

Appendix A

Agency Correspondence



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September 27, 2018

Carmen Corvalan
Ministry of Transportation, Ontario
159 Sir William Hearst Ave
Toronto, Ontario, M3M 0B7

Dear Ms. Corvalan:

SCOPE OF WORK FOR TRANSPORTATION IMPACT AND PARKING STUDY FOR PROPOSED DEVELOPMENT AT 1161-1167 NORTH SHORE BLVD, BURLINGTON, ON

1. Introduction

This letter provides our proposed scope of work for a transportation and parking study for the proposed seniors living campus at 1161-1167 North Shore Boulevard in the City of Burlington, Ontario. The subject site is located along North Shore Boulevard immediately northeast of the North Shore Boulevard / Queen Elizabeth Way (QEW) east ramp terminal intersection.

This transportation impact study component will examine the proposed development's anticipated impact on the study area's traffic operations and identify any necessary road improvements required to accommodate the generated traffic. The parking study component will review the proposed development's anticipated parking demand and propose a Zoning By-law parking requirement variance, if warranted.

2. Scope of Work

The proposed scope of work, outlined in this section, was developed based on the MTO Traffic Impact Study Guidelines.

Transportation Impact Study

1. **Development Study Area:** We will comment on existing transportation facilities within 500 metres of the subject site. Existing key roadways, major intersections, transit services, and pedestrian facilities will be discussed, as appropriate.
2. **Analysis Time Periods and Intersections:** Based on the proposed development's land use, size, and proximity to the QEW highway, we plan to analyze the following intersections during the AM peak period (between 7:30 AM - 10:00 AM), PM peak period (5:00 PM - 7:00 PM), and Saturday peak period (11:00 AM - 4:00 PM):
 - North Shore Boulevard East / Queen Elizabeth Way West Ramp Terminal;
 - North Shore Boulevard East / Queen Elizabeth Way East Ramp Terminal;
 - North Shore Boulevard East / Existing Site Driveway;
 - North Shore Boulevard East / Joseph Brant Hospital; and
 - North Shore Boulevard East / Lakeshore Road and Maple Avenue.

Carmen Corvalan – September 27, 2018

3. **2018 Existing Conditions:** Traffic counts at the study area intersections will be obtained through the City of Burlington and MTO, if available. If up-to-date (within the past 2 years) turning movement counts are not readily available for these intersections, new turning movement counts will be collected. The 2018 existing traffic operations at the aforementioned intersections will be analyzed using the software program Synchro (version 9) for the weekday AM, PM, and Saturday peak hours.
4. **2023, 2028, 2033 Future Background Traffic Conditions:** The background traffic volumes will be determined for the study area intersections, coinciding with the years of full build-out (2023), five years, and ten years after the estimated occupancy date for the site (i.e. 2028 and 2033, respectively). We will identify an applicable background traffic growth rate and other area developments that may introduce traffic into the study area, based on discussions with the City and MTO. Planned road improvements and other approved developments within close proximity will be taken into consideration. The 2023, 2028, and 2033 background traffic operations will be analyzed for the weekday AM, PM, and Saturday peak hours.
5. **Site Traffic Generation and Trip Distribution:** The size and nature of the proposed subject site will be documented based on the received site drawings and statistics, and will be used to estimate the number of automobile and non-automobile trips likely to be produced during the weekday AM, PM, and Saturday peak hours. The estimation will be based on information from the Institute of Transportation Engineers (ITE) publication, *Trip Generation, 9th Edition*.

The trip distribution for the proposed site will be based on a review of the 2011 Transportation Tomorrow Survey (TTS).

The forecast site traffic for the development will be added to the road network based on the trip distribution, and assigned to the network based on existing travel patterns, logical travel routes, and available traffic capacity.
6. **2023, 2028, 2033 Future Total Traffic Conditions:** The estimated site traffic volumes will be combined with the future background traffic volumes to determine the 2023, 2028, and 2033 total traffic volumes for the study area intersections. Intersection operations analysis will be undertaken for the weekday AM, PM, and Saturday peak hours. Any necessary road improvements required to accommodate total traffic volumes will be identified if necessary, such as additional turning lanes, storage length modifications, intersection reconfigurations, signal timing adjustments, and signal installation.
7. **Traffic Signal Warrant Analysis:** Ontario Traffic Manual (OTM) Book 12 will be referenced with regards to signal warrant guidelines to determine if the installation of a traffic signal at the subject site access fronting North Shore Boulevard is currently required, and if one will be required in the future.
8. **Road Improvements (Left Turn Storage Lane):** An eastbound left turn storage lane assessment will be conducted to determine if eastbound site traffic volumes entering the site from North Shore Boulevard will be high enough to warrant the extension of existing left turn storage provisions upon full buildout of the subject site. The assessment will be based on the methodology outlined in the Transportation Association of Canada (TAC) Geometric Design Guide.

Carmen Corvalan – September 27, 2018

Parking Study

1. **City of Burlington Zoning By-law Review:** The proposed development's parking requirements as per City of Burlington Zoning By-law 2020 will be determined. The by-law parking requirement will be used as a baseline for comparison with the parking demand observed during the parking utilization survey.
2. **Parking Utilization Survey:** In order to estimate the proposed development's peak parking demand, parking utilization surveys will be conducted at one proxy site of similar nature to the proposed development. The proxy site will be identified through discussions with Burlington staff. The parking utilization surveys will take place on:
 - One weekday (Tuesday, Wednesday, or Thursday) from 8:00 AM to 6:00 PM; and
 - One Saturday from 9:00 AM to 6:00 PM.

These survey times represent the anticipated peak conditions at the proposed seniors living campus development. The parking surveys will record parking demand on the site every 30 minutes.

3. **Parking Demand Review:** Using the observed parking rate obtained from the proxy site survey data, a parking rate will be recommended that is deemed applicable to the subject site. The recommended rate will then be used to estimate the number of parking spaces needed to meet the projected parking demand.

The estimated parking supply needed will be compared to the By-law required supply to assess the feasibility of providing less than the By-law supply requirements. In the event that the parking review determines that a parking reduction cannot be justified, the report will speak to this point.

Hugo Chan

From: Polus, Asia (MTO) <Asia.Polus@ontario.ca>
Sent: Monday, April 23, 2018 12:51 PM
To: Attila Hertel
Cc: McBride, Connor (MTO); Singh, Christian (MTO); Lawrence, Morgan (MTO)
Subject: FW: 1161-1167 North Short Blvd Proposed Development
Attachments: TTP_1161-1167NorthShoreBlvd Scope of Work_2018-04-10_MTO.DOCX

Hi Attila,

Further to your request please note that your "Scope of Work" for the TIS (attached above) was reviewed and the ministry has the following comments to offer:

- Our Traffic Office has reviewed all locations/intersections which were listed to be included in your analysis and please note that we do not require any other/additional locations to be included
- Please be advised that the section of North Shore Blvd within the CAH limits is under MTO's control. Therefore, any geometric changes proposed to the road (e.g. traffic lane configurations or widths, cycling lanes, turning lanes, etc.) which encroach into CAH lands must meet or exceed the requirements of the TAC Geometric Design Guide for Canadian Roads in addition to any requirements of MTO's TAC Geometric Design Supplement.

In addition I am including the general requirements for the future submission regarding any development proposal for this land:

- The owner should be aware that MTO requires a full submission in order to complete the technical review of the proposal and subsequently provide more specific comments related to the development.
- As a part of the Site Plan review and approval process the owner will be required to submit a Site Grading/Site Servicing plan, Stormwater Management Report and Traffic Impact Study Report. **In addition, please note that the drainage submission must also be provided in a digital format (CD, DVD or storage device).**
- MTO Building and Land Use permits are required prior to any grading/construction activity within 45m of QEW limits, or within 395m radius of centrepont of QEW and North Short Blvd. All above and below ground structures (including but not limited to, fire routes, stormwater management facilities and servicing/utilities) must be setback a minimum of 14m from all MTO property limits. The 14m setback from the ministry ROW must be clearly indicated on all plans submitted for our review.
- Furthermore, the ministry would like to see a lighting plan and report for the site. The MTO will only accept plan in LUX unit. Also, the Hwy property limits must be clearly defined so that our electrical office can verify the amount of acceptable light trespass on the Hwy ROW.
- In general, required parking must be setback a minimum of 14m from the QEW property limits. The Ministry will only allow surplus parking to be located within the 14m setback limit. Surplus parking must be labelled as "surplus" on the site plan.
- As part of the review and approval process the applicant will be required to submit 3 copies of all required documentation. All plans and reports must be stamped and signed, and circulated to the MTO through municipal site plan application process for a formal review and comments.
- The ministry controls all signage within 400m of any provincial highway ROW.
- We would request that all signage issues be kept as a separate entity from the site plan approval process, however, if the proponent prefer to have all signage approved as part of the site plan approval process, then all details regarding signage must be submitted to this ministry.
- Any proposed sign shall be located at min of 3m setback.

I trust that the above is clear and satisfactory.

If you require any additional clarification do not hesitate to call Connor or me.

The full package of the development proposal has to be sent to Connor attention through the City of Burlington to make sure that the both agencies are reviewing the same package.

Best Regards

W. Asia Polus

Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
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Fax 416 - 235-4267



From: Attila Hertel [<mailto:attila.hertel@IBIGroup.com>]
Sent: April 10, 2018 11:27 AM
To: Corvalan, Carmen (MTO)
Cc: Hugo Chan
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Good morning Carmen

Thank you for taking my call this morning. As discussed, please find attached the proposed scope of work document for the proposed seniors living campus at 1161-1167 North Short Blvd in Burlington for MTO review. As a note, we've been in touch with Burlington who have reviewed and approved the scope.

Kind Regards

- Attila

From: Attila Hertel
Sent: Thursday, April 5, 2018 11:51 AM
To: 'carmen.corvalan@ontario.ca'
Cc: Hugo Chan
Subject: 1161-1167 North Short Blvd Proposed Development

Good morning Carmen

My name is Attila Hertel. I work for IBI Group who has been retained by Amico Properties to prepare the traffic impact and parking study for the proposed seniors living campus at 1161-1167 North Short Blvd in Burlington. I received an out of office notification from Connor McBride (who I believe is our client's MTO contact) to direct all inquires to you.

I wanted to touch base to confirm to project scope and methodology. If I provided a scope of work document, could you review, provide comments, and approve?

Thank you

Attila Hertel

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tel +1 416 596 1930 ext 61263 fax +1 416 596 0644

Hugo Chan

From: Polus, Asia (MTO) <Asia.Polus@ontario.ca>
Sent: Friday, June 01, 2018 8:21 AM
To: Hugo Chan
Cc: Attila Hertel; McBride, Connor (MTO)
Subject: RE: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Categories: Green Category

Hi Hugo,

Please note that today Connor is away from the office therefore I am sending our Traffic Office clarifications on his behalf.

Below are MTO comments/clarifications in red.

3. Synchro Parameters which should be considered:

- a. Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit SFR study for the ministry review;
 - Do you require the SFR study to take place for the same length of time as the turning movement count data collection, or only one hour sample for each peak period is sufficient? **SFR study may be completed with 1 hr samples for each peak period.**
 - i.e. AM peak period (between 7:30 AM - 10:00 AM), PM peak period (5:00 PM - 7:00 PM), and Saturday peak period (11:00 AM - 4:00 PM):
- c. Please include results of 95th queue lengths from Sim Traffic analysis within the report. SimTraffic model should be calibrated as per the existing before using it for analysis of any future scenario;
 - Please clarify the required models parameters of the SimTraffic study, with regards to # of runs required, seed time, and study area. **The analysis should be carried out with 10min seeding and 60 min recording for at least 3 iterations.**
 - o Is the SimTraffic study area limited to the 2 ramp terminals, or all 5 intersections required? **Please include all 5 intersections in SimTraffic Study Area**
 - What are the calibration targets for the 95th percentile queues? E.g. Are SimTraffic 95th percentile queues for the existing conditions model to be within 10% of Synchro existing condition 95th percentile queues? Are there other SimTraffic calibration targets required? **Calibration targets for Sim traffic 95th percentile queues should be within 10% of synchro existing conditions.**
- d. For Synchro Analysis, value of lost time adjustment should be observed from the field as per the existing condition, and use it for existing as well as for all future scenarios;
 - Do you require the lost time study to take place for the same length of time as the turning movement count data collection, or only 30 min sample for each peak period?
30 min sample of each peak period is sufficient enough for study.

- Do you require field collection for **both** start-up lost time and clearance lost time values? Reference material has indicated that clearance lost time is often not observable and is typically determined by adding yellow + allred times. **Complete field collection for start-up lost time.**
- Is there a MTO approved methodology for obtaining lost time adjustment values in the field? Our traffic surveyor is requesting clarification prior to starting the survey. **There is no MTO approved methodology for obtaining lost time adjustment values, please compare values in HCM.**

I trust that the above is clear however if you have any questions, please feel free to ask.

Regards

W. Asia Polus

Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
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From: Hugo Chan [mailto:hugo.chan@ibigroup.com]
Sent: May-28-18 3:56 PM
To: McBride, Connor (MTO)
Cc: Polus, Asia (MTO); Attila Hertel
Subject: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Hi Connor,

I am working with Attila for the 1161-1167 North Shore Blvd TIS. May I ask for clarifications for the following items:

3. Synchro Parameters which should be considered:

- Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit SFR study for the ministry review;
 - Do you require the SFR study to take place for the same length of time as the turning movement count data collection, or only one hour sample for each peak period is sufficient?
 - i.e. AM peak period (between 7:30 AM - 10:00 AM), PM peak period (5:00 PM - 7:00 PM), and Saturday peak period (11:00 AM - 4:00 PM):
- Please include results of 95th queue lengths from Sim Traffic analysis within the report. SimTraffic model should be calibrated as per the existing before using it for analysis of any future scenario;
 - Please clarify the required models parameters of the SimTraffic study, with regards to # of runs required, seed time, and study area.
 - o Is the SimTraffic study area limited to the 2 ramp terminals, or all 5 intersections required?

- What are the calibration targets for the 95th percentile queues? E.g. Are SimTraffic 95th percentile queues for the existing conditions model to be within 10% of Synchro existing condition 95th percentile queues? Are there other SimTraffic calibration targets required?
- d. For Synchro Analysis, value of lost time adjustment should be observed from the field as per the existing condition, and use it for existing as well as for all future scenarios;
- Do you require the lost time study to take place for the same length of time as the turning movement count data collection, or only 30 min sample for each peak period?
 - Do you require field collection for **both** start-up lost time and clearance lost time values? Reference material has indicated that clearance lost time is often not observable and is typically determined by adding yellow + allred times.
 - Is there a MTO approved methodology for obtaining lost time adjustment values in the field? Our traffic surveyor is requesting clarification prior to starting the survey.

Thanks for your help,

Hugo Chan

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From: Polus, Asia (MTO) [mailto:Asia.Polus@ontario.ca]
Sent: Thursday, May 24, 2018 1:14 PM
To: Attila Hertel <attila.hertel@IBIGroup.com>
Cc: McBride, Connor (MTO) <Connor.McBride@ontario.ca>; Singh, Christian (MTO) <Christian.Singh@ontario.ca>; Lawrence, Morgan (MTO) <Morgan.Lawrence@ontario.ca>
Subject: RE: 1161-1167 North Short Blvd Proposed Development
Importance: High

Hi Attila,

Further to our yesterday meeting please note that as we have received more detailed information regarding the development proposal, our Traffic Office for a second time has reviewed your previously provided "Scope of Work" for the TIS and the following are updated comments:

- 1) Identify Type of Land Use from ITE Trip Generation Manual prior to completing TIS;
- 2) Proposed Development Access concerns and additional analysis required to be addressed in TIS:
 - a. Determine if Northshore Rd EB left turn traffic requires a left turn storage lane or access from development might be require Right In or Right Out restrictions;
 - b. Investigate the possibility of a shared access from an adjacent property;

- c. Access to development is in close proximity to QEW/North Shore Rd East Ramp Terminal, please ensure alternatives methods of accessing the development are considered to ensure unsafe lane manoeuvres with the off ramp are not promoted.

3) Synchro Parameters which should be considered:

- a. Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit SFR study for the ministry review;
- b. Please calculate PHF value from existing volume counts and use it within the analysis for existing as well as for all the future scenarios. Use of PHF=1 value within the analysis is not recommended;
- c. Please include results of 95th queue lengths from Sim Traffic analysis within the report. SimTraffic model should be calibrated as per the existing before using it for analysis of any future scenario;
- d. For Synchro Analysis, value of lost time adjustment should be observed from the field as per the existing condition, and use it for existing as well as for all future scenarios;
- e. Ministry recommends use of 2% growth rate for traffic at all the ramp terminals within the analysis limits; otherwise, please justify use of any other value;
- f. As outlined in MTO guidelines for Traffic impact studies, v/c ratio of 0.75 for ramp approaches and 0.85 for others are deemed to be critical in terms of operations and considered for geometric improvements. In report please provide recommendations for improvements if required by existing or any future scenario.

In addition I have attached the TMCs which you have requested yesterday.

I trust that the above is clear, however if you have any questions please feel free to ask Connor McBride, included in this e-mail, and he may be reached at 416-235-5383 or me.

Regards

W. Asia Polus
Corridor Management Planner

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- Furthermore, the ministry would like to see a lighting plan and report for the site. The MTO will only accept plan in LUX unit. Also, the Hwy property limits must be clearly defined so that our electrical office can verify the amount of acceptable light trespass on the Hwy ROW.
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Sent: April 10, 2018 11:27 AM
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Cc: Hugo Chan
Subject: RE: 1161-1167 North Short Blvd Proposed Development

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Kind Regards

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From: Attila Hertel
Sent: Thursday, April 5, 2018 11:51 AM
To: 'carmen.corvalan@ontario.ca'
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Thank you

Attila Hertel

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Hugo Chan

From: Polus, Asia (MTO) <Asia.Polus@ontario.ca>
Sent: Thursday, June 07, 2018 2:28 PM
To: Hugo Chan
Cc: Attila Hertel; McBride, Connor (MTO)
Subject: RE: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Categories: Green Category

Hi Hugo,

Your request was reviewed by our MTO's Traffic Expert and he has no further comments in regards yours methodology for obtaining lost time and the times when you will be collecting the information.

Regards

W. Asia Polus
Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
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From: Hugo Chan [mailto:hugo.chan@ibigroup.com]
Sent: June-07-18 10:36 AM
To: Polus, Asia (MTO)
Cc: Attila Hertel; McBride, Connor (MTO)
Subject: RE: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Hello Asia,

For Item 3 (d), can you confirm if you agree with my proposed field survey methodology to collect start up lost time data, based on the HCM 2010 methodology?

- 30 min interval: Weekday AM (8:30-9:00), Weekday PM (5:00-5:30), Saturday (12:00-12:30)
- For each direction's cycle during a 30 min interval, surveyor will collect start up lost time, t_i , (s) for the first 4 cars in the queue, as per HCM2010 manual Exhibit 4-6, Exhibit 4-7, and Equation 4-9.
 - o 1st headway will be measured as time elapsed between onset of green phase and time taken for front wheels of vehicle #1 to pass stop bar.
 - o 2nd headway will be time elapsed between onset of green phase and time taken for front wheels of vehicle #2 to pass stop bar.

- 3rd and 4th headway will be similarly measured.
- Total start-up lost time for a cycle will be the summation of the first 4 vehicle start-up lost times.
- For the Synchro model, start-up lost time will be calculated as the 85th percentile of the surveyed total start-up lost times obtained during the 30 min survey time.

Thanks,

Hugo Chan

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Sent: Friday, June 01, 2018 8:21 AM
To: Hugo Chan <hugo.chan@ibigroup.com>
Cc: Attila Hertel <attila.hertel@IBIGroup.com>; McBride, Connor (MTO) <Connor.McBride@ontario.ca>
Subject: RE: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Hi Hugo,

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Below are MTO comments/clarifications in red.

3. Synchro Parameters which should be considered:

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- What are the calibration targets for the 95th percentile queues? E.g. Are SimTraffic 95th percentile queues for the existing conditions model to be within 10% of Synchro existing condition 95th percentile queues? Are there other SimTraffic calibration targets required? **Calibration targets for Sim traffic 95th percentile queues should be within 10% of synchro existing conditions.**

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30 min sample of each peak period is sufficient enough for study.

- Do you require field collection for **both** start-up lost time and clearance lost time values? Reference material has indicated that clearance lost time is often not observable and is typically determined by adding yellow + allred times. **Complete field collection for start-up lost time.**
- Is there a MTO approved methodology for obtaining lost time adjustment values in the field? Our traffic surveyor is requesting clarification prior to starting the survey. **There is no MTO approved methodology for obtaining lost time adjustment values, please compare values in HCM.**

I trust that the above is clear however if you have any questions, please feel free to ask.

Regards

W. Asia Polus

Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
159 Sir William Hearst Ave. 7th Floor
Toronto, ON M3M 0B7
Tel. 416 - 235-3991
Fax 416 - 235-4267



From: Hugo Chan [<mailto:hugo.chan@ibigroup.com>]

Sent: May-28-18 3:56 PM

To: McBride, Connor (MTO)

Cc: Polus, Asia (MTO); Attila Hertel

Subject: Request for clarification: RE: 1161-1167 North Shore Blvd Proposed Development

Hi Connor,

I am working with Attila for the 1161-1167 North Shore Blvd TIS. May I ask for clarifications for the following items:

3. Synchro Parameters which should be considered:

- a. Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit SFR study for the ministry review;

- Do you require the SFR study to take place for the same length of time as the turning movement count data collection, or only one hour sample for each peak period is sufficient?
 - i.e. AM peak period (between 7:30 AM - 10:00 AM), PM peak period (5:00 PM - 7:00 PM), and Saturday peak period (11:00 AM - 4:00 PM):
- c. Please include results of 95th queue lengths from Sim Traffic analysis within the report. SimTraffic model should be calibrated as per the existing before using it for analysis of any future scenario;
- Please clarify the required models parameters of the SimTraffic study, with regards to # of runs required, seed time, and study area.
 - o Is the SimTraffic study area limited to the 2 ramp terminals, or all 5 intersections required?
 - What are the calibration targets for the 95th percentile queues? E.g. Are SimTraffic 95th percentile queues for the existing conditions model to be within 10% of Synchro existing condition 95th percentile queues? Are there other SimTraffic calibration targets required?
- d. For Synchro Analysis, value of lost time adjustment should be observed from the field as per the existing condition, and use it for existing as well as for all future scenarios;
- Do you require the lost time study to take place for the same length of time as the turning movement count data collection, or only 30 min sample for each peak period?
 - Do you require field collection for **both** start-up lost time and clearance lost time values? Reference material has indicated that clearance lost time is often not observable and is typically determined by adding yellow + allred times.
 - Is there a MTO approved methodology for obtaining lost time adjustment values in the field? Our traffic surveyor is requesting clarification prior to starting the survey.

Thanks for your help,

Hugo Chan

IBI GROUP

7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 905 763 2322 ext 63421 fax +1 416 596 0644



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From: Polus, Asia (MTO) [<mailto:Asia.Polus@ontario.ca>]

Sent: Thursday, May 24, 2018 1:14 PM

To: Attila Hertel <attila.hertel@IBIGroup.com>

Cc: McBride, Connor (MTO) <Connor.McBride@ontario.ca>; Singh, Christian (MTO) <Christian.Singh@ontario.ca>; Lawrence, Morgan (MTO) <Morgan.Lawrence@ontario.ca>

Subject: RE: 1161-1167 North Short Blvd Proposed Development

Importance: High

Hi Attila,

Further to our yesterday meeting please note that as we have received more detailed information regarding the development proposal, our Traffic Office for a second time has reviewed your previously provided "Scope of Work" for the TIS and the following are updated comments:

- 1) Identify Type of Land Use from ITE Trip Generation Manual prior to completing TIS;
- 2) Proposed Development Access concerns and additional analysis required to be addressed in TIS:
 - a. Determine if Northshore Rd EB left turn traffic requires a left turn storage lane or access from development might be require Right In or Right Out restrictions;
 - b. Investigate the possibility of a shared access from an adjacent property;
 - c. Access to development is in close proximity to QEW/North Shore Rd East Ramp Terminal, please ensure alternatives methods of accessing the development are considered to ensure unsafe lane manoeuvres with the off ramp are not promoted.
- 3) Synchro Parameters which should be considered:
 - a. Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit SFR study for the ministry review;
 - b. Please calculate PHF value from existing volume counts and use it within the analysis for existing as well as for all the future scenarios. Use of PHF=1 value within the analysis is not recommended;
 - c. Please include results of 95th queue lengths from Sim Traffic analysis within the report. SimTraffic model should be calibrated as per the existing before using it for analysis of any future scenario;
 - d. For Synchro Analysis, value of lost time adjustment should be observed from the field as per the existing condition, and use it for existing as well as for all future scenarios;
 - e. Ministry recommends use of 2% growth rate for traffic at all the ramp terminals within the analysis limits; otherwise, please justify use of any other value;
 - f. As outlined in MTO guidelines for Traffic impact studies, v/c ratio of 0.75 for ramp approaches and 0.85 for others are deemed to be critical in terms of operations and considered for geometric improvements. In report please provide recommendations for improvements if required by existing or any future scenario.

In addition I have attached the TMCs which you have requested yesterday.

I trust that the above is clear, however if you have any questions please feel free to ask Connor McBride, included in this e-mail, and he may be reached at 416-235-5383 or me.

Regards

W. Asia Polus
Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
159 Sir William Hearst Ave. 7th Floor
Toronto, ON M3M 0B7
Tel. 416 - 235-3991
Fax 416 - 235-4267



From: Polus, Asia (MTO)
Sent: April-23-18 12:51 PM
To: 'attila.hertel@IBIGroup.com'
Cc: McBride, Connor (MTO); Singh, Christian (MTO); Lawrence, Morgan (MTO)
Subject: FW: 1161-1167 North Short Blvd Proposed Development

Hi Attila,

Further to your request please note that your "Scope of Work" for the TIS (attached above) was reviewed and the ministry has the following comments to offer:

- Our Traffic Office has reviewed all locations/intersections which were listed to be included in your analysis and please note that we do not require any other/additional locations to be included
- Please be advised that the section of North Shore Blvd within the CAH limits is under MTO's control. Therefore, any geometric changes proposed to the road (e.g. traffic lane configurations or widths, cycling lanes, turning lanes, etc.) which encroach into CAH lands must meet or exceed the requirements of the TAC Geometric Design Guide for Canadian Roads in addition to any requirements of MTO's TAC Geometric Design Supplement.

In addition I am including the general requirements for the future submission regarding any development proposal for this land:

- The owner should be aware that MTO requires a full submission in order to complete the technical review of the proposal and subsequently provide more specific comments related to the development.
- As a part of the Site Plan review and approval process the owner will be required to submit a Site Grading/Site Servicing plan, Stormwater Management Report and Traffic Impact Study Report. **In addition, please note that the drainage submission must also be provided in a digital format (CD, DVD or storage device).**
- MTO Building and Land Use permits are required prior to any grading/construction activity within 45m of QEW limits, or within 395m radius of centrepont of QEW and North Short Blvd. All above and below ground structures (including but not limited to, fire routes, stormwater management facilities and servicing/utilities) must be setback a minimum of 14m from all MTO property limits. The 14m setback from the ministry ROW must be clearly indicated on all plans submitted for our review.
- Furthermore, the ministry would like to see a lighting plan and report for the site. The MTO will only accept plan in LUX unit. Also, the Hwy property limits must be clearly defined so that our electrical office can verify the amount of acceptable light trespass on the Hwy ROW.
- In general, required parking must be setback a minimum of 14m from the QEW property limits. The Ministry will only allow surplus parking to be located within the 14m setback limit. Surplus parking must be labelled as "surplus" on the site plan.
- As part of the review and approval process the applicant will be required to submit 3 copies of all required documentation. All plans and reports must be stamped and signed, and circulated to the MTO through municipal site plan application process for a formal review and comments.
- The ministry controls all signage within 400m of any provincial highway ROW.
- We would request that all signage issues be kept as a separate entity from the site plan approval process, however, if the proponent prefer to have all signage approved as part of the site plan approval process, then all details regarding signage must be submitted to this ministry.
- Any proposed sign shall be located at min of 3m setback.

I trust that the above is clear and satisfactory.

If you require any additional clarification do not hesitate to call Connor or me.

The full package of the development proposal has to be sent to Connor attention through the City of Burlington to make sure that the both agencies are reviewing the same package.

Best Regards

W. Asia Polus

Corridor Management Planner

Ministry of Transportation
Central Region, Highway Corridor Management Section
159 Sir William Hearst Ave. 7th Floor
Toronto, ON M3M 0B7
Tel. 416 - 235-3991
Fax 416 - 235-4267



From: Attila Hertel [<mailto:attila.hertel@IBIGroup.com>]
Sent: April 10, 2018 11:27 AM
To: Corvalan, Carmen (MTO)
Cc: Hugo Chan
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Good morning Carmen

Thank you for taking my call this morning. As discussed, please find attached the proposed scope of work document for the proposed seniors living campus at 1161-1167 North Short Blvd in Burlington for MTO review. As a note, we've been in touch with Burlington who have reviewed and approved the scope.

Kind Regards

- Attila

From: Attila Hertel
Sent: Thursday, April 5, 2018 11:51 AM
To: 'carmen.corvalan@ontario.ca'
Cc: Hugo Chan
Subject: 1161-1167 North Short Blvd Proposed Development

Good morning Carmen

My name is Attila Hertel. I work for IBI Group who has been retained by Amico Properties to prepare the traffic impact and parking study for the proposed seniors living campus at 1161-1167 North Short Blvd in Burlington. I received an out of office notification from Connor McBride (who I believe is our client's MTO contact) to direct all inquires to you.

I wanted to touch base to confirm to project scope and methodology. If I provided a scope of work document, could you review, provide comments, and approve?

Thank you

Attila Hertel

IBI GROUP

Hugo Chan

From: Lucas, Steve <Steve.Lucas@burlington.ca>
Sent: Thursday, July 12, 2018 4:14 PM
To: Hugo Chan
Cc: Attila Hertel; Edgcumbe, Kaylan; Ozimkovic , Danijel
Subject: RE: background developments and traffic growth rate request RE: 1161-1167 North Short Blvd Proposed Development

Categories: Green Category

Hello Hugo,

With regards to the background traffic growth rate, we will require a rate of 1.1%. The back ground developments which would potentially impact your site can be found at the following links:

<https://www.burlington.ca/en/services-for-you/490---492-Brock-Ave---1298-Ontario-St.asp>

<https://www.burlington.ca/en/services-for-you/markay-homes---1159-bellview-crescent.asp>

For further details on projects occurring in the area you can find them here:

<https://www.burlington.ca/en/services-for-you/current-development-projects.asp>

Thank you,

Steve Lucas

City of Burlington | Transportation Planning Technologist
t: 905.335.7671 ext.7691 | e: steve.lucas@burlington.ca

From: Hugo Chan [mailto:hugo.chan@ibigroup.com]
Sent: Thursday, July 12, 2018 1:59 PM
To: Lucas, Steve
Cc: Attila Hertel; Edgcumbe, Kaylan; Ozimkovic , Danijel
Subject: background developments and traffic growth rate request RE: 1161-1167 North Short Blvd Proposed Development

Hi Steve,

Regarding the 1161-1167 North Shore Proposed Development, thank you for approving the scope of work.

Regarding the future background conditions in the study area as per the scope of work, can you please:

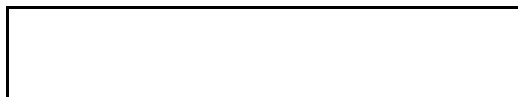
- Provide a background traffic growth rate for 2023, 2028, and 2033, for the adjacent corridors, namely North Shore Blvd east-west, and Maple/Lakeshore north-south?
- Provide background developments scheduled to be completed by 2023, 2028, and 2033 that would generated traffic in the study area?

Thanks in advance,

Hugo Chan

IBI GROUP

7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 905 763 2322 ext 63421



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From: Lucas, Steve [<mailto:Steve.Lucas@burlington.ca>]
Sent: Monday, April 9, 2018 11:35 AM
To: Attila Hertel
Cc: Ozimkovic , Danijel; Edgcumbe, Kaylan
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Hello Attila,

Thank you for getting in touch with us with regards to your scope of work. Based on what was provided to us, we are satisfied with your proposed scope of work, and look forward to the results of your study.

Regards,

Steve Lucas
City of Burlington | Transportation Planning Technologist
t: 905.335.7671 ext.7691 | e: steve.lucas@burlington.ca

From: Attila Hertel [<mailto:attila.hertel@IBIGroup.com>]
Sent: Friday, April 06, 2018 1:16 PM
To: Edgcumbe, Kaylan
Cc: Ozimkovic , Danijel; Lucas, Steve
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Thank you for the quick responses and the introduction.

Danijel and Steve, please find attached the proposed scope of work. Feel free to contact me with any questions or concerns. My number is at the office is 416 596 1930 ext 61263.
Note that we are contacting the MTO to obtain their approval concurrently.

Regards

- Attila

From: Edgcumbe, Kaylan [<mailto:Kaylan.Edgcumbe@burlington.ca>]
Sent: Thursday, April 5, 2018 2:36 PM
To: Attila Hertel
Cc: Ozimkovic , Danijel; Lucas, Steve
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Hi Attila,

Please provide your proposed scope of work to Dan Ozimkovic and Steve Lucas (CC'd above) for our review and comment.

If you have any questions, please contact Dan directly at 905-335-7600 ext. 7485

Thanks,

Kaylan

Kaylan Edgcumbe, C.E.T.
Manager, Transportation Planning and Parking
Transportation Services Department

From: Minaji, Rosalind
Sent: Thursday, April 05, 2018 2:34 PM
To: 'Attila Hertel' <attila.hertel@IBIGroup.com>
Cc: Edgcumbe, Kaylan <Kaylan.Edgcumbe@burlington.ca>; Ozimkovic, Danijel <Danijel.Ozimkovic@burlington.ca>
Subject: RE: 1161-1167 North Short Blvd Proposed Development

Hi Attila:

Our Transportation Services Department would be happy to provide feedback on the scope of work for the parking component of the TIS. I suggested to Hugo Chan that the MTO be consulted about the transportation component before the scope of work is prepared.

Thank you.

-Rosalind

Rosalind Minaji MCIP RPP
Coordinator of Development Review
Department of City Building | Planning Section
City of Burlington
426 Brant Street, Burlington L7R 3Z6
Phone: 905-335-7600 Ext. 7809
Fax: 905-335-7880
Email: rosalind.minaji@burlington.ca

From: Attila Hertel [<mailto:attila.hertel@IBIGroup.com>]
Sent: Thursday, April 05, 2018 2:06 PM
To: Minaji, Rosalind
Subject: 1161-1167 North Short Blvd Proposed Development

Good morning Rosalind

My name is Attila and I work for IBI Group. I just left you a voicemail regarding the 1161-1167 North Short Blvd proposed retirement development. I believe you've been in touch with my colleague (Hugo Chan) regarding the traffic component, for which comments were deferred until the MTO has approved. However, I wanted to touch base to confirm to parking component's scope and methodology. If I provided a scope of work document, could you review, provide comments, and approve?

Thank you
Regards

Attila Hertel

IBI GROUP

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Appendix B

Turning Movement Counts

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:30:00
To: 10:00:00

One Hour Peak

From: 8:00:00
To: 9:00:00

Municipality: Burlington
Site #: 1825400001
Intersection: North Shore Blvd E & Existing Site I
TFR File #: 1
Count date: 4-Jul-18

Weather conditions:
Person(s) who counted:

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

Major Road: North Shore Blvd E runs W/E

North Leg Total: 6
North Entering: 5
North Peds: 9
Peds Cross: \times

Heavys	0	0	0
Trucks	0	0	0
Cars	4	1	5
Totals	4	1	



Heavys	0
Trucks	0
Cars	1
Totals	1

East Leg Total: 1762
East Entering: 578
East Peds: 0
Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	27	555	582



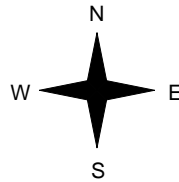
Existing Site Driveway



Cars	Trucks	Heavys	Totals
0	0	0	0
551	27	0	578
551	27	0	



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	0	1	1
0	33	1150	1183
0	33	1151	



North Shore Blvd E



Cars	Trucks	Heavys	Totals
1151	33	0	1184

Peds Cross: \times
West Peds: 0
West Entering: 1184
West Leg Total: 1766

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 17:00:00

To: 19:00:00

One Hour Peak

From: 17:00:00

To: 18:00:00

Municipality: Burlington
Site #: 1825400001
Intersection: North Shore Blvd E & Existing Site I
TFR File #: 1
Count date: 4-Jul-18

Weather conditions:
Person(s) who counted:

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

Major Road: North Shore Blvd E runs W/E

North Leg Total: 18

North Entering: 6

North Peds: 21

Peds Cross: \times

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



Heavys 0

Trucks 1

Cars 11

Totals 12

East Leg Total: 2129

East Entering: 1357

East Peds: 1

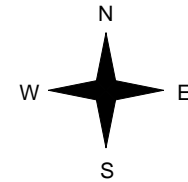
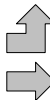
Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	18	1335	1353



North Shore Blvd E

Heavys	Trucks	Cars	Totals
0	0	5	5
0	11	759	770
0	11	764	



Existing Site Driveway



Cars	Trucks	Heavys	Totals
6	1	0	7
1331	18	0	1349
1338	19	0	

North Shore Blvd E



Cars	Trucks	Heavys	Totals
760	12	0	772

Peds Cross: \times
 West Peds: 0
 West Entering: 775
 West Leg Total: 2128

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1825400001
Intersection: North Shore Blvd E & Existing Site I
TFR File #: 1
Count date: 4-Jul-18

Weather conditions:
Person(s) who counted:

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

Major Road: North Shore Blvd E runs W/E

North Leg Total: 51
 North Entering: 30
 North Peds: 80
 Peds Cross: \times

Heavys	0	0	0
Trucks	0	1	1
Cars	16	13	29
Totals	16	14	



Heavys	1
Trucks	1
Cars	19
Totals	21

East Leg Total: 7585
 East Entering: 3527
 East Peds: 1
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	88	3443	3531



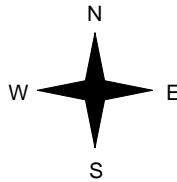
Existing Site Driveway



Cars	Trucks	Heavys	Totals
10	1	0	11
3427	88	0	3515
3438	89	0	



North Shore Blvd E



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	0	9	9
0	107	3937	4044
0	107	3946	



Cars	Trucks	Heavys	Totals
3950	108	0	4058

Peds Cross: \times
 West Peds: 1
 West Entering: 4053
 West Leg Total: 7584

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Existing Site													Count Date: 4-Jul-18		Municipality: Burlington	
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					
8:00:00	0	0	2	2	10	2	8:00:00	0	0	0	0	6				
9:00:00	1	0	4	5	9	5	9:00:00	0	0	0	0	10				
10:00:00	3	0	5	8	17	8	10:00:00	0	0	0	0	18				
17:00:00	0	0	0	0	0	0	17:00:00	0	0	0	0	0				
18:00:00	2	0	4	6	21	6	18:00:00	0	0	0	0	10				
19:00:00	8	0	1	9	23	10	19:00:00	0	1	0	1	9				
Totals:	14	0	16	30	80	31		0	1	0	1	53				
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					
8:00:00	0	310	0	310	0	834	8:00:00	0	524	0	524	0				
9:00:00	0	578	0	578	0	1762	9:00:00	1	1183	0	1184	0				
10:00:00	0	518	2	520	0	1394	10:00:00	0	874	0	874	0				
17:00:00	0	0	0	0	0	2	17:00:00	0	2	0	2	0				
18:00:00	1	1349	7	1357	1	2132	18:00:00	5	770	0	775	0				
19:00:00	0	760	2	762	0	1454	19:00:00	3	689	0	692	1				
Totals:	1	3515	11	3527	1	7578		9	4042	0	4051	1				
Calculated Values for Traffic Crossing Major Street																
Hours Ending:	0:00	0:00	8:00	9:00		10:00	17:00	18:00	19:00							
Crossing Values:	0	0	0	1		3	0	3	10							

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 11:00:00
To: 16:00:00

One Hour Peak

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

Municipality: Burlington
Site #: 1825400004
Intersection: North Shore Blvd E & Existing Site I
TFR File #: 2
Count date: 7-Jul-18

Weather conditions:
Person(s) who counted:

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

Major Road: North Shore Blvd E runs W/E

North Leg Total: 11
North Entering: 5
North Peds: 23
Peds Cross: \times

Heavys	0	0	0
Trucks	0	0	0
Cars	2	3	5
Totals	2	3	



Heavys	0
Trucks	0
Cars	6
Totals	6

East Leg Total: 2024
East Entering: 1053
East Peds: 0
Peds Cross: \times

Heavys	0
Trucks	10
Cars	1039
Totals	1049



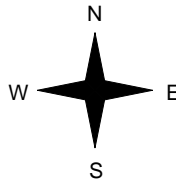
Existing Site Driveway



Cars	6	0	0	6
Trucks	1037	10	0	1047
Heavys	1043	10	0	
Totals				



North Shore Blvd E



Heavys	0	0	0	0
Trucks	0	11	957	968
Cars	0	11	957	
Totals				



North Shore Blvd E



Cars	960	11	0	971
Trucks				
Heavys				
Totals				

Peds Cross: \times
West Peds: 0
West Entering: 968
West Leg Total: 2017

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1825400004
Intersection: North Shore Blvd E & Existing Site I
TFR File #: 2
Count date: 7-Jul-18

Weather conditions:
Person(s) who counted:

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

Major Road: North Shore Blvd E runs W/E

North Leg Total: 54
 North Entering: 25
 North Peds: 129
 Peds Cross: \times

Heavys	0	0	0
Trucks	0	0	0
Cars	12	13	25
Totals	12	13	



Heavys	0
Trucks	0
Cars	29
Totals	29

East Leg Total: 9019
 East Entering: 4925
 East Peds: 4
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	47	4867	4914



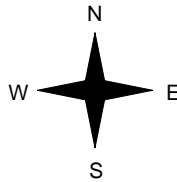
Existing Site Driveway



Cars	Trucks	Heavys	Totals
23	0	0	23
4855	47	0	4902
4878	47	0	



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	0	6	6
0	40	4041	4081
0	40	4047	



North Shore Blvd E



Cars	Trucks	Heavys	Totals
4054	40	0	4094

Peds Cross: \times
 West Peds: 1
 West Entering: 4087
 West Leg Total: 9001

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Existing Site														Count Date: 7-Jul-18		Municipality: Burlington	
North Approach Totals							South Approach Totals										
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	North/South Total Approaches	Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds					
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total						
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0					
12:00:00	2	0	4	6	29	6	12:00:00	0	0	0	0	37					
13:00:00	1	0	3	4	29	4	13:00:00	0	0	0	0	37					
14:00:00	2	0	2	4	29	4	14:00:00	0	0	0	0	28					
15:00:00	5	0	1	6	19	6	15:00:00	0	0	0	0	26					
16:00:00	3	0	2	5	23	5	16:00:00	0	0	0	0	15					
Totals:	13	0	12	25	129	25		0	0	0	0	143					
East Approach Totals							West Approach Totals										
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	East/West Total Approaches	Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds					
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total						
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0					
12:00:00	0	890	6	896	0	1547	12:00:00	0	651	0	651	0					
13:00:00	0	995	4	999	2	1770	13:00:00	1	770	0	771	0					
14:00:00	0	1015	3	1018	1	1860	14:00:00	2	840	0	842	1					
15:00:00	0	955	4	959	1	1814	15:00:00	3	852	0	855	0					
16:00:00	0	1047	6	1053	0	2020	16:00:00	0	967	0	967	0					
Totals:	0	4902	23	4925	4	9011		6	4080	0	4086	1					
Calculated Values for Traffic Crossing Major Street																	
Hours Ending:	0:00	0:00	11:00	12:00			13:00	14:00	15:00	16:00							
Crossing Values:	0	0	0	2			3	4	6	3							

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:30:00
To: 10:00:00

One Hour Peak

From: 8:00:00
To: 9:00:00

Municipality: Burlington
Site #: 1825400002
Intersection: North Shore Blvd E & Joseph Brant
TFR File #: 16
Count date: 4-Jul-18

Weather conditions:
Person(s) who counted:

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

Major Road: North Shore Blvd E runs W/E

North Leg Total: 48
North Entering: 26
North Peds: 19
Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	1	1
Cars	12	0	13	25
Totals	12	0	14	



Heavys	0
Trucks	1
Cars	21
Totals	22

East Leg Total: 1695
East Entering: 605
East Peds: 19
Peds Cross: \times

Heavys	Trucks	Cars	Totals
1	27	553	581

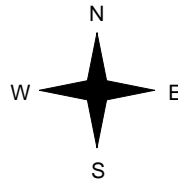


Condo Access

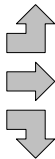
Cars	Trucks	Heavys	Totals
10	1	0	11
508	24	0	532
60	2	0	62
578	27	0	



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	0	11	11
0	31	1004	1035
0	2	144	146
0	33	1159	



North Shore Blvd E



Cars	Trucks	Heavys	Totals
1056	34	0	1090

Joseph Brant Hospital



Peds Cross: \times
West Peds: 4
West Entering: 1192
West Leg Total: 1773

Cars	204	Cars	33	0	39	72
Trucks	4	Trucks	3	0	2	5
Heavys	0	Heavys	1	0	0	1
Totals	208	Totals	37	0	41	



Peds Cross: \times
South Peds: 8
South Entering: 78
South Leg Total: 286

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 17:00:00

To: 19:00:00

One Hour Peak

From: 17:00:00

To: 18:00:00

Municipality: Burlington
Site #: 1825400002
Intersection: North Shore Blvd E & Joseph Brant
TFR File #: 16
Count date: 4-Jul-18

Weather conditions:
Person(s) who counted:

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

Major Road: North Shore Blvd E runs W/E

North Leg Total: 50
 North Entering: 18
 North Peds: 13
 Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	1	0	0	1
Cars	8	1	8	17
Totals	9	1	8	



Heavys	0
Trucks	0
Cars	32
Totals	32

East Leg Total: 2121
 East Entering: 1333
 East Peds: 5
 Peds Cross: \bowtie

Heavys	0
Trucks	19
Cars	1332
Totals	1351

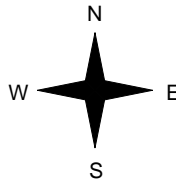


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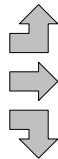
Cars	19	0	0	19
Trucks	1263	17	0	1280
Heavys	34	0	0	34
Totals	1316	17	0	



North Shore Blvd E



Heavys	0
Trucks	0
Cars	13
Totals	13
Heavys	0
Trucks	12
Cars	727
Totals	739
Heavys	0
Trucks	0
Cars	29
Totals	29
Heavys	0
Trucks	12
Cars	769
Totals	781



North Shore Blvd E



Cars	776	12	0	788
Trucks				
Heavys				
Totals				

Joseph Brant Hospital



Peds Cross: \bowtie
 West Peds: 2
 West Entering: 781
 West Leg Total: 2132

Cars	64	61	0	41	102
Trucks	0	1	0	0	1
Heavys	0	0	0	0	0
Totals	64	62	0	41	



Peds Cross: \bowtie
 South Peds: 9
 South Entering: 103
 South Leg Total: 167

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1825400002
Intersection: North Shore Blvd E & Joseph Brant
TFR File #: 16
Count date: 4-Jul-18

Weather conditions:
Person(s) who counted:

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

Major Road: North Shore Blvd E runs W/E

North Leg Total: 232
 North Entering: 123
 North Peds: 84
 Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	1	0	1	2
Cars	51	4	66	121
Totals	52	4	67	



Heavys	0
Trucks	2
Cars	107
Totals	109

East Leg Total: 7358
 East Entering: 3464
 East Peds: 47
 Peds Cross: \bowtie

Heavys	Trucks	Cars	Totals
1	89	3447	3537

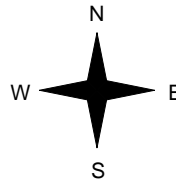


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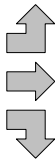
Cars	Trucks	Heavys	Totals
63	1	0	64
3141	80	0	3221
173	6	0	179
3377	87	0	



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	1	44	45
0	101	3570	3671
0	5	359	364
0	107	3973	



North Shore Blvd E



Cars	Trucks	Heavys	Totals
3788	106	0	3894

Peds Cross: \bowtie
 West Peds: 22
 West Entering: 4080
 West Leg Total: 7617

Cars	536	Cars	255	0	152	407
Trucks	11	Trucks	8	0	4	12
Heavys	0	Heavys	1	0	0	1
Totals	547	Totals	264	0	156	



Peds Cross: \bowtie
 South Peds: 54
 South Entering: 420
 South Leg Total: 967

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Joseph Brant Count Date: 4-Jul-18 Municipality: Burlington

North Approach Totals						South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	North/South Total Approaches	Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
8:00:00	8	0	3	11	12	86	8:00:00	58	0	17	75	3
9:00:00	14	0	12	26	19	104	9:00:00	37	0	41	78	8
10:00:00	26	3	20	49	22	127	10:00:00	41	0	37	78	24
17:00:00	0	0	0	0	0	0	17:00:00	0	0	0	0	0
18:00:00	8	1	9	18	13	121	18:00:00	62	0	41	103	9
19:00:00	11	0	8	19	18	105	19:00:00	66	0	20	86	10
Totals:	67	4	52	123	84	543		264	0	156	420	54
East Approach Totals						West Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	East/West Total Approaches	Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
8:00:00	27	250	4	281	12	805	8:00:00	2	428	94	524	3
9:00:00	62	532	11	605	19	1797	9:00:00	11	1035	146	1192	4
10:00:00	31	465	16	512	11	1400	10:00:00	10	816	62	888	10
17:00:00	0	0	0	0	0	0	17:00:00	0	0	0	0	0
18:00:00	34	1280	19	1333	5	2114	18:00:00	13	739	29	781	2
19:00:00	25	693	14	732	0	1425	19:00:00	9	651	33	693	3
Totals:	179	3220	64	3463	47	7541		45	3669	364	4078	22
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	8:00	9:00	10:00	17:00		18:00	18:00	19:00	19:00			
Crossing Values:	81	74	91	0		78	78	80	80			

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 11:00:00
To: 16:00:00

One Hour Peak

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

Municipality: Burlington
Site #: 1825400005
Intersection: North Shore Blvd E & Joseph Brant
TFR File #: 1
Count date: 7-Jul-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 94
North Entering: 48
North Peds: 15
Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	16	0	32	48
Totals	16	0	32	



Heavys	0
Trucks	0
Cars	46
Totals	46

East Leg Total: 2018
East Entering: 1031
East Peds: 7
Peds Cross: \times

Heavys	0
Trucks	11
Cars	1055
Totals	1066

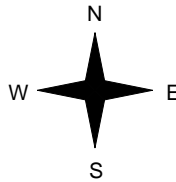


Condo Access

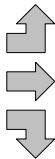
Cars	19	0	0	19
Trucks	966	9	0	975
Heavys	37	0	0	37
Totals	1022	9	0	



North Shore Blvd E



Heavys	0
Trucks	0
Cars	27
Totals	27
Heavys	0
Trucks	10
Cars	894
Totals	904
Heavys	0
Trucks	1
Cars	51
Totals	52
Heavys	0
Trucks	11
Cars	972
Totals	983



North Shore Blvd E



Cars	976	11	0	987
Trucks				
Heavys				
Totals				

Joseph Brant Hospital



Peds Cross: \times
West Peds: 3
West Entering: 983
West Leg Total: 2049

Cars	88	73	0	50	123
Trucks	1	2	0	1	3
Heavys	0	0	0	0	0
Totals	89	75	0	51	



Peds Cross: \times
South Peds: 12
South Entering: 126
South Leg Total: 215

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1825400005
Intersection: North Shore Blvd E & Joseph Brant
TFR File #: 1
Count date: 7-Jul-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 373
 North Entering: 171
 North Peds: 51
 Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	0	0	0	0
Cars	84	0	87	171
Totals	84	0	87	



Heavys	0
Trucks	0
Cars	202
Totals	202

East Leg Total: 9079
 East Entering: 4969
 East Peds: 26
 Peds Cross: \bowtie

Heavys	Trucks	Cars	Totals
0	49	4924	4973

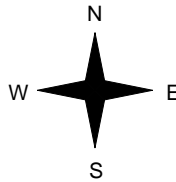


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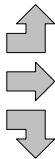
Cars	Trucks	Heavys	Totals
94	0	0	94
4673	46	0	4719
155	1	0	156
4922	47	0	



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	0	108	108
0	36	3820	3856
0	4	160	164
0	40	4088	



Joseph Brant Hospital



North Shore Blvd E



Cars	Trucks	Heavys	Totals
4073	37	0	4110

Peds Cross: \bowtie
 West Peds: 9
 West Entering: 4128
 West Leg Total: 9101

Cars	315	Cars	167	0	166	333
Trucks	5	Trucks	3	0	1	4
Heavys	0	Heavys	0	0	0	0
Totals	320	Totals	170	0	167	



Peds Cross: \bowtie
 South Peds: 50
 South Entering: 337
 South Leg Total: 657

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Joseph Brant													Count Date: 7-Jul-18		Municipality: Burlington	
North Approach Totals						North/South Total Approaches	South Approach Totals									
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds				
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total					
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0				
12:00:00	9	0	19	28	15	86	12:00:00	24	0	34	58	10				
13:00:00	13	0	18	31	5	72	13:00:00	19	0	22	41	14				
14:00:00	17	0	12	29	9	79	14:00:00	21	0	29	50	10				
15:00:00	16	0	19	35	7	97	15:00:00	31	0	31	62	4				
16:00:00	32	0	16	48	15	174	16:00:00	75	0	51	126	12				
Totals:	87	0	84	171	51	508		170	0	167	337	50				
East Approach Totals						East/West Total Approaches	West Approach Totals									
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds				
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total					
11:00:00	0	0	0	0	0	3	11:00:00	0	3	0	3	0				
12:00:00	27	867	16	910	2	1565	12:00:00	12	619	24	655	1				
13:00:00	22	964	25	1011	5	1785	13:00:00	17	736	21	774	3				
14:00:00	35	992	14	1041	10	1890	14:00:00	13	812	24	849	1				
15:00:00	35	921	20	976	2	1840	15:00:00	39	782	43	864	1				
16:00:00	37	971	19	1027	7	2010	16:00:00	27	904	52	983	3				
Totals:	156	4715	94	4965	26	9093		108	3856	164	4128	9				
Calculated Values for Traffic Crossing Major Street																
Hours Ending:	0:00	0:00	11:00	12:00		13:00	14:00	15:00	16:00							
Crossing Values:	0	0	0	36		40	49	50	117							

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:30:00
To: 10:00:00

One Hour Peak

From: 8:00:00
To: 9:00:00

Municipality: Burlington
Site #: 1825400003
Intersection: North Shore Blvd E & Lakeshore Rd
TFR File #: 4
Count date: 4-Jul-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 629
North Entering: 272
North Peds: 22
Peds Cross: \times

Heavys	0	0	0	0
Trucks	4	2	4	10
Cars	138	80	44	262
Totals	142	82	48	



Heavys	0
Trucks	15
Cars	342
Totals	357

East Leg Total: 1641
East Entering: 557
East Peds: 66
Peds Cross: \times

Heavys	0
Trucks	27
Cars	535
Totals	562

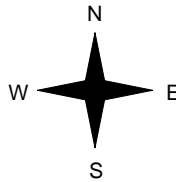


Maple Ave

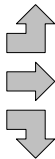
Cars	29	5	0	34
Trucks	369	17	0	386
Heavys	130	7	0	137
Totals	528	29	0	



North Shore Blvd E



Heavys	0
Trucks	6
Cars	212
Totals	218
Heavys	0
Trucks	23
Cars	767
Totals	790
Heavys	0
Trucks	5
Cars	67
Totals	72
Heavys	0
Trucks	34
Cars	1046
Totals	1080



Lakeshore Rd



Cars	1050	34	0	1084
Trucks				
Heavys				
Totals				

Peds Cross: \times
West Peds: 27
West Entering: 1080
West Leg Total: 1642

Cars	277	28	101	239	368
Trucks	14	6	4	7	17
Heavys	0	0	0	0	0
Totals	291	34	105	246	



Peds Cross: \times
South Peds: 46
South Entering: 385
South Leg Total: 676

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 17:00:00

To: 19:00:00

One Hour Peak

From: 17:00:00

To: 18:00:00

Municipality: Burlington
Site #: 1825400003
Intersection: North Shore Blvd E & Lakeshore Rd
TFR File #: 4
Count date: 4-Jul-18

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 858

North Entering: 491

North Peds: 11

Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	4	4	8
Cars	247	148	88	483
Totals	247	152	92	



Heavys 0

Trucks 6

Cars 361

Totals 367

East Leg Total: 1978

East Entering: 1176

East Peds: 38

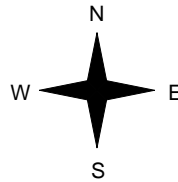
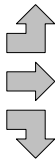
Peds Cross: \times

Heavys	Trucks	Cars	Totals
1	18	1234	1253



North Shore Blvd E

Heavys	Trucks	Cars	Totals
0	3	201	204
0	7	557	564
0	3	56	59
0	13	814	



Maple Ave



Cars	Trucks	Heavys	Totals
60	3	0	63
870	17	0	887
221	5	0	226
1151	25	0	



Lakeshore Rd



Cars	Trucks	Heavys	Totals
781	20	1	802

Peds Cross: \times

West Peds: 16

West Entering: 827

West Leg Total: 2080

Cars	425	Cars	117	100	136	353
Trucks	12	Trucks	1	0	9	10
Heavys	0	Heavys	1	0	1	2
Totals	437	Totals	119	100	146	



Lakeshore Rd



Peds Cross: \times

South Peds: 23

South Entering: 365

South Leg Total: 802

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1825400003
Intersection: North Shore Blvd E & Lakeshore Rd
TFR File #: 4
Count date: 4-Jul-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 2931
 North Entering: 1463
 North Peds: 94
 Peds Cross: \times

Heavys	0	0	0	0
Trucks	7	13	19	39
Cars	718	428	278	1424
Totals	725	441	297	



Heavys	0
Trucks	50
Cars	1418
Totals	1468

East Leg Total: 7261
 East Entering: 3359
 East Peds: 250
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
1	89	3215	3305

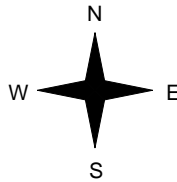


North Shore Blvd E

Heavys	Trucks	Cars	Totals
0	18	811	829
0	73	2763	2836
2	16	290	308
2	107	3864	



Maple Ave



Cars	Trucks	Heavys	Totals
208	20	0	228
2236	67	0	2303
796	32	0	828
3240	119	0	



Lakeshore Rd



Cars	Trucks	Heavys	Totals
3775	123	4	3902

Peds Cross: \times
 West Peds: 81
 West Entering: 3973
 West Leg Total: 7278

Cars	1514
Trucks	61
Heavys	2
Totals	1577



Cars	261	399	734	1394
Trucks	15	12	31	58
Heavys	1	0	4	5
Totals	277	411	769	

Peds Cross: \times
 South Peds: 128
 South Entering: 1457
 South Leg Total: 3034

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Lakeshore R													Count Date: 4-Jul-18		Municipality: Burlington	
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												
8:00:00	16	33	72	121	9	282	8:00:00	13	57	91	161	11				
9:00:00	48	82	142	272	22	657	9:00:00	34	105	246	385	46				
10:00:00	63	69	108	240	19	486	10:00:00	45	59	142	246	25				
17:00:00	2	2	7	11	0	18	17:00:00	0	1	6	7	0				
18:00:00	92	152	247	491	11	856	18:00:00	119	100	146	365	23				
19:00:00	76	103	149	328	33	621	19:00:00	66	89	138	293	23				
Totals:	297	441	725	1463	94	2920		277	411	769	1457	128				
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												
8:00:00	106	188	13	307	31	762	8:00:00	80	321	54	455	15				
9:00:00	137	386	34	557	66	1637	9:00:00	218	790	72	1080	27				
10:00:00	148	340	50	538	52	1412	10:00:00	173	632	69	874	12				
17:00:00	13	14	0	27	0	44	17:00:00	3	12	2	17	0				
18:00:00	226	887	63	1176	38	2003	18:00:00	204	564	59	827	16				
19:00:00	198	487	68	753	63	1472	19:00:00	151	516	52	719	11				
Totals:	828	2302	228	3358	250	7330		829	2835	308	3972	81				
Calculated Values for Traffic Crossing Major Street																
Hours Ending:	8:00	9:00	10:00	17:00			18:00	19:00	19:00	19:00						
Crossing Values:	132	280	241	4			417	319	319	319						

Ontario Traffic Inc.

Count Date: 4-Jul-18 Site #: 1825400003

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians		
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross		
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	
7:30:00	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	40	40	167	166	25	25	2	2	9	9	2	2	0	0	0	0	1	1	4	4	4
8:00:00	74	34	309	142	49	24	6	4	12	3	4	2	0	0	0	0	1	0	15	11	11
8:15:00	122	48	478	169	69	20	8	2	19	7	4	0	0	0	0	0	1	0	17	2	2
8:30:00	186	64	662	184	90	21	8	0	24	5	7	3	0	0	0	0	1	0	26	9	9
8:45:00	220	34	869	207	104	14	10	2	31	7	7	0	0	0	0	0	1	0	38	12	12
9:00:00	286	66	1076	207	116	12	12	2	35	4	9	2	0	0	0	0	1	0	42	4	4
9:15:00	336	50	1234	158	137	21	12	0	41	6	9	0	0	0	0	0	1	0	45	3	3
9:30:00	384	48	1386	152	145	8	14	2	47	6	10	1	0	0	0	0	1	0	47	2	2
9:45:00	410	26	1519	133	170	25	14	0	59	12	12	2	0	0	0	0	2	1	49	2	2
10:00:00	457	47	1679	160	180	10	14	0	64	5	13	1	0	0	0	0	2	0	54	5	5
10:00:09	457	0	1681	2	180	0	14	0	64	0	13	0	0	0	0	0	2	0	54	0	0
10:00:21	457	0	1681	0	180	0	14	0	64	0	13	0	0	0	0	0	2	0	54	0	0
17:00:00	460	3	1691	10	182	2	14	0	64	0	13	0	0	0	0	0	2	0	54	0	0
17:15:00	523	63	1821	130	192	10	15	1	66	2	14	1	0	0	0	0	2	0	56	2	2
17:30:00	571	48	1928	107	206	14	15	0	67	1	15	1	0	0	0	0	2	0	56	0	0
17:45:00	617	46	2108	180	227	21	16	1	69	2	15	0	0	0	0	0	2	0	60	4	4
18:00:00	661	44	2248	140	238	11	17	1	71	2	16	1	0	0	0	0	2	0	70	10	10
18:15:00	693	32	2383	135	249	11	17	0	72	1	16	0	0	0	0	0	2	0	72	2	2
18:30:00	734	41	2521	138	264	15	18	1	72	0	16	0	0	0	0	0	2	0	76	4	4
18:45:00	774	40	2640	119	281	17	18	0	72	0	16	0	0	0	0	0	2	0	79	3	3
19:00:00	811	37	2762	122	290	9	18	0	73	1	16	0	0	0	0	0	2	0	81	2	2
19:00:16	811	0	2763	1	290	0	18	0	73	0	16	0	0	0	0	0	2	0	81	0	0
19:00:59	811	0	2763	0	290	0	18	0	73	0	16	0	0	0	0	0	2	0	81	0	0

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 11:00:00
To: 16:00:00

One Hour Peak

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

Municipality: Burlington
Site #: 1825400006
Intersection: North Shore Blvd E & Lakeshore Rd
TFR File #: 1
Count date: 7-Jul-18

Weather conditions:
Person(s) who counted:

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

Major Road: North Shore Blvd E runs W/E

North Leg Total: 964
North Entering: 607
North Peds: 38
Peds Cross: \times

Heavys	0	0	0	0
Trucks	0	0	4	4
Cars	265	242	96	603
Totals	265	242	100	



Heavys	0
Trucks	4
Cars	353
Totals	357

East Leg Total: 1741
East Entering: 893
East Peds: 102
Peds Cross: \times

Heavys	0
Trucks	6
Cars	986
Totals	992

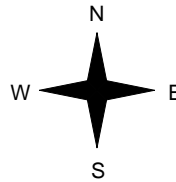


Maple Ave

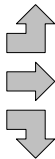
Cars	44	3	0	47
Trucks	526	5	0	531
Heavys	312	3	0	315
Totals	882	11	0	



North Shore Blvd E



Heavys	0
Trucks	1
Cars	189
Totals	190
Heavys	0
Trucks	7
Cars	559
Totals	566
Heavys	0
Trucks	4
Cars	172
Totals	176
Heavys	0
Trucks	12
Cars	920
Totals	932



Lakeshore Rd

Lakeshore Rd



Cars	833	15	0	848
Trucks				
Heavys				
Totals				

Peds Cross: \times
West Peds: 13
West Entering: 932
West Leg Total: 1924

Cars	726	195	120	178	493
Trucks	7	1	0	4	5
Heavys	0	0	0	0	0
Totals	733	196	120	182	



Peds Cross: \times
South Peds: 18
South Entering: 498
South Leg Total: 1231

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1825400006
Intersection: North Shore Blvd E & Lakeshore Rd
TFR File #: 1
Count date: 7-Jul-18

Weather conditions:
Person(s) who counted:

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

Major Road: North Shore Blvd E runs W/E

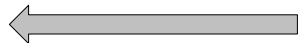
North Leg Total: 4378
 North Entering: 2886
 North Peds: 142
 Peds Cross: \times

Heavys	0	1	0	1
Trucks	7	3	15	25
Cars	1291	1071	498	2860
Totals	1298	1075	513	

Heavys 1
 Trucks 18
 Cars 1473
 Totals 1492

East Leg Total: 7979
 East Entering: 4110
 East Peds: 389
 Peds Cross: \times

Heavys	0	Trucks	46	Cars	4544	Totals	4590
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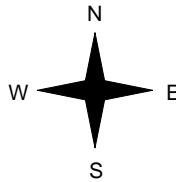


North Shore Blvd E

Heavys	1	Trucks	8	Cars	917	Totals	926
	0		23		2667		2690
	0		7		657		664
	1		38		4241		



Maple Ave



Cars	152	Trucks	9	Heavys	0	Totals	161
	2674		34		0		2708
	1230		11		0		1241
	4056		54		0		

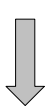
Lakeshore Rd



Cars	3815	Trucks	52	Heavys	2	Totals	3869
------	------	--------	----	--------	---	--------	------

Peds Cross: \times
 West Peds: 101
 West Entering: 4280
 West Leg Total: 8870

Cars	2958	Cars	579	404	650	1633
Trucks	21	Trucks	5	1	14	20
Heavys	1	Heavys	0	0	2	2
Totals	2980	Totals	584	405	666	



Lakeshore Rd

Peds Cross: \times
 South Peds: 103
 South Entering: 1655
 South Leg Total: 4635

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & Lakeshore F													Count Date: 7-Jul-18		Municipality: Burlington	
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					
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0				
12:00:00	87	103	159	349	23	542	12:00:00	63	49	81	193	18				
13:00:00	114	230	284	628	29	815	13:00:00	48	47	92	187	15				
14:00:00	85	250	293	628	19	1026	14:00:00	149	91	158	398	25				
15:00:00	127	250	297	674	33	1053	15:00:00	128	98	153	379	27				
16:00:00	100	242	265	607	38	1105	16:00:00	196	120	182	498	18				
Totals:						4541	Totals:						103			
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					
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0				
12:00:00	170	591	44	805	41	1490	12:00:00	132	479	74	685	42				
13:00:00	241	578	23	842	67	1676	13:00:00	163	536	135	834	7				
14:00:00	269	515	20	804	95	1738	14:00:00	217	584	133	934	13				
15:00:00	246	493	27	766	84	1661	15:00:00	224	525	146	895	26				
16:00:00	315	531	47	893	102	1825	16:00:00	190	566	176	932	13				
Totals:						8390	Totals:						101			
Calculated Values for Traffic Crossing Major Street																
Hours Ending:	0:00	0:00	11:00	12:00				13:00	14:00	15:00	16:00					
Crossing Values:	0	0	0	336				466	592	615	653					

Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 11:00:00
To: 16:00:00

One Hour Peak

From: 13:30:00
To: 14:30:00

Municipality: Burlington
Site #: 1825400011
Intersection: North Shore Blvd E & QEW West R
TFR File #: 1
Count date: 7-Jul-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 990
North Entering: 301
North Peds: 0
Peds Cross: \times

Heavys	0	0	0
Trucks	0	2	2
Cars	57	241	299
Totals	57	243	



Heavys	0
Trucks	3
Cars	686
Totals	689

East Leg Total: 1625
East Entering: 1014
East Peds: 5
Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	3	484	487



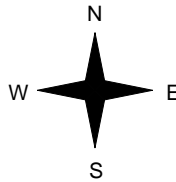
QEW West Ramp Terminal



Cars	Trucks	Heavys	Totals
573	3	0	576
427	3	0	430
1008	6	0	



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	0	113	113
0	4	364	368
0	4	478	



North Shore Blvd E



Cars	Trucks	Heavys	Totals
605	6	0	611

Peds Cross: \times
West Peds: 0
West Entering: 482
West Leg Total: 969

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1825400011
Intersection: North Shore Blvd E & QEW West R
TFR File #: 1
Count date: 7-Jul-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

North Leg Total: 4356
 North Entering: 1283
 North Peds: 1
 Peds Cross: \times

Heavys	0	0	0
Trucks	0	11	11
Cars	273	997	1272
Totals	273	1008	



Heavys	0
Trucks	20
Cars	3053
Totals	3073

East Leg Total: 7515
 East Entering: 4995
 East Peds: 37
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	16	2582	2598



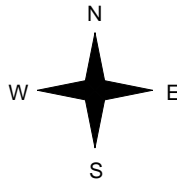
QEW West Ramp Terminal



Cars	Trucks	Heavys	Totals
2638	17	0	2655
2309	16	0	2325
4962	33	0	



North Shore Blvd E



Heavys	Trucks	Cars	Totals
0	3	415	418
0	23	1489	1512
0	26	1911	



North Shore Blvd E



Cars	Trucks	Heavys	Totals
2486	34	0	2520

Peds Cross: \times
 West Peds: 15
 West Entering: 1937
 West Leg Total: 4535

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & QEW West F													Count Date: 7-Jul-18		Municipality: Burlington								
North Approach Totals						North/South Total Approaches	South Approach Totals																
Includes Cars, Trucks, & Heavys					Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys					Total Peds										
Left	Thru	Right	Grand Total	Left				Thru	Right	Grand Total													
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0											
12:00:00	171	0	41	212	1	212	12:00:00	0	0	0	0	0											
13:00:00	193	1	44	238	0	238	13:00:00	0	0	0	0	0											
14:00:00	207	0	58	265	0	265	14:00:00	0	0	0	0	0											
15:00:00	247	1	50	298	0	298	15:00:00	0	0	0	0	4											
16:00:00	190	0	80	270	0	270	16:00:00	0	0	0	0	2											
Totals:													1008	2	273	1283	1	1283	0	0	0	0	6
East Approach Totals						East/West Total Approaches	West Approach Totals																
Includes Cars, Trucks, & Heavys					Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys					Total Peds										
Left	Thru	Right	Grand Total	Left				Thru	Right	Grand Total													
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0											
12:00:00	4	447	476	927	5	1247	12:00:00	75	244	1	320	3											
13:00:00	1	452	554	1007	6	1396	13:00:00	92	295	2	389	6											
14:00:00	2	429	550	981	11	1403	14:00:00	97	325	0	422	3											
15:00:00	7	415	543	965	3	1411	15:00:00	84	358	4	446	1											
16:00:00	1	582	532	1115	12	1475	16:00:00	70	290	0	360	2											
Totals:													15	2325	2655	4995	37	6932	418	1512	7	1937	15
Calculated Values for Traffic Crossing Major Street																							
Hours Ending:	0:00	0:00	11:00	12:00				13:00	14:00	15:00	16:00												
Crossing Values:	0	0	0	179				206	221	252	204												



Intersection Layout Sheet

Date: **June 02** Day: **Th** Hrs: **15 - 19 + 6 - 10 +** - -

Location: **1 (QEW) @ HWY 2** Ramps: **West / 34, 43**

Reg/Mun: **CR** Town/City: **Burlington** Area: _____

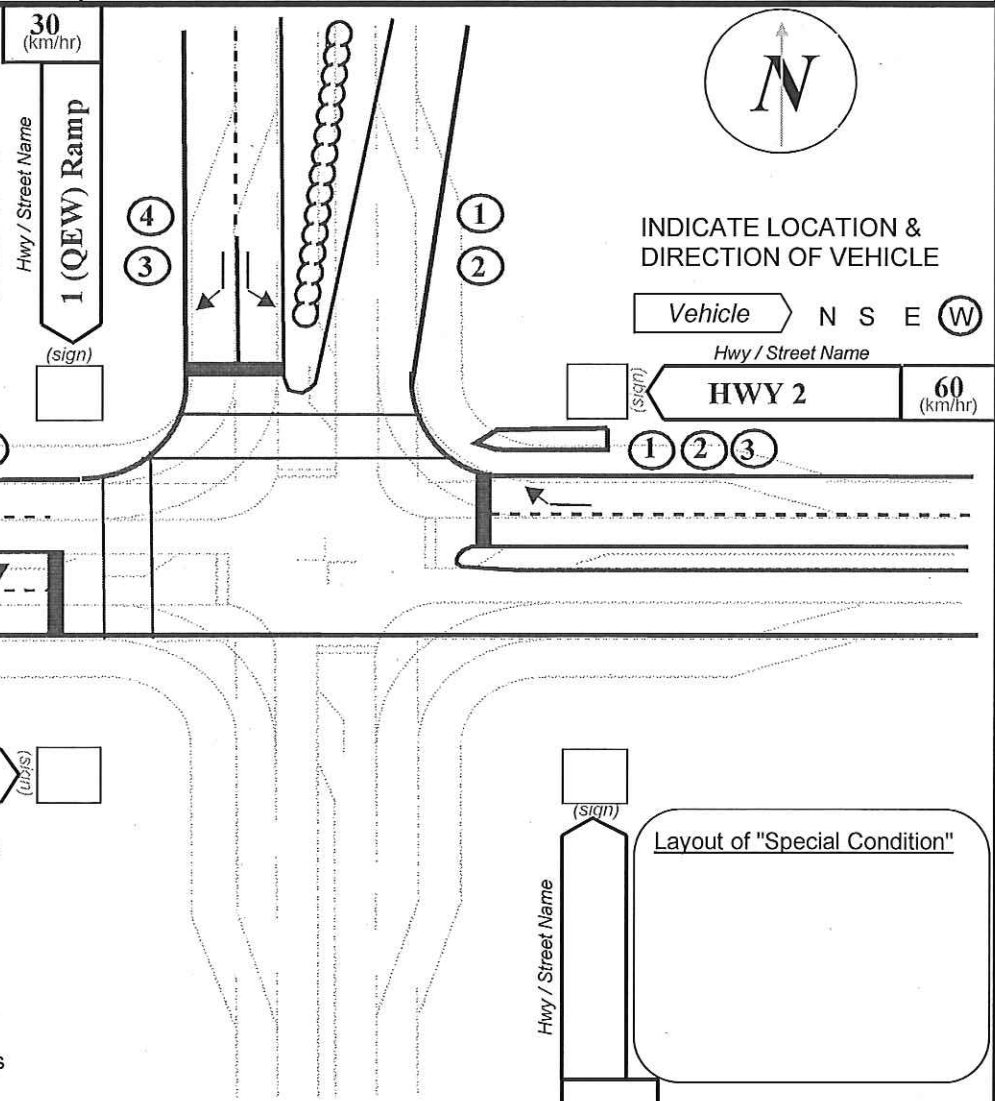
File Name: **4101130000** Device: **Gretch / Jamar** Unit # **10 /** Interval 1: **(AM)** NN / PM

Observer: **Zach Kula** Weather: **Clear / Clear** Road Condition: **Good / Good**

LHRS & O/S: **10113 0**
 GPS: **G-Star IV**
 Datum: WGS 84 **(Y) / N**
 Lat: **43.314546**
 Long: **-79.809293**

Comments: _____

SIGNALIZED (Y) / N
 If intersection is unsignalized;
 Sign Type: **Stop / Yield**
 Sign Size: _____ cm x _____ cm
 Sign Condition:
 NA: New / Good / Poor / Missing
 SA: New / Good / Poor / Missing
 WA: New / Good / Poor / Missing
 EA: New / Good / Poor / Missing
 Photograph all approach's
 including all Signs **(Y) / N**



60 (km/hr) **HWY 2** (sign)

Note: Hwy / Street Name
 Show all lanes approaching and leaving the intersection.
 Show all channelization
 If there are two or more through lane in one direction, indicate if these lanes are not continuous
 Show pedestrian crosswalks

(sign)
 Hwy / Street Name
 (km/hr)
 Layout of "Special Condition"
 Page 1 / 1



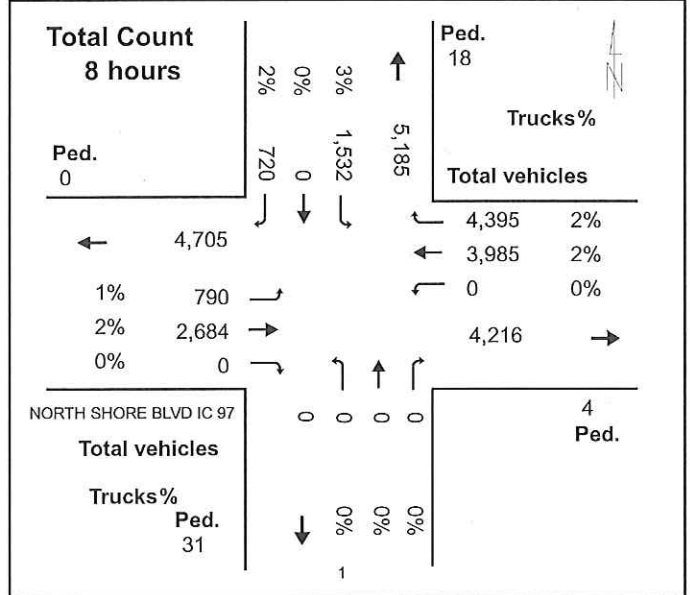
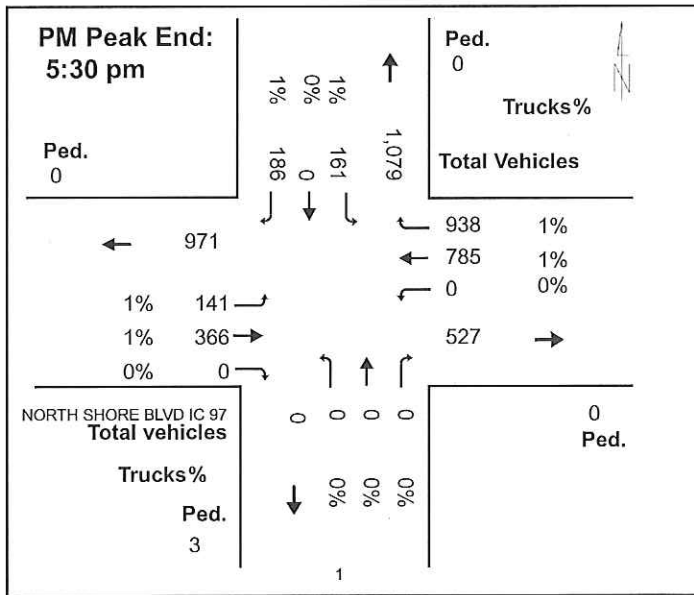
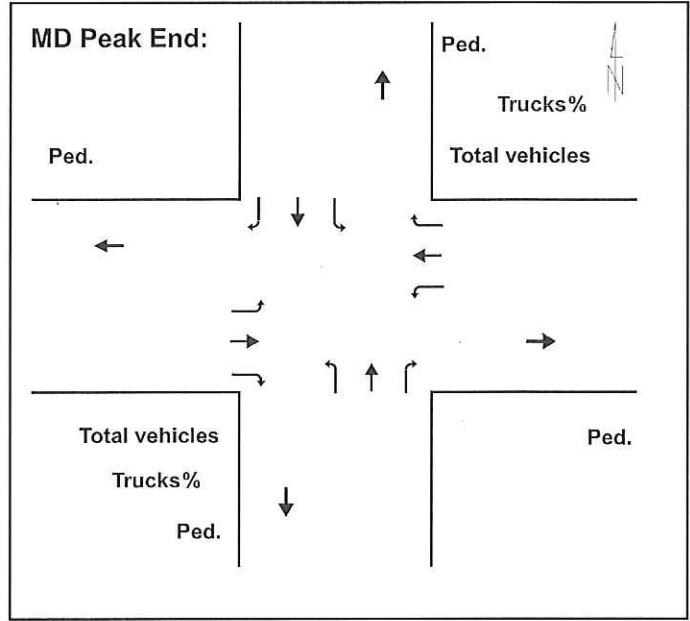
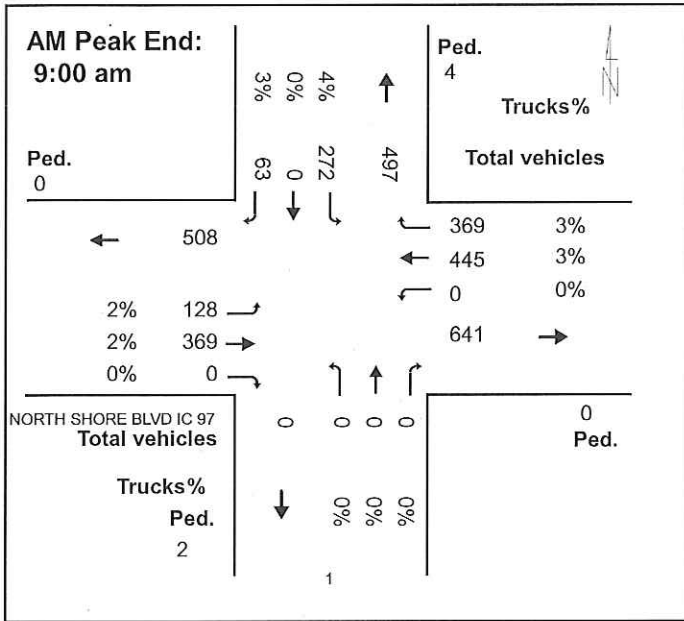
HWY 1 @ NORTH SHORE BLVD IC 97

Central

Intersection ID:101130000(--W--)

Count Day:Thursday

Count Date: 02-Jun-2016



Ontario Traffic Inc.

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 16:00:00

One Hour Peak

From: 15:00:00

To: 16:00:00

Municipality: Burlington
Site #: 1825400012
Intersection: North Shore Blvd E & QEW East O
TFR File #: 16
Count date: 7-Jul-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

East Leg Total: 1875
 East Entering: 910
 East Peds: 0
 Peds Cross: X

Heavys	Trucks	Cars	Totals
0	7	1110	1117

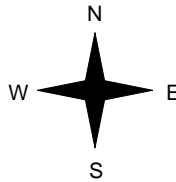


North Shore Blvd E

Heavys	Trucks	Cars	Totals
0	10	385	395
0	0	0	0
0	10	385	



QEW East Off-Ramp



Cars	Trucks	Heavys	Totals
903	7	0	910
0	0	0	0
903	7	0	



North Shore Blvd E

Cars	Trucks	Heavys	Totals
954	11	0	965



Peds Cross: X
 West Peds: 1
 West Entering: 395
 West Leg Total: 1512

Cars	0	Cars	207	569	776
Trucks	0	Trucks	0	1	1
Heavys	0	Heavys	0	0	0
Totals	0	Totals	207	570	



Peds Cross: X
 South Peds: 6
 South Entering: 777
 South Leg Total: 777

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Burlington
Site #: 1825400012
Intersection: North Shore Blvd E & QEW East O
TFR File #: 16
Count date: 7-Jul-18

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: North Shore Blvd E runs W/E

East Leg Total: 8442
 East Entering: 4361
 East Peds: 0
 Peds Cross: X

Heavys	Trucks	Cars	Totals
0	33	4986	5019

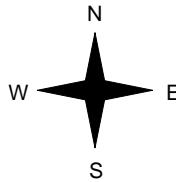


North Shore Blvd E

Heavys	Trucks	Cars	Totals
0	31	2054	2085
0	0	0	0
0	31	2054	



QEW East Off-Ramp



Cars	Trucks	Heavys	Totals
4328	33	0	4361
0	0	0	0
4328	33	0	



North Shore Blvd E

Cars	Trucks	Heavys	Totals
4041	40	0	4081

Peds Cross: X
 South Peds: 29
 South Entering: 2654
 South Leg Total: 2654

Peds Cross: X
 West Peds: 1
 West Entering: 2085
 West Leg Total: 7104

Cars	0	Cars	658	1987	2645
Trucks	0	Trucks	0	9	9
Heavys	0	Heavys	0	0	0
Totals	0	Totals	658	1996	



Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: North Shore Blvd E & QEW East Count Date: 7-Jul-18 Municipality: Burlington

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	0	0	0	0	0	420	12:00:00	112	0	308	420	2
13:00:00	0	0	0	0	0	473	13:00:00	124	0	349	473	8
14:00:00	0	0	0	0	0	524	14:00:00	111	0	413	524	11
15:00:00	0	0	0	0	0	460	15:00:00	104	0	356	460	2
16:00:00	0	0	0	0	0	775	16:00:00	207	0	568	775	6
Totals:	0	0	0	0	0	2652		658	0	1994	2652	29
East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	0	816	0	816	0	1159	12:00:00	0	343	0	343	0
13:00:00	0	894	0	894	0	1314	13:00:00	0	420	0	420	0
14:00:00	0	874	0	874	0	1304	14:00:00	0	430	0	430	0
15:00:00	0	867	0	867	0	1364	15:00:00	0	497	0	497	0
16:00:00	0	910	0	910	0	1305	16:00:00	0	395	0	395	1
Totals:	0	4361	0	4361	0	6446		0	2085	0	2085	1
Calculated Values for Traffic Crossing Major Street												
Hours Ending:	0:00	0:00	11:00	12:00		13:00	14:00	15:00	16:00			
Crossing Values:	0	0	0	112		124	111	104	208			



Intersection Layout Sheet

Contract # **9015-E-0009**

Work Order # **035**

2016

Date: **June 02** Day: **Th** Hrs: **15 - 19 + 6 - 10 + -**

Location: **1 (QEW) @ HWY 2** Ramps: **East 25,26,52,62**

Reg/Mun: **CR** Town/City: **Burlington** Area: _____

File Name: **3101130000** Device: **Gretch / Jamar** Unit # **10** / Interval 1: **(AM) NN / PM**

Observer: **Zach Kula** Weather: **Clear / Clear** Road Condition: **Good / Good**

LHRS & O/S: **10113 0**

GPS: **G-Star IV**

Datum: WGS 84 **(Y) / N**

Lat: **43.315903**

Long: **-79.806004**

Comments:

SIGNALIZED (Y) / N

If intersection is unsignalized;
Sign Type: **Stop / Yield**

Sign Size: _____ cm x _____ cm

Sign Condition:

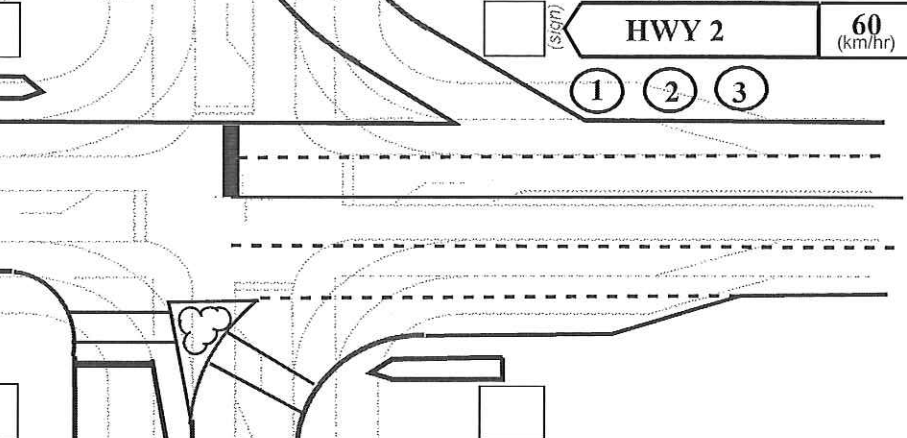
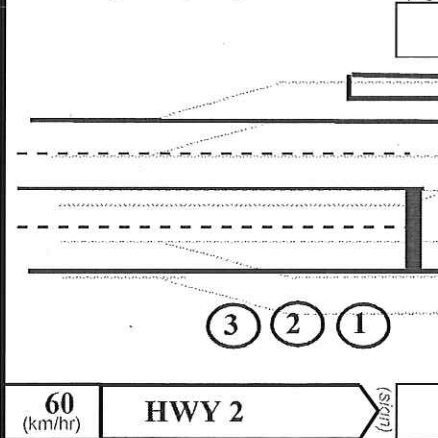
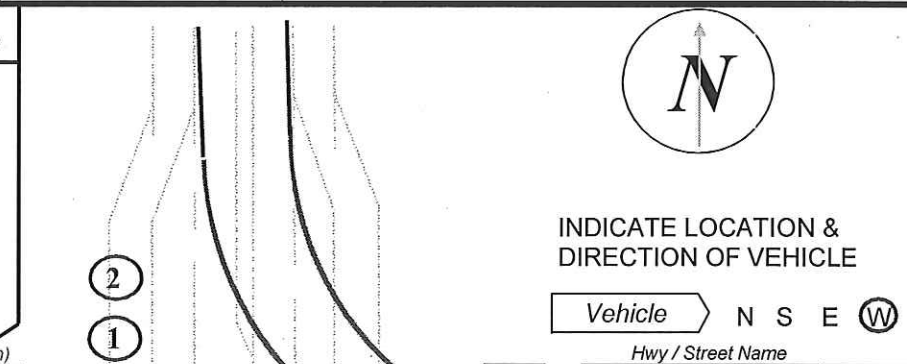
NA: New / Good / Poor / Missing

SA: New / Good / Poor / Missing

WA: New / Good / Poor / Missing

EA: New / Good / Poor / Missing

Photograph all approach's including all Signs **(Y) / N**



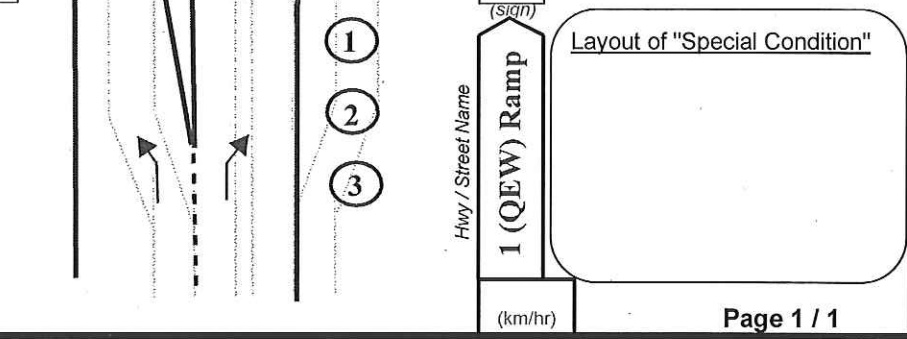
Note: Hwy / Street Name

Show all lanes approaching and leaving the intersection.

Show all channelization

If there are two or more through lane in one direction, indicate if these lanes are not continuous

Show pedestrian crosswalks





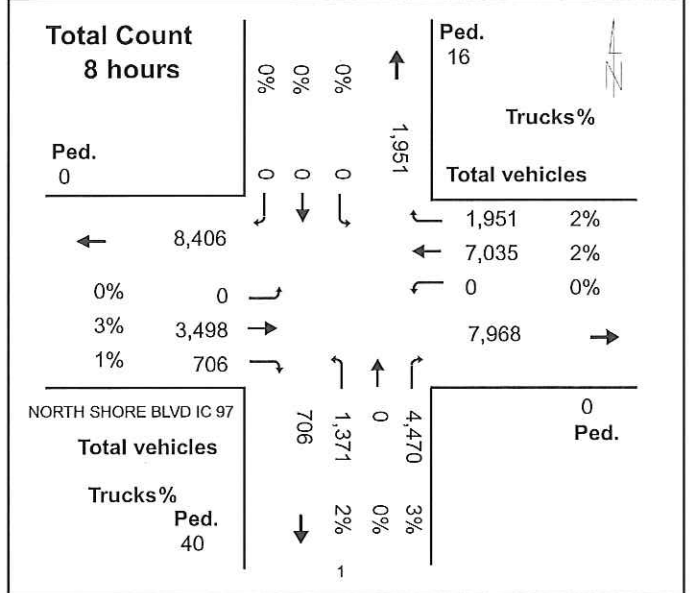
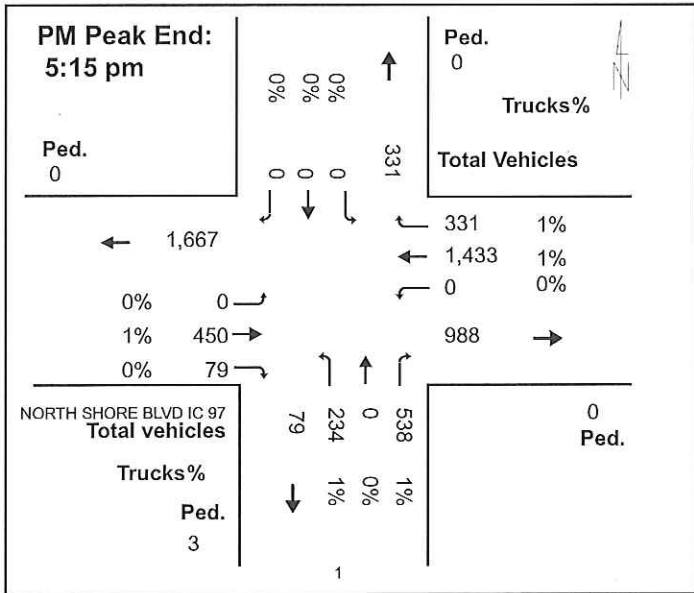
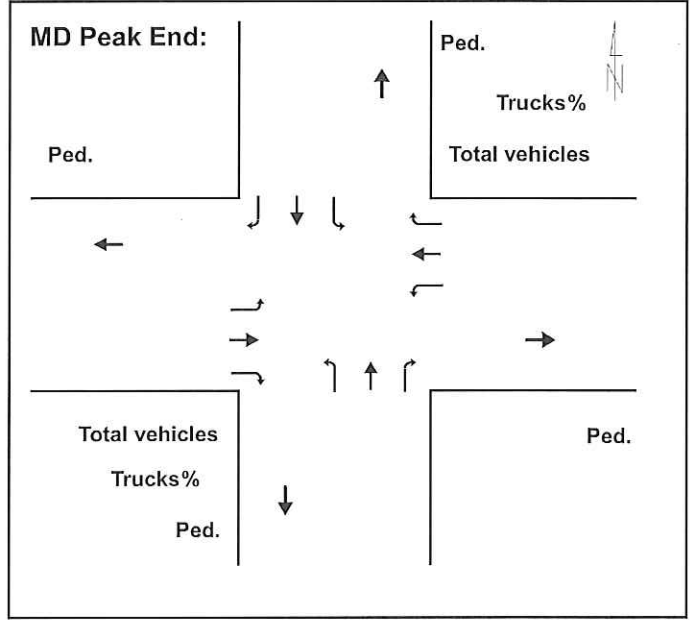
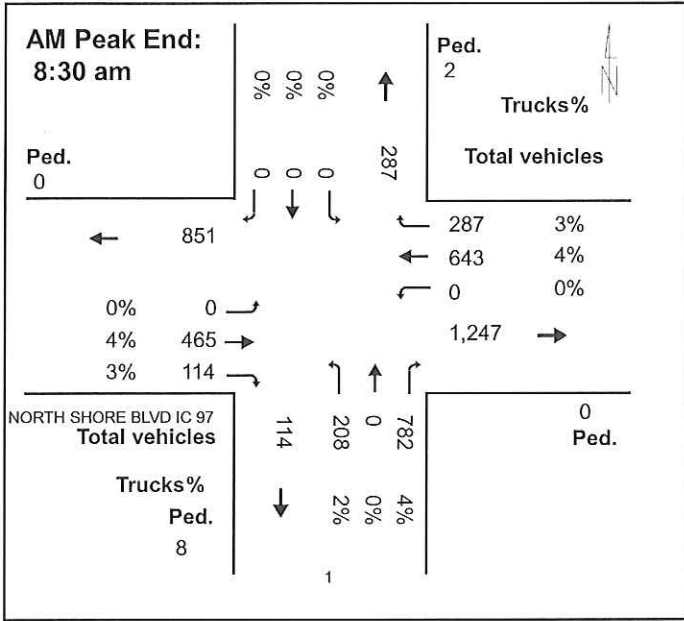
HWY 1 @ NORTH SHORE BLVD IC 97

Central

Intersection ID:101130000(--E--)

Count Day: Thursday

Count Date: 02-Jun-2016



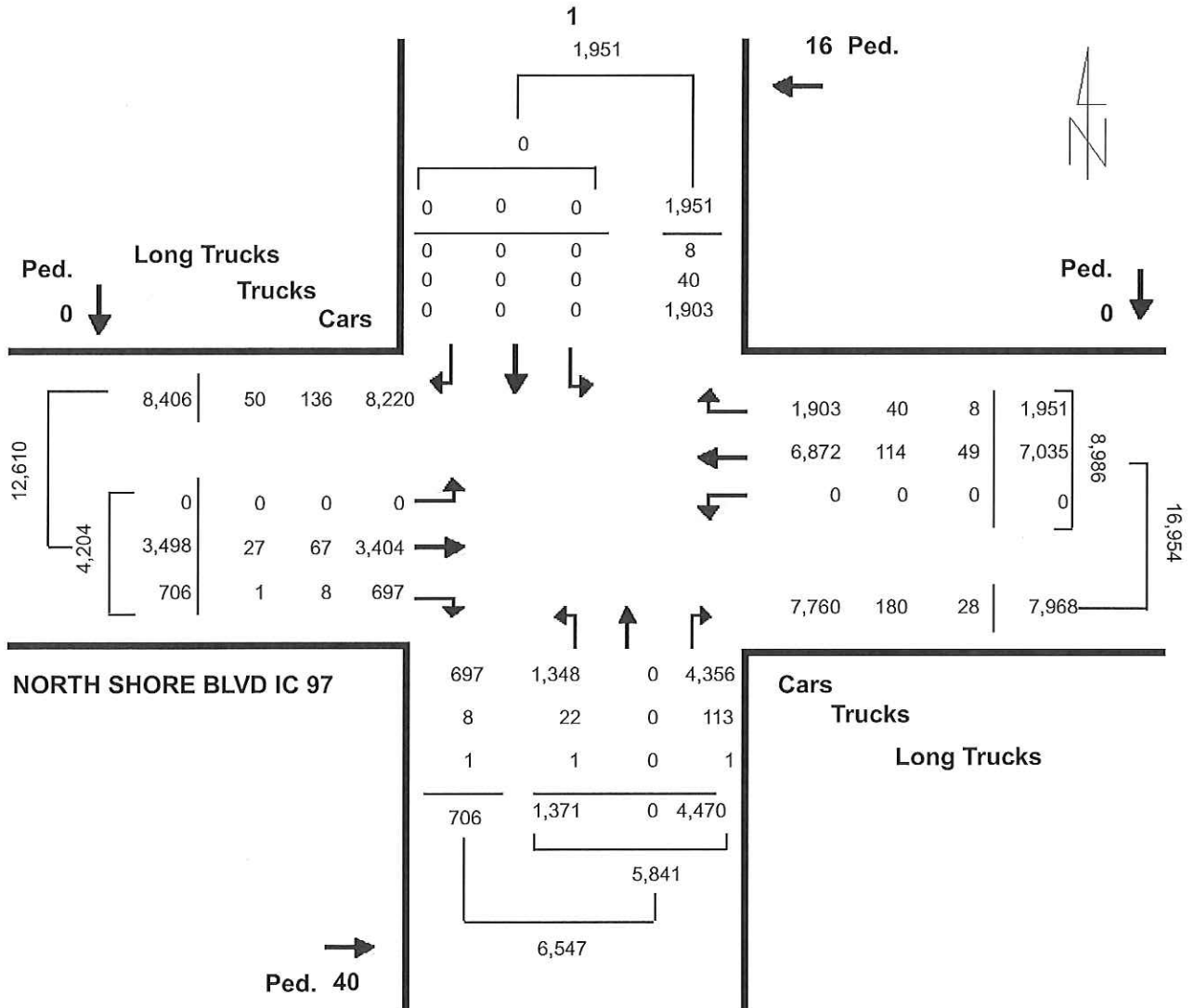
COUNT TOTAL

HWY 1 @ NORTH SHORE BLVD IC 97

Central

Intersection ID:101130000(--E--)

Date: 02-Jun-2016



Appendix C

Signal Timing Plans

Intersection Name: Lakeshore @ Maple	TS ID: 132	Line No: 1	Model: ACS/3	IP address: 172.22.38.2	Controller Make: Econolite
--	----------------------	----------------------	------------------------	-----------------------------------	--------------------------------------

Type of Operation: 8 Phase Semi-Actuated

*-Start from Main Menu

No	Date			Description	Prepared by EN
	Y	M	D		
6	2016	11	2	Revert back to original timings	

PHASE DESCRIPTION

Ph1	WBLT - Lakeshore Road	Ph5	EBLT - Lakeshore Road
Ph2	EB - Lakeshore Road	Ph6	WB - Lakeshore Road
Ph3	SBLT - Maple Avenue	Ph7	NBLT - Maple Avenue
Ph4	NB - Maple Avenue	Ph8	SB - Maple Avenue

PHASE IN USE/EXCLUSIVE PED (MM) * - 1 - 2

Phase:	1	2	3	4	5	6	7	8
Phase in Use	X	X	X	X	X	X	X	X
Exclusive PED								

CONTROLLER TIMING DATA - VEHICLE TIMING * - 2 - 1

Timing Plan: 1	Phase:							
Minimum Green	1	2	3	4	5	6	7	8
	6	8	6	8	6	8	6	8
Walk		12		8		12		8
Ped. Clearance		19		24		19		24
Pedestrian Carry Over								
Vehicle Extension	3	3	3	3	3	3	3	3
MAX 1	12	35	12	25	12	35	12	25
MAX 2	12	35	12	25	12	35	12	25
Yellow Change	3	4	3	4	3	4	3	4
Red Clearance	0	2	0	3	0	2	0	3
Phase Minimum:	10	38	10	40	10	38	10	40

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS * - 2 - 8

Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)							
					1	2	3	4	5	6	7	8
1	110	25	1	1	10	48	10	42	18	40	10	42
2	100	10	1	2	10	38	10	42	10	38	10	42
3	120	110	1	3	15	49	12	44	15	49	12	44
4	100	44	1	4	10	38	10	42	10	38	10	42
10	0	0	1	10	0	0	0	0	0	0	0	0

TIME BASE: ACTION PLAN, DAY PLAN

*** - 5 - 2, - 5 - 3, - 5 - 4**

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	
1	1	1	07:00	1	1	
1	1	2	09:00	2	1	Schedule 1 = Day Plan 1
1	1	3	15:30	3	1	Schedule 2 = Day Plan 2
1	1	4	19:00	4	1	Schedule 3 = Day Plan 3
1	1	10	22:00	254	1	
2	2	1	07:00	1	1	Day Plan 1 (Weekday)
2	2	10	23:00	254	1	Day Plan 2 (Saturday)
3	3	1	08:30	1	1	Day Plan 3 (Sunday, Holidays)
3	3	10	22:00	254	1	
						Action Plan 10 = free (254)

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS

*** - 5 - 5**

Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	4	6	1	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN

*** - 3 - 2, - 3 - 3**

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)							
					1	2	3	4	5	6	7	8
1	110	5	1	1	11	59		40		70		40
2	100	94	1	2	11	49		40		60		40
3	120	116	1	3	11	69		40		80		40
4	90	7	1	4	13	38		39		38		39
10	0	0	1	10	0	0		0		0		0

TIME BASE: ACTION PLAN, DAY PLAN

*** - 5 - 2, - 5 - 3, - 5 - 4**

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	
1	1	4	06:30	4	1	Schedule 1 = Day Plan 1 Schedule 2 = Day Plan 2 Schedule 3 = Day Plan 3 Day Plan 1 (Weekday) Day Plan 2 (Saturday) Day Plan 3 (Sunday, Holidays) Action Plan 10 = free (254)
1	1	1	07:00	1	1	
1	1	2	09:00	2	1	
1	1	3	15:30	3	1	
1	1	4	19:00	4	1	
1	1	10	22:00	254	1	
2	2	1	07:00	4	1	
2	2	10	23:00	254	1	
3	3	1	8:30	1	1	
3	3	10	22:00	254	1	

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS

*** - 5 - 5**

Events	Exception Day		MON/ MON	DOW/ DOW	WOM/ Year	Day Plan
New Year's Day	1	Fixed	1	1	0	3
Family Day	2	Float	2	2	3	3
Good Friday	3	Float	4	6	1	3
Victoria Day	4	Float	5	2	3	3
Canada Day	5	Fixed	7	1	0	3
Civic Day	6	Float	8	2	1	3
Labour Day	7	Float	9	2	1	3
Thanksgiving	8	Float	10	2	2	3
Christmas Day	9	Fixed	12	25	0	3

Intersection Name: Northshore Blvd @ QEW East Ramp		TS ID: 134	Group No:	IP address: 172.22.36.2
Controller Make: Econolite	Model: ACS/3			

CP # 1, 2, 10	Phase:	1	2	3	4	5	6	7	8
Coord Phase	:	_____	X	_____	_____	_____	X	_____	_____
Vehicle Recall	:	_____	_____	_____	_____	_____	_____	_____	_____
Pedestrian Recall *(3-3, 5-2)	:	_____	X	_____	_____	_____	X	_____	_____
Recall to MAX Time	:	_____	_____	_____	_____	_____	_____	_____	_____
Phase Omit	:	_____	_____	_____	_____	_____	_____	_____	_____
Special Function Outputs	:	_____	_____	_____	_____	_____	_____	_____	_____

Coordinator Pattern #	Prefer.	Phase							
		1	2	3	4	5	6	7	8
1									
2									

X - select "." deselect

TIME BASE: ACTION PLAN, DAY PLAN * - 5 - 2, - 5 - 3, - 5 - 4

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan
1	1	4	06:30	4	1
1	1	1	07:00	1	1
1	1	2	09:00	2	1
1	1	3	15:30	3	1
1	1	4	19:00	4	1
1	1	10	22:00	254	1
2	2	1	07:00	1	1
2	2	10	23:00	254	1
3	3	1	8:30	1	1
3	3	10	22:00	254	1

Schedule 1 = Day Plan 1
Schedule 2 = Day Plan 2
Schedule 3 = Day Plan 3

Day Plan 1 (Weekday)
Day Plan 2 (Saturday)
Day Plan 3 (Sunday, Holidays)

Action Plan 10 = free (254)

TIME BASE DATA - TIME OF YEAR EVENTS * - 5 - 5

Events	Exception Day	MON/MON	DOW/DOW	WOM/Year	Day Plan
New Year's Day	1 Fixed	1	1	0	3
Family Day	2 Float	2	2	3	3
Good Friday	3 Float	4	6	1	3
Victoria Day	4 Float	5	2	3	3
Canada Day	5 Fixed	7	1	0	3
Civic Day	6 Float	8	2	1	3
Labour Day	7 Float	9	2	1	3
Thanksgiving	8 Float	10	2	2	3
Christmas Day	9 Fixed	12	25	0	3

Intersection Name: Northshore Blvd @ QEW West Ra	TS ID: 135	Line No: 3	Model: ACS/3	IP address: 172.22.33.2	Controller Make: Econolite
---	---------------	---------------	-----------------	----------------------------	-------------------------------

Type of Operation: **8 Phase Semi-Actuated**

*-Start from Main Menu

No	Date			Description	Prepared by MA
	Y	M	D		
1	2017	9	13	Dropped to Local during AM and Off peak period	

PHASE DESCRIPTION

Ph1		Ph5	EBLT - Northshore Blvd
Ph2	EB - Northshore Blvd	Ph6	WB - Northshore Blvd
Ph3		Ph7	
Ph4		Ph8	NB - QEW West Ramp

PHASE IN USE/EXCLUSIVE PED (MM) *- 1 - 2

Phase:	1	2	3	4	5	6	7	8
Phase in Use		X			X	X		X
Exclusive PED								

CONTROLLER TIMING DATA - VEHICLE TIMING *- 2 - 1

Timing Plan: 1	Phase:							
Minimum Green	1	2	3	4	5	6	7	8
		8			6	8		8
Walk		8				8		8
Ped. Clearance		20				20		10
Pedestrian Carry Over								
Vehicle Extension		3			3	3		5
MAX 1		35			10	35		25
MAX 2		35			10	35		25
Yellow Change		4			3	4		4
Red Clearance		2				2		3
Phase Minimum:	1	35	1	1	10	35	1	26

PHASE DATA - VEHICLE AND PEDESTRIAN RECALLS *- 2 - 8

Phase:	1	2	3	4	5	6	7	8
Lock Detector								
Vehicle Recall								
Pedestrian Recall		X				X		
MAX Recall		X				X		
Min Recall								

COORDINATION: COORDINATOR PATTERN, SPLIT PATTERN * - 3 - 2, - 3 - 3

Coordinator Pattern (CP)	Cycle Length	Offset (sec)	Timing Plan	Split Pattern	Phases (sec)								
					1	2	3	4	5	6	7	8	
1	95	0	1	1		62			12	50			33
2	100	56	1	2		72			11	61			28
3	120	2	1	3		92			11	81			28
4	90	1	1	4		62			11	51			28
10	0	0		10		0			0	0			0

TIME BASE: ACTION PLAN, DAY PLAN * - 5 - 2, - 5 - 3, - 5 - 4

Day Plan	Sched. #	Action Plan	Time Period	Pattern	Timing Plan	
1	1	10	06:30	254	1	
1	1	10	07:00	254	1	Schedule 1 = Day Plan 1 Schedule 2 = Day Plan 2 Schedule 3 = Day Plan 3
1	1	10	09:00	254	1	
1	1	3	15:30	3	1	
1	1	10	19:00	254	1	Day Plan 1 (Weekday)
1	1	10	22:00	254	1	Day Plan 2 (Saturday)
2	2	1	07:00	1	1	Day Plan 3 (Sunday, Holidays)
2	2	10	23:00	254	1	
3	3	1	8:30	1	1	
3	3	10	22:00	254	1	Action Plan 10 = free (254)

Special Programming:

TIME BASE DATA - TIME OF YEAR EVENTS * - 5 - 5

Events	Exception Day	MON/	DOW/	WOM/	Day Plan
New Year's Day	1 Fixed	1	1	0	3
Family Day	2 Float	2	2	3	3
Good Friday	3 Float	4	6	1	3
Victoria Day	4 Float	5	2	3	3
Canada Day	5 Fixed	7	1	0	3
Civic Day	6 Float	8	2	1	3
Labour Day	7 Float	9	2	1	3
Thanksgiving	8 Float	10	2	2	3
Christmas Day	9 Fixed	12	25	0	3

Appendix D

Start-up Lost Time Field Data

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Northbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03				0:00:03
2					0:00:00
3					0:00:00
4	0:00:02				0:00:02
5					0:00:00
6					0:00:00
7	0:00:01				0:00:01
8	0:00:02				0:00:02
9					0:00:00
10					0:00:00
11	0:00:01				0:00:01
12	0:00:02	0:00:04			0:00:06
13	0:00:02				0:00:02
14	0:00:01				0:00:01
15					0:00:00
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:00:18

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Southbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:01	0:00:03			0:00:04
2					0:00:00
3	0:00:01				0:00:01
4					0:00:00
5					0:00:00
6	0:00:02				0:00:02
7	0:00:03	0:00:05			0:00:08
8	0:00:02				0:00:02
9	0:00:01				0:00:01
10					0:00:00
11					0:00:00
12	0:00:02	0:00:04			0:00:06
13					0:00:00
14	0:00:02				0:00:02
15	0:00:01				0:00:01
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:00:27

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Eastbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
2	0:00:03	0:00:05	0:00:07	0:00:08	0:00:23
3	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
4	0:00:01	0:00:02	0:00:06	0:00:07	0:00:16
5	0:00:01	0:00:03	0:00:05	0:00:07	0:00:16
6	0:00:02	0:00:05	0:00:07	0:00:09	0:00:23
7	0:00:02	0:00:03	0:00:05	0:00:08	0:00:18
8	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
9	0:00:03	0:00:05	0:00:08		0:00:16
10	0:00:01	0:00:03	0:00:07	0:00:09	0:00:20
11	0:00:02	0:00:04	0:00:05	0:00:08	0:00:19
12	0:00:01	0:00:04	0:00:07	0:00:09	0:00:21
13	0:00:02	0:00:05	0:00:07	0:00:10	0:00:24
14	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
15	0:00:01	0:00:03	0:00:06	0:00:12	0:00:22
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:05:04

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Westbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:04	0:00:06	0:00:10	0:00:22
2	0:00:01	0:00:02	0:00:05	0:00:08	0:00:16
3	0:00:04	0:00:06	0:00:08	0:00:09	0:00:27
4	0:00:02	0:00:03	0:00:07	0:00:10	0:00:22
5	0:00:03	0:00:05	0:00:07	0:00:09	0:00:24
6	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
7	0:00:02	0:00:05	0:00:08	0:00:10	0:00:25
8	0:00:01	0:00:03	0:00:05	0:00:08	0:00:17
9	0:00:01	0:00:02	0:00:05	0:00:08	0:00:16
10	0:00:02	0:00:04	0:00:08	0:00:12	0:00:26
11	0:00:01	0:00:02	0:00:04	0:00:07	0:00:14
12	0:00:01	0:00:03	0:00:06	0:00:08	0:00:18
13	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
14	0:00:03	0:00:04	0:00:07	0:00:10	0:00:24
15	0:00:02	0:00:03	0:00:05	0:00:08	0:00:18
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:05:11

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Northbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1					0:00:00
2	0:00:02				0:00:02
3					0:00:00
4					0:00:00
5	0:00:01				0:00:01
6	0:00:02				0:00:02
7					0:00:00
8	0:00:02				0:00:02
9	0:00:01	0:00:03			0:00:04
10	0:00:01				0:00:01
11					0:00:00
12					0:00:00
13	0:00:03				0:00:03
14					0:00:00
15	0:00:02				0:00:02
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:00:17

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Southbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:01	0:00:03			0:00:04
2	0:00:01	0:00:02	0:00:05		0:00:08
3	0:00:02				0:00:02
4	0:00:01	0:00:04			0:00:05
5	0:00:03	0:00:06			0:00:09
6	0:00:01	0:00:05	0:00:08		0:00:14
7	0:00:01	0:00:02			0:00:03
8	0:00:03	0:00:07			0:00:10
9	0:00:02	0:00:05	0:00:07		0:00:14
10	0:00:03				0:00:03
11	0:00:01	0:00:03			0:00:04
12	0:00:02	0:00:05			0:00:07
13	0:00:01	0:00:04			0:00:05
14	0:00:02				0:00:02
15	0:00:01				0:00:01
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:01:31

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Eastbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03	0:00:05	0:00:07		0:00:15
2	0:00:02	0:00:03	0:00:05	0:00:08	0:00:18
3	0:00:02	0:00:05	0:00:08	0:00:10	0:00:25
4	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
5	0:00:01	0:00:03	0:00:05		0:00:09
6	0:00:04	0:00:06	0:00:08	0:00:10	0:00:28
7	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
8	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
9	0:00:04	0:00:06	0:00:09	0:00:13	0:00:32
10	0:00:02	0:00:04	0:00:05	0:00:08	0:00:19
11	0:00:02	0:00:03	0:00:05		0:00:10
12	0:00:01	0:00:02	0:00:06	0:00:09	0:00:18
13	0:00:02	0:00:05	0:00:06	0:00:08	0:00:21
14	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
15	0:00:02	0:00:04	0:00:08	0:00:10	0:00:24
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:05:04

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Westbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:01	0:00:03	0:00:05	0:00:06	0:00:15
2	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
3	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
4	0:00:01	0:00:03	0:00:04	0:00:06	0:00:14
5	0:00:02	0:00:06	0:00:07	0:00:09	0:00:24
6	0:00:03	0:00:05	0:00:08	0:00:09	0:00:25
7	0:00:01	0:00:04	0:00:06	0:00:08	0:00:19
8	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
9	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
10	0:00:03	0:00:05	0:00:06	0:00:09	0:00:23
11	0:00:02	0:00:05	0:00:07	0:00:08	0:00:22
12	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
13	0:00:01	0:00:03	0:00:06	0:00:08	0:00:18
14	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
15	0:00:02	0:00:04	0:00:06	0:00:07	0:00:19
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:04:55

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Northbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:01	0:00:03	0:00:05		0:00:09
2	0:00:00	0:00:03	0:00:04	0:00:07	0:00:14
3	0:00:03	0:00:05			0:00:08
4	0:00:00	0:00:02			0:00:02
5	0:00:00				0:00:00
6	0:00:02	0:00:04	0:00:05	0:00:08	0:00:19
7	0:00:05	0:00:08			0:00:13
8	0:00:01	0:00:03			0:00:04
9	0:00:00	0:00:01	0:00:04	0:00:06	0:00:11
10	0:00:02	0:00:04	0:00:06		0:00:12
11	0:00:03	0:00:05			0:00:08
12	0:00:01	0:00:03	0:00:06		0:00:10
13	0:00:00	0:00:02			0:00:02
14	0:00:02				0:00:02
15	0:00:04	0:00:07			0:00:11
16	0:00:01	0:00:03	0:00:06		0:00:10
17	0:00:00				0:00:00
18	0:00:03	0:00:05	0:00:07		0:00:15
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:02:30

Change to seconds				Find t1, t2, t3, t4				SUM	85%ile	Lost Time Adjustme
t1	t2	t3	t4	t1	t2	t3	t4			
1	3	5	0	1	2	2	0	5	7	4
0	3	4	7	0	3	1	3	7		
3	5	0	0	3	2	0	0	5		
0	2	0	0	0	2	0	0	2		
0	0	0	0	0	0	0	0	0		
2	4	5	8	2	2	1	3	8		
5	8	0	0	5	3	0	0	8		
1	3	0	0	1	2	0	0	3		
0	1	4	6	0	1	3	2	6		
2	4	6	0	2	2	2	0	6		
3	5	0	0	3	2	0	0	5		
1	3	6	0	1	2	3	0	6		
0	2	0	0	0	2	0	0	2		
2	0	0	0	2	0	0	0	2		
4	7	0	0	4	3	0	0	7		
1	3	6	0	1	2	3	0	6		
0	0	0	0	0	0	0	0	0		
3	5	7	0	3	2	2	0	7		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Eastbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03	0:00:06	0:00:07		0:00:16
2					0:00:00
3	0:00:01	0:00:03			0:00:04
4	0:00:00	0:00:02			0:00:02
5					0:00:00
6	0:00:02				0:00:02
7	0:00:00	0:00:02			0:00:02
8					0:00:00
9	0:00:03	0:00:05	0:00:07		0:00:15
10					0:00:00
11	0:00:02				0:00:02
12	0:00:01	0:00:03	0:00:06		0:00:10
13	0:00:00	0:00:02			0:00:02
14	0:00:02	0:00:04			0:00:06
15					0:00:00
16	0:00:02	0:00:05			0:00:07
17	0:00:01				0:00:01
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:01:09

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Southbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:05	0:00:07		0:00:14
2	0:00:01	0:00:04			0:00:05
3	0:00:01	0:00:04	0:00:08		0:00:13
4	0:00:00	0:00:03			0:00:03
5	0:00:00	0:00:02			0:00:02
6					0:00:00
7	0:00:00	0:00:04	0:00:06	0:00:09	0:00:19
8	0:00:01				0:00:01
9					0:00:00
10	0:00:01	0:00:03			0:00:04
11	0:00:02				0:00:02
12	0:00:03	0:00:04	0:00:07		0:00:14
13	0:00:00	0:00:02			0:00:02
14	0:00:01	0:00:04			0:00:05
15	0:00:03				0:00:03
16					0:00:00
17	0:00:03				0:00:03
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:01:30

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Northbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1					0:00:00
2	0:00:02				0:00:02
3					0:00:00
4					0:00:00
5	0:00:04				0:00:04
6	0:00:01				0:00:01
7					0:00:00
8					0:00:00
9	0:00:02				0:00:02
10	0:00:03				0:00:03
11	0:00:01				0:00:01
12					0:00:00
13	0:00:02				0:00:02
14	0:00:02	0:00:04			0:00:06
15					0:00:00
16	0:00:02				0:00:02
17	0:00:02				0:00:02
Grand Total					0:00:25

Change to seconds	Find t1, t2, t3, t4				TOTAL	85%ile	AVG
	t1	t2	t3	t4			
0	0	0	0	0	0	2.6	1.4
2	0	0	0	0	2		
0	0	0	0	0	0		
0	0	0	0	0	0		
4	0	0	0	0	4		
1	0	0	0	0	1		
0	0	0	0	0	0		
0	0	0	0	0	0		
2	0	0	0	0	2		
3	0	0	0	0	3		
1	0	0	0	0	1		
0	0	0	0	0	0		
2	0	0	0	0	2		
2	4	0	0	0	4		
0	0	0	0	0	0		
2	0	0	0	0	2		
2	0	0	0	0	2		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Southbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1					0:00:00
2	0:00:01				0:00:01
3					0:00:00
4					0:00:00
5	0:00:02				0:00:02
6					0:00:00
7					0:00:00
8	0:00:02				0:00:02
9					0:00:00
10					0:00:00
11	0:00:02				0:00:02
12	0:00:02				0:00:02
13					0:00:00
14					0:00:00
15					0:00:00
16	0:00:02				0:00:02
17					0:00:00
Grand Total					0:00:11

Change to seconds	Find t1, t2, t3, t4				TOTAL	85%ile	AVG
	t1	t2	t3	t4			
0	0	0	0	0	0	2.0	0.6
1	0	0	0	0	1		
0	0	0	0	0	0		
0	0	0	0	0	0		
2	0	0	0	0	2		
0	0	0	0	0	0		
0	0	0	0	0	0		
2	0	0	0	0	2		
0	0	0	0	0	0		
0	0	0	0	0	0		
2	0	0	0	0	2		
2	0	0	0	0	2		
0	0	0	0	0	0		
0	0	0	0	0	0		
0	0	0	0	0	0		
2	0	0	0	0	2		
0	0	0	0	0	0		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Eastbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:03	0:00:05	0:00:09	0:00:19
2	0:00:03	0:00:04	0:00:07	0:00:10	0:00:24
3	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
4	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
5	0:00:01	0:00:02	0:00:04	0:00:07	0:00:14
6	0:00:02	0:00:05	0:00:07	0:00:09	0:00:23
7	0:00:01	0:00:04	0:00:05	0:00:08	0:00:18
8	0:00:01	0:00:03	0:00:06	0:00:07	0:00:17
9	0:00:02	0:00:05	0:00:07	0:00:09	0:00:23
10	0:00:02	0:00:05	0:00:09	0:00:11	0:00:27
11	0:00:03	0:00:04	0:00:07	0:00:10	0:00:24
12	0:00:01	0:00:02	0:00:05	0:00:07	0:00:15
13	0:00:02	0:00:03	0:00:06	0:00:08	0:00:19
14	0:00:01	0:00:03	0:00:05	0:00:07	0:00:16
15	0:00:02	0:00:03	0:00:07	0:00:09	0:00:21
16	0:00:02	0:00:05	0:00:07	0:00:10	0:00:24
17	0:00:01	0:00:03	0:00:06	0:00:09	0:00:19
Grand Total				0:05:40	

Change to seconds				Find t1, t2, t3, t4				TOTAL	85%ile	AVG
				t1	t2	t3	t4			
2	3	5	9	2	1	2	4	9	10.0	8.5
3	4	7	10	3	1	3	3	10		
2	4	6	8	2	2	2	2	8		
2	3	5	7	2	1	2	2	7		
1	2	4	7	1	1	2	3	7		
2	5	7	9	2	3	2	2	9		
1	4	5	8	1	3	1	3	8		
1	3	6	7	1	2	3	1	7		
2	5	7	9	2	3	2	2	9		
2	5	9	11	2	3	4	2	11		
3	4	7	10	3	1	3	3	10		
1	2	5	7	1	1	3	2	7		
2	3	6	8	2	1	3	2	8		
1	3	5	7	1	2	2	2	7		
2	3	7	9	2	1	4	2	9		
2	5	7	10	2	3	2	3	10		
1	3	6	9	1	2	3	3	9		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Westbound

Cycle #	Time (seconds) between onset of green phase and...				
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	Total
1	0:00:01	0:00:03	0:00:08	0:00:10	0:00:22
2	0:00:01	0:00:04	0:00:05	0:00:08	0:00:18
3	0:00:03	0:00:06	0:00:08	0:00:10	0:00:27
4	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
5	0:00:03	0:00:05	0:00:08	0:00:11	0:00:27
6	0:00:02	0:00:04	0:00:07	0:00:10	0:00:23
7	0:00:01	0:00:05	0:00:08	0:00:10	0:00:24
8	0:00:01	0:00:03	0:00:05	0:00:08	0:00:17
9	0:00:04	0:00:05	0:00:07	0:00:09	0:00:25
10	0:00:02	0:00:04	0:00:05	0:00:07	0:00:18
11	0:00:01	0:00:02	0:00:04	0:00:06	0:00:13
12	0:00:02	0:00:03	0:00:05	0:00:07	0:00:17
13	0:00:03	0:00:05	0:00:08	0:00:10	0:00:26
14	0:00:02	0:00:03	0:00:07	0:00:10	0:00:22
15	0:00:02	0:00:05	0:00:07	0:00:08	0:00:22
16	0:00:01	0:00:02	0:00:04	0:00:05	0:00:12
17	0:00:02	0:00:05	0:00:07	0:00:09	0:00:23
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:05:58

Change to seconds	Find t1, t2, t3, t4				TOTAL	85%ile	AVG			
	t1	t2	t3	t4						
1	3	8	10	1	2	5	2	10	10.0	8.6
1	4	5	8	1	3	1	3	8		
3	6	8	10	3	3	2	2	10		
2	4	7	9	2	2	3	2	9		
3	5	8	11	3	2	3	3	11		
2	4	7	10	2	2	3	3	10		
1	5	8	10	1	4	3	2	10		
1	3	5	8	1	2	2	3	8		
4	5	7	9	4	1	2	2	9		
2	4	5	7	2	2	1	2	7		
1	2	4	6	1	1	2	2	6		
2	3	5	7	2	1	2	2	7		
3	5	8	10	3	2	3	2	10		
2	3	7	10	2	1	4	3	10		
2	5	7	8	2	3	2	1	8		
1	2	4	5	1	1	2	1	5		
2	5	7	9	2	3	2	2	9		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Northbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02				0:00:02
2					0:00:00
3	0:00:01	0:00:03			0:00:04
4					0:00:00
5					0:00:00
6	0:00:02	0:00:04			0:00:06
7	0:00:01				0:00:01
8	0:00:02	0:00:04			0:00:06
9					0:00:00
10	0:00:01				0:00:01
11	0:00:02	0:00:03	0:00:05		0:00:10
12	0:00:01	0:00:02			0:00:03
13					0:00:00
14	0:00:02				0:00:02
15	0:00:02	0:00:04			0:00:06
16					0:00:00
17	0:00:03				0:00:03
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:00:44

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Southbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
2	0:00:01	0:00:03	0:00:05		0:00:09
3	0:00:02	0:00:04	0:00:06		0:00:12
4	0:00:02	0:00:05			0:00:07
5	0:00:02	0:00:03	0:00:06		0:00:11
6	0:00:01	0:00:04	0:00:09		0:00:14
7	0:00:01				0:00:01
8	0:00:03	0:00:05	0:00:08		0:00:16
9	0:00:01	0:00:03	0:00:05	0:00:07	0:00:16
10	0:00:02	0:00:05	0:00:07		0:00:14
11	0:00:01	0:00:04			0:00:05
12	0:00:03	0:00:06	0:00:07		0:00:16
13	0:00:02	0:00:05	0:00:07		0:00:14
14	0:00:02	0:00:05	0:00:08		0:00:15
15	0:00:01	0:00:04	0:00:06		0:00:11
16	0:00:02	0:00:05			0:00:07
17	0:00:04				0:00:04
18	0:00:02	0:00:04			0:00:06
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:03:18

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Eastbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:04	0:00:06	0:00:07	0:00:19
2	0:00:01	0:00:03	0:00:05	0:00:06	0:00:15
3	0:00:01	0:00:04	0:00:06	0:00:08	0:00:19
4	0:00:02	0:00:04	0:00:05		0:00:11
5	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
6	0:00:03	0:00:04	0:00:06	0:00:09	0:00:22
7	0:00:01	0:00:03	0:00:05	0:00:08	0:00:17
8	0:00:02	0:00:03	0:00:06		0:00:11
9	0:00:01	0:00:04	0:00:08	0:00:12	0:00:25
10	0:00:01	0:00:04	0:00:07	0:00:09	0:00:21
11	0:00:02	0:00:05	0:00:08	0:00:10	0:00:25
12	0:00:02	0:00:04	0:00:07		0:00:13
13	0:00:02	0:00:04	0:00:05	0:00:08	0:00:19
14	0:00:02	0:00:05	0:00:08		0:00:15
15	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
16	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
17	0:00:04	0:00:06	0:00:07		0:00:17
18	0:00:02	0:00:03	0:00:06		0:00:11
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:05:22

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Westbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:03	0:00:05	0:00:08	0:00:10	0:00:26
2	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
3	0:00:02	0:00:04	0:00:08	0:00:09	0:00:23
4	0:00:04	0:00:06	0:00:08	0:00:10	0:00:28
5	0:00:01	0:00:03	0:00:04	0:00:07	0:00:15
6	0:00:03	0:00:05	0:00:07	0:00:09	0:00:24
7	0:00:01	0:00:03	0:00:05	0:00:05	0:00:14
8	0:00:02	0:00:04	0:00:05	0:00:09	0:00:20
9	0:00:02	0:00:05	0:00:07	0:00:10	0:00:24
10	0:00:01	0:00:03	0:00:06	0:00:08	0:00:18
11	0:00:02	0:00:05	0:00:06	0:00:09	0:00:22
12	0:00:03	0:00:05	0:00:08	0:00:11	0:00:27
13	0:00:02	0:00:04	0:00:05	0:00:08	0:00:19
14	0:00:02	0:00:04	0:00:07	0:00:10	0:00:23
15	0:00:01	0:00:03	0:00:06	0:00:09	0:00:19
16	0:00:01	0:00:04	0:00:08	0:00:10	0:00:23
17	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
18	0:00:03	0:00:05	0:00:07	0:00:09	0:00:24
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:06:32

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Northbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:00	0:00:01	0:00:03		0:00:04
2	0:00:01	0:00:02			0:00:03
3	0:00:03	0:00:06	0:00:08	0:00:10	0:00:27
4	0:00:02	0:00:04	0:00:07		0:00:13
5	0:00:02				0:00:02
6	0:00:00				0:00:00
7	0:00:03	0:00:07	0:00:09		0:00:19
8	0:00:01	0:00:03			0:00:04
9	0:00:00	0:00:01	0:00:03	0:00:06	0:00:10
10	0:00:01	0:00:03			0:00:04
11	0:00:02	0:00:05	0:00:08		0:00:15
12	0:00:01				0:00:01
13	0:00:05	0:00:06	0:00:08	0:00:10	0:00:29
14	0:00:02	0:00:04	0:00:06		0:00:12
15	0:00:00	0:00:03			0:00:03
16	0:00:01	0:00:02	0:00:05		0:00:08
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:02:34

change to seconds				t1	t2	t3	t4	SUM	85%ile	Lost Time Adjustme
0	1	3	0	0	1	2	0	3	8.75	6
1	2	0	0	1	1	0	0	2		
3	6	8	10	3	3	2	2	10		
2	4	7	0	2	2	3	0	7		
2	0	0	0	2	0	0	0	2		
0	0	0	0	0	0	0	0	0		
3	7	9	0	3	4	2	0	9		
1	3	0	0	1	2	0	0	3		
0	1	3	6	0	1	2	3	6		
1	3	0	0	1	2	0	0	3		
2	5	8	0	2	3	3	0	8		
1	0	0	0	1	0	0	0	1		
5	6	8	10	5	1	2	2	10		
2	4	6	0	2	2	2	0	6		
0	3	0	0	0	3	0	0	3		
1	2	5	0	1	1	3	0	5		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Eastbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:05	0:00:09	0:00:11	0:00:27
2	0:00:03	0:00:06			0:00:09
3	0:00:01				0:00:01
4	0:00:02	0:00:04			0:00:06
5	0:00:02	0:00:05	0:00:07		0:00:14
6	0:00:03				0:00:03
7	0:00:02	0:00:04	0:00:06		0:00:12
8	0:00:01				0:00:01
9					0:00:00
10	0:00:03	0:00:04			0:00:07
11	0:00:02	0:00:05	0:00:07	0:00:09	0:00:23
12	0:00:02	0:00:04	0:00:06		0:00:12
13	0:00:02	0:00:04			0:00:06
14	0:00:05				0:00:05
				Grand Total	0:02:06

change to seconds				t1	t2	t3	t4	SUM	85%ile	Lost Time Adjustme
2	5	9	11	2	3	4	2	11	7.1	4
3	6	0	0	3	3	0	0	6		
1	0	0	0	1	0	0	0	1		
2	4	0	0	2	2	0	0	4		
2	5	7	0	2	3	2	0	7		
3	0	0	0	3	0	0	0	3		
2	4	6	0	2	2	2	0	6		
1	0	0	0	1	0	0	0	1		
0	0	0	0	0	0	0	0	0		
3	4	0	0	3	1	0	0	4		
2	5	7	9	2	3	2	2	9		
2	4	6	0	2	2	2	0	6		
2	4	0	0	2	2	0	0	4		
5	0	0	0	5	0	0	0	5		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Southbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:05			0:00:07
2	0:00:01	0:00:03	0:00:06		0:00:10
3	0:00:02	0:00:04			0:00:06
4	0:00:02	0:00:05	0:00:07		0:00:14
5	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
6	0:00:01				0:00:01
7	0:00:01	0:00:03			0:00:04
8	0:00:03	0:00:05	0:00:08		0:00:16
9	0:00:02	0:00:05			0:00:07
10	0:00:02	0:00:04	0:00:07	0:00:10	0:00:23
11	0:00:01	0:00:04			0:00:05
12	0:00:03				0:00:03
13	0:00:02	0:00:05			0:00:07
14	0:00:01	0:00:03			0:00:04
Grand Total					0:02:08

change to seconds				t1	t2	t3	t4	SUM	85%ile	Lost Time Adjustme
2	5	0	0	2	3	0	0	5	8.05	5
1	3	6	0	1	2	3	0	6		
2	4	0	0	2	2	0	0	4		
2	5	7	0	2	3	2	0	7		
2	4	6	9	2	2	2	3	9		
1	0	0	0	1	0	0	0	1		
1	3	0	0	1	2	0	0	3		
3	5	8	0	3	2	3	0	8		
2	5	0	0	2	3	0	0	5		
2	4	7	10	2	2	3	3	10		
1	4	0	0	1	3	0	0	4		
3	0	0	0	3	0	0	0	3		
2	5	0	0	2	3	0	0	5		
1	3	0	0	1	2	0	0	3		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Southbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1					0:00:00
2					0:00:00
3	0:00:01				0:00:01
4					0:00:00
5					0:00:00
6					0:00:00
7					0:00:00
8					0:00:00
9					0:00:00
10	0:00:01				0:00:01
11	0:00:01				0:00:01
12					0:00:00
13					0:00:00
14					0:00:00
Grand Total					0:00:03

Change to seconds	Find t1, t2, t3, t4				TOTAL	85%ile	AVG
	t1	t2	t3	t4			
0	0	0	0	0	0	1.0	0.2
0	0	0	0	0	0		
1	0	0	0	0	1		
0	0	0	0	0	0		
0	0	0	0	0	0		
0	0	0	0	0	0		
0	0	0	0	0	0		
0	0	0	0	0	0		
0	0	0	0	0	0		
0	0	0	0	0	0		
1	0	0	0	0	1		
1	0	0	0	0	1		
0	0	0	0	0	0		
0	0	0	0	0	0		
0	0	0	0	0	0		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Eastbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:01	0:00:04	0:00:06	0:00:09	0:00:20
2	0:00:02	0:00:03	0:00:05	0:00:08	0:00:18
3	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
4	0:00:01	0:00:02	0:00:04	0:00:07	0:00:14
5	0:00:01	0:00:03	0:00:06	0:00:10	0:00:20
6	0:00:03	0:00:05	0:00:07	0:00:09	0:00:24
7	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
8	0:00:01	0:00:03	0:00:06	0:00:07	0:00:17
9	0:00:03	0:00:05	0:00:08	0:00:09	0:00:25
10	0:00:02	0:00:04	0:00:07	0:00:08	0:00:21
11	0:00:03	0:00:06	0:00:09	0:00:11	0:00:29
12	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
13	0:00:01	0:00:03	0:00:06	0:00:08	0:00:18
14	0:00:02	0:00:05	0:00:07	0:00:08	0:00:22
15					0:00:00
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
				Grand Total	0:04:54

Change to seconds				Find t1, t2, t3, t4				TOTAL	85%ile	AVG
				t1	t2	t3	t4			
1	4	6	9	1	3	2	3	9	9.1	8.6
2	3	5	8	2	1	2	3	8		
2	4	7	9	2	2	3	2	9		
1	2	4	7	1	1	2	3	7		
1	3	6	10	1	2	3	4	10		
3	5	7	9	3	2	2	2	9		
2	4	7	9	2	2	3	2	9		
1	3	6	7	1	2	3	1	7		
3	5	8	9	3	2	3	1	9		
2	4	7	8	2	2	3	1	8		
3	6	9	11	3	3	3	2	11		
2	4	7	9	2	2	3	2	9		
1	3	6	8	1	2	3	2	8		
2	5	7	8	2	3	2	1	8		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Joseph Brant Hospital-Condo Access

Westbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:01	0:00:04	0:00:06	0:00:09	0:00:20
2	0:00:02	0:00:03	0:00:05	0:00:08	0:00:18
3	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
4	0:00:03	0:00:05	0:00:09	0:00:10	0:00:27
5	0:00:04	0:00:05	0:00:07	0:00:09	0:00:25
6	0:00:01	0:00:02	0:00:04	0:00:07	0:00:14
7	0:00:02	0:00:04	0:00:08	0:00:11	0:00:25
8	0:00:01	0:00:04	0:00:05	0:00:08	0:00:18
9	0:00:01	0:00:03	0:00:06	0:00:09	0:00:19
10	0:00:03	0:00:05	0:00:08	0:00:10	0:00:26
11	0:00:03	0:00:04	0:00:06	0:00:09	0:00:22
12	0:00:01	0:00:05	0:00:07	0:00:09	0:00:22
13	0:00:03	0:00:06	0:00:08	0:00:09	0:00:26
14	0:00:02	0:00:05	0:00:07	0:00:10	0:00:24
15					0:00:00
16					0:00:00
17					0:00:00
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
				Grand Total	0:05:08

Change to seconds				Find t1, t2, t3, t4				TOTAL	85%ile	AVG
				t1	t2	t3	t4			
1	4	6	9	1	3	2	3	9	10.0	9.1
2	3	5	8	2	1	2	3	8		
2	4	7	9	2	2	3	2	9		
3	5	9	10	3	2	4	1	10		
4	5	7	9	4	1	2	2	9		
1	2	4	7	1	1	2	3	7		
2	4	8	11	2	2	4	3	11		
1	4	5	8	1	3	1	3	8		
1	3	6	9	1	2	3	3	9		
3	5	8	10	3	2	3	2	10		
3	4	6	9	3	1	2	3	9		
1	5	7	9	1	4	2	2	9		
3	6	8	9	3	3	2	1	9		
2	5	7	10	2	3	2	3	10		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Northbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1					0:00:00
2	0:00:02				0:00:02
3					0:00:00
4	0:00:01				0:00:01
5					0:00:00
6	0:00:02	0:00:04			0:00:06
7	0:00:01				0:00:01
8					0:00:00
9	0:00:01	0:00:02			0:00:03
10					0:00:00
11					0:00:00
12	0:00:02	0:00:05	0:00:07		0:00:14
13					0:00:00
14	0:00:02	0:00:04			0:00:06
15	0:00:01				0:00:01
16	0:00:01				0:00:01
17	0:00:02				0:00:02
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:00:37

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Southbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:01	0:00:02	0:00:05		0:00:08
2	0:00:01	0:00:04	0:00:07	0:00:09	0:00:21
3	0:00:01	0:00:03	0:00:05		0:00:09
4	0:00:02	0:00:07	0:00:09		0:00:18
5	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
6	0:00:01	0:00:03			0:00:04
7	0:00:03				0:00:03
8	0:00:01	0:00:04			0:00:05
9	0:00:02	0:00:04	0:00:06		0:00:12
10	0:00:02	0:00:05	0:00:08	0:00:11	0:00:26
11	0:00:03	0:00:06			0:00:09
12	0:00:03	0:00:04	0:00:07		0:00:14
13	0:00:01	0:00:04	0:00:05	0:00:08	0:00:18
14	0:00:01	0:00:03			0:00:04
15	0:00:02				0:00:02
16	0:00:02	0:00:05	0:00:07	0:00:09	0:00:23
17	0:00:02				0:00:02
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:03:18

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Eastbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:04	0:00:06	0:00:08	0:00:11	0:00:29
2	0:00:02	0:00:05	0:00:08		0:00:15
3	0:00:05	0:00:07	0:00:09	0:00:11	0:00:32
4	0:00:03	0:00:05	0:00:06	0:00:09	0:00:23
5	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
6	0:00:05	0:00:07	0:00:09	0:00:12	0:00:33
7	0:00:03	0:00:04	0:00:06	0:00:10	0:00:23
8	0:00:04	0:00:06	0:00:08	0:00:11	0:00:29
9	0:00:02	0:00:03	0:00:04	0:00:06	0:00:15
10	0:00:05	0:00:07	0:00:08		0:00:20
11	0:00:03	0:00:05	0:00:08	0:00:10	0:00:26
12	0:00:02	0:00:03	0:00:05	0:00:06	0:00:16
13	0:00:01	0:00:03	0:00:04	0:00:07	0:00:15
14	0:00:03	0:00:04	0:00:06	0:00:08	0:00:21
15	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
16	0:00:02	0:00:04	0:00:07	0:00:09	0:00:22
17	0:00:01	0:00:04	0:00:06	0:00:10	0:00:21
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:06:21

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & Lakeshore Rd & Maple Ave

Westbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
2	0:00:02	0:00:05	0:00:06	0:00:09	0:00:22
3	0:00:01	0:00:03	0:00:05	0:00:08	0:00:17
4	0:00:03	0:00:05	0:00:07	0:00:09	0:00:24
5	0:00:01	0:00:03	0:00:05	0:00:08	0:00:17
6	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
7	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
8	0:00:01	0:00:03	0:00:06	0:00:09	0:00:19
9	0:00:02	0:00:04	0:00:07	0:00:08	0:00:21
10	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
11	0:00:04	0:00:06	0:00:07		0:00:17
12	0:00:02	0:00:04	0:00:05	0:06	0:06:11
13	0:00:01	0:00:03	0:00:05	0:0;7	0:00:09
14	0:00:02	0:00:05	0:00:07	0:00:10	0:00:24
15	0:00:01	0:00:03	0:00:07	0:00:10	0:00:21
16	0:00:02	0:00:04	0:00:06	0:00:09	0:00:21
17	0:00:03	0:00:05	0:00:06	0:00:08	0:00:22
18					0:00:00
19					0:00:00
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:11:27

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW East Ramp Terminal

Northbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:00	0:00:02	0:00:05		0:00:07
2	0:00:01				0:00:01
3	0:00:04	0:00:07	0:00:09		0:00:20
4					0:00:00
5	0:00:01	0:00:03	0:00:06		0:00:10
6	0:00:03	0:00:05	0:00:08	0:00:09	0:00:25
7	0:00:01				0:00:01
8	0:00:01	0:00:02			0:00:03
9	0:00:00	0:00:02	0:00:06	0:00:08	0:00:16
10	0:00:03	0:00:04			0:00:07
11	0:00:01				0:00:01
12	0:00:04	0:00:07	0:00:10		0:00:21
13					0:00:00
14	0:00:02	0:00:03	0:00:05	0:00:08	0:00:18
15	0:00:01	0:00:02			0:00:03
16	0:00:01	0:00:03			0:00:04
17	0:00:03				0:00:03
18	0:00:02	0:00:05	0:00:09	0:00:12	0:00:28
19	0:00:01	0:00:02			0:00:03
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:02:51

change to seconds				t1	t2	t3	t4	SUM	85%ile	Lost Time Adjustme
0	2	5	0	0	2	3	0	5	9	6
1	0	0	0	1	0	0	0	1		
4	7	9	0	4	3	2	0	9		
0	0	0	0	0	0	0	0	0		
1	3	6	0	1	2	3	0	6		
3	5	8	9	3	2	3	1	9		
1	0	0	0	1	0	0	0	1		
1	2	0	0	1	1	0	0	2		
0	2	6	8	0	2	4	2	8		
3	4	0	0	3	1	0	0	4		
1	0	0	0	1	0	0	0	1		
4	7	10	0	4	3	3	0	10		
0	0	0	0	0	0	0	0	0		
2	3	5	8	2	1	2	3	8		
1	2	0	0	1	1	0	0	2		
1	3	0	0	1	2	0	0	3		
3	0	0	0	3	0	0	0	3		
2	5	9	12	2	3	4	3	12		
1	2	0	0	1	1	0	0	2		

Ontario Traffic Inc - Start-up Lost Time Form

Location: North Shore Blvd E & QEW West Ramp Terminal

Southbound

Cycle #	Time (seconds) between onset of green phase and...				Total
	1st Veh.	2nd Veh.	3rd Veh.	4th Veh.	
1	0:00:02	0:00:04	0:00:06		0:00:12
2	0:00:01	0:00:03			0:00:04
3	0:00:03	0:00:05			0:00:08
4	0:00:02	0:00:04			0:00:06
5	0:00:01				0:00:01
6	0:00:02	0:00:05	0:00:06	0:00:09	0:00:22
7	0:00:02				0:00:02
8	0:00:01	0:00:03			0:00:04
9					0:00:00
10	0:00:03				0:00:03
11	0:00:02	0:00:04	0:00:06		0:00:12
12	0:00:02	0:00:03			0:00:05
13	0:00:01	0:00:04			0:00:05
14	0:00:02	0:00:04	0:00:06	0:00:08	0:00:20
15	0:00:02				0:00:02
16	0:00:03	0:00:06			0:00:09
17	0:00:01	0:00:04			0:00:05
18	0:00:02				0:00:02
19	0:00:01	0:00:03	0:00:05		0:00:09
20					0:00:00
21					0:00:00
22					0:00:00
23					0:00:00
24					0:00:00
Grand Total					0:02:11

change to seconds				t1	t2	t3	t4	SUM	85%ile	Lost Time Adjustme
2	4	6	0	2	2	2	0	6	6	3
1	3	0	0	1	2	0	0	3		
3	5	0	0	3	2	0	0	5		
2	4	0	0	2	2	0	0	4		
1	0	0	0	1	0	0	0	1		
2	5	6	9	2	3	1	3	9		
2	0	0	0	2	0	0	0	2		
1	3	0	0	1	2	0	0	3		
0	0	0	0	0	0	0	0	0		
3	0	0	0	3	0	0	0	3		
2	4	6	0	2	2	2	0	6		
2	3	0	0	2	1	0	0	3		
1	4	0	0	1	3	0	0	4		
2	4	6	8	2	2	2	2	8		
2	0	0	0	2	0	0	0	2		
3	6	0	0	3	3	0	0	6		
1	4	0	0	1	3	0	0	4		
2	0	0	0	2	0	0	0	2		
1	3	5	0	1	2	2	0	5		

Appendix E

Saturation Flow Rate Field Data

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal

Date: July 4th, 2018

Westbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2		0:00:04				
3						
4						
5						
6	0:00:02					
7						0:00:12
8						
9						
10						
11						
12	0:00:02					
13	0:00:03					
14						0:00:11
15		0:00:04				
16						
17			0:00:06			
18		0:00:07				
19						
20						
21						
22						
23			0:00:06			
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26						
27	0:00:04					
28		0:00:05				
29	0:00:02					
30						0:00:13
31						
32						
33						
34	0:00:04					
35					0:00:12	
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal

Date: July 4th, 2018

Eastbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6	0:00:03					
7						
8						
9						
10						
11	0:00:02					
12		0:00:02				
13						
14						
15						
16						
17	0:00:03					
18						
19						
20						
21						
22						
23						
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25	0:00:02					
26						
27						
28		0:00:04				
29	0:00:03					
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal

Date: July 4th, 2018

Southbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3		0:00:03				
4						
5	0:00:02					
6				0:00:07		
7						
8						
9			0:00:07			
10						
11	0:00:02					
12						0:00:12
13	0:00:02					
14						
15						0:00:13
16						
17			0:00:07			
18			0:00:08			
19						
20					0:00:09	
21						
22		0:05				
23			0:00:06			
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26						0:00:13
27					0:00:10	
28						
29						
30						0:00:18
31						
32						
33			0:07			
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal

Date: July 4th, 2018

Westbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22			0:00:05			
23						
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25		0:00:05				
26						
27						
28						
29						
30		0:00:09				
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal

Date: July 4th, 2018

Eastbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11	0:00:02					
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26						
27						
28						
29						
30						
31						
32						
33						
34	0:00:03					
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal

Date: July 4th, 2018

Northbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2	0:00:04					
3						
4						
5			0:00:07			
6				0:00:10		
7						
8						
9		0:00:07				
10						
11						
12						
13			0:00:09			
14						
15			0:00:06			
16						
17	0:00:05					
18				0:00:10		
19						
20			0:00:08			
21					0:00:12	
22						
23		0:00:07				
24			0:00:08			

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25				0:00:11		
26						
27						0:00:14
28						
29			0:00:08			
30						
31						
32			0:00:07			
33			0:00:08			
34			0:00:07			
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal

Date: July 4th, 2018

Westbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3				0:00:06		
4			0:00:05			
5						
6						0:00:14
7						0:00:13
8			0:00:06			
9						0:00:14
10						
11					0:00:11	
12						
13			0:00:05			
14				0:00:08		
15						
16				0:00:06		
17						
18						0:00:13
19			0:00:04			
20					0:00:11	
21			0:00:04			
22					0:00:12	
23					0:00:13	
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25			0:00:06			
26						
27				0:00:10		
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal

Date: July 4th, 2018

Eastbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4			0:00:09			
5						
6						
7						
8				0:00:08		
9						
10						
11		0:00:04				
12						
13				0:00:06		
14						
15	0:00:02					
16						
17						
18		0:00:03				
19						
20						
21						
22					0:00:09	
23						
24		0:00:02				

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25	0:00:03					
26						
27						
28	0:00:02					
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal

Date: July 4th, 2018

Southbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2			0:00:05			
3						
4						
5						
6		0:00:04				
7				0:00:07		
8						
9						
10					0:00:12	
11			0:00:06			
12		0:00:04				
13						
14			0:00:06			
15						
16				0:00:08		
17						
18						0:00:13
19		0:00:06				
20						
21						
22				0:00:07		
23						
24			0:00:06			

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26	0:00:03					
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal

Date: July 4th, 2018

Westbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3	0:00:02					
4						
5						
6						
7						
8						
9	0:00:03					
10						
11						
12						
13						
14						
15						
16						
17		0:00:03				
18						
19						
20						
21						
22						
23						
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26						
27						
28						
29	0:00:02					
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal

Date: July 4th, 2018

Eastbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5	0:00:06					
6						
7						
8						
9		0:00:08				
10						
11						
12						
13						
14						
15						
16	0:00:04					
17						
18						
19						
20						
21						
22						
23						
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26						
27	0:00:05					
28						
29						
30						
31		0:00:06				
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal

Date: July 4th, 2018

Northbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3			0:00:09			
4						
5			0:00:07			
6					0:00:12	
7						
8		0:00:08				
9						
10			0:00:10			
11						
12				0:00:14		
13				0:00:12		
14					0:00:15	
15				0:00:13		
16				0:00:13		
17						
18			0:00:09			
19						
20				0:00:12		
21					0:00:12	
22						
23				0:00:14		
24			0:00:12			

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25				0:00:10		
26						
27				0:00:11		
28						
29					0:00:14	
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal

Date: July 7th, 2018

Westbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2	0:00:02					
3						
4						
5						
6						
7		0:00:04				
8						
9						
10					0:00:09	
11						
12						
13	0:00:03					
14						
15				0:00:07		
16						
17						
18						
19						
20			0:00:05			
21				0:00:08		
22						
23		0:00:05				
24			0:00:08			

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25					0:00:12	
26						
27						
28			0:00:08			
29						
30						
31						
32		0:00:06				
33				0:00:09		
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal

Date: July 7th, 2018

Eastbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7						
8	0:00:02					
9						
10						
11						
12			0:00:04			
13						
14						
15						
16						
17						
18	0:00:02					
19						
20		0:00:04				
21						
22						
23						
24		0:00:03				

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26						
27	0:00:02					
28						
29						
30						
31						
32						
33		0:00:02				
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW West Ramp Terminal

Date: July 7th, 2018

Southbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10		0:00:04				
11						
12						
13						
14						
15						0:00:14
16						
17						
18				0:00:10		
19						
20						
21						
22						
23		0:00:06				
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25		0:00:05				
26						
27			0:00:06			
28						
29		0:00:04				
30		0:00:05				
31						
32						
33		0:00:05				
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal

Date: July 7th, 2018

Westbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3				0:00:07		
4			0:00:05			
5						
6		0:00:04				
7						
8						
9						
10				0:00:09		
11			0:00:05			
12						
13						
14						
15		0:00:04				
16						
17						
18						
19				0:00:09		
20						
21						
22			0:00:08			
23						
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26			0:00:06			
27			0:00:07			
28	0:00:02					
29						
30						
31						
32						
33						
34	0:00:03					
35			0:00:05			
36						
37		0:00:05				
38			0:00:08			
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal

Date: July 7th, 2018

Eastbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10	0:00:03					
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26	0:00:02					
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Ontario Traffic Inc - Saturation Flow Study

Location: North Shore Blvd E & QEW East Ramp Terminal

Date: July 7th, 2018

Northbound

Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
1						
2						
3	0:00:03					
4						
5						
6		0:00:04				
7						
8						
9						
10			0:00:06			
11						
12						
13						
14						
15						
16						
17						
18		0:00:05				
19						
20						
21				0:00:09		
22						
23						
24			0:00:08			

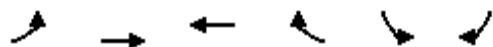
Cycle #	Time (seconds) between 4th vehicle and					
	5th Veh.	6th Veh.	7th Veh.	8th Veh.	9th Veh.	10th Veh.
25						
26	0:00:03					
27			0:00:08			
28					0:00:10	
29						
30		0:00:05				
31						
32						
33	0:00:03					
34						
35						
36				0:00:09		
37			0:00:07			
38		0:00:06				
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						

Appendix F

Existing Conditions Synchro and SimTraffic Reports

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	128	369	482	369	272	63
Future Volume (vph)	128	369	482	369	272	63
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			0.97		
Fr _t				0.850		0.850
Fl _t Protected	0.950				0.950	
Satd. Flow (prot)	1483	1561	1435	1220	1546	1397
Fl _t Permitted	0.260				0.950	
Satd. Flow (perm)	405	1561	1435	1186	1546	1397
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				415		68
Link Speed (k/h)		50	60		100	
Link Distance (m)		165.3	312.3		178.0	
Travel Time (s)		11.9	18.7		6.4	
Confl. Peds. (#/hr)	4			4		
Peak Hour Factor	0.95	0.95	0.89	0.89	0.93	0.93
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Adj. Flow (vph)	135	388	542	415	292	68
Shared Lane Traffic (%)						
Lane Group Flow (vph)	135	388	542	415	292	68
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	1.25	1.25	1.37	1.37	1.16	1.16
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Maximum Green (s)	8.0	40.0	29.0	20.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-1.4	-1.4
Total Lost Time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	43.5	40.5	31.3	50.3	21.4	21.4
Actuated g/C Ratio	0.60	0.55	0.43	0.69	0.29	0.29
v/c Ratio	0.38	0.45	0.88	0.43	0.64	0.15
Control Delay	9.8	11.7	39.7	1.8	30.2	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	11.7	39.7	1.8	30.2	6.4
LOS	A	B	D	A	C	A
Approach Delay		11.2	23.3		25.7	
Approach LOS		B	C		C	
Queue Length 50th (m)	7.4	29.0	70.0	0.0	34.7	0.0
Queue Length 95th (m)	14.4	48.0	#127.4	4.8	59.2	8.1
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	366	866	615	955	453	457
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.45	0.88	0.43	0.64	0.15

Intersection Summary

Area Type:	Other
Cycle Length:	73
Actuated Cycle Length:	73
Offset:	22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	20.3
Intersection LOS:	C

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

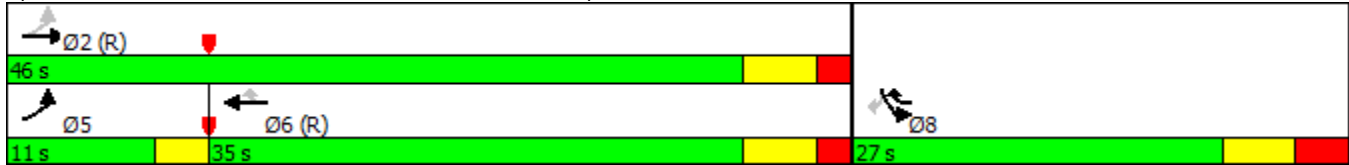
AM Peak Period
 Existing Conditions (2018)

Intersection Capacity Utilization 71.6% ICU Level of Service C

Analysis Period (min) 15

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Existing Conditions (2018)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↖
Traffic Volume (vph)	128	369	482	369	272	63
Future Volume (vph)	128	369	482	369	272	63
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Total Lost time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	1483	1561	1435	1199	1546	1397
Flt Permitted	0.26	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	406	1561	1435	1199	1546	1397
Peak-hour factor, PHF	0.95	0.95	0.89	0.89	0.93	0.93
Adj. Flow (vph)	135	388	542	415	292	68
RTOR Reduction (vph)	0	0	0	127	0	48
Lane Group Flow (vph)	135	388	542	288	292	20
Confl. Peds. (#/hr)	4			4		
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	30.7	50.7	20.0	20.0
Effective Green, g (s)	40.5	40.5	30.7	50.7	21.4	21.4
Actuated g/C Ratio	0.55	0.55	0.42	0.69	0.29	0.29
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	325	866	603	832	453	409
v/s Ratio Prot	0.04	c0.25	c0.38	0.09	c0.19	
v/s Ratio Perm	0.19			0.15		0.01
v/c Ratio	0.42	0.45	0.90	0.35	0.64	0.05
Uniform Delay, d1	9.8	9.6	19.7	4.5	22.5	18.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.7	18.8	1.1	6.9	0.2
Delay (s)	10.6	11.3	38.5	5.6	29.4	18.7
Level of Service	B	B	D	A	C	B
Approach Delay (s)		11.1	24.2		27.4	
Approach LOS		B	C		C	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Existing Conditions (2018)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	527	114	0	643	208	782
Future Volume (vph)	527	114	0	643	208	782
Ideal Flow (vphpl)	1440	1440	1246	1246	1266	1266
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2660	1202	0	2302	1192	1046
Flt Permitted					0.950	
Satd. Flow (perm)	2660	1165	0	2302	1192	1046
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		123				526
Link Speed (k/h)	60			60	48	
Link Distance (m)	312.3			111.4	163.6	
Travel Time (s)	18.7			6.7	12.3	
Confl. Peds. (#/hr)		8	8			
Peak Hour Factor	0.93	0.93	0.89	0.89	0.91	0.91
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Adj. Flow (vph)	567	123	0	722	229	859
Shared Lane Traffic (%)						
Lane Group Flow (vph)	567	123	0	722	229	859
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	1.40	1.40	1.66	1.66	1.63	1.63
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Existing Conditions (2018)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	25.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.6	
Total Lost Time (s)	6.0	6.0		6.0	4.4	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0	7.0	
Flash Dont Walk (s)	7.0	7.0		7.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	61.3	61.3		61.3	23.3	95.0
Actuated g/C Ratio	0.65	0.65		0.65	0.25	1.00
v/c Ratio	0.33	0.15		0.49	0.78	0.82
Control Delay	8.7	1.9		10.6	52.6	7.9
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	8.7	1.9		10.6	52.6	7.9
LOS	A	A		B	D	A
Approach Delay	7.5			10.6	17.3	
Approach LOS	A			B	B	
Queue Length 50th (m)	24.0	0.0		35.1	38.0	0.0
Queue Length 95th (m)	33.4	6.1		47.9	#70.5	0.0
Internal Link Dist (m)	288.3			87.4	139.6	
Turn Bay Length (m)						
Base Capacity (vph)	1716	795		1484	321	1046
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.33	0.15		0.49	0.71	0.82

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 12.6
 Intersection LOS: B
 Intersection Capacity Utilization 56.8%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

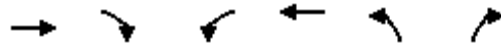
Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Existing Conditions (2018)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	527	114	0	643	208	782
Future Volume (vph)	527	114	0	643	208	782
Ideal Flow (vphp)	1440	1440	1246	1246	1266	1266
Total Lost time (s)	6.0	6.0		6.0	4.4	1.4
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2660	1165		2302	1192	1046
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2660	1165		2302	1192	1046
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.91	0.91
Adj. Flow (vph)	567	123	0	722	229	859
RTOR Reduction (vph)	0	44	0	0	0	0
Lane Group Flow (vph)	567	79	0	722	229	859
Confl. Peds. (#/hr)		8	8			
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	61.3	61.3		61.3	20.7	95.0
Effective Green, g (s)	61.3	61.3		61.3	23.3	95.0
Actuated g/C Ratio	0.65	0.65		0.65	0.25	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1716	751		1485	292	1046
v/s Ratio Prot	0.21			0.31	0.19	
v/s Ratio Perm		0.07				c0.82
v/c Ratio	0.33	0.11		0.49	0.78	0.82
Uniform Delay, d1	7.6	6.4		8.7	33.5	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.3		1.1	12.9	7.3
Delay (s)	8.1	6.7		9.9	46.4	7.3
Level of Service	A	A		A	D	A
Approach Delay (s)	7.9			9.9	15.5	
Approach LOS	A			A	B	

Intersection Summary

HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

AM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	1221	581	0	1	4
Future Volume (vph)	1	1221	581	0	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Fr _t					0.892	
Fl _t Protected	0.950				0.990	
Satd. Flow (prot)	1825	3544	3476	0	1696	0
Fl _t Permitted	0.950				0.990	
Satd. Flow (perm)	1825	3544	3476	0	1696	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	111.5		90.6	
Travel Time (s)		6.7	6.7		16.3	
Confl. Peds. (#/hr)	9			9		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	0%	0%	0%
Adj. Flow (vph)	1	1372	625	0	1	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	1372	625	0	5	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.8%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1065	146	62	532	11	37	0	41	14	0	12
Future Volume (vph)	11	1065	146	62	532	11	37	0	41	14	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	1.00			1.00		1.00		0.97	0.98	0.98	
Frt		0.982			0.997				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3473	0	1772	3459	0	1644	0	1400	1706	1606	0
Flt Permitted	0.421			0.170			0.749			0.950		
Satd. Flow (perm)	794	3473	0	317	3459	0	1291	0	1354	1670	1606	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			3				69			263
Link Speed (k/h)		60			60			20				20
Link Distance (m)		111.5			270.1			136.0				79.6
Travel Time (s)		6.7			16.2			24.5				14.3
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Adj. Flow (vph)	12	1145	157	70	598	12	40	0	45	15	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1302	0	70	610	0	40	0	45	15	13	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	1.13	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm		NA
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	59.0	59.0		11.0	70.0		40.0		40.0	40.0		40.0
Total Split (%)	53.6%	53.6%		10.0%	63.6%		36.4%		36.4%	36.4%		36.4%
Maximum Green (s)	53.0	53.0		7.0	64.0		33.0		33.0	33.0		33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	83.2	83.2		92.4	91.6		9.6		9.6	9.6		9.6
Actuated g/C Ratio	0.76	0.76		0.84	0.83		0.09		0.09	0.09		0.09
v/c Ratio	0.02	0.50		0.20	0.21		0.36		0.25	0.10		0.03
Control Delay	5.9	7.9		4.4	1.4		55.6		8.1	46.6		0.2
Queue Delay	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	5.9	7.9		4.4	1.4		55.6		8.1	46.6		0.2
LOS	A	A		A	A		E		A	D		A
Approach Delay		7.9			1.7			30.5				25.1
Approach LOS		A			A			C				C
Queue Length 50th (m)	0.7	59.3		1.0	6.0		8.3		0.0	3.0		0.0
Queue Length 95th (m)	2.8	87.3		4.6	7.1		18.7		5.5	9.1		0.0
Internal Link Dist (m)		87.5			246.1			112.0				55.6
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	600	2630		359	2881		387		454	501		665
Starvation Cap Reductn	0	0		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.02	0.50		0.19	0.21		0.10		0.10	0.03		0.02

Intersection Summary

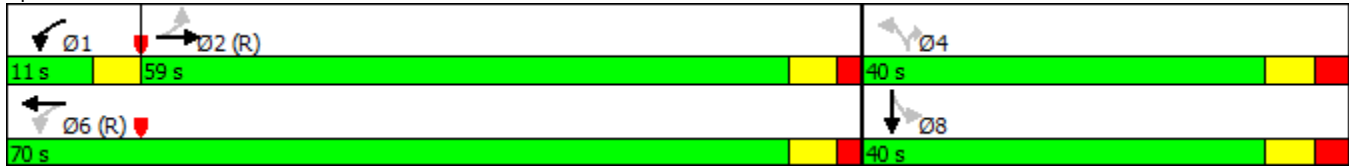
Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50

Lanes, Volumes, Timings
 4: Northshore Blvd & JBH Access

AM Peak Period
 Existing Conditions (2018)

Intersection Signal Delay: 7.0	Intersection LOS: A
Intersection Capacity Utilization 72.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: Northshore Blvd & JBH Access



HCM Signalized Intersection Capacity Analysis
4: Northshore Blvd & JBH Access

AM Peak Period
Existing Conditions (2018)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	1065	146	62	532	11	37	0	41	14	0	12
Future Volume (vph)	11	1065	146	62	532	11	37	0	41	14	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.97	1.00	0.98	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		1.00		1.00	0.98	1.00	
Frt	1.00	0.98		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1792	3472		1771	3459		1637		1354	1670	1606	
Flt Permitted	0.42	1.00		0.17	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	794	3472		317	3459		1291		1354	1670	1606	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1145	157	70	598	12	40	0	45	15	0	13
RTOR Reduction (vph)	0	5	0	0	1	0	0	0	42	0	12	0
Lane Group Flow (vph)	12	1297	0	70	609	0	40	0	3	15	1	0
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	79.7	79.7		89.0	89.0		8.0		8.0	8.0	8.0	
Effective Green, g (s)	79.7	79.7		89.0	89.0		8.0		8.0	8.0	8.0	
Actuated g/C Ratio	0.72	0.72		0.81	0.81		0.07		0.07	0.07	0.07	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	575	2515		326	2798		93		98	121	116	
v/s Ratio Prot		c0.37		0.01	c0.18							0.00
v/s Ratio Perm	0.02			0.16			c0.03		0.00	0.01		
v/c Ratio	0.02	0.52		0.21	0.22		0.43		0.03	0.12	0.01	
Uniform Delay, d1	4.2	6.7		3.6	2.4		48.8		47.4	47.7	47.3	
Progression Factor	1.00	1.00		1.41	0.48		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.8		0.3	0.2		3.2		0.1	0.5	0.0	
Delay (s)	4.3	7.4		5.4	1.3		52.0		47.5	48.2	47.3	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		7.4			1.8			49.6			47.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	790	112	137	429	34	34	105	246	48	82	142
Future Volume (vph)	218	790	112	137	429	34	34	105	246	48	82	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	1.00		0.99	0.96		0.98	0.98	
Frt		0.981			0.989			0.895			0.905	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	3313	0	1738	3434	0	1547	1606	0	1690	3161	0
Flt Permitted	0.470			0.115			0.601			0.197		
Satd. Flow (perm)	868	3313	0	210	3434	0	967	1606	0	344	3161	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			8			112			154	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		270.1			172.4			278.5			293.6	
Travel Time (s)		16.2			10.3			20.1			21.1	
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Adj. Flow (vph)	245	888	126	147	461	37	37	114	267	52	89	154
Shared Lane Traffic (%)												
Lane Group Flow (vph)	245	1014	0	147	498	0	37	381	0	52	243	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	53.8	50.8		49.0	46.0		34.5	25.0		35.2	27.0	
Actuated g/C Ratio	0.49	0.46		0.45	0.42		0.31	0.23		0.32	0.25	
v/c Ratio	0.45	0.66		0.63	0.35		0.11	0.84		0.27	0.27	
Control Delay	20.3	21.1		37.0	24.5		21.3	44.6		24.4	12.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.3	21.1		37.0	24.5		21.3	44.6		24.4	12.3	
LOS	C	C		D	C		C	D		C	B	
Approach Delay		21.0			27.4			42.6			14.4	
Approach LOS		C			C			D			B	
Queue Length 50th (m)	33.3	92.7		19.4	38.2		5.2	56.9		7.4	8.0	
Queue Length 95th (m)	54.7	123.3		#54.9	60.0		10.5	82.6		13.4	16.1	
Internal Link Dist (m)		246.1			148.4			254.5			269.6	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	548	1539		234	1440		341	587		195	1110	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.45	0.66		0.63	0.35		0.11	0.65		0.27	0.22	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 25.3
 Intersection LOS: C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

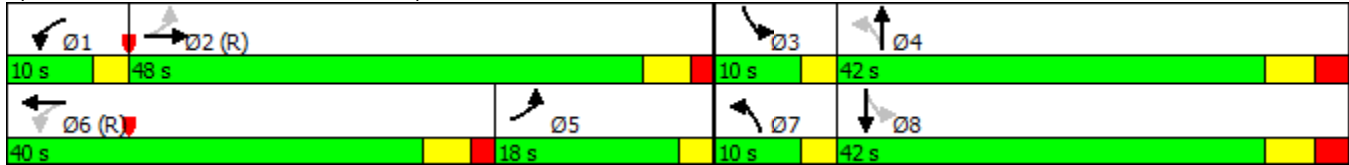
AM Peak Period
 Existing Conditions (2018)

Intersection Capacity Utilization 86.0% ICU Level of Service E

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Existing Conditions (2018)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	218	790	112	137	429	34	34	105	246	48	82	142
Future Volume (vph)	218	790	112	137	429	34	34	105	246	48	82	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.96		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.89		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1764	3314		1738	3434		1536	1605		1685	3161	
Flt Permitted	0.47	1.00		0.12	1.00		0.60	1.00		0.20	1.00	
Satd. Flow (perm)	872	3314		211	3434		972	1605		350	3161	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	888	126	147	461	37	37	114	267	52	89	154
RTOR Reduction (vph)	0	9	0	0	5	0	0	86	0	0	116	0
Lane Group Flow (vph)	245	1005	0	147	493	0	37	295	0	52	127	0
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	52.7	49.7		44.8	44.8		29.8	25.6		32.6	27.0	
Effective Green, g (s)	52.7	49.7		44.8	44.8		29.8	25.6		32.6	27.0	
Actuated g/C Ratio	0.48	0.45		0.41	0.41		0.27	0.23		0.30	0.25	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	539	1497		226	1398		284	373		171	775	
v/s Ratio Prot	0.06	c0.30		c0.06	0.14		0.00	c0.18		c0.02	0.04	
v/s Ratio Perm	0.16			0.21			0.03			0.07		
v/c Ratio	0.45	0.67		0.65	0.35		0.13	0.79		0.30	0.16	
Uniform Delay, d1	20.8	23.7		24.1	22.6		30.0	39.7		29.5	32.6	
Progression Factor	0.73	0.76		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	2.2		6.5	0.7		0.2	10.9		1.0	0.1	
Delay (s)	15.8	20.2		30.7	23.3		30.2	50.6		30.5	32.7	
Level of Service	B	C		C	C		C	D		C	C	
Approach Delay (s)		19.4			25.0			48.8			32.3	
Approach LOS		B			C			D			C	

Intersection Summary

HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queuing and Blocking Report AM Peak Period
Existing Conditions (2018)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.3	64.8	115.0	43.0
72.4	27.3				
Average Queue (m)		17.9	29.8	50.6	14.9
36.3	7.9				
95th Queue (m)	34.6	52.8	89.9	30.2	60.6
19.2					
Link Distance (m)		372.2	304.9	304.9	672.0
672.0					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		0	2		
Queuing Penalty (veh)		2	3		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		35.7	34.6	48.4	53.7
70.1	6.4				
Average Queue (m)		15.8	14.9	21.7	19.2
38.7	0.4				
95th Queue (m)	30.5	29.5	44.2	42.6	62.1

EXAM_sim_2.txt

6.6					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B22	B22
B22 SB					
Directions Served	L	T	T	T	T
LR					
Maximum Queue (m)		1.5	5.5	8.9	13.8
28.2 14.2 9.0					
Average Queue (m)		0.1	0.3	0.3	0.5
2.0 0.5 1.4					
95th Queue (m)	1.6	3.8	4.9	10.6	23.4
10.9 6.8					
Link Distance (m)		14.9	14.9	82.7	82.7
82.7 91.5					
Upstream Blk Time (%)			0	0	0
0 0					
Queuing Penalty (veh)			0	1	0
1 0					
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		1	0		

EXAM_sim_2.txt

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		21.2	84.0	94.3	27.1
34.2 32.9 27.4	25.7	18.7	10.3		
Average Queue (m)		1.8	35.4	42.1	9.9
12.1 10.7 9.7	6.2	3.8	2.8		
95th Queue (m)		11.1	73.4	81.9	27.9
26.6 22.4 17.0	12.3	9.6			
Link Distance (m)		99.8	99.8		245.5
245.5 132.6	62.4	62.4			
Upstream Blk Time (%)			0	0	
Queuing Penalty (veh)			0	1	
Storage Bay Dist (m)		45.0			70.0
30.0					
Storage Blk Time (%)		0	5		
1	0				
Queuing Penalty (veh)		0	0		
0	0				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		62.3	83.3	94.8	32.3
85.5 72.3 27.5	95.6	29.8	27.3	35.3	
Average Queue (m)		28.1	36.1	44.7	24.6
40.2 27.4 8.4	51.5	7.5	12.1	14.1	
95th Queue (m)		51.3	70.6	80.5	73.3
57.0 21.6 85.2	20.1	25.3	26.8		
Link Distance (m)		245.5	245.5		222.7
222.7 221.1		176.9	176.9		

EXAM_sim_2.txt

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (m)		165.0	30.0
	105.0	50.0	

Storage Blk Time (%)			9
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10	0	0	
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Queuing Penalty (veh)			20
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14	0	0	
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Network Summary

Network wide Queuing Penalty: 43

SimTraffic Report 09/05/2018

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	141	368	785	938	161	186
Future Volume (vph)	141	368	785	938	161	186
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.209				0.950	
Satd. Flow (perm)	387	1852	1807	1536	1370	1225
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				501		233
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Peak Hour Factor	0.98	0.98	0.94	0.94	0.80	0.80
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	144	376	835	998	201	233
Shared Lane Traffic (%)						
Lane Group Flow (vph)	144	376	835	998	201	233
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	1.02	1.02	1.05	1.05	1.40	1.40
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Existing Conditions (2018)



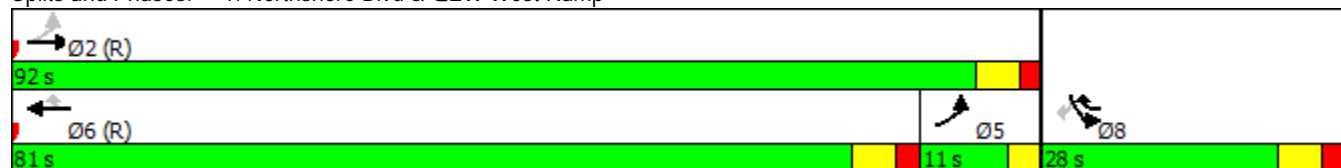
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Maximum Green (s)	8.0	86.0	75.0	21.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.8	-2.8	0.0	0.0	-3.2	-3.2
Total Lost Time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	91.8	88.8	75.0	102.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.85	0.20	0.20
v/c Ratio	0.34	0.27	0.74	0.72	0.73	0.54
Control Delay	8.4	5.7	11.3	5.5	61.3	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	5.7	11.3	5.5	61.3	10.2
LOS	A	A	B	A	E	B
Approach Delay		6.4	8.1		33.9	
Approach LOS		A	A		C	
Queue Length 50th (m)	7.4	25.1	64.9	17.0	44.7	0.0
Queue Length 95th (m)	12.2	36.1	m121.8	m47.5	61.7	12.8
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	419	1370	1129	1380	276	433
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.27	0.74	0.72	0.73	0.54

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	11.8
Intersection LOS:	B
Intersection Capacity Utilization:	78.3%
ICU Level of Service:	D
Analysis Period (min):	15

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Existing Conditions (2018)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	141	368	785	938	161	186
Future Volume (vph)	141	368	785	938	161	186
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Total Lost time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lane Util. Factor	1.00	1.00	1.00	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)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.21	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	386	1852	1807	1536	1370	1225
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	144	376	835	998	201	232
RTOR Reduction (vph)	0	0	0	100	0	186
Lane Group Flow (vph)	144	376	835	898	201	47
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	91.8	88.8	75.0	96.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.80	0.20	0.20
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	418	1370	1129	1318	276	247
v/s Ratio Prot	c0.03	0.20	c0.46	0.12	c0.15	
v/s Ratio Perm	0.23			0.47		0.04
v/c Ratio	0.34	0.27	0.74	0.68	0.73	0.19
Uniform Delay, d1	20.0	5.1	15.7	5.3	44.8	39.8
Progression Factor	1.00	1.00	0.50	2.01	1.00	1.00
Incremental Delay, d2	0.5	0.5	3.2	2.1	15.5	1.7
Delay (s)	20.5	5.6	11.0	12.6	60.3	41.5
Level of Service	C	A	B	B	E	D
Approach Delay (s)		9.7	11.9		50.2	
Approach LOS		A	B		D	

Intersection Summary

HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Existing Conditions (2018)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑	↗	↗
Traffic Volume (vph)	450	79	0	1489	234	538
Future Volume (vph)	450	79	0	1489	234	538
Ideal Flow (vphpl)	1000	1000	1805	1805	1694	1694
Storage Length (m)		70.0	0.0		0.0	0.0
Storage Lanes		1	0		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.98				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	1902	859	0	3433	1611	1441
Flt Permitted					0.950	
Satd. Flow (perm)	1902	838	0	3433	1611	1441
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		84				575
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		3	3			
Peak Hour Factor	0.94	0.94	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Adj. Flow (vph)	479	84	0	1654	257	591
Shared Lane Traffic (%)						
Lane Group Flow (vph)	479	84	0	1654	257	591
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	2.14	2.14	1.05	1.05	1.14	1.14
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Existing Conditions (2018)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	50.0	50.0		50.0	25.0	
Total Split (s)	95.0	95.0		95.0	25.0	
Total Split (%)	79.2%	79.2%		79.2%	20.8%	
Maximum Green (s)	89.0	89.0		89.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.9	
Total Lost Time (s)	6.0	6.0		6.0	4.1	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effect Green (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
v/c Ratio	0.34	0.13		0.65	0.92	0.41
Control Delay	3.7	0.5		5.2	85.6	0.9
Queue Delay	0.0	0.0		0.1	0.0	0.0
Total Delay	3.7	0.5		5.3	85.6	0.9
LOS	A	A		A	F	A
Approach Delay	3.3			5.3	26.5	
Approach LOS	A			A	C	
Queue Length 50th (m)	10.4	0.0		48.1	60.1	0.0
Queue Length 95th (m)	13.9	m0.3		61.1	#108.2	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)		70.0				
Base Capacity (vph)	1410	643		2546	280	1441
Starvation Cap Reductn	0	0		111	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.34	0.13		0.68	0.92	0.41

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 10.8
 Intersection LOS: B

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

PM Peak Period
 Existing Conditions (2018)

Intersection Capacity Utilization 66.3% ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

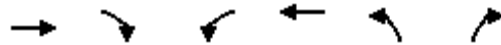
Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Existing Conditions (2018)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	450	79	0	1489	234	538
Future Volume (vph)	450	79	0	1489	234	538
Ideal Flow (vphp)	1000	1000	1805	1805	1694	1694
Total Lost time (s)	6.0	6.0		6.0	4.1	1.1
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1902	838		3433	1611	1441
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1902	838		3433	1611	1441
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	479	84	0	1654	257	591
RTOR Reduction (vph)	0	22	0	0	0	0
Lane Group Flow (vph)	479	62	0	1654	257	591
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1410	621		2546	280	1441
v/s Ratio Prot	0.25			c0.48	c0.16	
v/s Ratio Perm		0.07				0.41
v/c Ratio	0.34	0.10		0.65	0.92	0.41
Uniform Delay, d1	5.4	4.3		7.7	48.7	0.0
Progression Factor	0.57	0.14		0.51	1.00	1.00
Incremental Delay, d2	0.6	0.3		1.2	32.6	0.9
Delay (s)	3.7	0.9		5.1	81.4	0.9
Level of Service	A	A		A	F	A
Approach Delay (s)	3.3			5.1	25.3	
Approach LOS	A			A	C	

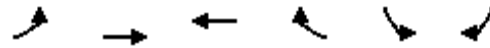
Intersection Summary

HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

PM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	818	1349	7	2	4
Future Volume (vph)	5	818	1349	7	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.910	
Flt Protected	0.950				0.984	
Satd. Flow (prot)	1825	3614	3608	0	1720	0
Flt Permitted	0.950				0.984	
Satd. Flow (perm)	1825	3614	3608	0	1720	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	21			21	1	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	14%	0%	0%
Adj. Flow (vph)	6	919	1451	8	2	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	919	1459	0	6	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.5%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	778	29	34	1285	19	62	0	41	8	1	9
Future Volume (vph)	13	778	29	34	1285	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00		0.98	0.99	0.99	
Frt		0.995			0.998				0.850		0.864	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3558	0	1825	3605	0	1789	0	1633	1825	1489	0
Flt Permitted	0.173			0.297			0.750			0.950		
Satd. Flow (perm)	331	3558	0	568	3605	0	1409	0	1604	1814	1489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			2				64		10	
Link Speed (k/h)		60			60			20			20	
Link Distance (m)		117.6			266.3			150.8			78.0	
Travel Time (s)		7.1			16.0			27.1			14.0	
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Adj. Flow (vph)	14	837	31	38	1444	21	67	0	45	9	1	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	868	0	38	1465	0	67	0	45	9	11	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	69.0	69.0		11.0	80.0		40.0		40.0	40.0		40.0
Total Split (%)	57.5%	57.5%		9.2%	66.7%		33.3%		33.3%	33.3%		33.3%
Maximum Green (s)	63.0	63.0		7.0	74.0		33.0		33.0	33.0		33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	93.6	93.6		100.6	99.8		11.4		11.4	11.4		11.4
Actuated g/C Ratio	0.78	0.78		0.84	0.83		0.10		0.10	0.10		0.10
v/c Ratio	0.05	0.31		0.07	0.49		0.50		0.21	0.05		0.07
Control Delay	5.6	4.6		2.1	2.7		63.7		8.0	47.8		26.0
Queue Delay	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	5.6	4.6		2.1	2.7		63.7		8.0	47.8		26.0
LOS	A	A		A	A		E		A	D		C
Approach Delay		4.6			2.7			41.3				35.8
Approach LOS		A			A			D				D
Queue Length 50th (m)	0.8	27.4		0.9	26.0		15.3		0.0	2.0		0.2
Queue Length 95th (m)	m2.3	37.2		m2.2	37.1		28.9		6.6	6.8		5.7
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	258	2776		549	2998		387		487	498		416
Starvation Cap Reductn	0	0		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.05	0.31		0.07	0.49		0.17		0.09	0.02		0.03

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 5.3
 Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

PM Peak Period
 Existing Conditions (2018)

Intersection Capacity Utilization 55.3% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis
4: JBH Access & Northshore Blvd

PM Peak Period
Existing Conditions (2018)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	13	778	29	34	1285	19	62	0	41	8	1	9
Future Volume (vph)	13	778	29	34	1285	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1818	3557		1822	3604		1785		1604	1814	1489	
Flt Permitted	0.17	1.00		0.30	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	331	3557		570	3604		1410		1604	1814	1489	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	837	31	38	1444	21	67	0	45	9	1	10
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	9	0
Lane Group Flow (vph)	14	867	0	38	1465	0	67	0	4	9	2	0
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Effective Green, g (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Actuated g/C Ratio	0.75	0.75		0.81	0.81		0.08		0.08	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	246	2649		501	2919		115		130	148	121	
v/s Ratio Prot		0.24		0.00	c0.41						0.00	
v/s Ratio Perm	0.04			0.06			c0.05		0.00	0.00		
v/c Ratio	0.06	0.33		0.08	0.50		0.58		0.03	0.06	0.02	
Uniform Delay, d1	4.1	5.2		2.5	3.6		53.1		50.7	50.9	50.7	
Progression Factor	0.82	0.76		0.72	0.55		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.3		0.1	0.5		7.3		0.1	0.2	0.0	
Delay (s)	3.8	4.2		1.9	2.5		60.4		50.8	51.0	50.7	
Level of Service	A	A		A	A		E		D	D	D	
Approach Delay (s)		4.2			2.5			56.6			50.9	
Approach LOS		A			A			E			D	

Intersection Summary		
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.53	A
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	55.3%	17.0
Analysis Period (min)	15	ICU Level of Service
		B

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	564	59	226	972	63	119	100	146	92	152	247
Future Volume (vph)	204	564	59	226	972	63	119	100	146	92	152	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor		0.99		0.96	0.99		0.95	0.83		0.83	0.94	
Frt		0.986			0.991			0.911				0.907
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3497	0	1789	3497	0	1789	1394	0	1755	3068	0
Flt Permitted	0.123			0.332			0.349			0.352		
Satd. Flow (perm)	234	3497	0	598	3497	0	627	1394	0	539	3068	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			6			63				268
Link Speed (k/h)		60			60			50				50
Link Distance (m)		266.3			172.2			236.6				191.7
Travel Time (s)		16.0			10.3			17.0				13.8
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Adj. Flow (vph)	229	634	66	243	1045	68	129	109	159	100	165	268
Shared Lane Traffic (%)												
Lane Group Flow (vph)	229	700	0	243	1113	0	129	268	0	100	433	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Existing Conditions (2018)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	15.0	49.0		15.0	49.0		12.0	44.0		12.0	44.0	
Total Split (%)	12.5%	40.8%		12.5%	40.8%		10.0%	36.7%		10.0%	36.7%	
Maximum Green (s)	12.0	43.0		12.0	43.0		9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	74.0	56.2		68.6	53.3		36.6	23.8		36.2	23.6	
Actuated g/C Ratio	0.62	0.47		0.57	0.44		0.30	0.20		0.30	0.20	
v/c Ratio	0.67	0.43		0.52	0.72		0.47	0.82		0.40	0.53	
Control Delay	41.6	21.7		16.0	32.3		33.0	53.9		31.4	17.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.6	21.7		16.0	32.3		33.0	53.9		31.4	17.1	
LOS	D	C		B	C		C	D		C	B	
Approach Delay		26.6			29.4			47.1			19.7	
Approach LOS		C			C			D			B	
Queue Length 50th (m)	33.7	37.7		23.7	113.1		21.7	47.3		16.6	17.4	
Queue Length 95th (m)	#61.1	70.8		45.1	#160.5		31.9	70.8		25.7	29.3	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	346	1643		479	1556		279	473		255	1131	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.66	0.43		0.51	0.72		0.46	0.57		0.39	0.38	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 29.2
 Intersection LOS: C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd









PM Peak Period
 Existing Conditions (2018)

Intersection Capacity Utilization 90.5% ICU Level of Service E

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	49 s	12 s	44 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	49 s	12 s	44 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Existing Conditions (2018)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	564	59	226	972	63	119	100	146	92	152	247
Future Volume (vph)	204	564	59	226	972	63	119	100	146	92	152	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.83		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.95	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3497		1763	3497		1764	1394		1663	3069	
Flt Permitted	0.12	1.00		0.33	1.00		0.35	1.00		0.35	1.00	
Satd. Flow (perm)	234	3497		616	3497		649	1394		616	3069	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	229	634	66	243	1045	68	129	109	159	100	165	268
RTOR Reduction (vph)	0	5	0	0	3	0	0	51	0	0	215	0
Lane Group Flow (vph)	229	695	0	243	1110	0	129	217	0	100	218	0
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	71.6	56.3		65.6	53.3		32.6	23.8		32.2	23.6	
Effective Green, g (s)	71.6	56.3		65.6	53.3		32.6	23.8		32.2	23.6	
Actuated g/C Ratio	0.60	0.47		0.55	0.44		0.27	0.20		0.27	0.20	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	339	1640		454	1553		258	276		240	603	
v/s Ratio Prot	c0.09	0.20		0.05	c0.32		c0.04	c0.16		0.03	0.07	
v/s Ratio Perm	0.32			0.24			0.10			0.08		
v/c Ratio	0.68	0.42		0.54	0.71		0.50	0.79		0.42	0.36	
Uniform Delay, d1	17.9	21.1		14.6	27.2		34.6	45.7		34.6	41.7	
Progression Factor	1.98	0.91		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.1	0.8		1.2	2.8		1.5	13.8		1.2	0.4	
Delay (s)	40.5	19.9		15.9	30.0		36.1	59.5		35.8	42.1	
Level of Service	D	B		B	C		D	E		D	D	
Approach Delay (s)		25.0			27.5			51.9			40.9	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queuing and Blocking Report PM Peak Period
Existing Conditions (2018)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	151.8	125.2	122.7
65.4 54.4					
Average Queue (m)		29.9	47.6	69.5	58.9
29.2 20.6					
95th Queue (m)	48.0	114.4	109.4	99.5	51.6
40.3					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		12	5		
Queuing Penalty (veh)		45	7		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	EB	WB	WB
NB NB					
Directions Served	T	T	R	T	T
L R					
Maximum Queue (m)		21.8	24.1	10.0	51.7
55.8 111.4 3.5					
Average Queue (m)		8.1	6.7	0.6	23.0
24.3 57.1 0.1					
95th Queue (m)	19.8	18.5	4.4	45.4	48.2

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103.8	2.7				
Link Distance (m)		304.9	304.9	82.7	82.7
662.3	662.3				
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				70.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	WB	WB
SB					
Directions Served	L	T	T	T	TR
LR					
Maximum Queue (m)		9.0	8.1	4.2	12.0
6.6	9.0				
Average Queue (m)		0.8	0.5	0.1	0.6
0.4	1.2				
95th Queue (m)	5.0	4.3	2.4	5.2	5.1
6.2					
Link Distance (m)		14.9	14.9	99.4	99.4
91.5					
Upstream Blk Time (%)		0	0	0	
Queuing Penalty (veh)		0	0	0	
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		1	0		
Queuing Penalty (veh)		6	0		

EXPM_sim_2.txt

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		7.9	45.6	49.1	10.0
45.2 49.3 30.7	24.5	12.6	13.0		
Average Queue (m)		1.6	15.5	18.6	4.4
15.1 16.9 13.4	5.5	2.1	2.2		
95th Queue (m)		6.4	36.9	39.8	10.9
37.5 27.1 16.9	8.3	8.9			
Link Distance (m)		99.4	99.4		242.6
242.6	137.1	65.8	65.8		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		45.0			70.0
	30.0				
Storage Blk Time (%)			0		
	2	0			
Queuing Penalty (veh)			0		
	1	0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		81.3	65.1	65.9	32.4
230.4 228.1 58.2	95.6	44.3	43.6	68.4	
Average Queue (m)		35.0	33.2	38.0	28.4
162.3 146.7 21.7	41.7	13.6	19.6	32.4	
95th Queue (m)		64.8	57.1	60.9	241.9
227.1 42.6 77.6	30.3	34.6	56.3		
Link Distance (m)		242.6	242.6		222.7
222.7	224.7	176.9	176.9		

EXPM_sim_2.txt

Upstream Blk Time (%)

6 3

Queuing Penalty (veh)

0 0

Storage Bay Dist (m)

105.0

165.0

30.0

50.0

Storage Blk Time (%)

47

0

0

0

0

13

Queuing Penalty (veh)

106

0

0

0

0

65

Network Summary

Network wide Queuing Penalty: 230

SimTraffic Report 09/05/2018

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HCM Signalized Intersection Capacity Analysis

1: Northshore Blvd & QEW West Ramp

Weekend Peak Period
Existing Conditions (2018)

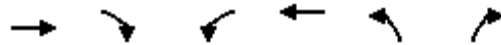


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	113	383	554	576	243	57
Future Volume (vph)	113	383	554	576	243	57
Ideal Flow (vphpl)	2129	2129	1575	1575	1518	1518
Total Lost time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	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
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)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.27	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	565	2153	1577	1340	1299	1305
Peak-hour factor, PHF	0.84	0.84	0.93	0.93	0.89	0.89
Adj. Flow (vph)	135	456	596	619	273	64
RTOR Reduction (vph)	0	0	0	148	0	46
Lane Group Flow (vph)	135	456	596	471	273	18
Confl. Peds. (#/hr)					5	
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	59.0	56.0	44.0	70.0	26.0	26.0
Effective Green, g (s)	60.5	57.5	44.0	70.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.74	0.27	0.27
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	516	1303	730	1086	355	357
v/s Ratio Prot	0.03	c0.21	c0.38	0.12	c0.21	
v/s Ratio Perm	0.14			0.23		0.01
v/c Ratio	0.26	0.35	0.82	0.43	0.77	0.05
Uniform Delay, d1	17.8	9.4	22.0	4.8	31.7	25.4
Progression Factor	1.00	1.00	0.69	1.38	1.00	1.00
Incremental Delay, d2	0.3	0.7	8.1	1.0	14.8	0.3
Delay (s)	18.1	10.1	23.3	7.7	46.5	25.7
Level of Service	B	B	C	A	D	C
Approach Delay (s)		12.0	15.3		42.6	
Approach LOS		B	B		D	
Intersection Summary						
HCM 2000 Control Delay			18.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.74			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	14.5
Intersection Capacity Utilization			71.8%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Weekend Peak Period
Existing Conditions (2018)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	410	216	0	923	207	570
Future Volume (vph)	410	216	0	923	207	570
Ideal Flow (vphp)	1450	1450	1670	1670	1450	1450
Total Lost time (s)	6.0	6.0		6.0	4.8	1.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2434	1091		2859	1254	1122
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2434	1091		2859	1254	1122
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.76	0.76
Adj. Flow (vph)	446	235	0	961	272	750
RTOR Reduction (vph)	0	86	0	0	0	0
Lane Group Flow (vph)	446	149	0	961	272	750
Confl. Peds. (#/hr)		6	6		1	
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	60.1	60.1		60.1	21.9	95.0
Effective Green, g (s)	60.1	60.1		60.1	24.1	95.0
Actuated g/C Ratio	0.63	0.63		0.63	0.25	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1539	690		1808	318	1122
v/s Ratio Prot	0.18			0.34	c0.22	
v/s Ratio Perm		0.14				c0.67
v/c Ratio	0.29	0.22		0.53	0.86	0.67
Uniform Delay, d1	7.8	7.4		9.7	33.8	0.0
Progression Factor	0.62	0.16		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.6		1.1	19.6	3.2
Delay (s)	5.3	1.8		10.8	53.3	3.2
Level of Service	A	A		B	D	A
Approach Delay (s)	4.1			10.8	16.5	
Approach LOS	A			B	B	

Intersection Summary

HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

Weekend Peak Period
Existing Conditions (2018)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	27	904	52	37	975	19	75	0	51	32	0	16
Future Volume (vph)	27	904	52	37	975	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1815	3574		1824	3601		1767		1572	1814	1609	
Flt Permitted	0.26	1.00		0.23	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	487	3574		442	3601		1388		1572	1814	1609	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	972	56	42	1096	21	82	0	55	35	0	17
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	49	0	15	0
Lane Group Flow (vph)	29	1026	0	42	1116	0	82	0	6	35	2	0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Effective Green, g (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Actuated g/C Ratio	0.66	0.66		0.75	0.75		0.11		0.11	0.11	0.11	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	323	2370		389	2700		146		165	191	169	
v/s Ratio Prot		c0.29		0.00	c0.31							0.00
v/s Ratio Perm	0.06			0.08			c0.06		0.00	0.02		
v/c Ratio	0.09	0.43		0.11	0.41		0.56		0.04	0.18	0.01	
Uniform Delay, d1	5.4	7.2		3.6	4.1		38.3		36.1	36.7	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.6		0.1	0.5		4.9		0.1	0.5	0.0	
Delay (s)	6.0	7.7		3.7	4.5		43.1		36.2	37.2	36.1	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		7.7			4.5			40.4			36.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Weekend Peak Period
Existing Conditions (2018)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕		↗	↕		↖	↕	
Traffic Volume (vph)	190	621	176	315	570	47	196	120	182	100	242	265
Future Volume (vph)	190	621	176	315	570	47	196	120	182	100	242	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.93		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.91		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1791	3463		1806	3538		1805	1606		1733	3320	
Flt Permitted	0.38	1.00		0.17	1.00		0.26	1.00		0.27	1.00	
Satd. Flow (perm)	716	3463		320	3538		503	1606		493	3320	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	213	698	198	339	613	51	213	130	198	109	263	288
RTOR Reduction (vph)	0	23	0	0	4	0	0	57	0	0	209	0
Lane Group Flow (vph)	213	873	0	339	660	0	213	271	0	109	342	0
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	53.7	42.0		63.4	48.7		30.6	23.6		30.6	23.6	
Effective Green, g (s)	53.7	42.0		63.4	48.7		30.6	23.6		30.6	23.6	
Actuated g/C Ratio	0.49	0.38		0.58	0.44		0.28	0.21		0.28	0.21	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	463	1322		433	1566		222	344		216	712	
v/s Ratio Prot	0.05	0.25		c0.13	0.19		c0.06	0.17		0.03	0.10	
v/s Ratio Perm	0.18			c0.32			c0.21			0.11		
v/c Ratio	0.46	0.66		0.78	0.42		0.96	0.79		0.50	0.48	
Uniform Delay, d1	16.4	28.1		18.0	21.0		36.9	40.8		31.3	37.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	2.6		9.0	0.8		48.4	11.3		1.9	0.5	
Delay (s)	17.1	30.7		27.0	21.8		85.2	52.1		33.2	38.3	
Level of Service	B	C		C	C		F	D		C	D	
Approach Delay (s)		28.1			23.6			65.1			37.5	
Approach LOS		C			C			E			D	

Intersection Summary

HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

EXSAT_sim_2.txt

Queuing and Blocking Report Weekend Peak Period
Existing Conditions (2018)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.1	78.4	91.0	58.0
64.5	16.6				
Average Queue (m)		21.1	32.6	42.3	20.2
36.5	5.8				
95th Queue (m)	37.9	60.0	76.6	41.3	59.0
13.4					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		1	3		
Queuing Penalty (veh)		3	3		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B22
B22					
NB					
Directions Served	T	T	T	T	T
T					
L					
Maximum Queue (m)		23.1	20.0	75.3	78.4
1.4	2.3	68.6			
Average Queue (m)		8.6	6.4	28.5	29.3
0.0	0.1	36.8			
95th Queue (m)	19.8	17.0	60.2	61.6	1.1

EXSAT_sim_2.txt

1.8	59.7					
Link Distance (m)		304.9	304.9	82.7	82.7	14.9
14.9	662.3					
Upstream Blk Time (%)					0	0
	0					
Queuing Penalty (veh)					0	1
	0					
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Northshore Blvd & Site Driveway

Movement	WB	SB		
Directions Served	TR	LR		
Maximum Queue (m)		4.1	12.2	
Average Queue (m)		0.1	1.3	
95th Queue (m)	2.3	7.0		
Link Distance (m)	99.4	91.5		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: JBH Access & Northshore Blvd

Movement			EB	EB	EB	WB	WB
WB	NB	NB	SB	SB			
Directions Served			L	T	TR	L	T
TR	L	R	L	TR			
Maximum Queue (m)				19.1	55.9	56.0	16.3
63.5	67.0	30.7	27.2	20.7	10.1		
Average Queue (m)				4.2	21.7	28.1	5.2
24.1	27.3	14.4	6.5	6.1	2.7		
95th Queue (m)			14.4	44.8	49.6	13.1	50.8

EXSAT_sim_2.txt

55.2	27.2	16.8	15.7	9.0		
Link Distance (m)				99.4	99.4	242.6
242.6		137.1	65.8	65.8		
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)				45.0		70.0
		30.0				
Storage Blk Time (%)				0	1	
0	1		0			
Queuing Penalty (veh)				0	0	
0	1		0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement			EB	EB	EB	WB	WB
WB	NB	NB	SB	SB	SB		
Directions Served			L	T	TR	L	T
TR	L	TR	L	T	TR		
Maximum Queue (m)				58.3	82.1	91.8	32.4
203.9	190.6	83.7	113.5	40.4	54.1	75.1	
Average Queue (m)				26.3	47.0	54.6	31.7
132.1	106.9	33.5	50.0	14.4	30.2	37.0	
95th Queue (m)				48.1	73.7	82.9	227.4
196.1	65.1	95.1	30.4	48.4	65.2		
Link Distance (m)				242.6	242.6		222.7
222.7		224.7		176.9	176.9		
Upstream Blk Time (%)							
11	0						
Queuing Penalty (veh)							
0	0						
Storage Bay Dist (m)				165.0			30.0
		105.0		50.0			
Storage Blk Time (%)							62
17	0		1	0	0		
Queuing Penalty (veh)							177
53	0		3	0	0		

EXSAT_sim_2.txt

Network Summary

Network wide Queuing Penalty: 242

SimTraffic Report 09/05/2018

EXSAT_sim_2.syn Page 0

Appendix G

Future Background Synchro and SimTraffic Reports

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	141	396	521	410	301	70
Future Volume (vph)	141	396	521	410	301	70
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			0.97		
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1483	1561	1435	1220	1546	1397
Flt Permitted	0.204				0.950	
Satd. Flow (perm)	318	1561	1435	1186	1546	1397
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				457		75
Link Speed (k/h)		50	60		100	
Link Distance (m)		165.3	312.3		178.0	
Travel Time (s)		11.9	18.7		6.4	
Confl. Peds. (#/hr)	4			4		
Peak Hour Factor	0.95	0.95	0.89	0.89	0.93	0.93
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Adj. Flow (vph)	148	417	585	461	324	75
Shared Lane Traffic (%)						
Lane Group Flow (vph)	148	417	585	461	324	75
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	1.25	1.25	1.37	1.37	1.16	1.16
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Maximum Green (s)	8.0	40.0	29.0	20.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-1.4	-1.4
Total Lost Time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	43.5	40.5	29.4	48.4	21.4	21.4
Actuated g/C Ratio	0.60	0.55	0.40	0.66	0.29	0.29
v/c Ratio	0.47	0.48	1.01	0.49	0.72	0.16
Control Delay	11.7	12.2	65.7	2.2	33.7	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	12.2	65.7	2.2	33.7	6.3
LOS	B	B	E	A	C	A
Approach Delay		12.1	37.7		28.6	
Approach LOS		B	D		C	
Queue Length 50th (m)	8.2	31.9	~82.8	0.2	39.4	0.0
Queue Length 95th (m)	15.7	52.8	#141.1	5.2	#73.6	8.5
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	325	866	578	949	453	462
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.48	1.01	0.49	0.72	0.16

Intersection Summary

Area Type:	Other
Cycle Length:	73
Actuated Cycle Length:	73
Offset:	22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	28.7
Intersection LOS:	C

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

AM Peak Period
 Future Background (2023)

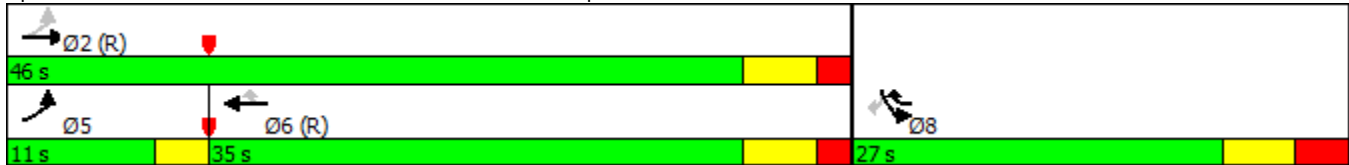
Intersection Capacity Utilization 77.0% ICU Level of Service D

Analysis Period (min) 15

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

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Background (2023)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	141	396	521	410	301	70
Future Volume (vph)	141	396	521	410	301	70
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Total Lost time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	1483	1561	1435	1200	1546	1397
Flt Permitted	0.20	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	319	1561	1435	1200	1546	1397
Peak-hour factor, PHF	0.95	0.95	0.89	0.89	0.93	0.93
Adj. Flow (vph)	148	417	585	461	324	75
RTOR Reduction (vph)	0	0	0	148	0	53
Lane Group Flow (vph)	148	417	585	313	324	22
Confl. Peds. (#/hr)	4			4		
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	29.4	49.4	20.0	20.0
Effective Green, g (s)	40.5	40.5	29.4	49.4	21.4	21.4
Actuated g/C Ratio	0.55	0.55	0.40	0.68	0.29	0.29
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	306	866	577	812	453	409
v/s Ratio Prot	c0.05	0.27	c0.41	0.11	c0.21	
v/s Ratio Perm	0.21			0.16		0.02
v/c Ratio	0.48	0.48	1.01	0.39	0.72	0.05
Uniform Delay, d1	10.7	9.9	21.8	5.2	23.1	18.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.9	41.0	1.4	9.3	0.2
Delay (s)	11.9	11.8	62.8	6.5	32.4	18.8
Level of Service	B	B	E	A	C	B
Approach Delay (s)		11.8	38.0		29.8	
Approach LOS		B	D		C	

Intersection Summary			
HCM 2000 Control Delay	29.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	571	126	0	701	230	866
Future Volume (vph)	571	126	0	701	230	866
Ideal Flow (vphpl)	1440	1440	1246	1246	1266	1266
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2660	1202	0	2302	1192	1046
Flt Permitted					0.950	
Satd. Flow (perm)	2660	1165	0	2302	1192	1046
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		135				503
Link Speed (k/h)	60			60	48	
Link Distance (m)	312.3			111.4	163.6	
Travel Time (s)	18.7			6.7	12.3	
Confl. Peds. (#/hr)		8	8			
Peak Hour Factor	0.93	0.93	0.89	0.89	0.91	0.91
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Adj. Flow (vph)	614	135	0	788	253	952
Shared Lane Traffic (%)						
Lane Group Flow (vph)	614	135	0	788	253	952
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	1.40	1.40	1.66	1.66	1.63	1.63
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.6	
Total Lost Time (s)	6.0	6.0		6.0	4.4	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	60.5	60.5		60.5	24.1	95.0
Actuated g/C Ratio	0.64	0.64		0.64	0.25	1.00
v/c Ratio	0.36	0.17		0.54	0.83	0.91
Control Delay	9.2	1.9		11.6	57.6	15.1
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	9.2	1.9		11.6	57.6	15.1
LOS	A	A		B	E	B
Approach Delay	7.9			11.6	24.0	
Approach LOS	A			B	C	
Queue Length 50th (m)	26.6	0.0		39.9	43.0	0.0
Queue Length 95th (m)	36.7	6.4		54.3	#81.7	#35.4
Internal Link Dist (m)	288.3			87.4	139.6	
Turn Bay Length (m)						
Base Capacity (vph)	1693	790		1465	321	1046
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.36	0.17		0.54	0.79	0.91

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 16.0
 Intersection LOS: B
 Intersection Capacity Utilization 58.6%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Background (2023)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	571	126	0	701	230	866
Future Volume (vph)	571	126	0	701	230	866
Ideal Flow (vphp)	1440	1440	1246	1246	1266	1266
Total Lost time (s)	6.0	6.0		6.0	4.4	1.4
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2660	1165		2302	1192	1046
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2660	1165		2302	1192	1046
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.91	0.91
Adj. Flow (vph)	614	135	0	788	253	952
RTOR Reduction (vph)	0	49	0	0	0	0
Lane Group Flow (vph)	614	86	0	788	253	952
Confl. Peds. (#/hr)		8	8			
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	60.5	60.5		60.5	21.5	95.0
Effective Green, g (s)	60.5	60.5		60.5	24.1	95.0
Actuated g/C Ratio	0.64	0.64		0.64	0.25	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1694	741		1466	302	1046
v/s Ratio Prot	0.23			0.34	0.21	
v/s Ratio Perm		0.07				c0.91
v/c Ratio	0.36	0.12		0.54	0.84	0.91
Uniform Delay, d1	8.1	6.8		9.5	33.6	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.3		1.4	18.0	13.2
Delay (s)	8.7	7.1		10.9	51.6	13.2
Level of Service	A	A		B	D	B
Approach Delay (s)	8.4			10.9	21.2	
Approach LOS	A			B	C	

Intersection Summary

HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

AM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	1349	671	0	1	4
Future Volume (vph)	1	1349	671	0	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Fr _t					0.892	
Fl _t Protected	0.950				0.990	
Satd. Flow (prot)	1825	3544	3476	0	1696	0
Fl _t Permitted	0.950				0.990	
Satd. Flow (perm)	1825	3544	3476	0	1696	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	111.5		90.6	
Travel Time (s)		6.7	6.7		16.3	
Confl. Peds. (#/hr)	9			9		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	0%	0%	0%
Adj. Flow (vph)	1	1516	722	0	1	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	1516	722	0	5	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1193	146	62	622	11	37	0	41	14	0	12
Future Volume (vph)	11	1193	146	62	622	11	37	0	41	14	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	1.00			1.00		1.00		0.97	0.98	0.98	
Frt		0.984			0.997				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3480	0	1772	3460	0	1644	0	1400	1706	1606	0
Flt Permitted	0.381			0.140			0.749			0.950		
Satd. Flow (perm)	721	3480	0	261	3460	0	1291	0	1354	1670	1606	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			3				69			208
Link Speed (k/h)		60			60			20				20
Link Distance (m)		111.5			270.1			136.0				79.6
Travel Time (s)		6.7			16.2			24.5				14.3
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Adj. Flow (vph)	12	1283	157	70	699	12	40	0	45	15	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1440	0	70	711	0	40	0	45	15	13	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	1.13	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm		NA
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	59.0	59.0		11.0	70.0		40.0		40.0	40.0		40.0
Total Split (%)	53.6%	53.6%		10.0%	63.6%		36.4%		36.4%	36.4%		36.4%
Maximum Green (s)	53.0	53.0		7.0	64.0		33.0		33.0	33.0		33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	82.9	82.9		92.4	91.6		9.6		9.6	9.6		9.6
Actuated g/C Ratio	0.75	0.75		0.84	0.83		0.09		0.09	0.09		0.09
v/c Ratio	0.02	0.55		0.23	0.25		0.36		0.25	0.10		0.04
Control Delay	6.2	8.8		6.8	1.5		55.6		8.1	46.6		0.2
Queue Delay	0.0	0.2		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	6.2	9.0		6.8	1.5		55.6		8.1	46.6		0.2
LOS	A	A		A	A		E		A	D		A
Approach Delay		9.0			1.9			30.5				25.1
Approach LOS		A			A			C				C
Queue Length 50th (m)	0.7	70.4		1.0	6.9		8.3		0.0	3.0		0.0
Queue Length 95th (m)	3.0	106.8		8.2	8.2		18.7		5.5	9.1		0.0
Internal Link Dist (m)		87.5			246.1			112.0				55.6
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	543	2627		319	2882		387		454	501		627
Starvation Cap Reductn	0	394		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.02	0.64		0.22	0.25		0.10		0.10	0.03		0.02

Intersection Summary

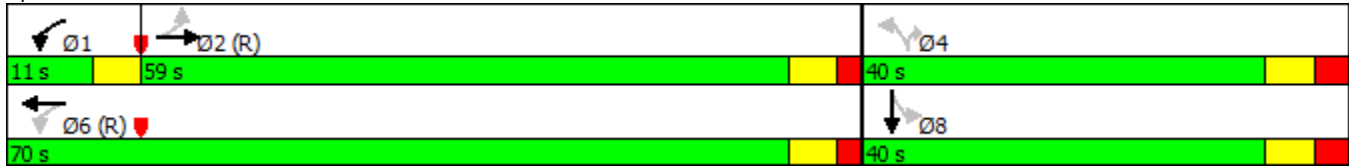
Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55

Lanes, Volumes, Timings
 4: Northshore Blvd & JBH Access

AM Peak Period
 Future Background (2023)

Intersection Signal Delay: 7.6	Intersection LOS: A
Intersection Capacity Utilization 76.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Northshore Blvd & JBH Access



HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Period
Future Background (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	1193	146	62	622	11	37	0	41	14	0	12
Future Volume (vph)	11	1193	146	62	622	11	37	0	41	14	0	12
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.97	1.00	0.98	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		1.00		1.00	0.98	1.00	
Frt	1.00	0.98		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1797	3479		1772	3462		1637		1354	1670	1606	
Flt Permitted	0.38	1.00		0.14	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	721	3479		261	3462		1291		1354	1670	1606	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1283	157	70	699	12	40	0	45	15	0	13
RTOR Reduction (vph)	0	4	0	0	1	0	0	0	42	0	12	0
Lane Group Flow (vph)	12	1436	0	70	710	0	40	0	3	15	1	0
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Effective Green, g (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Actuated g/C Ratio	0.72	0.72		0.81	0.81		0.07		0.07	0.07	0.07	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	521	2514		286	2801		93		98	121	116	
v/s Ratio Prot		c0.41		0.01	c0.21							0.00
v/s Ratio Perm	0.02			0.19			c0.03		0.00	0.01		
v/c Ratio	0.02	0.57		0.24	0.25		0.43		0.03	0.12	0.01	
Uniform Delay, d1	4.3	7.2		4.4	2.5		48.8		47.4	47.7	47.3	
Progression Factor	1.00	1.00		2.35	0.46		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.9		0.4	0.2		3.2		0.1	0.5	0.0	
Delay (s)	4.4	8.1		10.8	1.4		52.0		47.5	48.2	47.3	
Level of Service	A	A		B	A		D		D	D	D	
Approach Delay (s)		8.1			2.2			49.6				47.8
Approach LOS		A			A			D				D

Intersection Summary

HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	913	112	137	514	34	34	111	246	48	87	149
Future Volume (vph)	223	913	112	137	514	34	34	111	246	48	87	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	1.00		0.99	0.97		0.98	0.98	
Frt		0.984			0.991			0.897			0.905	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	3342	0	1738	3447	0	1547	1610	0	1690	3162	0
Flt Permitted	0.429			0.117			0.593			0.198		
Satd. Flow (perm)	793	3342	0	213	3447	0	954	1610	0	346	3162	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			6			106			162	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		270.1			172.4			278.5			293.6	
Travel Time (s)		16.2			10.3			20.1			21.1	
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Adj. Flow (vph)	251	1026	126	147	553	37	37	121	267	52	95	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	251	1152	0	147	590	0	37	388	0	52	257	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	53.3	50.3		48.3	45.3		35.2	25.7		35.9	27.7	
Actuated g/C Ratio	0.48	0.46		0.44	0.41		0.32	0.23		0.33	0.25	
v/c Ratio	0.49	0.75		0.63	0.41		0.11	0.85		0.27	0.28	
Control Delay	21.4	23.6		37.6	26.0		21.0	45.8		24.0	12.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.4	23.6		37.6	26.0		21.0	45.8		24.0	12.2	
LOS	C	C		D	C		C	D		C	B	
Approach Delay		23.2			28.3			43.6			14.2	
Approach LOS		C			C			D			B	
Queue Length 50th (m)	34.7	113.3		19.7	47.7		5.1	59.4		7.3	8.4	
Queue Length 95th (m)	51.3	#156.3		#54.5	72.3		10.5	86.0		13.4	16.8	
Internal Link Dist (m)		246.1			148.4			254.5			269.6	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	517	1536		232	1424		343	584		198	1116	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.49	0.75		0.63	0.41		0.11	0.66		0.26	0.23	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	26.5
Intersection LOS:	C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

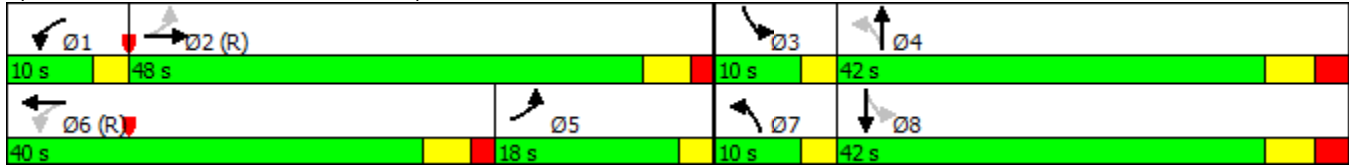
AM Peak Period
 Future Background (2023)

Intersection Capacity Utilization 86.4% ICU Level of Service E

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Background (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	913	112	137	514	34	34	111	246	48	87	149
Future Volume (vph)	223	913	112	137	514	34	34	111	246	48	87	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.90		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3341		1738	3445		1536	1610		1685	3163	
Flt Permitted	0.43	1.00		0.12	1.00		0.59	1.00		0.20	1.00	
Satd. Flow (perm)	798	3341		215	3445		959	1610		351	3163	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	251	1026	126	147	553	37	37	121	267	52	95	162
RTOR Reduction (vph)	0	8	0	0	4	0	0	81	0	0	121	0
Lane Group Flow (vph)	251	1144	0	147	586	0	37	307	0	52	136	0
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	52.1	49.1		44.1	44.1		30.5	26.3		33.3	27.7	
Effective Green, g (s)	52.1	49.1		44.1	44.1		30.5	26.3		33.3	27.7	
Actuated g/C Ratio	0.47	0.45		0.40	0.40		0.28	0.24		0.30	0.25	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	509	1491		224	1381		287	384		174	796	
v/s Ratio Prot	0.07	c0.34		c0.06	0.17		0.00	c0.19		c0.02	0.04	
v/s Ratio Perm	0.17			0.20			0.03			0.08		
v/c Ratio	0.49	0.77		0.66	0.42		0.13	0.80		0.30	0.17	
Uniform Delay, d1	22.2	25.6		25.6	23.8		29.4	39.4		29.0	32.2	
Progression Factor	0.72	0.75		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	3.4		6.8	1.0		0.2	11.3		1.0	0.1	
Delay (s)	16.6	22.5		32.4	24.7		29.6	50.7		30.0	32.3	
Level of Service	B	C		C	C		C	D		C	C	
Approach Delay (s)		21.5			26.3			48.9			31.9	
Approach LOS		C			C			D			C	

Intersection Summary

HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queuing and Blocking Report AM Peak Period
 Future Background (2023)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		41.1	71.0	108.0	38.2
81.6 22.0					
Average Queue (m)		20.1	31.5	54.5	17.3
42.6 7.9					
95th Queue (m)	36.5	60.2	94.3	32.4	69.5
17.0					
Link Distance (m)		372.2	304.9	304.9	672.0
672.0					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		0	2		
Queuing Penalty (veh)		1	3		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		35.7	37.6	60.0	60.2
77.3 23.3					
Average Queue (m)		15.8	17.5	23.9	21.5
43.0 0.9					
95th Queue (m)	29.9	34.0	50.7	50.2	69.2

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9.3					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B22	B22
SB					
Directions Served	L	T	T	T	T
LR					
Maximum Queue (m)		6.0	3.0	11.8	38.0
57.6	9.0				
Average Queue (m)		0.2	0.1	0.6	1.3
2.9	1.4				
95th Queue (m)	2.4	1.7	6.5	17.3	27.8
6.6					
Link Distance (m)		14.9	14.9	82.7	82.7
91.5					
Upstream Blk Time (%)		0		0	0
0					
Queuing Penalty (veh)		0		1	0
0					
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		1	0		

2023 AM_sim_2.txt

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		23.2	94.2	100.9	27.4
36.8 37.5 27.4	27.6	16.2	9.0		
Average Queue (m)		2.6	41.9	49.0	10.1
12.9 12.7 9.3	6.6	3.7	2.1		
95th Queue (m)	14.9	84.5	94.3	20.7	30.1
29.8 21.4 18.8	11.7	8.2			
Link Distance (m)		99.8	99.8		245.5
245.5 132.6	62.4	62.4			
Upstream Blk Time (%)			0	0	
Queuing Penalty (veh)			0	1	
Storage Bay Dist (m)		45.0			70.0
30.0					
Storage Blk Time (%)		0	7		
0 0					
Queuing Penalty (veh)		0	1		
0 0					

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		60.2	103.2	109.7	32.3
118.0 101.5 28.5	101.4	27.4	33.0	40.6	
Average Queue (m)		29.1	46.2	54.1	25.6
54.7 42.4 7.1	54.1	9.5	11.3	15.8	
95th Queue (m)	52.2	86.8	95.6	39.5	101.4
86.7 19.9 89.8	21.6	25.2	30.3		
Link Distance (m)		245.5	245.5		222.7
222.7 221.1		176.9	176.9		

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Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (m)		165.0	30.0
	105.0	50.0	

Storage Blk Time (%)			18
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13	0	0	
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Queuing Penalty (veh)			47
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18	0	0	
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Network Summary

Network wide Queuing Penalty: 74

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	156	393	842	1042	179	205
Future Volume (vph)	156	393	842	1042	179	205
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.174				0.950	
Satd. Flow (perm)	322	1852	1807	1536	1370	1225
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				417		224
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Peak Hour Factor	0.98	0.98	0.94	0.94	0.80	0.80
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	159	401	896	1109	224	256
Shared Lane Traffic (%)						
Lane Group Flow (vph)	159	401	896	1109	224	256
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	1.02	1.02	1.05	1.05	1.40	1.40
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Maximum Green (s)	8.0	86.0	75.0	21.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.8	-2.8	0.0	0.0	-3.2	-3.2
Total Lost Time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	91.8	88.8	75.0	102.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.85	0.20	0.20
v/c Ratio	0.42	0.29	0.79	0.81	0.81	0.60
Control Delay	12.5	5.8	14.2	9.1	68.9	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	5.8	14.2	9.1	68.9	14.7
LOS	B	A	B	A	E	B
Approach Delay		7.7	11.4		40.0	
Approach LOS		A	B		D	
Queue Length 50th (m)	8.2	27.3	75.2	30.7	50.8	6.2
Queue Length 95th (m)	13.4	38.8	m141.1	m88.0	#72.9	20.8
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	375	1370	1129	1368	276	425
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.29	0.79	0.81	0.81	0.60

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.81
Intersection Signal Delay:	15.2
Intersection LOS:	B
Intersection Capacity Utilization:	86.0%
ICU Level of Service:	E
Analysis Period (min):	15

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

PM Peak Period
 Future Background (2023)

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Background (2023)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	156	393	842	1042	179	205
Future Volume (vph)	156	393	842	1042	179	205
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Total Lost time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lane Util. Factor	1.00	1.00	1.00	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)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.17	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	322	1852	1807	1536	1370	1225
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	159	401	896	1109	224	256
RTOR Reduction (vph)	0	0	0	83	0	179
Lane Group Flow (vph)	159	401	896	1026	224	77
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	91.8	88.8	75.0	96.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.80	0.20	0.20
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	375	1370	1129	1318	276	247
v/s Ratio Prot	c0.04	0.22	0.50	c0.14	0.16	
v/s Ratio Perm	0.29			0.53		0.06
v/c Ratio	0.42	0.29	0.79	0.78	0.81	0.31
Uniform Delay, d1	25.1	5.2	16.7	6.4	45.7	40.8
Progression Factor	1.00	1.00	0.59	1.94	1.00	1.00
Incremental Delay, d2	0.8	0.5	3.8	3.0	22.3	3.3
Delay (s)	25.8	5.7	13.7	15.3	68.0	44.1
Level of Service	C	A	B	B	E	D
Approach Delay (s)		11.4	14.6		55.2	
Approach LOS		B	B		E	

Intersection Summary

HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	485	87	0	1626	258	597
Future Volume (vph)	485	87	0	1626	258	597
Ideal Flow (vphpl)	1000	1000	1805	1805	1694	1694
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.98				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	1902	859	0	3433	1611	1441
Flt Permitted					0.950	
Satd. Flow (perm)	1902	838	0	3433	1611	1441
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		93				550
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		3	3			
Peak Hour Factor	0.94	0.94	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Adj. Flow (vph)	516	93	0	1807	284	656
Shared Lane Traffic (%)						
Lane Group Flow (vph)	516	93	0	1807	284	656
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	2.14	2.14	1.05	1.05	1.14	1.14
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	50.0	50.0		50.0	25.0	
Total Split (s)	95.0	95.0		95.0	25.0	
Total Split (%)	79.2%	79.2%		79.2%	20.8%	
Maximum Green (s)	89.0	89.0		89.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.9	
Total Lost Time (s)	6.0	6.0		6.0	4.1	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effect Green (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
v/c Ratio	0.37	0.14		0.71	1.01	0.46
Control Delay	3.8	0.5		5.4	106.9	1.0
Queue Delay	0.0	0.0		0.1	0.0	0.0
Total Delay	3.8	0.5		5.5	106.9	1.0
LOS	A	A		A	F	A
Approach Delay	3.3			5.5	33.0	
Approach LOS	A			A	C	
Queue Length 50th (m)	11.2	0.0		48.4	~68.8	0.0
Queue Length 95th (m)	m14.7	m0.0		60.8	#123.4	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1410	645		2546	280	1441
Starvation Cap Reductn	0	0		112	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.37	0.14		0.74	1.01	0.46

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.01
 Intersection Signal Delay: 12.8
 Intersection LOS: B
 Intersection Capacity Utilization 71.8%
 ICU Level of Service C
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

PM Peak Period
 Future Background (2023)

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

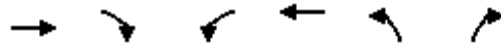
Splits and Phases: 2: QEW East Ramp & Northshore Blvd

 Ø2 (R) 95 s	 Ø6 (R) 95 s	 Ø4 25 s
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HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Background (2023)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	485	87	0	1626	258	597
Future Volume (vph)	485	87	0	1626	258	597
Ideal Flow (vphp)	1000	1000	1805	1805	1694	1694
Total Lost time (s)	6.0	6.0		6.0	4.1	1.1
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1902	838		3433	1611	1441
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1902	838		3433	1611	1441
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	516	93	0	1807	284	656
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	516	69	0	1807	284	656
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1410	621		2546	280	1441
v/s Ratio Prot	0.27			c0.53	c0.18	
v/s Ratio Perm		0.08				0.46
v/c Ratio	0.37	0.11		0.71	1.01	0.46
Uniform Delay, d1	5.5	4.4		8.5	49.5	0.0
Progression Factor	0.56	0.10		0.44	1.00	1.00
Incremental Delay, d2	0.7	0.3		1.5	57.5	1.0
Delay (s)	3.7	0.8		5.3	107.0	1.0
Level of Service	A	A		A	F	A
Approach Delay (s)	3.3			5.3	33.1	
Approach LOS	A			A	C	

Intersection Summary

HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

PM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	912	1522	7	2	4
Future Volume (vph)	5	912	1522	7	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.910	
Flt Protected	0.950				0.984	
Satd. Flow (prot)	1825	3614	3608	0	1720	0
Flt Permitted	0.950				0.984	
Satd. Flow (perm)	1825	3614	3608	0	1720	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	21			21	1	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	14%	0%	0%
Adj. Flow (vph)	6	1025	1637	8	2	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	1025	1645	0	6	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	52.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	872	29	34	1458	19	62	0	41	8	1	9
Future Volume (vph)	13	872	29	34	1458	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	1.00		1.00		0.98	0.99	0.99	
Frt		0.995			0.998				0.850		0.864	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3558	0	1825	3605	0	1789	0	1633	1825	1489	0
Flt Permitted	0.135			0.264			0.750			0.950		
Satd. Flow (perm)	259	3558	0	505	3605	0	1409	0	1604	1814	1489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			2				64		10	
Link Speed (k/h)		60			60			20			20	
Link Distance (m)		117.6			266.3			150.8			78.0	
Travel Time (s)		7.1			16.0			27.1			14.0	
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Adj. Flow (vph)	14	938	31	38	1638	21	67	0	45	9	1	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	969	0	38	1659	0	67	0	45	9	11	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	69.0	69.0		11.0	80.0		40.0		40.0	40.0		40.0
Total Split (%)	57.5%	57.5%		9.2%	66.7%		33.3%		33.3%	33.3%		33.3%
Maximum Green (s)	63.0	63.0		7.0	74.0		33.0		33.0	33.0		33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	93.6	93.6		100.6	99.8		11.4		11.4	11.4		11.4
Actuated g/C Ratio	0.78	0.78		0.84	0.83		0.10		0.10	0.10		0.10
v/c Ratio	0.07	0.35		0.08	0.55		0.50		0.21	0.05		0.07
Control Delay	6.0	4.7		1.9	3.3		63.7		8.0	47.8		26.0
Queue Delay	0.0	0.0		0.0	0.1		0.0		0.0	0.0		0.0
Total Delay	6.0	4.7		1.9	3.4		63.7		8.0	47.8		26.0
LOS	A	A		A	A		E		A	D		C
Approach Delay		4.8			3.3			41.3				35.8
Approach LOS		A			A			D				D
Queue Length 50th (m)	0.8	31.2		0.9	27.4		15.3		0.0	2.0		0.2
Queue Length 95th (m)	m2.2	42.0		m1.7	38.3		28.9		6.6	6.8		5.7
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	202	2776		500	2998		387		487	498		416
Starvation Cap Reductn	0	0		0	263		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.07	0.35		0.08	0.61		0.17		0.09	0.02		0.03

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 5.6
 Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

PM Peak Period
 Future Background (2023)

Intersection Capacity Utilization 59.9% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis
4: JBH Access & Northshore Blvd

PM Peak Period
Future Background (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	13	872	29	34	1458	19	62	0	41	8	1	9
Future Volume (vph)	13	872	29	34	1458	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00		0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1820	3559		1823	3605		1785		1604	1814	1489	
Flt Permitted	0.13	1.00		0.26	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	258	3559		506	3605		1410		1604	1814	1489	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	938	31	38	1638	21	67	0	45	9	1	10
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	9	0
Lane Group Flow (vph)	14	968	0	38	1659	0	67	0	4	9	2	0
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Effective Green, g (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Actuated g/C Ratio	0.75	0.75		0.81	0.81		0.08		0.08	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	192	2651		451	2920		115		130	148	121	
v/s Ratio Prot		0.27		0.00	c0.46						0.00	
v/s Ratio Perm	0.05			0.07			c0.05		0.00	0.00		
v/c Ratio	0.07	0.37		0.08	0.57		0.58		0.03	0.06	0.02	
Uniform Delay, d1	4.1	5.4		2.7	4.0		53.1		50.7	50.9	50.7	
Progression Factor	0.82	0.75		0.66	0.61		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4		0.1	0.6		7.3		0.1	0.2	0.0	
Delay (s)	4.1	4.4		1.8	3.0		60.4		50.8	51.0	50.7	
Level of Service	A	A		A	A		E		D	D	D	
Approach Delay (s)		4.4			3.0			56.6			50.9	
Approach LOS		A			A			E			D	

Intersection Summary		
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.59	A
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	59.9%	17.0
Analysis Period (min)	15	ICU Level of Service
		B

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	209	653	59	226	1136	63	119	106	146	92	161	256
Future Volume (vph)	209	653	59	226	1136	63	119	106	146	92	161	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor		0.99		0.96	0.99		0.96	0.83		0.83	0.94	
Frt		0.988			0.992			0.913			0.908	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3513	0	1789	3507	0	1789	1404	0	1755	3073	0
Flt Permitted	0.073			0.278			0.334			0.349		
Satd. Flow (perm)	139	3513	0	505	3507	0	601	1404	0	536	3073	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			5			60			271	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Adj. Flow (vph)	235	734	66	243	1222	68	129	115	159	100	175	278
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	800	0	243	1290	0	129	274	0	100	453	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	15.0	49.0		15.0	49.0		12.0	44.0		12.0	44.0	
Total Split (%)	12.5%	40.8%		12.5%	40.8%		10.0%	36.7%		10.0%	36.7%	
Maximum Green (s)	12.0	43.0		12.0	43.0		9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	73.3	55.2		67.8	52.1		37.2	24.4		36.9	24.3	
Actuated g/C Ratio	0.61	0.46		0.56	0.43		0.31	0.20		0.31	0.20	
v/c Ratio	0.77	0.49		0.58	0.85		0.47	0.82		0.40	0.54	
Control Delay	59.5	23.4		17.9	38.5		32.7	54.3		30.8	17.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	59.5	23.4		17.9	38.5		32.7	54.3		30.8	17.9	
LOS	E	C		B	D		C	D		C	B	
Approach Delay		31.6			35.2			47.4			20.2	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	44.8	44.2		24.1	145.3		21.5	49.3		16.4	19.2	
Queue Length 95th (m)	#85.9	92.6		45.6	#212.6		31.6	72.9		25.5	31.5	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	305	1622		433	1524		276	474		257	1134	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.77	0.49		0.56	0.85		0.47	0.58		0.39	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 33.2
 Intersection LOS: C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd









PM Peak Period
 Future Background (2023)

Intersection Capacity Utilization 95.3% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	49 s	12 s	44 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	49 s	12 s	44 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Background (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	209	653	59	226	1136	63	119	106	146	92	161	256
Future Volume (vph)	209	653	59	226	1136	63	119	106	146	92	161	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.83		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.95	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	3511		1772	3508		1766	1404		1665	3072	
Flt Permitted	0.07	1.00		0.28	1.00		0.33	1.00		0.35	1.00	
Satd. Flow (perm)	138	3511		519	3508		621	1404		612	3072	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	235	734	66	243	1222	68	129	115	159	100	175	278
RTOR Reduction (vph)	0	5	0	0	3	0	0	48	0	0	216	0
Lane Group Flow (vph)	235	795	0	243	1287	0	129	226	0	100	237	0
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	70.9	55.2		64.7	52.0		33.3	24.5		32.9	24.3	
Effective Green, g (s)	70.9	55.2		64.7	52.0		33.3	24.5		32.9	24.3	
Actuated g/C Ratio	0.59	0.46		0.54	0.43		0.28	0.20		0.27	0.20	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	1615		412	1520		256	286		243	622	
v/s Ratio Prot	c0.10	0.23		0.06	c0.37		c0.04	c0.16		0.03	0.08	
v/s Ratio Perm	0.35			0.26			0.10			0.08		
v/c Ratio	0.78	0.49		0.59	0.85		0.50	0.79		0.41	0.38	
Uniform Delay, d1	32.8	22.6		15.5	30.4		34.1	45.3		34.1	41.3	
Progression Factor	1.61	0.91		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.5	1.0		2.2	6.0		1.6	13.8		1.1	0.4	
Delay (s)	64.4	21.6		17.7	36.5		35.6	59.2		35.2	41.7	
Level of Service	E	C		B	D		D	E		D	D	
Approach Delay (s)		31.3			33.5			51.6			40.6	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Queuing and Blocking Report PM Peak Period
 Future Background (2023)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	215.8	103.0	103.0
81.2 54.5					
Average Queue (m)		33.0	69.9	69.8	63.4
34.8 23.2					
95th Queue (m)	49.9	188.4	97.8	97.3	63.4
43.1					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		19	12		
Queuing Penalty (veh)		73	18		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		27.7	28.1	55.0	55.4
140.7 30.2					
Average Queue (m)		8.3	6.5	24.4	25.8
81.0 1.0					
95th Queue (m)	20.6	19.5	45.7	49.6	155.2

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19.6					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement			EB	EB	EB	B22	B22
WB	WB	SB					
Directions Served			L	T	T	T	
T	TR	LR					
Maximum Queue (m)				9.1	9.2	1.6	11.4
12.2	5.3	1.1	13.0				
Average Queue (m)				1.2	0.5	0.1	0.4
0.4	0.2	0.0	2.0				
95th Queue (m)			6.2	3.8	1.2	8.7	9.4
2.9	0.8	8.4					
Link Distance (m)				14.9	14.9	82.7	82.7
99.4	99.4	91.5					
Upstream Blk Time (%)				0	0		
Queuing Penalty (veh)				0	0		
Storage Bay Dist (m)				5.0			
Storage Blk Time (%)				3	0		
Queuing Penalty (veh)				12	0		

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Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		10.0	44.9	52.1	12.0
40.3 44.6 30.3	27.6	11.4	14.0		
Average Queue (m)		2.2	17.2	20.6	4.2
16.3 18.0 13.5	5.6	2.7	2.2		
95th Queue (m)	7.9	38.2	43.4	11.4	35.3
36.6 26.8 16.4	9.4	9.1			
Link Distance (m)		99.4	99.4		242.6
242.6 137.1	65.8	65.8			
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		45.0			70.0
30.0					
Storage Blk Time (%)			0		
1	0				
Queuing Penalty (veh)			0		
0	0				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		78.6	71.9	80.3	32.4
237.9 236.2 47.8	77.7	39.1	56.7	80.0	
Average Queue (m)		37.0	38.6	44.0	26.9
225.1 223.5 20.8	38.5	13.9	22.6	37.9	
95th Queue (m)	71.9	65.9	72.3	40.4	253.0
255.7 37.9 68.8	29.3	43.0	66.5		
Link Distance (m)		242.6	242.6		222.7
222.7 224.7		176.9	176.9		

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Upstream Blk Time (%)

64 51

Queuing Penalty (veh)

0 0

Storage Bay Dist (m)

165.0

30.0

105.0

50.0

Storage Blk Time (%)

53

0

0

10

Queuing Penalty (veh)

120

0

0

54

Network Summary

Network wide Queuing Penalty: 279

SimTraffic Report 09/04/2018

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Background (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷	↷	↶	↷
Traffic Volume (vph)	125	415	598	642	269	63
Future Volume (vph)	125	415	598	642	269	63
Ideal Flow (vphp)	2129	2129	1575	1575	1518	1518
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.99	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.233				0.950	
Satd. Flow (perm)	487	2153	1577	1340	1289	1305
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				490		71
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.84	0.84	0.93	0.93	0.89	0.89
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Adj. Flow (vph)	149	494	643	690	302	71
Shared Lane Traffic (%)						
Lane Group Flow (vph)	149	494	643	690	302	71
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	0.85	0.85	1.25	1.25	1.49	1.31
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Background (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	12.0	62.0	50.0	33.0	33.0	33.0
Total Split (%)	12.6%	65.3%	52.6%	34.7%	34.7%	34.7%
Maximum Green (s)	9.0	56.0	44.0	26.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.5	-1.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	60.5	57.5	44.0	76.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.80	0.27	0.27
v/c Ratio	0.31	0.38	0.88	0.59	0.85	0.17
Control Delay	11.9	10.7	28.5	2.9	56.2	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	10.7	28.5	2.9	56.2	7.8
LOS	B	B	C	A	E	A
Approach Delay		11.0	15.2		47.0	
Approach LOS		B	B		D	
Queue Length 50th (m)	9.7	42.6	56.2	4.2	52.4	0.0
Queue Length 95th (m)	15.6	55.9	m#162.9	m8.0	#95.1	9.6
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	475	1303	730	1170	355	408
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.38	0.88	0.59	0.85	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Background (2023)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	125	415	598	642	269	63
Future Volume (vph)	125	415	598	642	269	63
Ideal Flow (vphpl)	2129	2129	1575	1575	1518	1518
Total Lost time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	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
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)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.23	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	486	2153	1577	1340	1299	1305
Peak-hour factor, PHF	0.84	0.84	0.93	0.93	0.89	0.89
Adj. Flow (vph)	149	494	643	690	302	71
RTOR Reduction (vph)	0	0	0	129	0	52
Lane Group Flow (vph)	149	494	643	561	302	19
Confl. Peds. (#/hr)					5	
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	59.0	56.0	44.0	70.0	26.0	26.0
Effective Green, g (s)	60.5	57.5	44.0	70.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.74	0.27	0.27
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	475	1303	730	1086	355	357
v/s Ratio Prot	0.03	c0.23	c0.41	0.14	c0.23	
v/s Ratio Perm	0.16			0.28		0.01
v/c Ratio	0.31	0.38	0.88	0.52	0.85	0.05
Uniform Delay, d1	20.5	9.6	23.1	5.3	32.7	25.4
Progression Factor	1.00	1.00	0.67	1.39	1.00	1.00
Incremental Delay, d2	0.4	0.8	11.2	1.3	21.8	0.3
Delay (s)	20.9	10.4	26.8	8.7	54.5	25.7
Level of Service	C	B	C	A	D	C
Approach Delay (s)		12.9	17.4		49.0	
Approach LOS		B	B		D	

Intersection Summary

HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Background (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	446	238	0	1011	229	632
Future Volume (vph)	446	238	0	1011	229	632
Ideal Flow (vphpl)	1450	1450	1670	1670	1450	1450
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97			1.00	
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2434	1122	0	2859	1254	1122
Flt Permitted					0.950	
Satd. Flow (perm)	2434	1091	0	2859	1252	1122
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		259				585
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		6	6		1	
Peak Hour Factor	0.92	0.92	0.96	0.96	0.76	0.76
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Adj. Flow (vph)	485	259	0	1053	301	832
Shared Lane Traffic (%)						
Lane Group Flow (vph)	485	259	0	1053	301	832
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	1.57	1.57	1.33	1.33	1.57	1.57
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Background (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.2	
Total Lost Time (s)	6.0	6.0		6.0	4.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	59.3	59.3		59.3	24.9	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.26	1.00
v/c Ratio	0.32	0.33		0.59	0.92	0.74
Control Delay	5.7	1.1		12.4	68.7	4.4
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	5.7	1.1		12.4	68.7	4.4
LOS	A	A		B	E	A
Approach Delay	4.1			12.4	21.5	
Approach LOS	A			B	C	
Queue Length 50th (m)	12.7	0.1		55.6	53.3	0.0
Queue Length 95th (m)	m16.7	m0.1		73.6	#75.6	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1520	778		1785	332	1122
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.32	0.33		0.59	0.91	0.74

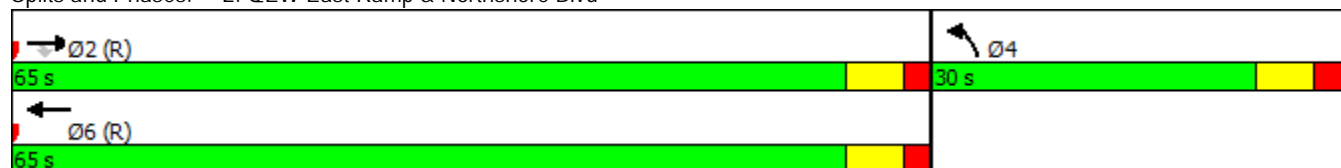
Intersection Summary

Area Type: CBD
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 13.8
 Intersection LOS: B
 Intersection Capacity Utilization 62.8%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Background (2023)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	446	238	0	1011	229	632
Future Volume (vph)	446	238	0	1011	229	632
Ideal Flow (vphp)	1450	1450	1670	1670	1450	1450
Total Lost time (s)	6.0	6.0		6.0	4.8	1.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2434	1091		2859	1254	1122
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2434	1091		2859	1254	1122
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.76	0.76
Adj. Flow (vph)	485	259	0	1053	301	832
RTOR Reduction (vph)	0	97	0	0	0	0
Lane Group Flow (vph)	485	162	0	1053	301	832
Confl. Peds. (#/hr)		6	6		1	
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	59.3	59.3		59.3	22.7	95.0
Effective Green, g (s)	59.3	59.3		59.3	24.9	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.26	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1519	681		1784	328	1122
v/s Ratio Prot	0.20			0.37	c0.24	
v/s Ratio Perm		0.15				c0.74
v/c Ratio	0.32	0.24		0.59	0.92	0.74
Uniform Delay, d1	8.4	7.9		10.6	34.1	0.0
Progression Factor	0.61	0.16		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.7		1.4	29.3	4.4
Delay (s)	5.6	1.9		12.1	63.3	4.4
Level of Service	A	A		B	E	A
Approach Delay (s)	4.3			12.1	20.1	
Approach LOS	A			B	C	

Intersection Summary

HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

Saturday Peak Hour
Future Background (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1078	1164	6	3	2
Future Volume (vph)	0	1078	1164	6	3	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.946	
Flt Protected					0.971	
Satd. Flow (prot)	1921	3614	3611	0	1765	0
Flt Permitted					0.971	
Satd. Flow (perm)	1921	3614	3611	0	1765	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	23			23		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	0	1211	1252	6	3	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1211	1258	0	5	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.4%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	1002	52	37	1079	19	75	0	51	32	0	16
Future Volume (vph)	27	1002	52	37	1079	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00		1.00		0.98	0.99	0.99	
Frt		0.993			0.997				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3580	0	1825	3601	0	1772	0	1601	1825	1609	0
Flt Permitted	0.227			0.200			0.746			0.950		
Satd. Flow (perm)	434	3580	0	384	3601	0	1388	0	1572	1814	1609	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3				85			85
Link Speed (k/h)		60			60			20				20
Link Distance (m)		117.6			266.3			150.8				78.0
Travel Time (s)		7.1			16.0			27.1				14.0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Adj. Flow (vph)	29	1077	56	42	1212	21	82	0	55	35	0	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1133	0	42	1233	0	82	0	55	35	17	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0	8.0	
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0	38.0	
Total Split (s)	38.0	38.0		13.0	38.0		39.0		39.0	39.0	39.0	
Total Split (%)	42.2%	42.2%		14.4%	42.2%		43.3%		43.3%	43.3%	43.3%	
Maximum Green (s)	32.0	32.0		9.0	32.0		32.0		32.0	32.0	32.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None	None	
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0	12.0	
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0		0	0	0	
Act Effct Green (s)	63.9	63.9		70.9	70.1		11.1		11.1	11.1	11.1	
Actuated g/C Ratio	0.71	0.71		0.79	0.78		0.12		0.12	0.12	0.12	
v/c Ratio	0.09	0.45		0.10	0.44		0.48		0.21	0.16	0.06	
Control Delay	9.1	8.9		3.9	5.3		45.5		5.1	35.4	0.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay	9.1	8.9		3.9	5.3		45.5		5.1	35.4	0.4	
LOS	A	A		A	A		D		A	D	A	
Approach Delay		8.9			5.3			29.3				24.0
Approach LOS		A			A			C				C
Queue Length 50th (m)	1.8	50.8		1.4	36.8		13.5		0.0	5.5	0.0	
Queue Length 95th (m)	6.6	78.4		4.4	58.3		25.8		5.0	13.2	0.0	
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	308	2542		446	2806		493		613	644	626	
Starvation Cap Reductn	0	0		0	0		0		0	0	0	
Spillback Cap Reductn	0	0		0	0		0		0	0	0	
Storage Cap Reductn	0	0		0	0		0		0	0	0	
Reduced v/c Ratio	0.09	0.45		0.09	0.44		0.17		0.09	0.05	0.03	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.48
 Intersection Signal Delay: 8.5
 Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

Saturday Peak Hour
 Future Background (2023)

Intersection Capacity Utilization 63.2% ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis
 4: JBH Access & Northshore Blvd

Saturday Peak Hour
 Future Background (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕		↗		↖	↗	↖	↕
Traffic Volume (vph)	27	1002	52	37	1079	19	75	0	51	32	0	16
Future Volume (vph)	27	1002	52	37	1079	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1816	3578		1824	3602		1767		1572	1814	1609	
Flt Permitted	0.23	1.00		0.20	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	434	3578		384	3602		1388		1572	1814	1609	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	1077	56	42	1212	21	82	0	55	35	0	17
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	49	0	15	0
Lane Group Flow (vph)	29	1131	0	42	1232	0	82	0	6	35	2	0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Effective Green, g (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Actuated g/C Ratio	0.66	0.66		0.75	0.75		0.11		0.11	0.11	0.11	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	287	2373		348	2701		146		165	191	169	
v/s Ratio Prot		c0.32		0.01	c0.34							0.00
v/s Ratio Perm	0.07			0.09			c0.06		0.00	0.02		
v/c Ratio	0.10	0.48		0.12	0.46		0.56		0.04	0.18	0.01	
Uniform Delay, d1	5.5	7.5		3.9	4.3		38.3		36.1	36.7	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.7		0.2	0.6		4.9		0.1	0.5	0.0	
Delay (s)	6.2	8.1		4.1	4.8		43.1		36.2	37.2	36.1	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		8.1			4.8			40.4			36.8	
Approach LOS		A			A			D			D	

Intersection Summary		
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.50	A
Actuated Cycle Length (s)	90.0	Sum of lost time (s)
Intersection Capacity Utilization	63.2%	17.0
Analysis Period (min)	15	ICU Level of Service
		B

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	714	176	315	666	47	196	127	182	100	256	274
Future Volume (vph)	195	714	176	315	666	47	196	127	182	100	256	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.98	0.99		1.00	0.99		0.99	0.93		0.94	0.99	
Frt		0.970			0.990			0.912			0.922	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3477	0	1807	3548	0	1807	1614	0	1755	3322	0
Flt Permitted	0.308			0.127			0.250			0.267		
Satd. Flow (perm)	576	3477	0	241	3548	0	473	1614	0	466	3322	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			7			69			260	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Adj. Flow (vph)	219	802	198	339	716	51	213	138	198	109	278	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	219	1000	0	339	767	0	213	336	0	109	576	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Background (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	55.9	42.0		62.9	47.8		35.3	24.3		35.3	24.3	
Actuated g/C Ratio	0.51	0.38		0.57	0.43		0.32	0.22		0.32	0.22	
v/c Ratio	0.52	0.74		0.87	0.50		0.90	0.82		0.47	0.62	
Control Delay	16.7	32.4		48.9	25.6		67.2	47.8		30.1	22.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.7	32.4		48.9	25.6		67.2	47.8		30.1	22.6	
LOS	B	C		D	C		E	D		C	C	
Approach Delay		29.6			32.8			55.3			23.8	
Approach LOS		C			C			E			C	
Queue Length 50th (m)	20.2	93.3		46.0	60.3		33.4	55.6		16.1	31.7	
Queue Length 95th (m)	38.8	115.5		#140.2	96.4		#55.4	79.6		24.8	44.0	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	482	1347		389	1546		236	560		231	1234	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.45	0.74		0.87	0.50		0.90	0.60		0.47	0.47	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 25 (23%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 33.4
 Intersection LOS: C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd









Saturday Peak Hour
 Future Background (2023)

Intersection Capacity Utilization 92.8% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
10 s	48 s	10 s	42 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
18 s	40 s	10 s	42 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Background (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↘		↗	↗↘		↗	↘		↗	↗↘	
Traffic Volume (vph)	195	714	176	315	666	47	196	127	182	100	256	274
Future Volume (vph)	195	714	176	315	666	47	196	127	182	100	256	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.93		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.91		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1797	3478		1807	3548		1805	1614		1734	3323	
Flt Permitted	0.31	1.00		0.13	1.00		0.25	1.00		0.27	1.00	
Satd. Flow (perm)	582	3478		241	3548		474	1614		488	3323	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	219	802	198	339	716	51	213	138	198	109	278	298
RTOR Reduction (vph)	0	20	0	0	4	0	0	54	0	0	203	0
Lane Group Flow (vph)	219	980	0	339	763	0	213	282	0	109	373	0
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	53.9	42.0		62.7	47.8		31.3	24.3		31.3	24.3	
Effective Green, g (s)	53.9	42.0		62.7	47.8		31.3	24.3		31.3	24.3	
Actuated g/C Ratio	0.49	0.38		0.57	0.43		0.28	0.22		0.28	0.22	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	416	1327		389	1541		219	356		218	734	
v/s Ratio Prot	0.06	0.28		c0.14	0.22		c0.06	0.17		0.03	0.11	
v/s Ratio Perm	0.20			c0.36			c0.21			0.11		
v/c Ratio	0.53	0.74		0.87	0.50		0.97	0.79		0.50	0.51	
Uniform Delay, d1	16.5	29.3		25.9	22.4		36.6	40.5		30.9	37.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	3.7		18.8	1.1		52.7	11.5		1.8	0.6	
Delay (s)	17.8	33.0		44.7	23.5		89.3	51.9		32.7	38.2	
Level of Service	B	C		D	C		F	D		C	D	
Approach Delay (s)		30.3			30.0			66.4			37.3	
Approach LOS		C			C			E			D	

Intersection Summary

HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2023 SAT_sim_2.txt

Queuing and Blocking Report Weekend Peak Period
Future Background (2023)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	89.9	119.0	66.9
74.2	17.5				
Average Queue (m)		24.9	35.7	49.7	26.3
42.6	6.3				
95th Queue (m)	42.6	68.5	91.3	52.4	68.8
14.3					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		2	4		
Queuing Penalty (veh)		10	5		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B22
B22					
NB					
Directions Served	T	T	T	T	T
T					
L					
R					
Maximum Queue (m)		23.2	21.6	84.2	87.7
4.6	6.9	83.8	4.3		
Average Queue (m)		8.6	7.5	32.0	34.0
0.2	0.2	41.5	0.3		
95th Queue (m)		19.3	18.5	65.1	68.7
					2.7

2023 SAT_sim_2.txt

4.2	69.0	4.6					
Link Distance (m)			304.9	304.9	82.7	82.7	14.9
14.9	662.3	662.3					
Upstream Blk Time (%)					0	0	
0	0						
Queuing Penalty (veh)					1	2	
0	1						
Storage Bay Dist (m)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Northshore Blvd & Site Driveway

Movement	WB	SB		
Directions Served	TR	LR		
Maximum Queue (m)		2.6	8.9	
Average Queue (m)		0.1	1.3	
95th Queue (m)	2.0	6.3		
Link Distance (m)	99.4	91.5		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: JBH Access & Northshore Blvd

Movement			EB	EB	EB	WB	WB
WB	NB	NB	SB	SB			
Directions Served			L	T	TR	L	T
TR	L	R	L	TR			
Maximum Queue (m)				11.1	70.8	75.4	16.5
66.4	71.3	28.7	20.0	21.0	10.1		
Average Queue (m)				3.8	26.4	31.3	5.6
27.3	31.1	12.4	6.5	7.2	3.0		
95th Queue (m)			10.3	57.0	62.9	13.5	57.7

2023 SAT_sim_2.txt

62.1	24.8	15.0	17.3	9.6			
Link Distance (m)				99.4	99.4		242.6
242.6		137.1	65.8	65.8			
Upstream Blk Time (%)					0		
Queuing Penalty (veh)					0		
Storage Bay Dist (m)				45.0			70.0
		30.0					
Storage Blk Time (%)					2		
0		0	0				
Queuing Penalty (veh)					1		
0		0	0				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement			EB	EB	EB	WB	WB
WB	NB	NB	SB	SB	SB		
Directions Served			L	T	TR	L	T
TR	L	TR	L	T	TR		
Maximum Queue (m)				59.6	91.6	95.4	32.4
230.5	224.3	88.8	118.5	47.3	60.7	78.4	
Average Queue (m)				26.2	53.1	60.4	32.3
185.1	169.4	35.7	52.5	15.1	31.1	40.4	
95th Queue (m)				48.3	82.4	90.4	272.8
263.0	67.2	102.2	32.6	50.8	67.1		
Link Distance (m)				242.6	242.6		222.7
222.7		224.7		176.9	176.9		
Upstream Blk Time (%)							
40	5						
Queuing Penalty (veh)							
0	0						
Storage Bay Dist (m)				165.0			30.0
		105.0		50.0			
Storage Blk Time (%)							74
18		0	1	0	1		
Queuing Penalty (veh)							246
58		0	3	0	1		

2023 SAT_sim_2.txt

Network Summary

Network wide Queuing Penalty: 327

SimTraffic Report 09/04/2018

2023 SAT_sim_2.syn Page 0

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	156	424	559	453	333	77
Future Volume (vph)	156	424	559	453	333	77
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			0.97		
Fr _t				0.850		0.850
Fl _t Protected	0.950				0.950	
Satd. Flow (prot)	1483	1561	1435	1220	1546	1397
Fl _t Permitted	0.164				0.950	
Satd. Flow (perm)	256	1561	1435	1186	1546	1397
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				376		83
Link Speed (k/h)		50	60		100	
Link Distance (m)		165.3	312.3		178.0	
Travel Time (s)		11.9	18.7		6.4	
Confl. Peds. (#/hr)	4			4		
Peak Hour Factor	0.95	0.95	0.89	0.89	0.93	0.93
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Adj. Flow (vph)	164	446	628	509	358	83
Shared Lane Traffic (%)						
Lane Group Flow (vph)	164	446	628	509	358	83
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	1.25	1.25	1.37	1.37	1.16	1.16
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Maximum Green (s)	8.0	40.0	29.0	20.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-1.4	-1.4
Total Lost Time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	43.5	40.5	29.3	48.3	21.4	21.4
Actuated g/C Ratio	0.60	0.55	0.40	0.66	0.29	0.29
v/c Ratio	0.57	0.52	1.09	0.55	0.79	0.18
Control Delay	15.4	12.8	89.5	3.5	38.7	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	12.8	89.5	3.5	38.7	6.2
LOS	B	B	F	A	D	A
Approach Delay		13.5	51.0		32.6	
Approach LOS		B	D		C	
Queue Length 50th (m)	9.2	35.0	~100.0	3.8	44.9	0.0
Queue Length 95th (m)	19.5	57.8	#154.8	10.5	#85.3	8.8
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	295	866	576	920	453	468
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.52	1.09	0.55	0.79	0.18

Intersection Summary

Area Type: Other
 Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.09
 Intersection Signal Delay: 36.8
 Intersection LOS: D

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

AM Peak Hour
 Future Background (2028)

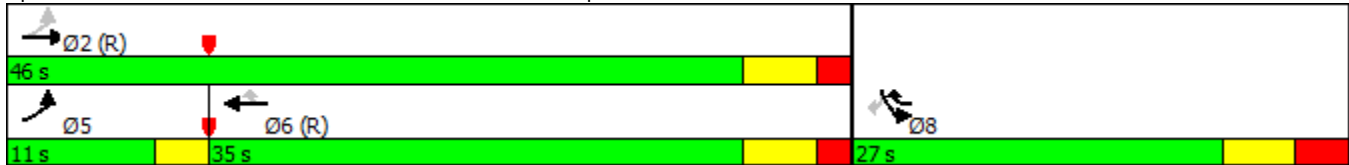
Intersection Capacity Utilization 82.6% ICU Level of Service E

Analysis Period (min) 15

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

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis

1: Northshore Blvd & QEW West Ramp

AM Peak Hour
Future Background (2028)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (vph)	156	424	559	453	333	77
Future Volume (vph)	156	424	559	453	333	77
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Total Lost time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	1483	1561	1435	1200	1546	1397
Flt Permitted	0.16	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	255	1561	1435	1200	1546	1397
Peak-hour factor, PHF	0.95	0.95	0.89	0.89	0.93	0.93
Adj. Flow (vph)	164	446	628	509	358	83
RTOR Reduction (vph)	0	0	0	122	0	59
Lane Group Flow (vph)	164	446	628	387	358	24
Confl. Peds. (#/hr)	4			4		
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	29.3	49.3	20.0	20.0
Effective Green, g (s)	40.5	40.5	29.3	49.3	21.4	21.4
Actuated g/C Ratio	0.55	0.55	0.40	0.68	0.29	0.29
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	279	866	575	810	453	409
v/s Ratio Prot	c0.07	0.29	c0.44	0.13	c0.23	
v/s Ratio Perm	0.26			0.19		0.02
v/c Ratio	0.59	0.52	1.09	0.48	0.79	0.06
Uniform Delay, d1	11.7	10.1	21.9	5.7	23.7	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	2.2	65.1	2.0	13.1	0.3
Delay (s)	14.9	12.3	87.0	7.7	36.9	18.8
Level of Service	B	B	F	A	D	B
Approach Delay (s)		13.0	51.5		33.5	
Approach LOS		B	D		C	

Intersection Summary

HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

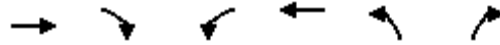
AM Peak Hour
Future Background (2028)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	618	139	0	758	254	956
Future Volume (vph)	618	139	0	758	254	956
Ideal Flow (vphpl)	1440	1440	1246	1246	1266	1266
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2660	1202	0	2302	1192	1046
Flt Permitted					0.950	
Satd. Flow (perm)	2660	1165	0	2302	1192	1046
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		149				482
Link Speed (k/h)	60			60	48	
Link Distance (m)	312.3			111.4	163.6	
Travel Time (s)	18.7			6.7	12.3	
Confl. Peds. (#/hr)		8	8			
Peak Hour Factor	0.93	0.93	0.89	0.89	0.91	0.91
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Adj. Flow (vph)	665	149	0	852	279	1051
Shared Lane Traffic (%)						
Lane Group Flow (vph)	665	149	0	852	279	1051
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	1.40	1.40	1.66	1.66	1.63	1.63
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Hour
Future Background (2028)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.6	
Total Lost Time (s)	6.0	6.0		6.0	4.4	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	59.7	59.7		59.7	24.9	95.0
Actuated g/C Ratio	0.63	0.63		0.63	0.26	1.00
v/c Ratio	0.40	0.19		0.59	0.89	1.00
Control Delay	9.8	1.9		12.7	65.1	33.3
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	9.8	1.9		12.7	65.1	33.3
LOS	A	A		B	E	C
Approach Delay	8.3			12.7	39.9	
Approach LOS	A			B	D	
Queue Length 50th (m)	29.5	0.0		45.1	48.8	-1.9
Queue Length 95th (m)	40.4	6.7		61.3	#93.2	#75.0
Internal Link Dist (m)	288.3			87.4	139.6	
Turn Bay Length (m)						
Base Capacity (vph)	1671	786		1446	321	1046
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.40	0.19		0.59	0.87	1.00

Intersection Summary

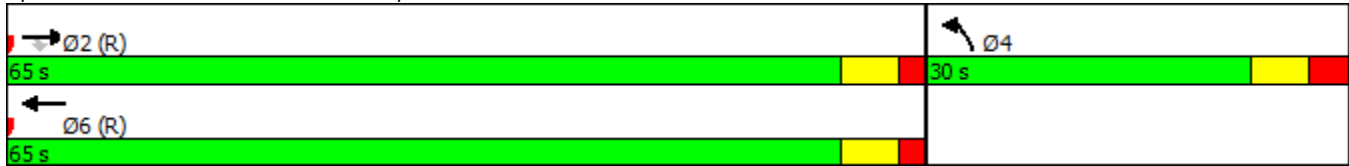
Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 23.6
 Intersection LOS: C
 Intersection Capacity Utilization 61.7%
 ICU Level of Service B
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

AM Peak Hour
 Future Background (2028)

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

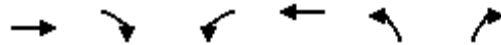
Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Hour
Future Background (2028)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	618	139	0	758	254	956
Future Volume (vph)	618	139	0	758	254	956
Ideal Flow (vphpl)	1440	1440	1246	1246	1266	1266
Total Lost time (s)	6.0	6.0		6.0	4.4	1.4
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2660	1165		2302	1192	1046
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2660	1165		2302	1192	1046
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.91	0.91
Adj. Flow (vph)	665	149	0	852	279	1051
RTOR Reduction (vph)	0	55	0	0	0	0
Lane Group Flow (vph)	665	94	0	852	279	1051
Confl. Peds. (#/hr)		8	8			
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	59.7	59.7		59.7	22.3	95.0
Effective Green, g (s)	59.7	59.7		59.7	24.9	95.0
Actuated g/C Ratio	0.63	0.63		0.63	0.26	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1671	732		1446	312	1046
v/s Ratio Prot	0.25			0.37	0.23	
v/s Ratio Perm		0.08				c1.00
v/c Ratio	0.40	0.13		0.59	0.89	1.00
Uniform Delay, d1	8.7	7.1		10.4	33.8	47.5
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.7	0.4		1.8	26.0	29.0
Delay (s)	9.5	7.5		12.2	59.8	76.5
Level of Service	A	A		B	E	E
Approach Delay (s)	9.1			12.2	73.0	
Approach LOS	A			B	E	

Intersection Summary

HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

AM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	1486	761	0	1	4
Future Volume (vph)	1	1486	761	0	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt					0.892	
Flt Protected	0.950				0.990	
Satd. Flow (prot)	1825	3544	3476	0	1696	0
Flt Permitted	0.950				0.990	
Satd. Flow (perm)	1825	3544	3476	0	1696	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	111.5		90.6	
Travel Time (s)		6.7	6.7		16.3	
Confl. Peds. (#/hr)	9			9		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	0%	0%	0%
Adj. Flow (vph)	1	1670	818	0	1	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	1670	818	0	5	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.1%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1330	146	62	712	11	37	0	41	14	0	12
Future Volume (vph)	11	1330	146	62	712	11	37	0	41	14	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			1.00		1.00		0.97	0.98	0.98	
Frt		0.985			0.998				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3484	0	1772	3464	0	1644	0	1400	1706	1606	0
Flt Permitted	0.345			0.112			0.749			0.950		
Satd. Flow (perm)	654	3484	0	209	3464	0	1291	0	1354	1670	1606	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			2				69			164
Link Speed (k/h)		60			60			20				20
Link Distance (m)		111.5			270.1			136.0				79.6
Travel Time (s)		6.7			16.2			24.5				14.3
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Adj. Flow (vph)	12	1430	157	70	800	12	40	0	45	15	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1587	0	70	812	0	40	0	45	15	13	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	1.13	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm		NA
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	59.0	59.0		11.0	70.0		40.0		40.0	40.0		40.0
Total Split (%)	53.6%	53.6%		10.0%	63.6%		36.4%		36.4%	36.4%		36.4%
Maximum Green (s)	53.0	53.0		7.0	64.0		33.0		33.0	33.0		33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	82.9	82.9		92.4	91.6		9.6		9.6	9.6		9.6
Actuated g/C Ratio	0.75	0.75		0.84	0.83		0.09		0.09	0.09		0.09
v/c Ratio	0.02	0.60		0.26	0.28		0.36		0.25	0.10		0.04
Control Delay	6.2	9.7		10.2	1.5		55.6		8.1	46.6		0.3
Queue Delay	0.0	0.2		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	6.2	9.9		10.2	1.5		55.6		8.1	46.6		0.3
LOS	A	A		B	A		E		A	D		A
Approach Delay		9.9			2.2			30.5				25.1
Approach LOS		A			A			C				C
Queue Length 50th (m)	0.7	83.6		1.4	7.9		8.3		0.0	3.0		0.0
Queue Length 95th (m)	3.0	127.0		12.0	9.2		18.7		5.5	9.1		0.0
Internal Link Dist (m)		87.5			246.1			112.0				55.6
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	493	2630		279	2885		387		454	501		596
Starvation Cap Reductn	0	366		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.02	0.70		0.25	0.28		0.10		0.10	0.03		0.02

Intersection Summary

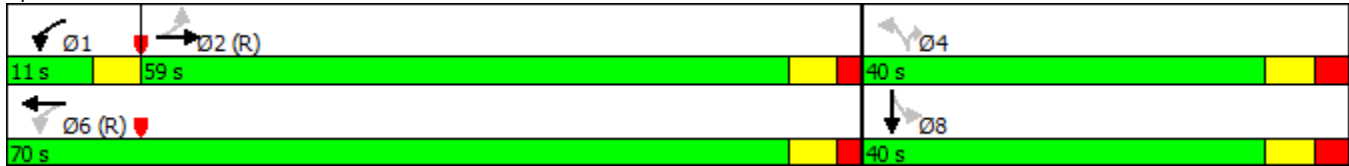
Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60

Lanes, Volumes, Timings
 4: Northshore Blvd & JBH Access

AM Peak Hour
 Future Background (2028)

Intersection Signal Delay: 8.1	Intersection LOS: A
Intersection Capacity Utilization 80.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Northshore Blvd & JBH Access



HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Hour
Future Background (2028)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1330	146	62	712	11	37	0	41	14	0	12
Future Volume (vph)	11	1330	146	62	712	11	37	0	41	14	0	12
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.97	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00		1.00	0.98	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1800	3485		1772	3464		1637		1354	1670	1606	
Flt Permitted	0.35	1.00		0.11	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	654	3485		209	3464		1291		1354	1670	1606	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1430	157	70	800	12	40	0	45	15	0	13
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	42	0	12	0
Lane Group Flow (vph)	12	1583	0	70	812	0	40	0	3	15	1	0
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Effective Green, g (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Actuated g/C Ratio	0.72	0.72		0.81	0.81		0.07		0.07	0.07	0.07	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	472	2518		247	2802		93		98	121	116	
v/s Ratio Prot		c0.45		0.01	c0.23							0.00
v/s Ratio Perm	0.02			0.21			c0.03		0.00	0.01		
v/c Ratio	0.03	0.63		0.28	0.29		0.43		0.03	0.12	0.01	
Uniform Delay, d1	4.3	7.7		5.6	2.6		48.8		47.4	47.7	47.3	
Progression Factor	1.00	1.00		3.62	0.45		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.2		0.6	0.2		3.2		0.1	0.5	0.0	
Delay (s)	4.4	9.0		21.0	1.4		52.0		47.5	48.2	47.3	
Level of Service	A	A		C	A		D		D	D	D	
Approach Delay (s)		8.9			3.0			49.6				47.8
Approach LOS		A			A			D				D

Intersection Summary

HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	1050	112	137	604	34	34	117	246	48	91	149
Future Volume (vph)	223	1050	112	137	604	34	34	117	246	48	91	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	1.00		0.99	0.97		0.98	0.98	
Frt		0.986			0.992			0.898			0.907	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	3365	0	1738	3455	0	1547	1613	0	1690	3170	0
Flt Permitted	0.391			0.119			0.591			0.197		
Satd. Flow (perm)	724	3365	0	217	3455	0	951	1613	0	344	3170	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			5			101			162	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		270.1			172.4			278.5			293.6	
Travel Time (s)		16.2			10.3			20.1			21.1	
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Adj. Flow (vph)	251	1180	126	147	649	37	37	127	267	52	99	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	251	1306	0	147	686	0	37	394	0	52	261	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	52.9	49.9		47.8	44.8		35.7	26.2		36.4	28.2	
Actuated g/C Ratio	0.48	0.45		0.43	0.41		0.32	0.24		0.33	0.26	
v/c Ratio	0.51	0.85		0.64	0.49		0.11	0.85		0.27	0.28	
Control Delay	21.6	27.4		38.1	27.5		20.7	46.7		23.7	12.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.6	27.4		38.1	27.5		20.7	46.7		23.7	12.3	
LOS	C	C		D	C		C	D		C	B	
Approach Delay		26.5			29.4			44.4			14.2	
Approach LOS		C			C			D			B	
Queue Length 50th (m)	34.7	139.3		19.9	58.2		5.1	61.6		7.2	8.7	
Queue Length 95th (m)	45.2	#192.8		#54.0	85.6		10.5	89.2		13.4	17.2	
Internal Link Dist (m)		246.1			148.4			254.5			269.6	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	491	1533		231	1410		347	582		199	1119	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.51	0.85		0.64	0.49		0.11	0.68		0.26	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 28.5
 Intersection LOS: C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

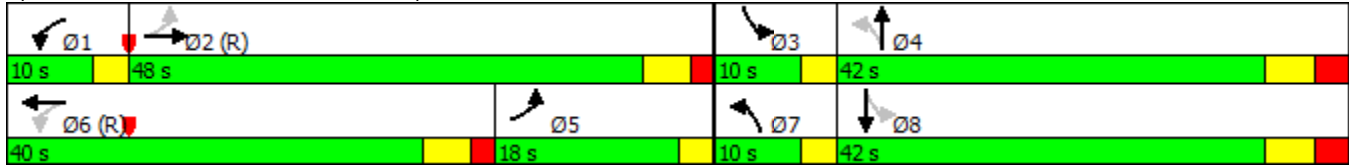
AM Peak Hour
 Future Background (2028)

Intersection Capacity Utilization 88.7% ICU Level of Service E

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Hour
Future Background (2028)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	1050	112	137	604	34	34	117	246	48	91	149
Future Volume (vph)	223	1050	112	137	604	34	34	117	246	48	91	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3364		1738	3454		1537	1613		1686	3169	
Flt Permitted	0.39	1.00		0.12	1.00		0.59	1.00		0.20	1.00	
Satd. Flow (perm)	727	3364		217	3454		955	1613		349	3169	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	251	1180	126	147	649	37	37	127	267	52	99	162
RTOR Reduction (vph)	0	7	0	0	3	0	0	76	0	0	120	0
Lane Group Flow (vph)	251	1299	0	147	683	0	37	318	0	52	141	0
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	51.7	48.7		43.6	43.6		31.0	26.8		33.8	28.2	
Effective Green, g (s)	51.7	48.7		43.6	43.6		31.0	26.8		33.8	28.2	
Actuated g/C Ratio	0.47	0.44		0.40	0.40		0.28	0.24		0.31	0.26	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	483	1489		222	1369		291	392		175	812	
v/s Ratio Prot	0.07	c0.39		c0.06	0.20		0.00	c0.20		c0.02	0.04	
v/s Ratio Perm	0.17			0.20			0.03			0.08		
v/c Ratio	0.52	0.87		0.66	0.50		0.13	0.81		0.30	0.17	
Uniform Delay, d1	23.6	27.8		26.3	25.0		29.1	39.2		28.7	31.8	
Progression Factor	0.68	0.72		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	6.3		7.2	1.3		0.2	12.0		1.0	0.1	
Delay (s)	16.9	26.3		33.5	26.3		29.3	51.2		29.7	31.9	
Level of Service	B	C		C	C		C	D		C	C	
Approach Delay (s)		24.8			27.6			49.3			31.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2028 AM_FB_sim_2.txt

Queuing and Blocking Report AM Peak Period
Future Background (2028)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.3	65.9	127.7	49.5
82.2	22.5				
Average Queue (m)		21.7	33.1	70.5	20.6
46.8	8.8				
95th Queue (m)	38.2	56.0	124.0	39.6	73.1
19.0					
Link Distance (m)		372.2	304.9	304.9	672.0
672.0					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		2	4		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		40.9	43.7	63.3	63.0
95.0	116.2				
Average Queue (m)		19.2	20.2	27.0	24.9
49.6	6.6				
95th Queue (m)	34.6	37.7	57.2	53.5	81.4

2028 AM_FB_sim_2.txt

52.4					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B22	B22
B22 SB					
Directions Served	L	T	T	T	T
LR					
Maximum Queue (m)		4.5	11.2	28.7	41.3
76.3 27.9 9.0					
Average Queue (m)		0.1	0.4	2.6	2.6
6.1 0.9 1.4					
95th Queue (m)	2.0	4.9	13.7	25.8	41.2
15.5 6.6					
Link Distance (m)		14.9	14.9	82.7	82.7
82.7 91.5					
Upstream Blk Time (%)			0	1	0
0 0					
Queuing Penalty (veh)			1	5	0
2 0					
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		1	0		

2028 AM_FB_sim_2.txt

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		9.5	100.1	102.9	25.0
47.5 39.7 27.6	30.0	17.8	10.0		
Average Queue (m)		1.6	52.3	60.2	10.5
15.3 14.9 8.4	7.1	4.1	2.1		
95th Queue (m)	7.1	98.4	106.9	20.6	35.5
33.5 21.0 18.4	13.4	8.5			
Link Distance (m)		99.8	99.8		245.5
245.5	132.6	62.4	62.4		
Upstream Blk Time (%)			0	1	
Queuing Penalty (veh)			2	6	
Storage Bay Dist (m)		45.0			70.0
	30.0				
Storage Blk Time (%)			10		
	1	0			
Queuing Penalty (veh)			1		
	0	0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		115.9	179.4	184.0	32.3
117.6 95.9 53.8	103.8	25.6	31.6	36.8	
Average Queue (m)		38.5	77.7	88.6	28.5
63.5 50.0 9.8	54.7	8.5	12.7	15.8	
95th Queue (m)	90.8	155.4	165.8	37.6	106.4
89.4 30.3 91.9	20.5	25.5	28.2		
Link Distance (m)		245.5	245.5		222.7
222.7	221.1	176.9	176.9		

2028 AM_FB_sim_2.txt

Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (m)			165.0		30.0
	105.0		50.0		
Storage Blk Time (%)			0	1	21
19	0	0			
Queuing Penalty (veh)			0	2	64
26	0	0			

Network Summary

Network wide Queuing Penalty: 117

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷	↷	↶	↷
Traffic Volume (vph)	172	419	902	1149	197	227
Future Volume (vph)	172	419	902	1149	197	227
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.137				0.950	
Satd. Flow (perm)	254	1852	1807	1536	1370	1225
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				322		203
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Peak Hour Factor	0.98	0.98	0.94	0.94	0.80	0.80
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	176	428	960	1222	246	284
Shared Lane Traffic (%)						
Lane Group Flow (vph)	176	428	960	1222	246	284
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	1.02	1.02	1.05	1.05	1.40	1.40
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Maximum Green (s)	8.0	86.0	75.0	21.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.8	-2.8	0.0	0.0	-3.2	-3.2
Total Lost Time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	91.8	88.8	75.0	102.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.85	0.20	0.20
v/c Ratio	0.53	0.31	0.85	0.90	0.89	0.69
Control Delay	21.6	6.0	17.3	14.1	79.7	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	6.0	17.3	14.1	79.7	23.3
LOS	C	A	B	B	E	C
Approach Delay		10.5	15.5		49.5	
Approach LOS		B	B		D	
Queue Length 50th (m)	9.2	29.6	105.0	65.0	56.8	16.7
Queue Length 95th (m)	17.9	42.0	m159.7	m204.3	#84.2	35.1
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	329	1370	1129	1353	276	409
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.31	0.85	0.90	0.89	0.69

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.90
Intersection Signal Delay:	20.0
Intersection LOS:	C
Intersection Capacity Utilization:	93.8%
ICU Level of Service:	F
Analysis Period (min):	15

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

PM Peak Hour
 Future Background (2028)

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Hour
Future Background (2028)



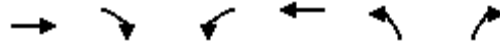
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	172	419	902	1149	197	227
Future Volume (vph)	172	419	902	1149	197	227
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Total Lost time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	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)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.14	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	254	1852	1807	1536	1370	1225
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	176	428	960	1222	246	284
RTOR Reduction (vph)	0	0	0	64	0	162
Lane Group Flow (vph)	176	428	960	1158	246	122
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	91.8	88.8	75.0	96.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.80	0.20	0.20
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	329	1370	1129	1318	276	247
v/s Ratio Prot	c0.05	0.23	0.53	c0.15	0.18	
v/s Ratio Perm	0.36			0.60		0.10
v/c Ratio	0.53	0.31	0.85	0.88	0.89	0.49
Uniform Delay, d1	32.4	5.3	18.0	8.1	46.6	42.5
Progression Factor	1.00	1.00	0.65	1.61	1.00	1.00
Incremental Delay, d2	1.7	0.6	4.6	4.9	32.2	6.9
Delay (s)	34.1	5.9	16.4	17.9	78.9	49.4
Level of Service	C	A	B	B	E	D
Approach Delay (s)		14.1	17.3		63.1	
Approach LOS		B	B		E	

Intersection Summary

HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Hour
Future Background (2028)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	520	96	0	1766	285	659
Future Volume (vph)	520	96	0	1766	285	659
Ideal Flow (vphpl)	1000	1000	1805	1805	1694	1694
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.98				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	1902	859	0	3433	1611	1441
Flt Permitted					0.950	
Satd. Flow (perm)	1902	838	0	3433	1611	1441
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		102				527
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		3	3			
Peak Hour Factor	0.94	0.94	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Adj. Flow (vph)	553	102	0	1962	313	724
Shared Lane Traffic (%)						
Lane Group Flow (vph)	553	102	0	1962	313	724
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	2.14	2.14	1.05	1.05	1.14	1.14
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Hour
Future Background (2028)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	50.0	50.0		50.0	25.0	
Total Split (s)	95.0	95.0		95.0	25.0	
Total Split (%)	79.2%	79.2%		79.2%	20.8%	
Maximum Green (s)	89.0	89.0		89.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.9	
Total Lost Time (s)	6.0	6.0		6.0	4.1	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effect Green (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
v/c Ratio	0.39	0.16		0.77	1.12	0.50
Control Delay	3.9	0.5		5.7	134.8	1.3
Queue Delay	0.0	0.0		0.2	0.0	0.0
Total Delay	3.9	0.5		5.9	134.8	1.3
LOS	A	A		A	F	A
Approach Delay	3.3			5.9	41.5	
Approach LOS	A			A	D	
Queue Length 50th (m)	12.0	0.0		47.7	-84.6	0.0
Queue Length 95th (m)	m15.1	m0.0		80.2	#139.5	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1410	647		2546	280	1441
Starvation Cap Reductn	0	0		114	0	0
Spillback Cap Reductn	0	0		23	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.39	0.16		0.81	1.12	0.50

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.12
 Intersection Signal Delay: 15.6
 Intersection Capacity Utilization 77.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

PM Peak Hour
 Future Background (2028)

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

Splits and Phases: 2: QEW East Ramp & Northshore Blvd

→ Ø2 (R) 95 s	↶ Ø4 25 s
← Ø6 (R) 95 s	

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Hour
Future Background (2028)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	520	96	0	1766	285	659
Future Volume (vph)	520	96	0	1766	285	659
Ideal Flow (vphp)	1000	1000	1805	1805	1694	1694
Total Lost time (s)	6.0	6.0		6.0	4.1	1.1
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1902	838		3433	1611	1441
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1902	838		3433	1611	1441
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	553	102	0	1962	313	724
RTOR Reduction (vph)	0	26	0	0	0	0
Lane Group Flow (vph)	553	76	0	1962	313	724
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1410	621		2546	280	1441
v/s Ratio Prot	0.29			c0.57	c0.19	
v/s Ratio Perm		0.09				0.50
v/c Ratio	0.39	0.12		0.77	1.12	0.50
Uniform Delay, d1	5.6	4.4		9.3	49.5	0.0
Progression Factor	0.55	0.07		0.39	1.00	1.00
Incremental Delay, d2	0.7	0.3		1.9	89.3	1.3
Delay (s)	3.8	0.7		5.6	138.8	1.3
Level of Service	A	A		A	F	A
Approach Delay (s)	3.3			5.6	42.8	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

PM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	1009	1700	7	2	4
Future Volume (vph)	5	1009	1700	7	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.910	
Flt Protected	0.950				0.984	
Satd. Flow (prot)	1825	3614	3608	0	1720	0
Flt Permitted	0.950				0.984	
Satd. Flow (perm)	1825	3614	3608	0	1720	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	21			21	1	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	14%	0%	0%
Adj. Flow (vph)	6	1134	1828	8	2	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	1134	1836	0	6	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.2%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	969	29	34	1636	19	62	0	41	8	1	9
Future Volume (vph)	13	969	29	34	1636	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	1.00		1.00		0.98	0.99	0.99	
Frt		0.996			0.998				0.850		0.864	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3562	0	1825	3605	0	1789	0	1633	1825	1489	0
Flt Permitted	0.102			0.232			0.750			0.950		
Satd. Flow (perm)	196	3562	0	445	3605	0	1409	0	1604	1814	1489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			2				64		10	
Link Speed (k/h)		60			60			20			20	
Link Distance (m)		117.6			266.3			150.8			78.0	
Travel Time (s)		7.1			16.0			27.1			14.0	
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Adj. Flow (vph)	14	1042	31	38	1838	21	67	0	45	9	1	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	1073	0	38	1859	0	67	0	45	9	11	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0	8.0	
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0	38.0	
Total Split (s)	69.0	69.0		11.0	80.0		40.0		40.0	40.0	40.0	
Total Split (%)	57.5%	57.5%		9.2%	66.7%		33.3%		33.3%	33.3%	33.3%	
Maximum Green (s)	63.0	63.0		7.0	74.0		33.0		33.0	33.0	33.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None	None	
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0	12.0	
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0		0	0	0	
Act Effct Green (s)	93.6	93.6		100.6	99.8		11.4		11.4	11.4	11.4	
Actuated g/C Ratio	0.78	0.78		0.84	0.83		0.10		0.10	0.10	0.10	
v/c Ratio	0.09	0.39		0.09	0.62		0.50		0.21	0.05	0.07	
Control Delay	6.7	4.9		1.7	5.3		63.7		8.0	47.8	26.0	
Queue Delay	0.0	0.0		0.0	0.1		0.0		0.0	0.0	0.0	
Total Delay	6.7	4.9		1.7	5.4		63.7		8.0	47.8	26.0	
LOS	A	A		A	A		E		A	D	C	
Approach Delay		4.9			5.3			41.3				35.8
Approach LOS		A			A			D				D
Queue Length 50th (m)	0.8	35.3		0.8	28.1		15.3		0.0	2.0	0.2	
Queue Length 95th (m)	m2.1	47.1		m1.4	m36.7		28.9		6.6	6.8	5.7	
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	153	2779		453	2998		387		487	498	416	
Starvation Cap Reductn	0	0		0	254		0		0	0	0	
Spillback Cap Reductn	0	0		0	0		0		0	0	0	
Storage Cap Reductn	0	0		0	0		0		0	0	0	
Reduced v/c Ratio	0.09	0.39		0.08	0.68		0.17		0.09	0.02	0.03	

Intersection Summary

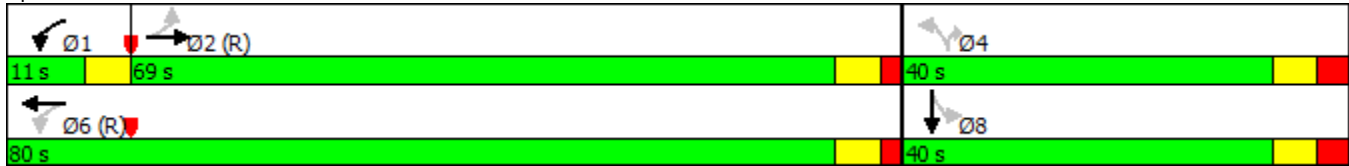
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 6.7
 Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

PM Peak Hour
 Future Background (2028)

Intersection Capacity Utilization 64.8% ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Hour
Future Background (2028)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖		↖	↖	↕	↕
Traffic Volume (vph)	13	969	29	34	1636	19	62	0	41	8	1	9
Future Volume (vph)	13	969	29	34	1636	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00		0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1822	3561		1824	3606		1785		1604	1814	1489	
Flt Permitted	0.10	1.00		0.23	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	196	3561		446	3606		1410		1604	1814	1489	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1042	31	38	1838	21	67	0	45	9	1	10
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	9	0
Lane Group Flow (vph)	14	1072	0	38	1859	0	67	0	4	9	2	0
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Effective Green, g (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Actuated g/C Ratio	0.75	0.75		0.81	0.81		0.08		0.08	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	146	2652		404	2920		115		130	148	121	
v/s Ratio Prot		0.30		0.00	c0.52						0.00	
v/s Ratio Perm	0.07			0.07			c0.05		0.00	0.00		
v/c Ratio	0.10	0.40		0.09	0.64		0.58		0.03	0.06	0.02	
Uniform Delay, d1	4.2	5.6		2.9	4.5		53.1		50.7	50.9	50.7	
Progression Factor	0.81	0.74		0.59	0.93		1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.4		0.1	0.6		7.3		0.1	0.2	0.0	
Delay (s)	4.6	4.5		1.7	4.8		60.4		50.8	51.0	50.7	
Level of Service	A	A		A	A		E		D	D	D	
Approach Delay (s)		4.5			4.7			56.6			50.9	
Approach LOS		A			A			E			D	

Intersection Summary

HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	209	750	59	226	1314	63	119	112	146	92	170	256
Future Volume (vph)	209	750	59	226	1314	63	119	112	146	92	170	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor		0.99		0.97	0.99		0.96	0.84		0.83	0.94	
Frt		0.989		0.993			0.915			0.910		
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3523	0	1789	3516	0	1789	1416	0	1755	3083	0
Flt Permitted	0.075			0.214			0.329			0.343		
Satd. Flow (perm)	143	3523	0	392	3516	0	593	1416	0	529	3083	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			4			57			269	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Adj. Flow (vph)	235	843	66	243	1413	68	129	122	159	100	185	278
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	909	0	243	1481	0	129	281	0	100	463	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	15.0	49.0		15.0	49.0		12.0	44.0		12.0	44.0	
Total Split (%)	12.5%	40.8%		12.5%	40.8%		10.0%	36.7%		10.0%	36.7%	
Maximum Green (s)	12.0	43.0		12.0	43.0		9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	72.1	53.3		68.5	51.5		37.9	25.1		37.5	24.9	
Actuated g/C Ratio	0.60	0.44		0.57	0.43		0.32	0.21		0.31	0.21	
v/c Ratio	0.77	0.58		0.63	0.98		0.47	0.83		0.40	0.54	
Control Delay	59.3	26.1		20.1	53.8		32.2	54.8		30.4	18.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	59.3	26.1		20.1	53.8		32.2	54.8		30.4	18.4	
LOS	E	C		C	D		C	D		C	B	
Approach Delay		32.9			49.0			47.7			20.6	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	44.5	51.4		24.5	~196.7		21.4	51.5		16.3	20.4	
Queue Length 95th (m)	#87.5	106.1		46.2	#262.7		31.3	75.2		25.2	32.6	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	304	1569		392	1512		277	476		258	1136	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.77	0.58		0.62	0.98		0.47	0.59		0.39	0.41	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 39.9
 Intersection LOS: D

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
 Future Background (2028)









Intersection Capacity Utilization 100.2% ICU Level of Service G

Analysis Period (min) 15

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

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	49 s	12 s	44 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	49 s	12 s	44 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
Future Background (2028)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	209	750	59	226	1314	63	119	112	146	92	170	256
Future Volume (vph)	209	750	59	226	1314	63	119	112	146	92	170	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.84		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.95	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	3524		1780	3517		1767	1416		1669	3082	
Flt Permitted	0.08	1.00		0.21	1.00		0.33	1.00		0.34	1.00	
Satd. Flow (perm)	143	3524		401	3517		612	1416		602	3082	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	235	843	66	243	1413	68	129	122	159	100	185	278
RTOR Reduction (vph)	0	4	0	0	2	0	0	45	0	0	213	0
Lane Group Flow (vph)	235	905	0	243	1479	0	129	236	0	100	250	0
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	69.1	53.3		65.5	51.5		33.9	25.1		33.5	24.9	
Effective Green, g (s)	69.1	53.3		65.5	51.5		33.9	25.1		33.5	24.9	
Actuated g/C Ratio	0.58	0.44		0.55	0.43		0.28	0.21		0.28	0.21	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	301	1565		379	1509		257	296		244	639	
v/s Ratio Prot	c0.10	0.26		0.07	c0.42		c0.04	c0.17		0.03	0.08	
v/s Ratio Perm	0.35			0.27			0.10			0.08		
v/c Ratio	0.78	0.58		0.64	0.98		0.50	0.80		0.41	0.39	
Uniform Delay, d1	34.0	24.9		16.2	33.7		33.6	45.0		33.7	41.0	
Progression Factor	1.61	0.91		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.8	1.5		3.7	18.9		1.5	13.8		1.1	0.4	
Delay (s)	66.5	24.2		19.9	52.6		35.2	58.8		34.8	41.4	
Level of Service	E	C		B	D		D	E		C	D	
Approach Delay (s)		32.9			48.0			51.4			40.2	
Approach LOS		C			D			D			D	

Intersection Summary

HCM 2000 Control Delay	42.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

2028 PM_FB_sim_2.txt

Queuing and Blocking Report PM Peak Period
Future Background (2028)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	218.3	111.4	113.1
76.1 61.4					
Average Queue (m)		35.4	82.1	68.5	69.2
38.0 26.4					
95th Queue (m)	50.1	187.9	98.0	103.3	67.2
49.4					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		27	13		
Queuing Penalty (veh)		111	23		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		26.1	21.8	52.3	55.8
256.6 79.2					
Average Queue (m)		7.8	6.3	22.8	25.7
159.0 4.5					
95th Queue (m)	20.3	18.4	43.3	48.9	276.8

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63.9					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	WB	WB
SB					
Directions Served	L	T	T	T	TR
LR					
Maximum Queue (m)		9.1	12.5	4.1	6.2
2.8	9.0				
Average Queue (m)		1.2	1.1	0.2	0.3
0.1	1.5				
95th Queue (m)	6.3	6.8	2.6	4.0	2.2
7.0					
Link Distance (m)		14.9	14.9	99.4	99.4
91.5					
Upstream Blk Time (%)		0	0	0	
Queuing Penalty (veh)		0	1	0	
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		2	0		
Queuing Penalty (veh)		11	0		

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Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		17.4	59.7	64.0	13.0
42.8 46.5 28.3	20.4	9.4	13.7		
Average Queue (m)		2.6	21.0	24.3	4.1
16.0 18.0 13.3	5.2	1.8	2.5		
95th Queue (m)	10.6	46.5	50.7	11.2	34.7
38.1 26.3 13.4	7.1	9.7			
Link Distance (m)		99.4	99.4		242.6
242.6	137.1	65.8	65.8		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		45.0			70.0
	30.0				
Storage Blk Time (%)			1		
	1	0			
Queuing Penalty (veh)			0		
	0	0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		78.3	82.4	86.5	32.4
239.2 237.9 44.2	75.9	45.5	54.9	73.6	
Average Queue (m)		36.9	47.6	52.4	27.7
229.0 228.8 20.7	39.1	15.0	23.4	36.8	
95th Queue (m)	64.7	75.5	81.5	39.6	234.4
235.6 36.5 67.5	31.3	46.4	64.4		
Link Distance (m)		242.6	242.6		222.7
222.7	224.7	176.9	176.9		

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Upstream Blk Time (%)

73 64

Queuing Penalty (veh)

0 0

Storage Bay Dist (m)

165.0

30.0

105.0 50.0

Storage Blk Time (%)

54 0 0

13

Queuing Penalty (veh)

123 0 0

87

Network Summary

Network wide Queuing Penalty: 356

SimTraffic Report 09/04/2018

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	138	450	641	708	297	69
Future Volume (vph)	138	450	641	708	297	69
Ideal Flow (vphp)	2129	2129	1575	1575	1518	1518
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.99	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.196				0.950	
Satd. Flow (perm)	410	2153	1577	1340	1289	1305
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				416		78
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.84	0.84	0.93	0.93	0.89	0.89
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Adj. Flow (vph)	164	536	689	761	334	78
Shared Lane Traffic (%)						
Lane Group Flow (vph)	164	536	689	761	334	78
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	0.85	0.85	1.25	1.25	1.49	1.31
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	12.0	62.0	50.0	33.0	33.0	33.0
Total Split (%)	12.6%	65.3%	52.6%	34.7%	34.7%	34.7%
Maximum Green (s)	9.0	56.0	44.0	26.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.5	-1.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	60.5	57.5	44.0	76.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.80	0.27	0.27
v/c Ratio	0.38	0.41	0.94	0.66	0.94	0.19
Control Delay	15.2	11.0	35.4	4.2	70.6	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.2	11.0	35.4	4.2	70.6	7.7
LOS	B	B	D	A	E	A
Approach Delay		12.0	19.0		58.7	
Approach LOS		B	B		E	
Queue Length 50th (m)	10.8	47.5	84.6	5.8	59.8	0.0
Queue Length 95th (m)	17.0	61.5 m#	172.6 m#	24.0 m#	109.3 m#	10.0
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	435	1303	730	1155	355	413
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.41	0.94	0.66	0.94	0.19

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Background (2028)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	138	450	641	708	297	69
Future Volume (vph)	138	450	641	708	297	69
Ideal Flow (vphpl)	2129	2129	1575	1575	1518	1518
Total Lost time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	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
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)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.20	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	411	2153	1577	1340	1299	1305
Peak-hour factor, PHF	0.84	0.84	0.93	0.93	0.89	0.89
Adj. Flow (vph)	164	536	689	761	334	78
RTOR Reduction (vph)	0	0	0	109	0	57
Lane Group Flow (vph)	164	536	689	652	334	21
Confl. Peds. (#/hr)					5	
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	59.0	56.0	44.0	70.0	26.0	26.0
Effective Green, g (s)	60.5	57.5	44.0	70.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.74	0.27	0.27
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	435	1303	730	1086	355	357
v/s Ratio Prot	0.04	c0.25	c0.44	0.16	c0.26	
v/s Ratio Perm	0.20			0.32		0.02
v/c Ratio	0.38	0.41	0.94	0.60	0.94	0.06
Uniform Delay, d1	23.6	9.9	24.3	5.9	33.7	25.5
Progression Factor	1.00	1.00	0.67	1.33	1.00	1.00
Incremental Delay, d2	0.5	1.0	16.8	1.7	34.9	0.3
Delay (s)	24.2	10.8	33.1	9.5	68.6	25.8
Level of Service	C	B	C	A	E	C
Approach Delay (s)		13.9	20.7		60.5	
Approach LOS		B	C		E	
Intersection Summary						
HCM 2000 Control Delay			25.3		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	14.5
Intersection Capacity Utilization			82.3%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Background (2028)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	484	263	0	1097	252	698
Future Volume (vph)	484	263	0	1097	252	698
Ideal Flow (vphpl)	1450	1450	1670	1670	1450	1450
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97			1.00	
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2434	1122	0	2859	1254	1122
Flt Permitted					0.950	
Satd. Flow (perm)	2434	1091	0	2859	1252	1122
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		286				562
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		6	6		1	
Peak Hour Factor	0.92	0.92	0.96	0.96	0.76	0.76
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Adj. Flow (vph)	526	286	0	1143	332	918
Shared Lane Traffic (%)						
Lane Group Flow (vph)	526	286	0	1143	332	918
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	1.57	1.57	1.33	1.33	1.57	1.57
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Background (2028)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.2	
Total Lost Time (s)	6.0	6.0		6.0	4.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	59.0	59.0		59.0	25.2	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
v/c Ratio	0.35	0.36		0.64	1.00	0.82
Control Delay	5.9	1.2		13.5	86.5	7.1
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	5.9	1.2		13.5	86.5	7.1
LOS	A	A		B	F	A
Approach Delay	4.2			13.5	28.2	
Approach LOS	A			B	C	
Queue Length 50th (m)	13.7	0.0		63.5	60.8	0.0
Queue Length 95th (m)	m17.6	m0.1		83.8	#87.1	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1511	785		1775	332	1122
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.35	0.36		0.64	1.00	0.82

Intersection Summary

Area Type: CBD
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 16.9
 Intersection Capacity Utilization 67.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C
 # 95th percentile volume exceeds capacity, queue may be longer.

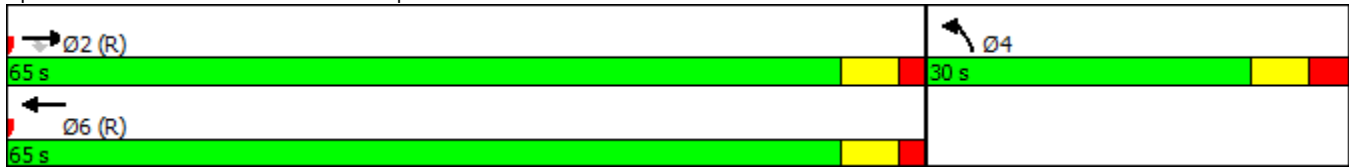
Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
 Future Background (2028)

Queue shown is maximum after two cycles.

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

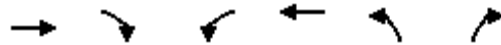
Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Background (2028)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	484	263	0	1097	252	698
Future Volume (vph)	484	263	0	1097	252	698
Ideal Flow (vphp)	1450	1450	1670	1670	1450	1450
Total Lost time (s)	6.0	6.0		6.0	4.8	1.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2434	1091		2859	1254	1122
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2434	1091		2859	1254	1122
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.76	0.76
Adj. Flow (vph)	526	286	0	1143	332	918
RTOR Reduction (vph)	0	108	0	0	0	0
Lane Group Flow (vph)	526	178	0	1143	332	918
Confl. Peds. (#/hr)		6	6		1	
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	59.0	59.0		59.0	23.0	95.0
Effective Green, g (s)	59.0	59.0		59.0	25.2	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1511	677		1775	332	1122
v/s Ratio Prot	0.22			0.40	c0.26	
v/s Ratio Perm		0.16				c0.82
v/c Ratio	0.35	0.26		0.64	1.00	0.82
Uniform Delay, d1	8.7	8.1		11.4	34.9	0.0
Progression Factor	0.61	0.16		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.7		1.8	49.4	6.7
Delay (s)	5.8	2.0		13.2	84.3	6.7
Level of Service	A	A		B	F	A
Approach Delay (s)	4.5			13.2	27.3	
Approach LOS	A			B	C	

Intersection Summary

HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

Saturday Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1182	1266	6	3	2
Future Volume (vph)	0	1182	1266	6	3	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.946	
Flt Protected					0.971	
Satd. Flow (prot)	1921	3614	3611	0	1765	0
Flt Permitted					0.971	
Satd. Flow (perm)	1921	3614	3611	0	1765	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	23			23		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	0	1328	1361	6	3	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1328	1367	0	5	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.2%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	1106	52	37	1181	19	75	0	51	32	0	16
Future Volume (vph)	27	1106	52	37	1181	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00		1.00		0.98	0.99	0.99	
Frt		0.993			0.998				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3580	0	1825	3605	0	1772	0	1601	1825	1609	0
Flt Permitted	0.199			0.170			0.746			0.950		
Satd. Flow (perm)	381	3580	0	327	3605	0	1388	0	1572	1814	1609	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			2				85			85
Link Speed (k/h)		60			60			20				20
Link Distance (m)		117.6			266.3			150.8				78.0
Travel Time (s)		7.1			16.0			27.1				14.0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Adj. Flow (vph)	29	1189	56	42	1327	21	82	0	55	35	0	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1245	0	42	1348	0	82	0	55	35	17	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0	38.0	38.0
Total Split (s)	38.0	38.0		13.0	38.0		39.0		39.0	39.0	39.0	39.0
Total Split (%)	42.2%	42.2%		14.4%	42.2%		43.3%		43.3%	43.3%	43.3%	43.3%
Maximum Green (s)	32.0	32.0		9.0	32.0		32.0		32.0	32.0	32.0	32.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None	None	None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0	12.0	12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0	0	0
Act Effct Green (s)	63.9	63.9		70.9	70.1		11.1		11.1	11.1	11.1	11.1
Actuated g/C Ratio	0.71	0.71		0.79	0.78		0.12		0.12	0.12	0.12	0.12
v/c Ratio	0.11	0.49		0.12	0.48		0.48		0.21	0.16	0.06	
Control Delay	9.4	9.5		4.0	5.6		45.5		5.1	35.4	0.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Delay	9.4	9.5		4.0	5.6		45.5		5.1	35.4	0.4	
LOS	A	A		A	A		D		A	D	A	
Approach Delay		9.5			5.6			29.3				24.0
Approach LOS		A			A			C				C
Queue Length 50th (m)	1.8	58.5		1.4	42.4		13.5		0.0	5.5	0.0	
Queue Length 95th (m)	6.8	89.9		4.4	66.9		25.8		5.0	13.2	0.0	
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	270	2542		407	2809		493		613	644	626	
Starvation Cap Reductn	0	0		0	0		0		0	0	0	
Spillback Cap Reductn	0	0		0	0		0		0	0	0	
Storage Cap Reductn	0	0		0	0		0		0	0	0	
Reduced v/c Ratio	0.11	0.49		0.10	0.48		0.17		0.09	0.05	0.03	

Intersection Summary

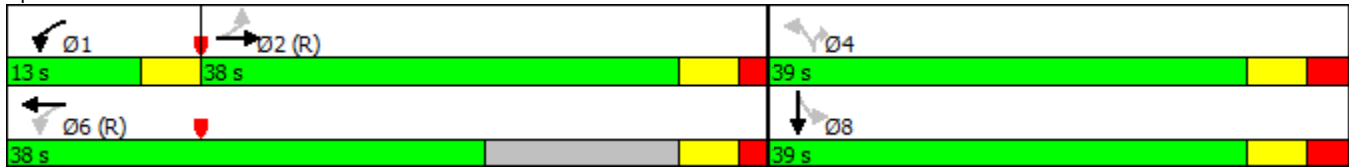
Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 8.8
 Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

Saturday Peak Hour
 Future Background (2028)

Intersection Capacity Utilization 66.1% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Background (2028)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑		↖	↑↑		↖		↗	↖	↑	↗
Traffic Volume (vph)	27	1106	52	37	1181	19	75	0	51	32	0	16
Future Volume (vph)	27	1106	52	37	1181	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1818	3581		1824	3603		1767		1572	1814	1609	
Flt Permitted	0.20	1.00		0.17	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	381	3581		327	3603		1388		1572	1814	1609	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	1189	56	42	1327	21	82	0	55	35	0	17
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	49	0	15	0
Lane Group Flow (vph)	29	1243	0	42	1348	0	82	0	6	35	2	0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Effective Green, g (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Actuated g/C Ratio	0.66	0.66		0.75	0.75		0.11		0.11	0.11	0.11	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	252	2375		308	2702		146		165	191	169	
v/s Ratio Prot		c0.35		0.01	c0.37							0.00
v/s Ratio Perm	0.08			0.10			c0.06		0.00	0.02		
v/c Ratio	0.12	0.52		0.14	0.50		0.56		0.04	0.18	0.01	
Uniform Delay, d1	5.5	7.8		4.3	4.5		38.3		36.1	36.7	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.9	0.8		0.2	0.7		4.9		0.1	0.5	0.0	
Delay (s)	6.4	8.6		4.5	5.2		43.1		36.2	37.2	36.1	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		8.6			5.1			40.4			36.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	818	176	315	768	47	196	134	182	100	270	274
Future Volume (vph)	195	818	176	315	768	47	196	134	182	100	270	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	0.99		1.00	1.00		0.99	0.93		0.95	0.99	
Frt		0.973			0.991			0.914			0.924	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3491	0	1807	3555	0	1807	1621	0	1755	3330	0
Flt Permitted	0.237			0.089			0.245			0.266		
Satd. Flow (perm)	445	3491	0	169	3555	0	464	1621	0	465	3330	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			6			65			247	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Adj. Flow (vph)	219	919	198	339	826	51	213	146	198	109	293	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	219	1117	0	339	877	0	213	344	0	109	591	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Background (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	56.3	42.0		61.6	46.6		36.1	25.1		36.1	25.1	
Actuated g/C Ratio	0.51	0.38		0.56	0.42		0.33	0.23		0.33	0.23	
v/c Ratio	0.58	0.83		0.98	0.58		0.90	0.82		0.47	0.62	
Control Delay	19.0	36.4		77.1	28.1		65.8	47.6		29.2	23.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.0	36.4		77.1	28.1		65.8	47.6		29.2	23.7	
LOS	B	D		E	C		E	D		C	C	
Approach Delay		33.5			41.8			54.6			24.5	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	20.6	110.2		55.6	74.3		33.1	58.0		15.9	34.6	
Queue Length 95th (m)	39.9	135.0		#156.4	113.7		#53.7	81.3		24.3	46.4	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	426	1349		346	1509		237	560		234	1227	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.51	0.83		0.98	0.58		0.90	0.61		0.47	0.48	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	25 (23%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.98
Intersection Signal Delay:	37.6
Intersection LOS:	D

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
 Future Background (2028)

Intersection Capacity Utilization 95.5% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Ø1	Ø2 (R)	Ø3	Ø4
10 s	48 s	10 s	42 s
Ø5	Ø6 (R)	Ø7	Ø8
18 s	40 s	10 s	42 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Background (2028)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖	↕		↖	↕	
Traffic Volume (vph)	195	818	176	315	768	47	196	134	182	100	270	274
Future Volume (vph)	195	818	176	315	768	47	196	134	182	100	270	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.93		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.91		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1801	3493		1807	3556		1805	1620		1734	3331	
Flt Permitted	0.24	1.00		0.09	1.00		0.25	1.00		0.27	1.00	
Satd. Flow (perm)	449	3493		169	3556		466	1620		485	3331	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	219	919	198	339	826	51	213	146	198	109	293	298
RTOR Reduction (vph)	0	17	0	0	3	0	0	50	0	0	191	0
Lane Group Flow (vph)	219	1100	0	339	874	0	213	294	0	109	400	0
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.3	42.0		61.9	46.6		32.1	25.1		32.1	25.1	
Effective Green, g (s)	54.3	42.0		61.9	46.6		32.1	25.1		32.1	25.1	
Actuated g/C Ratio	0.49	0.38		0.56	0.42		0.29	0.23		0.29	0.23	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	372	1333		346	1506		221	369		221	760	
v/s Ratio Prot	0.07	0.32		c0.15	0.25		c0.06	0.18		0.03	0.12	
v/s Ratio Perm	0.22			c0.40			c0.22			0.11		
v/c Ratio	0.59	0.83		0.98	0.58		0.96	0.80		0.49	0.53	
Uniform Delay, d1	17.0	30.7		33.3	24.2		36.0	40.0		30.3	37.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	5.9		42.4	1.6		49.9	11.3		1.7	0.7	
Delay (s)	19.3	36.6		75.7	25.9		85.9	51.3		32.0	37.9	
Level of Service	B	D		E	C		F	D		C	D	
Approach Delay (s)		33.8			39.8			64.6			37.0	
Approach LOS		C			D			E			D	

Intersection Summary

HCM 2000 Control Delay	40.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2028 SAT_FB_sim_2.txt
 Queuing and Blocking Report Weekend Peak Period
 Future Background (2028)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.1	87.8	107.4	68.9
95.1 17.1					
Average Queue (m)		25.7	42.0	53.9	28.7
49.0 6.5					
95th Queue (m)	44.0	77.2	94.3	55.8	81.2
13.9					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		3	6		
Queuing Penalty (veh)		13	8		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B22
NB NB					
Directions Served	T	T	T	T	T
L R					
Maximum Queue (m)		24.4	24.0	78.1	84.8
1.3 93.3 5.3					
Average Queue (m)		9.7	8.3	34.9	36.1
0.0 46.5 0.2					
95th Queue (m)	20.5	20.3	69.2	72.1	1.0

2028 SAT_FB_sim_2.txt

78.1	3.0					
Link Distance (m)		304.9	304.9	82.7	82.7	14.9
662.3	662.3					
Upstream Blk Time (%)					0	0
Queuing Penalty (veh)					1	2
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Northshore Blvd & Site Driveway

Movement		EB	B22	B22	WB	SB
Directions Served		T	T	T	TR	LR
Maximum Queue (m)			4.2	12.7	11.6	1.5
10.1						
Average Queue (m)			0.1	0.4	0.4	0.0
2.1						
95th Queue (m)		2.4	9.7	9.0	1.1	8.4
Link Distance (m)		14.9	82.7	82.7	99.4	91.5
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			0			
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 4: JBH Access & Northshore Blvd

Movement			EB	EB	EB	WB	WB
WB	NB	NB	SB	SB			

2028 SAT_FB_sim_2.txt

Directions Served			L	T	TR	L	T
TR	L	R	L	TR			
Maximum Queue (m)				29.4	74.3	82.4	17.0
73.1	74.7	31.2	26.6	24.4	12.1		
Average Queue (m)				4.8	29.1	35.4	5.3
27.5	29.6	14.2	6.8	6.6	3.1		
95th Queue (m)				16.3	60.5	66.7	13.5
59.4	27.5	17.7	17.1	9.8			
Link Distance (m)				99.4	99.4		242.6
242.6		137.1	65.8	65.8			
Upstream Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (m)				45.0			70.0
		30.0					
Storage Blk Time (%)				0	3		
0	1		0				
Queuing Penalty (veh)				0	1		
0	1		0				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement			EB	EB	EB	WB	WB
WB	NB	NB	SB	SB	SB		
Directions Served			L	T	TR	L	T
TR	L	TR	L	T	TR		
Maximum Queue (m)				60.8	105.6	110.4	32.4
232.0	231.2	88.6	134.7	46.1	61.3	91.3	
Average Queue (m)				30.2	63.1	69.4	32.2
215.1	200.1	39.0	56.4	16.0	33.5	45.9	
95th Queue (m)				52.9	98.1	103.6	265.8
274.3	78.0	120.8	33.7	54.1	76.6		
Link Distance (m)				242.6	242.6		222.7
222.7		224.7		176.9	176.9		
Upstream Blk Time (%)							
69	13		1				
Queuing Penalty (veh)							
0	0		0				

2028 SAT_FB_sim_2.txt

Storage Bay Dist (m)			165.0		30.0
	105.0		50.0		
Storage Blk Time (%)					80
18	0	4	0	1	
Queuing Penalty (veh)					308
56	0	8	0	1	

Network Summary

Network wide Queuing Penalty: 399

SimTraffic Report 09/04/2018

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	172	454	597	500	367	85
Future Volume (vph)	172	454	597	500	367	85
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			0.97		
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1483	1561	1435	1220	1546	1397
Flt Permitted	0.124				0.950	
Satd. Flow (perm)	193	1561	1435	1186	1546	1397
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				293		91
Link Speed (k/h)		50	60		100	
Link Distance (m)		165.3	312.3		178.0	
Travel Time (s)		11.9	18.7		6.4	
Confl. Peds. (#/hr)	4			4		
Peak Hour Factor	0.95	0.95	0.89	0.89	0.93	0.93
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Adj. Flow (vph)	181	478	671	562	395	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	181	478	671	562	395	91
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	1.25	1.25	1.37	1.37	1.16	1.16
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Maximum Green (s)	8.0	40.0	29.0	20.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-1.4	-1.4
Total Lost Time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	43.5	40.5	29.2	48.2	21.4	21.4
Actuated g/C Ratio	0.60	0.55	0.40	0.66	0.29	0.29
v/c Ratio	0.69	0.55	1.17	0.63	0.87	0.19
Control Delay	26.1	13.5	119.0	5.5	47.0	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	13.5	119.0	5.5	47.0	6.0
LOS	C	B	F	A	D	A
Approach Delay		17.0	67.3		39.3	
Approach LOS		B	E		D	
Queue Length 50th (m)	10.3	38.6	~112.5	8.8	51.2	0.0
Queue Length 95th (m)	#35.4	63.7	#168.5	19.9	#98.1	9.3
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	265	866	573	891	453	473
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.55	1.17	0.63	0.87	0.19

Intersection Summary

Area Type: Other
 Cycle Length: 73
 Actuated Cycle Length: 73
 Offset: 22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.17
 Intersection Signal Delay: 47.6
 Intersection LOS: D

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

AM Peak Hour
 Future Background (2033)

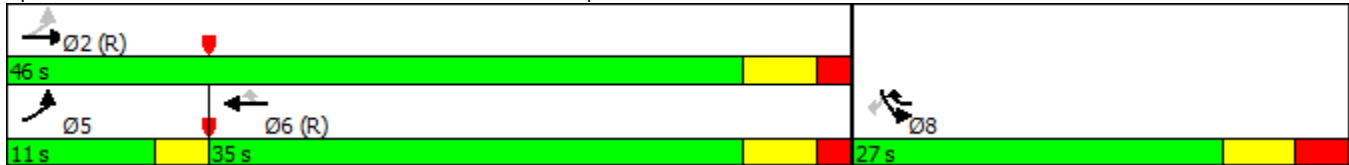
Intersection Capacity Utilization 88.4% ICU Level of Service E

Analysis Period (min) 15

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

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis

1: Northshore Blvd & QEW West Ramp

AM Peak Hour
Future Background (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	172	454	597	500	367	85
Future Volume (vph)	172	454	597	500	367	85
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Total Lost time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	1483	1561	1435	1200	1546	1397
Flt Permitted	0.12	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	194	1561	1435	1200	1546	1397
Peak-hour factor, PHF	0.95	0.95	0.89	0.89	0.93	0.93
Adj. Flow (vph)	181	478	671	562	395	91
RTOR Reduction (vph)	0	0	0	96	0	64
Lane Group Flow (vph)	181	478	671	466	395	27
Confl. Peds. (#/hr)	4			4		
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	29.2	49.2	20.0	20.0
Effective Green, g (s)	40.5	40.5	29.2	49.2	21.4	21.4
Actuated g/C Ratio	0.55	0.55	0.40	0.67	0.29	0.29
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	254	866	574	808	453	409
v/s Ratio Prot	c0.08	0.31	c0.47	0.16	c0.26	
v/s Ratio Perm	0.31			0.23		0.02
v/c Ratio	0.71	0.55	1.17	0.58	0.87	0.07
Uniform Delay, d1	13.1	10.4	21.9	6.4	24.5	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	2.5	93.7	3.0	20.1	0.3
Delay (s)	22.2	13.0	115.6	9.3	44.6	18.9
Level of Service	C	B	F	A	D	B
Approach Delay (s)		15.5	67.1		39.8	
Approach LOS		B	E		D	

Intersection Summary

HCM 2000 Control Delay	47.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

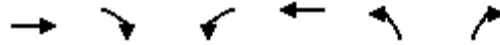
AM Peak Hour
Future Background (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	668	153	0	817	280	1055
Future Volume (vph)	668	153	0	817	280	1055
Ideal Flow (vphpl)	1440	1440	1246	1246	1266	1266
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2660	1202	0	2302	1192	1046
Flt Permitted					0.950	
Satd. Flow (perm)	2660	1165	0	2302	1192	1046
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		165				461
Link Speed (k/h)	60			60	48	
Link Distance (m)	312.3			111.4	163.6	
Travel Time (s)	18.7			6.7	12.3	
Confl. Peds. (#/hr)		8	8			
Peak Hour Factor	0.93	0.93	0.89	0.89	0.91	0.91
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Adj. Flow (vph)	718	165	0	918	308	1159
Shared Lane Traffic (%)						
Lane Group Flow (vph)	718	165	0	918	308	1159
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	1.40	1.40	1.66	1.66	1.63	1.63
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Hour
Future Background (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.6	
Total Lost Time (s)	6.0	6.0		6.0	4.4	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	59.0	59.0		59.0	25.6	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
v/c Ratio	0.43	0.21		0.64	0.96	1.11
Control Delay	10.4	1.9		14.0	77.3	69.1
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	10.4	1.9		14.0	77.3	69.1
LOS	B	A		B	E	E
Approach Delay	8.8			14.0	70.8	
Approach LOS	A			B	E	
Queue Length 50th (m)	32.8	0.0		50.9	55.6	-43.4
Queue Length 95th (m)	44.6	7.0		69.1	#106.3	#118.4
Internal Link Dist (m)	288.3			87.4	139.6	
Turn Bay Length (m)						
Base Capacity (vph)	1652	786		1429	321	1046
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.43	0.21		0.64	0.96	1.11

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.11
 Intersection Signal Delay: 38.1
 Intersection Capacity Utilization 66.4%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

AM Peak Hour
 Future Background (2033)

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

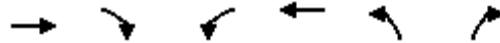
Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Hour
Future Background (2033)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	668	153	0	817	280	1055
Future Volume (vph)	668	153	0	817	280	1055
Ideal Flow (vphpl)	1440	1440	1246	1246	1266	1266
Total Lost time (s)	6.0	6.0		6.0	4.4	1.4
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2660	1165		2302	1192	1046
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2660	1165		2302	1192	1046
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.91	0.91
Adj. Flow (vph)	718	165	0	918	308	1159
RTOR Reduction (vph)	0	63	0	0	0	0
Lane Group Flow (vph)	718	102	0	918	308	1159
Confl. Peds. (#/hr)		8	8			
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	59.0	59.0		59.0	23.0	95.0
Effective Green, g (s)	59.0	59.0		59.0	25.6	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1652	723		1429	321	1046
v/s Ratio Prot	0.27			0.40	0.26	
v/s Ratio Perm		0.09				c1.11
v/c Ratio	0.43	0.14		0.64	0.96	1.11
Uniform Delay, d1	9.3	7.5		11.3	34.2	47.5
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.4		2.2	39.0	62.4
Delay (s)	10.2	7.9		13.6	73.1	109.9
Level of Service	B	A		B	E	F
Approach Delay (s)	9.8			13.6	102.2	
Approach LOS	A			B	F	

Intersection Summary

HCM 2000 Control Delay	52.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

AM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	1635	856	0	1	4
Future Volume (vph)	1	1635	856	0	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt					0.892	
Flt Protected	0.950				0.990	
Satd. Flow (prot)	1825	3544	3476	0	1696	0
Flt Permitted	0.950				0.990	
Satd. Flow (perm)	1825	3544	3476	0	1696	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	111.5		90.6	
Travel Time (s)		6.7	6.7		16.3	
Confl. Peds. (#/hr)	9			9		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	0%	0%	0%
Adj. Flow (vph)	1	1837	920	0	1	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	1837	920	0	5	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.2%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1479	146	62	807	11	37	0	41	14	0	12
Future Volume (vph)	11	1479	146	62	807	11	37	0	41	14	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			1.00		1.00		0.97	0.98	0.98	
Frt		0.987			0.998				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3492	0	1772	3465	0	1644	0	1400	1706	1606	0
Flt Permitted	0.311			0.087			0.749			0.950		
Satd. Flow (perm)	590	3492	0	162	3465	0	1291	0	1354	1670	1606	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			2				69			128
Link Speed (k/h)		60			60			20				20
Link Distance (m)		111.5			270.1			136.0				79.6
Travel Time (s)		6.7			16.2			24.5				14.3
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Adj. Flow (vph)	12	1590	157	70	907	12	40	0	45	15	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1747	0	70	919	0	40	0	45	15	13	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	1.13	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm		NA
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	59.0	59.0		11.0	70.0		40.0		40.0	40.0		40.0
Total Split (%)	53.6%	53.6%		10.0%	63.6%		36.4%		36.4%	36.4%		36.4%
Maximum Green (s)	53.0	53.0		7.0	64.0		33.0		33.0	33.0		33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	82.9	82.9		92.4	91.6		9.6		9.6	9.6		9.6
Actuated g/C Ratio	0.75	0.75		0.84	0.83		0.09		0.09	0.09		0.09
v/c Ratio	0.03	0.66		0.30	0.32		0.36		0.25	0.10		0.05
Control Delay	6.3	10.8		14.4	2.1		55.6		8.1	46.6		0.4
Queue Delay	0.0	0.3		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	6.3	11.2		14.4	2.1		55.6		8.1	46.6		0.4
LOS	A	B		B	A		E		A	D		A
Approach Delay		11.1			3.0			30.5				25.2
Approach LOS		B			A			C				C
Queue Length 50th (m)	0.7	100.5		2.6	8.9		8.3		0.0	3.0		0.0
Queue Length 95th (m)	3.0	152.5		m14.1	21.0		18.7		5.5	9.1		0.0
Internal Link Dist (m)		87.5			246.1			112.0				55.6
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	444	2635		242	2886		387		454	501		571
Starvation Cap Reductn	0	336		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.03	0.76		0.29	0.32		0.10		0.10	0.03		0.02

Intersection Summary

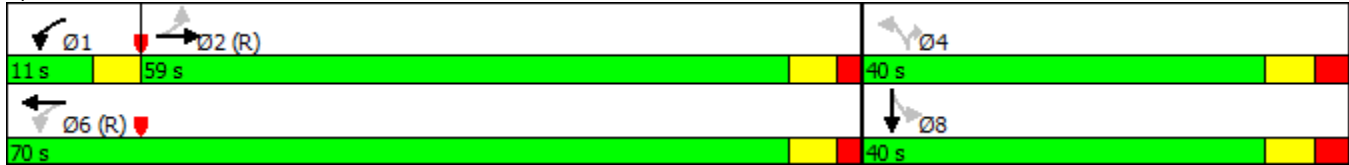
Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66

Lanes, Volumes, Timings
 4: Northshore Blvd & JBH Access

AM Peak Hour
 Future Background (2033)

Intersection Signal Delay: 9.0	Intersection LOS: A
Intersection Capacity Utilization 84.2%	ICU Level of Service E
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 4: Northshore Blvd & JBH Access



HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Hour
Future Background (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖		↗	↖	↕	↗
Traffic Volume (vph)	11	1479	146	62	807	11	37	0	41	14	0	12
Future Volume (vph)	11	1479	146	62	807	11	37	0	41	14	0	12
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.97	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00		1.00	0.98	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1804	3490		1772	3465		1637		1354	1670	1606	
Flt Permitted	0.31	1.00		0.09	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	590	3490		161	3465		1291		1354	1670	1606	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1590	157	70	907	12	40	0	45	15	0	13
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	42	0	12	0
Lane Group Flow (vph)	12	1743	0	70	919	0	40	0	3	15	1	0
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Effective Green, g (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Actuated g/C Ratio	0.72	0.72		0.81	0.81		0.07		0.07	0.07	0.07	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	426	2522		210	2803		93		98	121	116	
v/s Ratio Prot		c0.50		0.02	c0.27							0.00
v/s Ratio Perm	0.02			0.25			c0.03		0.00	0.01		
v/c Ratio	0.03	0.69		0.33	0.33		0.43		0.03	0.12	0.01	
Uniform Delay, d1	4.3	8.5		7.7	2.7		48.8		47.4	47.7	47.3	
Progression Factor	1.00	1.00		5.18	0.62		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.6		0.8	0.3		3.2		0.1	0.5	0.0	
Delay (s)	4.4	10.0		40.7	2.0		52.0		47.5	48.2	47.3	
Level of Service	A	B		D	A		D		D	D	D	
Approach Delay (s)		10.0			4.7			49.6			47.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	1199	112	137	699	34	34	124	246	48	97	149
Future Volume (vph)	223	1199	112	137	699	34	34	124	246	48	97	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	1.00		0.99	0.97		0.98	0.98	
Frt		0.987			0.993			0.900			0.909	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	3383	0	1738	3462	0	1547	1617	0	1690	3178	0
Flt Permitted	0.340			0.121			0.587			0.196		
Satd. Flow (perm)	630	3383	0	221	3462	0	945	1617	0	343	3178	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			5			95			162	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		270.1			172.4			278.5			293.6	
Travel Time (s)		16.2			10.3			20.1			21.1	
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Adj. Flow (vph)	251	1347	126	147	752	37	37	135	267	52	105	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	251	1473	0	147	789	0	37	402	0	52	267	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	52.3	49.3		47.1	44.1		36.4	26.9		37.1	28.9	
Actuated g/C Ratio	0.48	0.45		0.43	0.40		0.33	0.24		0.34	0.26	
v/c Ratio	0.55	0.97		0.64	0.57		0.11	0.86		0.26	0.28	
Control Delay	23.1	38.7		38.7	29.4		20.4	47.8		23.3	12.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.1	38.7		38.7	29.4		20.4	47.8		23.3	12.4	
LOS	C	D		D	C		C	D		C	B	
Approach Delay		36.4			30.9			45.5			14.2	
Approach LOS		D			C			D			B	
Queue Length 50th (m)	35.3	~187.8		20.2	70.6		5.0	64.3		7.1	9.2	
Queue Length 95th (m)	39.8	#232.6		#53.5	100.9		10.5	93.2		13.4	17.8	
Internal Link Dist (m)		246.1			148.4			254.5			269.6	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	455	1522		229	1392		351	579		201	1121	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.55	0.97		0.64	0.57		0.11	0.69		0.26	0.24	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.97
Intersection Signal Delay:	34.0
Intersection LOS:	C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Hour
 Future Background (2033)

Intersection Capacity Utilization 92.8% ICU Level of Service F

Analysis Period (min) 15

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

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Ø1 10 s	Ø2 (R) 48 s	Ø3 10 s	Ø4 42 s
Ø6 (R) 40 s	Ø5 18 s	Ø7 10 s	Ø8 42 s

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Hour
Future Background (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	223	1199	112	137	699	34	34	124	246	48	97	149
Future Volume (vph)	223	1199	112	137	699	34	34	124	246	48	97	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1768	3384		1738	3461		1537	1618		1686	3178	
Flt Permitted	0.34	1.00		0.12	1.00		0.59	1.00		0.20	1.00	
Satd. Flow (perm)	633	3384		221	3461		950	1618		348	3178	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	251	1347	126	147	752	37	37	135	267	52	105	162
RTOR Reduction (vph)	0	6	0	0	3	0	0	71	0	0	119	0
Lane Group Flow (vph)	251	1467	0	147	786	0	37	331	0	52	148	0
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	51.1	48.1		42.9	42.9		31.7	27.5		34.5	28.9	
Effective Green, g (s)	51.1	48.1		42.9	42.9		31.7	27.5		34.5	28.9	
Actuated g/C Ratio	0.46	0.44		0.39	0.39		0.29	0.25		0.31	0.26	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	448	1479		221	1349		296	404		177	834	
v/s Ratio Prot	0.08	c0.43		c0.06	0.23		0.00	c0.20		c0.01	0.05	
v/s Ratio Perm	0.18			0.20			0.03			0.08		
v/c Ratio	0.56	0.99		0.67	0.58		0.12	0.82		0.29	0.18	
Uniform Delay, d1	26.2	30.8		26.5	26.5		28.6	38.9		28.3	31.4	
Progression Factor	0.67	0.71		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	19.0		7.3	1.8		0.2	12.2		0.9	0.1	
Delay (s)	18.8	40.7		33.9	28.3		28.7	51.1		29.2	31.5	
Level of Service	B	D		C	C		C	D		C	C	
Approach Delay (s)		37.5			29.2			49.2			31.1	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2033 AM_FB_sim_2.txt

Queuing and Blocking Report AM Peak Period
Future Background (2033)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	91.2	178.9	98.6
119.1 24.1					
Average Queue (m)		23.9	39.3	91.2	25.3
59.9 9.0					
95th Queue (m)	41.1	78.6	177.2	62.8	101.0
19.3					
Link Distance (m)		372.2	304.9	304.9	672.0
672.0					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		2	4		
Queuing Penalty (veh)		8	7		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		39.8	43.3	71.6	74.8
213.5 301.8					
Average Queue (m)		21.2	22.8	31.1	30.7
66.7 54.3					
95th Queue (m)	36.9	39.7	63.1	65.5	152.7

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231.6					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)				0	0
Queuing Penalty (veh)				0	1
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B22	B22
B22 SB					
Directions Served	L	T	T	T	T
LR					
Maximum Queue (m)		4.5	28.4	31.4	67.6
88.4 32.2 9.0					
Average Queue (m)		0.2	2.7	6.7	4.5
9.2 1.5 1.7					
95th Queue (m)	2.4	15.5	25.8	33.6	50.6
19.8 7.3					
Link Distance (m)		14.9	14.9	82.7	82.7
82.7 91.5					
Upstream Blk Time (%)			1	3	0
0 0					
Queuing Penalty (veh)			10	29	0
2 0					
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		0	1		
Queuing Penalty (veh)		1	0		

2033 AM_FB_sim_2.txt

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		27.8	103.4	105.3	29.9
48.2 52.2 24.6	27.2	20.6	9.0		
Average Queue (m)		2.9	60.6	68.4	12.1
21.0 21.7 8.3	6.5	4.0	2.8		
95th Queue (m)		16.2	109.6	116.6	24.5
45.9 19.5 17.3	13.1	9.4			
Link Distance (m)		99.8	99.8		245.5
245.5 132.6	62.4	62.4			
Upstream Blk Time (%)			1	3	
Queuing Penalty (veh)			11	25	
Storage Bay Dist (m)		45.0			70.0
30.0					
Storage Blk Time (%)		0	13		
0 0					
Queuing Penalty (veh)		0	1		
0 0					

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		137.0	229.6	230.1	32.3
144.8 131.9 69.8	117.2	26.2	35.0	43.1	
Average Queue (m)		54.6	115.7	123.5	28.3
86.8 69.5 9.5	59.6	8.6	13.7	17.5	
95th Queue (m)		139.2	221.3	225.4	38.8
121.2 36.4 102.6	20.1	28.6	32.4		140.3
Link Distance (m)		245.5	245.5		222.7
222.7 221.1		176.9	176.9		

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Upstream Blk Time (%)			1	1	
Queuing Penalty (veh)			10	10	
Storage Bay Dist (m)			165.0		30.0
	105.0		50.0		
Storage Blk Time (%)			0	6	28
24	0	1			
Queuing Penalty (veh)			1	13	99
32	0	0			

Network Summary

Network wide Queuing Penalty: 260

SimTraffic Report 09/04/2018

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	190	448	966	1268	218	250
Future Volume (vph)	190	448	966	1268	218	250
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.098				0.950	
Satd. Flow (perm)	181	1852	1807	1536	1370	1225
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				222		185
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Peak Hour Factor	0.98	0.98	0.94	0.94	0.80	0.80
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	194	457	1028	1349	273	313
Shared Lane Traffic (%)						
Lane Group Flow (vph)	194	457	1028	1349	273	313
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	1.02	1.02	1.05	1.05	1.40	1.40
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Maximum Green (s)	8.0	86.0	75.0	21.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.8	-2.8	0.0	0.0	-3.2	-3.2
Total Lost Time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	91.8	88.8	75.0	102.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.85	0.20	0.20
v/c Ratio	0.69	0.33	0.91	1.01	0.99	0.79
Control Delay	39.6	6.2	20.5	28.7	99.8	34.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.6	6.2	20.5	28.7	99.8	34.2
LOS	D	A	C	C	F	C
Approach Delay		16.1	25.2		64.8	
Approach LOS		B	C		E	
Queue Length 50th (m)	13.7	32.4	129.9	~198.8	64.6	29.5
Queue Length 95th (m)	#41.0	45.5 m	#232.2 m	#375.3	#97.9	49.5
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	280	1370	1129	1338	276	394
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.33	0.91	1.01	0.99	0.79

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	120
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	30.0
Intersection LOS:	C
Intersection Capacity Utilization:	102.6%
ICU Level of Service:	G
Analysis Period (min):	15

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

PM Peak Hour
 Future Background (2033)

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Hour
Future Background (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	190	448	966	1268	218	250
Future Volume (vph)	190	448	966	1268	218	250
Ideal Flow (vphp)	1850	1850	1805	1805	1440	1440
Total Lost time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lane Util. Factor	1.00	1.00	1.00	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)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.10	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	182	1852	1807	1536	1370	1225
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	194	457	1028	1349	272	312
RTOR Reduction (vph)	0	0	0	44	0	148
Lane Group Flow (vph)	194	457	1028	1305	273	165
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	91.8	88.8	75.0	96.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.80	0.20	0.20
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	281	1370	1129	1318	276	247
v/s Ratio Prot	c0.06	0.25	0.57	c0.17	0.20	
v/s Ratio Perm	0.47			0.68		0.13
v/c Ratio	0.69	0.33	0.91	0.99	0.99	0.67
Uniform Delay, d1	38.1	5.4	19.6	11.5	47.8	44.2
Progression Factor	1.00	1.00	0.68	1.22	1.00	1.00
Incremental Delay, d2	7.1	0.7	6.0	14.0	51.5	13.5
Delay (s)	45.2	6.0	19.3	28.0	99.3	57.7
Level of Service	D	A	B	C	F	E
Approach Delay (s)		17.7	24.3		77.1	
Approach LOS		B	C		E	

Intersection Summary

HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Hour
Future Background (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	560	106	0	1919	315	727
Future Volume (vph)	560	106	0	1919	315	727
Ideal Flow (vphpl)	1000	1000	1805	1805	1694	1694
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.98				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	1902	859	0	3433	1611	1441
Flt Permitted					0.950	
Satd. Flow (perm)	1902	838	0	3433	1611	1441
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		113				501
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		3	3			
Peak Hour Factor	0.94	0.94	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Adj. Flow (vph)	596	113	0	2132	346	799
Shared Lane Traffic (%)						
Lane Group Flow (vph)	596	113	0	2132	346	799
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	2.14	2.14	1.05	1.05	1.14	1.14
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Hour
Future Background (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	50.0	50.0		50.0	25.0	
Total Split (s)	95.0	95.0		95.0	25.0	
Total Split (%)	79.2%	79.2%		79.2%	20.8%	
Maximum Green (s)	89.0	89.0		89.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.9	
Total Lost Time (s)	6.0	6.0		6.0	4.1	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effect Green (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
v/c Ratio	0.42	0.17		0.84	1.24	0.55
Control Delay	4.0	0.5		6.5	174.7	1.5
Queue Delay	0.0	0.0		0.5	0.0	0.0
Total Delay	4.0	0.5		7.0	174.7	1.5
LOS	A	A		A	F	A
Approach Delay	3.4			7.0	53.9	
Approach LOS	A			A	D	
Queue Length 50th (m)	12.9	0.0		51.0	~100.8	0.0
Queue Length 95th (m)	m15.5	m0.0		108.3	#158.1	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1410	650		2546	280	1441
Starvation Cap Reductn	0	0		115	0	0
Spillback Cap Reductn	0	0		62	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.42	0.17		0.88	1.24	0.55

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.24
 Intersection Signal Delay: 19.8
 Intersection Capacity Utilization 83.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E



~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

PM Peak Hour
 Future Background (2033)

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

Splits and Phases: 2: QEW East Ramp & Northshore Blvd

 Ø2 (R) 95 s	 Ø6 (R) 95 s	 Ø4 25 s
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HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Hour
Future Background (2033)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	560	106	0	1919	315	727
Future Volume (vph)	560	106	0	1919	315	727
Ideal Flow (vphp)	1000	1000	1805	1805	1694	1694
Total Lost time (s)	6.0	6.0		6.0	4.1	1.1
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1902	838		3433	1611	1441
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1902	838		3433	1611	1441
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	596	113	0	2132	346	799
RTOR Reduction (vph)	0	29	0	0	0	0
Lane Group Flow (vph)	596	84	0	2132	346	799
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1410	621		2546	280	1441
v/s Ratio Prot	0.31			c0.62	c0.21	
v/s Ratio Perm		0.10				0.55
v/c Ratio	0.42	0.13		0.84	1.24	0.55
Uniform Delay, d1	5.8	4.4		10.6	49.5	0.0
Progression Factor	0.54	0.04		0.35	1.00	1.00
Incremental Delay, d2	0.8	0.4		2.7	133.0	1.5
Delay (s)	3.9	0.6		6.3	182.5	1.5
Level of Service	A	A		A	F	A
Approach Delay (s)	3.4			6.3	56.2	
Approach LOS	A			A	E	

Intersection Summary

HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

PM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	1117	1895	7	2	4
Future Volume (vph)	5	1117	1895	7	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.910	
Flt Protected	0.950				0.984	
Satd. Flow (prot)	1825	3614	3609	0	1720	0
Flt Permitted	0.950				0.984	
Satd. Flow (perm)	1825	3614	3609	0	1720	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	21			21	1	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	14%	0%	0%
Adj. Flow (vph)	6	1255	2038	8	2	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	6	1255	2046	0	6	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.6%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	1077	29	34	1831	19	62	0	41	8	1	9
Future Volume (vph)	13	1077	29	34	1831	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00		1.00		0.98	0.99	0.99	
Frt		0.996			0.998				0.850		0.864	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3562	0	1825	3605	0	1789	0	1633	1825	1489	0
Flt Permitted	0.073			0.201			0.750			0.950		
Satd. Flow (perm)	140	3562	0	386	3605	0	1409	0	1604	1814	1489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			2				64		10	
Link Speed (k/h)		60			60			20			20	
Link Distance (m)		117.6			266.3			150.8			78.0	
Travel Time (s)		7.1			16.0			27.1			14.0	
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Adj. Flow (vph)	14	1158	31	38	2057	21	67	0	45	9	1	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	1189	0	38	2078	0	67	0	45	9	11	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0	38.0	38.0
Total Split (s)	69.0	69.0		11.0	80.0		40.0		40.0	40.0	40.0	40.0
Total Split (%)	57.5%	57.5%		9.2%	66.7%		33.3%		33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	63.0	63.0		7.0	74.0		33.0		33.0	33.0	33.0	33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None	None	None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0	12.0	12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0	0	0
Act Effct Green (s)	93.6	93.6		100.6	99.8		11.4		11.4	11.4	11.4	11.4
Actuated g/C Ratio	0.78	0.78		0.84	0.83		0.10		0.10	0.10	0.10	0.10
v/c Ratio	0.13	0.43		0.10	0.69		0.50		0.21	0.05	0.07	
Control Delay	8.0	5.1		1.5	8.8		63.7		8.0	47.8	26.0	
Queue Delay	0.0	0.0		0.0	0.2		0.0		0.0	0.0	0.0	
Total Delay	8.0	5.1		1.5	9.0		63.7		8.0	47.8	26.0	
LOS	A	A		A	A		E		A	D	C	
Approach Delay		5.1			8.9			41.3				35.8
Approach LOS		A			A			D				D
Queue Length 50th (m)	0.8	40.1		0.7	34.1		15.3		0.0	2.0	0.2	
Queue Length 95th (m)	m1.8	53.1		m1.2	m40.3		28.9		6.6	6.8	5.7	
Internal Link Dist (m)		93.6			242.3			126.8			54.0	
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	109	2779		407	2998		387		487	498	416	
Starvation Cap Reductn	0	0		0	245		0		0	0	0	
Spillback Cap Reductn	0	0		0	0		0		0	0	0	
Storage Cap Reductn	0	0		0	0		0		0	0	0	
Reduced v/c Ratio	0.13	0.43		0.09	0.75		0.17		0.09	0.02	0.03	

Intersection Summary

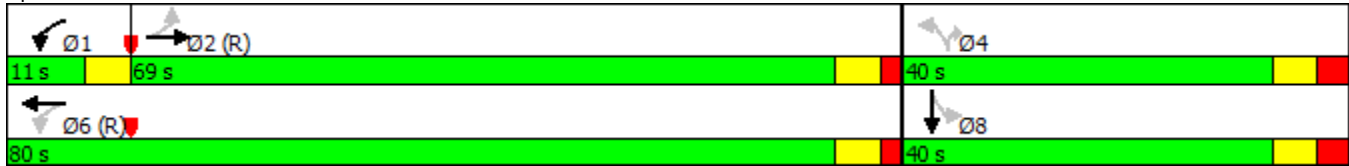
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 8.8
 Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

PM Peak Hour
 Future Background (2033)

Intersection Capacity Utilization 70.2% ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Hour
Future Background (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	13	1077	29	34	1831	19	62	0	41	8	1	9
Future Volume (vph)	13	1077	29	34	1831	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00		0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1823	3563		1824	3607		1785		1604	1814	1489	
Flt Permitted	0.07	1.00		0.20	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	140	3563		386	3607		1410		1604	1814	1489	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1158	31	38	2057	21	67	0	45	9	1	10
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	9	0
Lane Group Flow (vph)	14	1188	0	38	2078	0	67	0	4	9	2	0
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Effective Green, g (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Actuated g/C Ratio	0.75	0.75		0.81	0.81		0.08		0.08	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	104	2654		358	2921		115		130	148	121	
v/s Ratio Prot		0.33		0.00	c0.58						0.00	
v/s Ratio Perm	0.10			0.08			c0.05		0.00	0.00		
v/c Ratio	0.13	0.45		0.11	0.71		0.58		0.03	0.06	0.02	
Uniform Delay, d1	4.3	5.9		3.1	5.1		53.1		50.7	50.9	50.7	
Progression Factor	0.79	0.72		0.53	1.42		1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.4	0.5		0.0	0.5		7.3		0.1	0.2	0.0	
Delay (s)	5.8	4.7		1.7	7.8		60.4		50.8	51.0	50.7	
Level of Service	A	A		A	A		E		D	D	D	
Approach Delay (s)		4.7			7.6			56.6			50.9	
Approach LOS		A			A			E			D	

Intersection Summary

HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	209	858	59	226	1509	63	119	118	146	92	179	256
Future Volume (vph)	209	858	59	226	1509	63	119	118	146	92	179	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor		0.99		0.98	0.99		0.96	0.84		0.84	0.94	
Frt		0.990			0.994			0.917			0.912	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3533	0	1789	3525	0	1789	1426	0	1755	3092	0
Flt Permitted	0.080			0.140			0.324			0.339		
Satd. Flow (perm)	152	3533	0	258	3525	0	584	1426	0	524	3092	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			4			54			268	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Adj. Flow (vph)	235	964	66	243	1623	68	129	128	159	100	195	278
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	1030	0	243	1691	0	129	287	0	100	473	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	15.0	49.0		15.0	49.0		12.0	44.0		12.0	44.0	
Total Split (%)	12.5%	40.8%		12.5%	40.8%		10.0%	36.7%		10.0%	36.7%	
Maximum Green (s)	12.0	43.0		12.0	43.0		9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	68.6	49.8		70.9	50.9		38.5	25.7		38.1	25.5	
Actuated g/C Ratio	0.57	0.42		0.59	0.42		0.32	0.21		0.32	0.21	
v/c Ratio	0.77	0.70		0.66	1.13		0.47	0.83		0.39	0.55	
Control Delay	58.6	31.0		26.6	100.4		31.8	55.1		29.9	18.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	58.6	31.0		26.6	100.4		31.8	55.1		29.9	18.9	
LOS	E	C		C	F		C	E		C	B	
Approach Delay		36.1			91.1			47.8			20.8	
Approach LOS		D			F			D			C	
Queue Length 50th (m)	43.7	100.0		24.9	~255.6		21.2	53.5		16.2	21.5	
Queue Length 95th (m)	#87.3	123.3		#71.2	#317.6		31.0	77.5		25.0	33.9	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	304	1469		368	1498		278	477		260	1138	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.77	0.70		0.66	1.13		0.46	0.60		0.38	0.42	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.13
 Intersection Signal Delay: 60.6
 Intersection LOS: E

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
 Future Background (2033)









Intersection Capacity Utilization 105.6% ICU Level of Service G

Analysis Period (min) 15

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

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	49 s	12 s	44 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	49 s	12 s	44 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
Future Background (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	209	858	59	226	1509	63	119	118	146	92	179	256
Future Volume (vph)	209	858	59	226	1509	63	119	118	146	92	179	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.84		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.95	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	3534		1786	3524		1768	1426		1671	3092	
Flt Permitted	0.08	1.00		0.14	1.00		0.32	1.00		0.34	1.00	
Satd. Flow (perm)	153	3534		262	3524		604	1426		597	3092	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	235	964	66	243	1623	68	129	128	159	100	195	278
RTOR Reduction (vph)	0	4	0	0	2	0	0	42	0	0	211	0
Lane Group Flow (vph)	235	1026	0	243	1689	0	129	245	0	100	262	0
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	65.6	49.8		67.8	50.9		34.5	25.7		34.1	25.5	
Effective Green, g (s)	65.6	49.8		67.8	50.9		34.5	25.7		34.1	25.5	
Actuated g/C Ratio	0.55	0.41		0.56	0.42		0.29	0.21		0.28	0.21	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	301	1466		362	1494		259	305		246	657	
v/s Ratio Prot	c0.10	0.29		c0.09	c0.48		c0.04	c0.17		0.03	0.08	
v/s Ratio Perm	0.32			0.28			0.11			0.09		
v/c Ratio	0.78	0.70		0.67	1.13		0.50	0.80		0.41	0.40	
Uniform Delay, d1	33.2	28.9		18.1	34.5		33.2	44.7		33.2	40.7	
Progression Factor	1.57	0.92		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.6	2.6		4.8	67.7		1.5	14.0		1.1	0.4	
Delay (s)	64.0	29.4		23.0	102.2		34.7	58.8		34.3	41.1	
Level of Service	E	C		C	F		C	E		C	D	
Approach Delay (s)		35.8			92.3			51.3			39.9	
Approach LOS		D			F			D			D	

Intersection Summary

HCM 2000 Control Delay	64.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

2033 PM_FB_sim_2.txt

Queuing and Blocking Report PM Peak Period
Future Background (2033)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	303.1	115.8	129.1
105.4 63.3					
Average Queue (m)		39.2	163.0	70.9	70.4
52.8 29.3					
95th Queue (m)	49.9	366.8	100.0	113.2	93.2
53.5					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)			12		
Queuing Penalty (veh)			0		
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		39	22		
Queuing Penalty (veh)		177	42		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B22
NB NB					
Directions Served	T	T	T	T	T
L R					
Maximum Queue (m)		28.3	32.8	54.2	56.8
0.9 407.6 312.7					
Average Queue (m)		6.5	6.1	21.6	25.1
0.0 254.3 69.2					
95th Queue (m)	19.9	20.9	43.2	47.0	0.7

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456.6	303.3					
Link Distance (m)		304.9	304.9	82.7	82.7	14.9
662.3	662.3					
Upstream Blk Time (%)						

Queuing Penalty (veh)

Storage Bay Dist (m)

Storage Blk Time (%)

Queuing Penalty (veh)

Intersection: 3: Northshore Blvd & Site Driveway

Movement			EB	EB	EB	B22	B22
WB	WB	SB					
Directions Served			L	T	T	T	T
T	TR	LR					
Maximum Queue (m)				7.6	7.7	6.8	11.4
12.2	4.5	8.8	12.3				
Average Queue (m)				0.8	0.5	0.2	0.4
0.4	0.4	0.6	1.8				
95th Queue (m)			4.9	3.9	3.1	8.7	9.4
5.1	6.5	8.1					
Link Distance (m)				14.9	14.9	82.7	82.7
99.4	99.4	91.5					
Upstream Blk Time (%)				0	0	0	
Queuing Penalty (veh)				0	0	0	
Storage Bay Dist (m)				5.0			
Storage Blk Time (%)				1	0		
Queuing Penalty (veh)				7	0		

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Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		22.3	65.2	70.5	12.4
54.2 50.6 31.2	29.0	10.4	13.0		
Average Queue (m)		2.6	22.4	27.8	4.3
17.5 20.1 14.3	5.8	2.0	2.5		
95th Queue (m)		12.1	52.1	57.7	11.3
41.7 27.9 16.3	7.9	9.1			
Link Distance (m)		99.4	99.4		242.6
242.6 137.1	65.8	65.8			
Upstream Blk Time (%)					

Queuing Penalty (veh)

Storage Bay Dist (m)		45.0		70.0
30.0				
Storage Blk Time (%)		0	2	
0 2 0				
Queuing Penalty (veh)		0	0	
0 1 0				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		70.4	93.0	96.3	32.3
238.4 239.0 49.9	95.0	49.1	63.8	82.6	
Average Queue (m)		36.0	56.7	61.1	25.4
228.8 229.2 18.7	44.6	15.2	26.8	41.4	
95th Queue (m)		65.9	86.7	92.1	40.8
234.9 36.6 79.6	32.7	49.6	69.8		
Link Distance (m)		242.6	242.6		222.7
222.7 224.7		176.9	176.9		

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Upstream Blk Time (%)

75 68

Queuing Penalty (veh)

0 0

Storage Bay Dist (m)

105.0

165.0

50.0

30.0

Storage Blk Time (%)

56 0 0 0 1

8

Queuing Penalty (veh)

126 0 0 0 1

61

Network Summary

Network wide Queuing Penalty: 416

SimTraffic Report 09/04/2018

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	152	489	690	781	328	77
Future Volume (vph)	152	489	690	781	328	77
Ideal Flow (vphpl)	2129	2129	1575	1575	1518	1518
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.99	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.155				0.950	
Satd. Flow (perm)	324	2153	1577	1340	1289	1305
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				329		87
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.84	0.84	0.93	0.93	0.89	0.89
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Adj. Flow (vph)	181	582	742	840	369	87
Shared Lane Traffic (%)						
Lane Group Flow (vph)	181	582	742	840	369	87
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	0.85	0.85	1.25	1.25	1.49	1.31
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	12.0	62.0	50.0	33.0	33.0	33.0
Total Split (%)	12.6%	65.3%	52.6%	34.7%	34.7%	34.7%
Maximum Green (s)	9.0	56.0	44.0	26.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.5	-1.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	60.5	57.5	44.0	76.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.80	0.27	0.27
v/c Ratio	0.47	0.45	1.02	0.74	1.04	0.21
Control Delay	21.2	11.5	50.0	6.4	94.2	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.2	11.5	50.0	6.4	94.2	7.4
LOS	C	B	D	A	F	A
Approach Delay		13.8	26.9		77.6	
Approach LOS		B	C		E	
Queue Length 50th (m)	12.0	53.0	~127.1	14.6	~73.5	0.0
Queue Length 95th (m)	18.5	68.2	m#188.6	m44.8	#124.7	10.4
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	389	1303	730	1137	355	420
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.45	1.02	0.74	1.04	0.21

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
 Future Background (2033)

Intersection Signal Delay: 31.6 Intersection LOS: C

Intersection Capacity Utilization 88.2% ICU Level of Service E

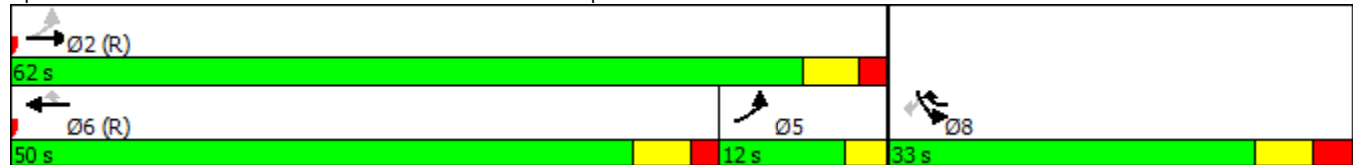
Analysis Period (min) 15

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

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

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

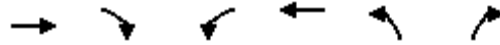
Saturday Peak Hour
Future Background (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	152	489	690	781	328	77
Future Volume (vph)	152	489	690	781	328	77
Ideal Flow (vphpl)	2129	2129	1575	1575	1518	1518
Total Lost time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	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
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)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.16	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	324	2153	1577	1340	1299	1305
Peak-hour factor, PHF	0.84	0.84	0.93	0.93	0.89	0.89
Adj. Flow (vph)	181	582	742	840	369	87
RTOR Reduction (vph)	0	0	0	87	0	63
Lane Group Flow (vph)	181	582	742	753	369	24
Confl. Peds. (#/hr)					5	
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	59.0	56.0	44.0	70.0	26.0	26.0
Effective Green, g (s)	60.5	57.5	44.0	70.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.74	0.27	0.27
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	389	1303	730	1086	355	357
v/s Ratio Prot	c0.05	0.27	c0.47	0.19	c0.28	
v/s Ratio Perm	0.24			0.37		0.02
v/c Ratio	0.47	0.45	1.02	0.69	1.04	0.07
Uniform Delay, d1	28.1	10.1	25.5	6.7	34.5	25.5
Progression Factor	1.00	1.00	0.69	1.32	1.00	1.00
Incremental Delay, d2	0.9	1.1	29.7	2.2	58.4	0.4
Delay (s)	29.0	11.3	47.2	11.1	92.9	25.9
Level of Service	C	B	D	B	F	C
Approach Delay (s)		15.5	28.0		80.1	
Approach LOS		B	C		F	
Intersection Summary						
HCM 2000 Control Delay			33.1		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.95			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	14.5
Intersection Capacity Utilization			88.2%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

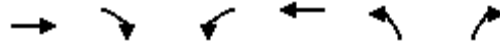
Saturday Peak Hour
Future Background (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	526	291	0	1192	279	770
Future Volume (vph)	526	291	0	1192	279	770
Ideal Flow (vphpl)	1450	1450	1670	1670	1450	1450
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97			1.00	
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2434	1122	0	2859	1254	1122
Flt Permitted					0.950	
Satd. Flow (perm)	2434	1091	0	2859	1252	1122
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		316				538
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		6	6		1	
Peak Hour Factor	0.92	0.92	0.96	0.96	0.76	0.76
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Adj. Flow (vph)	572	316	0	1242	367	1013
Shared Lane Traffic (%)						
Lane Group Flow (vph)	572	316	0	1242	367	1013
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	1.57	1.57	1.33	1.33	1.57	1.57
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Background (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.2	
Total Lost Time (s)	6.0	6.0		6.0	4.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	59.0	59.0		59.0	25.2	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
v/c Ratio	0.38	0.40		0.70	1.11	0.90
Control Delay	6.0	1.2		14.8	115.7	13.4
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	6.0	1.2		14.8	115.7	13.4
LOS	A	A		B	F	B
Approach Delay	4.3			14.8	40.6	
Approach LOS	A			B	D	
Queue Length 50th (m)	15.1	0.1		73.3	~77.2	0.0
Queue Length 95th (m)	m18.9	m0.1		96.6	#99.8	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1511	797		1775	332	1122
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.38	0.40		0.70	1.11	0.90

Intersection Summary

Area Type: CBD
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.11
 Intersection Signal Delay: 22.3
 Intersection Capacity Utilization 73.2%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
 Future Background (2033)

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

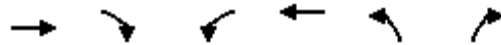
Splits and Phases: 2: QEW East Ramp & Northshore Blvd

 Ø2 (R) 65 s	 Ø4 30 s
 Ø6 (R) 65 s	

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Background (2033)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	526	291	0	1192	279	770
Future Volume (vph)	526	291	0	1192	279	770
Ideal Flow (vphp)	1450	1450	1670	1670	1450	1450
Total Lost time (s)	6.0	6.0		6.0	4.8	1.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2434	1091		2859	1254	1122
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2434	1091		2859	1254	1122
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.76	0.76
Adj. Flow (vph)	572	316	0	1242	367	1013
RTOR Reduction (vph)	0	120	0	0	0	0
Lane Group Flow (vph)	572	196	0	1242	367	1013
Confl. Peds. (#/hr)		6	6		1	
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	59.0	59.0		59.0	23.0	95.0
Effective Green, g (s)	59.0	59.0		59.0	25.2	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1511	677		1775	332	1122
v/s Ratio Prot	0.24			0.43	c0.29	
v/s Ratio Perm		0.18				c0.90
v/c Ratio	0.38	0.29		0.70	1.11	0.90
Uniform Delay, d1	8.9	8.3		12.1	34.9	0.0
Progression Factor	0.60	0.16		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.8		2.3	80.8	11.8
Delay (s)	5.9	2.1		14.4	115.7	11.8
Level of Service	A	A		B	F	B
Approach Delay (s)	4.5			14.4	39.4	
Approach LOS	A			B	D	

Intersection Summary

HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

Saturday Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1296	1379	6	3	2
Future Volume (vph)	0	1296	1379	6	3	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.946	
Flt Protected					0.971	
Satd. Flow (prot)	1921	3614	3611	0	1765	0
Flt Permitted					0.971	
Satd. Flow (perm)	1921	3614	3611	0	1765	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	23			23		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	0	1456	1483	6	3	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1456	1489	0	5	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	48.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	1220	52	37	1294	19	75	0	51	32	0	16
Future Volume (vph)	27	1220	52	37	1294	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00		1.00		0.98	0.99	0.99	
Fr't		0.994			0.998				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3585	0	1825	3605	0	1772	0	1601	1825	1609	0
Flt Permitted	0.168			0.142			0.746			0.950		
Satd. Flow (perm)	322	3585	0	273	3605	0	1388	0	1572	1814	1609	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			2				85			85
Link Speed (k/h)		60			60			20				20
Link Distance (m)		117.6			266.3			150.8				78.0
Travel Time (s)		7.1			16.0			27.1				14.0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Adj. Flow (vph)	29	1312	56	42	1454	21	82	0	55	35	0	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1368	0	42	1475	0	82	0	55	35	17	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	38.0	38.0		13.0	38.0		39.0		39.0	39.0		39.0
Total Split (%)	42.2%	42.2%		14.4%	42.2%		43.3%		43.3%	43.3%		43.3%
Maximum Green (s)	32.0	32.0		9.0	32.0		32.0		32.0	32.0		32.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	63.9	63.9		70.9	70.1		11.1		11.1	11.1		11.1
Actuated g/C Ratio	0.71	0.71		0.79	0.78		0.12		0.12	0.12		0.12
v/c Ratio	0.13	0.54		0.13	0.53		0.48		0.21	0.16		0.06
Control Delay	10.1	10.1		4.2	6.1		45.5		5.1	35.4		0.4
Queue Delay	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	10.1	10.1		4.2	6.1		45.5		5.1	35.4		0.4
LOS	B	B		A	A		D		A	D		A
Approach Delay		10.1			6.0			29.3				24.0
Approach LOS		B			A			C				C
Queue Length 50th (m)	1.9	67.8		1.4	49.0		13.5		0.0	5.5		0.0
Queue Length 95th (m)	7.1	104.0		4.4	77.1		25.8		5.0	13.2		0.0
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	228	2545		370	2809		493		613	644		626
Starvation Cap Reductn	0	0		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.13	0.54		0.11	0.53		0.17		0.09	0.05		0.03

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	85
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.54
Intersection Signal Delay:	9.2
Intersection LOS:	A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

Saturday Peak Hour
 Future Background (2033)

Intersection Capacity Utilization 69.2% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis
4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Background (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	27	1220	52	37	1294	19	75	0	51	32	0	16
Future Volume (vph)	27	1220	52	37	1294	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1819	3584		1825	3604		1767		1572	1814	1609	
Flt Permitted	0.17	1.00		0.14	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	322	3584		272	3604		1388		1572	1814	1609	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	1312	56	42	1454	21	82	0	55	35	0	17
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	49	0	15	0
Lane Group Flow (vph)	29	1366	0	42	1475	0	82	0	6	35	2	0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Effective Green, g (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Actuated g/C Ratio	0.66	0.66		0.75	0.75		0.11		0.11	0.11	0.11	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	213	2377		269	2703		146		165	191	169	
v/s Ratio Prot		c0.38		0.01	c0.41							0.00
v/s Ratio Perm	0.09			0.11			c0.06		0.00	0.02		
v/c Ratio	0.14	0.57		0.16	0.55		0.56		0.04	0.18	0.01	
Uniform Delay, d1	5.6	8.2		4.9	4.8		38.3		36.1	36.7	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.3	1.0		0.3	0.8		4.9		0.1	0.5	0.0	
Delay (s)	6.9	9.3		5.2	5.6		43.1		36.2	37.2	36.1	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		9.2			5.5			40.4			36.8	
Approach LOS		A			A			D			D	

Intersection Summary		
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.58	A
Actuated Cycle Length (s)	90.0	Sum of lost time (s)
Intersection Capacity Utilization	69.2%	17.0
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	932	176	315	881	47	196	141	182	100	285	274
Future Volume (vph)	195	932	176	315	881	47	196	141	182	100	285	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	1.00		1.00	0.94		0.95	0.99	
Frt		0.976			0.992			0.915			0.926	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3504	0	1807	3562	0	1807	1625	0	1755	3338	0
Flt Permitted	0.171			0.089			0.238			0.263		
Satd. Flow (perm)	322	3504	0	169	3562	0	450	1625	0	460	3338	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			5			62			231	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Adj. Flow (vph)	219	1047	198	339	947	51	213	153	198	109	310	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	219	1245	0	339	998	0	213	351	0	109	608	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Background (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	56.5	42.0		60.8	45.7		36.7	25.7		36.7	25.7	
Actuated g/C Ratio	0.51	0.38		0.55	0.42		0.33	0.23		0.33	0.23	
v/c Ratio	0.65	0.92		1.01	0.67		0.90	0.82		0.46	0.64	
Control Delay	22.7	44.0		84.8	31.0		66.8	48.2		28.8	25.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.7	44.0		84.8	31.0		66.8	48.2		28.8	25.3	
LOS	C	D		F	C		E	D		C	C	
Approach Delay		40.8			44.6			55.2			25.8	
Approach LOS		D			D			E			C	
Queue Length 50th (m)	21.0	130.4		56.4	90.8		32.7	59.9		15.8	38.2	
Queue Length 95th (m)	40.0	#170.0		#157.2	#144.5		#54.6	83.6		24.2	50.1	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	378	1352		336	1482		236	559		235	1219	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.58	0.92		1.01	0.67		0.90	0.63		0.46	0.50	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	25 (23%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	41.4
Intersection LOS:	D

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd









Saturday Peak Hour
 Future Background (2033)

Intersection Capacity Utilization 98.7% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
10 s	48 s	10 s	42 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
18 s	40 s	10 s	42 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Background (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	932	176	315	881	47	196	141	182	100	285	274
Future Volume (vph)	195	932	176	315	881	47	196	141	182	100	285	274
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.94		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3505		1807	3563		1805	1626		1735	3340	
Flt Permitted	0.17	1.00		0.09	1.00		0.24	1.00		0.26	1.00	
Satd. Flow (perm)	325	3505		169	3563		451	1626		480	3340	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	219	1047	198	339	947	51	213	153	198	109	310	298
RTOR Reduction (vph)	0	14	0	0	3	0	0	48	0	0	177	0
Lane Group Flow (vph)	219	1231	0	339	995	0	213	303	0	109	431	0
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.7	42.0		61.3	45.6		32.7	25.7		32.7	25.7	
Effective Green, g (s)	54.7	42.0		61.3	45.6		32.7	25.7		32.7	25.7	
Actuated g/C Ratio	0.50	0.38		0.56	0.41		0.30	0.23		0.30	0.23	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	332	1338		336	1477		220	379		222	780	
v/s Ratio Prot	0.08	0.35		c0.15	0.28		c0.06	0.19		0.03	0.13	
v/s Ratio Perm	0.25			c0.41			c0.23			0.11		
v/c Ratio	0.66	0.92		1.01	0.67		0.97	0.80		0.49	0.55	
Uniform Delay, d1	18.0	32.4		34.2	26.2		35.7	39.7		29.9	37.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.7	11.7		51.4	2.5		51.0	11.5		1.7	0.9	
Delay (s)	22.7	44.1		85.6	28.6		86.7	51.2		31.6	37.9	
Level of Service	C	D		F	C		F	D		C	D	
Approach Delay (s)		40.9			43.1			64.6			37.0	
Approach LOS		D			D			E			D	

Intersection Summary

HCM 2000 Control Delay	44.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	98.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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Queuing and Blocking Report Weekend Peak Period
Future Background (2033)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	102.2	140.8	84.9
101.2 24.0					
Average Queue (m)		30.6	48.7	65.0	33.7
52.4 9.0					
95th Queue (m)	46.8	87.1	128.5	66.3	86.8
18.6					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		4	8		
Queuing Penalty (veh)		21	12		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		25.9	27.0	75.6	81.7
94.6 26.2					
Average Queue (m)		11.1	9.6	34.9	37.4
50.3 1.0					
95th Queue (m)	21.2	21.7	68.1	71.8	79.9

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15.1					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)				0	0
Queuing Penalty (veh)				2	2
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B22	B22	SB
Directions Served	T	T	T	T	LR
Maximum Queue (m)		1.6	6.5	11.8	13.9
11.0					
Average Queue (m)		0.1	0.2	0.8	0.5
1.7					
95th Queue (m)	1.2	3.1	12.8	10.7	7.6
Link Distance (m)	14.9	14.9	82.7	82.7	91.5
Upstream Blk Time (%)			0		0
Queuing Penalty (veh)			0		0
Storage Bay Dist (m)					
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

Intersection: 4: JBH Access & Northshore Blvd

Movement			EB	EB	EB	WB	WB
WB	NB	NB	SB	SB			

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Directions Served			L	T	TR	L	T
TR	L	R	L	TR			
Maximum Queue (m)				23.2	88.2	88.8	15.2
68.3	71.7	30.8	37.2	19.3	11.3		
Average Queue (m)				4.2	31.6	36.7	4.8
25.2	27.7	13.8	7.4	6.3	3.5		
95th Queue (m)				14.0	65.4	69.8	53.1
55.4	27.0	21.7	16.1	10.1			
Link Distance (m)				99.4	99.4		242.6
242.6		137.1	65.8	65.8			
Upstream Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (m)				45.0			70.0
		30.0					
Storage Blk Time (%)					2		
0	1		0				
Queuing Penalty (veh)					1		
0	0		0				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement			EB	EB	EB	WB	WB
WB	NB	NB	SB	SB	SB		
Directions Served			L	T	TR	L	T
TR	L	TR	L	T	TR		
Maximum Queue (m)				59.9	141.8	148.6	32.4
234.5	234.1	79.2	116.6	42.7	63.8	81.7	
Average Queue (m)				28.9	80.9	87.3	32.3
225.6	220.5	35.1	57.3	15.7	34.5	43.4	
95th Queue (m)				50.4	125.2	131.5	244.3
251.2	72.0	105.4	33.9	56.0	73.2		
Link Distance (m)				242.6	242.6		222.7
222.7		224.7		176.9	176.9		
Upstream Blk Time (%)							
86	37						
Queuing Penalty (veh)							
0	0						

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Storage Bay Dist (m)			165.0		30.0
	105.0		50.0		
Storage Blk Time (%)					82
19	0	2	0	1	
Queuing Penalty (veh)					360
60	0	4	0	1	

Network Summary

Network wide Queuing Penalty: 463

SimTraffic Report 09/04/2018

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Appendix H

Future Total Synchro and SimTraffic Reports

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↖
Traffic Volume (vph)	141	414	526	419	315	70
Future Volume (vph)	141	414	526	419	315	70
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			0.97		
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1483	1561	1435	1220	1546	1397
Flt Permitted	0.199				0.950	
Satd. Flow (perm)	310	1561	1435	1186	1546	1397
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				452		75
Link Speed (k/h)		50	60		100	
Link Distance (m)		165.3	312.3		178.0	
Travel Time (s)		11.9	18.7		6.4	
Confl. Peds. (#/hr)	4			4		
Peak Hour Factor	0.95	0.95	0.89	0.89	0.93	0.93
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Adj. Flow (vph)	148	436	591	471	339	75
Shared Lane Traffic (%)						
Lane Group Flow (vph)	148	436	591	471	339	75
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	1.25	1.25	1.37	1.37	1.16	1.16
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Maximum Green (s)	8.0	40.0	29.0	20.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-1.4	-1.4
Total Lost Time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	43.5	40.5	29.4	48.4	21.4	21.4
Actuated g/C Ratio	0.60	0.55	0.40	0.66	0.29	0.29
v/c Ratio	0.47	0.50	1.02	0.50	0.75	0.16
Control Delay	11.8	12.6	68.4	2.3	35.7	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	12.6	68.4	2.3	35.7	6.3
LOS	B	B	E	A	D	A
Approach Delay		12.4	39.1		30.4	
Approach LOS		B	D		C	
Queue Length 50th (m)	8.2	33.8	~89.2	0.5	41.8	0.0
Queue Length 95th (m)	15.7	55.9	#143.2	5.8	#78.8	8.5
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	321	866	578	947	453	462
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.50	1.02	0.50	0.75	0.16

Intersection Summary

Area Type:	Other
Cycle Length:	73
Actuated Cycle Length:	73
Offset:	22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.02
Intersection Signal Delay:	29.8
Intersection LOS:	C

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

AM Peak Hour
 Future Total (2023)

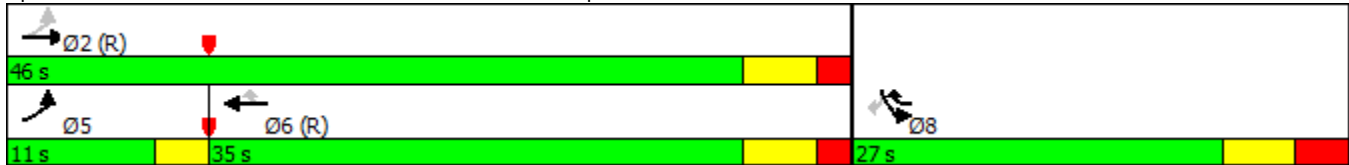
Intersection Capacity Utilization 78.2% ICU Level of Service D

Analysis Period (min) 15

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

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Hour
Future Total (2023)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	141	414	526	419	315	70
Future Volume (vph)	141	414	526	419	315	70
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Total Lost time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	1483	1561	1435	1200	1546	1397
Flt Permitted	0.20	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	310	1561	1435	1200	1546	1397
Peak-hour factor, PHF	0.95	0.95	0.89	0.89	0.93	0.93
Adj. Flow (vph)	148	436	591	471	339	75
RTOR Reduction (vph)	0	0	0	146	0	53
Lane Group Flow (vph)	148	436	591	325	339	22
Confl. Peds. (#/hr)	4			4		
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	29.4	49.4	20.0	20.0
Effective Green, g (s)	40.5	40.5	29.4	49.4	21.4	21.4
Actuated g/C Ratio	0.55	0.55	0.40	0.68	0.29	0.29
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	302	866	577	812	453	409
v/s Ratio Prot	0.05	c0.28	c0.41	0.11	c0.22	
v/s Ratio Perm	0.22			0.16		0.02
v/c Ratio	0.49	0.50	1.02	0.40	0.75	0.05
Uniform Delay, d1	10.8	10.0	21.8	5.2	23.4	18.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	2.1	43.8	1.5	10.8	0.2
Delay (s)	12.1	12.1	65.6	6.7	34.1	18.8
Level of Service	B	B	E	A	C	B
Approach Delay (s)		12.1	39.5		31.4	
Approach LOS		B	D		C	
Intersection Summary						
HCM 2000 Control Delay			30.1		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			73.0		Sum of lost time (s)	15.5
Intersection Capacity Utilization			78.2%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Hour
Future Total (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	603	126	0	716	230	916
Future Volume (vph)	603	126	0	716	230	916
Ideal Flow (vphpl)	1440	1440	1246	1246	1266	1266
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2660	1202	0	2302	1192	1046
Flt Permitted					0.950	
Satd. Flow (perm)	2660	1165	0	2302	1192	1046
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		135				489
Link Speed (k/h)	60			60	48	
Link Distance (m)	312.3			111.4	163.6	
Travel Time (s)	18.7			6.7	12.3	
Confl. Peds. (#/hr)		8	8			
Peak Hour Factor	0.93	0.93	0.89	0.89	0.91	0.91
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Adj. Flow (vph)	648	135	0	804	253	1007
Shared Lane Traffic (%)						
Lane Group Flow (vph)	648	135	0	804	253	1007
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	1.40	1.40	1.66	1.66	1.63	1.63
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Hour
Future Total (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.6	
Total Lost Time (s)	6.0	6.0		6.0	4.4	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	60.5	60.5		60.5	24.1	95.0
Actuated g/C Ratio	0.64	0.64		0.64	0.25	1.00
v/c Ratio	0.38	0.17		0.55	0.83	0.96
Control Delay	9.4	1.9		11.8	57.6	23.5
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	9.4	1.9		11.8	57.6	23.5
LOS	A	A		B	E	C
Approach Delay	8.1			11.8	30.3	
Approach LOS	A			B	C	
Queue Length 50th (m)	28.5	0.0		41.2	43.0	0.0
Queue Length 95th (m)	39.2	6.4		56.0	#81.7	#57.3
Internal Link Dist (m)	288.3			87.4	139.6	
Turn Bay Length (m)						
Base Capacity (vph)	1693	790		1465	321	1046
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.38	0.17		0.55	0.79	0.96

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 19.0
 Intersection LOS: B
 Intersection Capacity Utilization 58.6%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Hour
Future Total (2023)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	603	126	0	716	230	916
Future Volume (vph)	603	126	0	716	230	916
Ideal Flow (vphp)	1440	1440	1246	1246	1266	1266
Total Lost time (s)	6.0	6.0		6.0	4.4	1.4
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2660	1165		2302	1192	1046
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2660	1165		2302	1192	1046
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.91	0.91
Adj. Flow (vph)	648	135	0	804	253	1007
RTOR Reduction (vph)	0	49	0	0	0	0
Lane Group Flow (vph)	648	86	0	804	253	1007
Confl. Peds. (#/hr)		8	8			
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	60.5	60.5		60.5	21.5	95.0
Effective Green, g (s)	60.5	60.5		60.5	24.1	95.0
Actuated g/C Ratio	0.64	0.64		0.64	0.25	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1694	741		1466	302	1046
v/s Ratio Prot	0.24			0.35	0.21	
v/s Ratio Perm		0.07				c0.96
v/c Ratio	0.38	0.12		0.55	0.84	0.96
Uniform Delay, d1	8.3	6.8		9.6	33.6	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.7	0.3		1.5	18.0	20.2
Delay (s)	8.9	7.1		11.1	51.6	20.2
Level of Service	A	A		B	D	C
Approach Delay (s)	8.6			11.1	26.5	
Approach LOS	A			B	C	

Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

AM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	83	1349	673	36	28	24
Future Volume (vph)	83	1349	673	36	28	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.992		0.937	
Flt Protected	0.950				0.974	
Satd. Flow (prot)	1825	3544	3457	0	1753	0
Flt Permitted	0.950				0.974	
Satd. Flow (perm)	1825	3544	3457	0	1753	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	111.5		90.6	
Travel Time (s)		6.7	6.7		16.3	
Confl. Peds. (#/hr)	9			9		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	0%	0%	0%
Adj. Flow (vph)	93	1516	724	39	30	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	1516	763	0	56	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1220	146	62	660	11	37	0	41	14	0	12
Future Volume (vph)	11	1220	146	62	660	11	37	0	41	14	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			1.00		1.00		0.97	0.98	0.98	
Frt		0.984			0.998				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3480	0	1772	3464	0	1644	0	1400	1706	1606	0
Flt Permitted	0.366			0.134			0.749			0.950		
Satd. Flow (perm)	693	3480	0	250	3464	0	1291	0	1354	1670	1606	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			2				69			188
Link Speed (k/h)		60			60			20				20
Link Distance (m)		111.5			270.1			136.0				79.6
Travel Time (s)		6.7			16.2			24.5				14.3
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Adj. Flow (vph)	12	1312	157	70	742	12	40	0	45	15	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1469	0	70	754	0	40	0	45	15	13	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	1.13	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm		NA
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	59.0	59.0		11.0	70.0		40.0		40.0	40.0		40.0
Total Split (%)	53.6%	53.6%		10.0%	63.6%		36.4%		36.4%	36.4%		36.4%
Maximum Green (s)	53.0	53.0		7.0	64.0		33.0		33.0	33.0		33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	82.9	82.9		92.4	91.6		9.6		9.6	9.6		9.6
Actuated g/C Ratio	0.75	0.75		0.84	0.83		0.09		0.09	0.09		0.09
v/c Ratio	0.02	0.56		0.23	0.26		0.36		0.25	0.10		0.04
Control Delay	6.2	8.9		7.2	1.5		55.6		8.1	46.6		0.2
Queue Delay	0.0	0.2		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	6.2	9.1		7.2	1.5		55.6		8.1	46.6		0.2
LOS	A	A		A	A		E		A	D		A
Approach Delay		9.1			2.0			30.5				25.1
Approach LOS		A			A			C				C
Queue Length 50th (m)	0.7	72.6		1.0	7.4		8.3		0.0	3.0		0.0
Queue Length 95th (m)	3.0	110.6		8.8	8.7		18.7		5.5	9.1		0.0
Internal Link Dist (m)		87.5			246.1			112.0				55.6
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	522	2627		310	2885		387		454	501		613
Starvation Cap Reductn	0	388		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.02	0.66		0.23	0.26		0.10		0.10	0.03		0.02

Intersection Summary

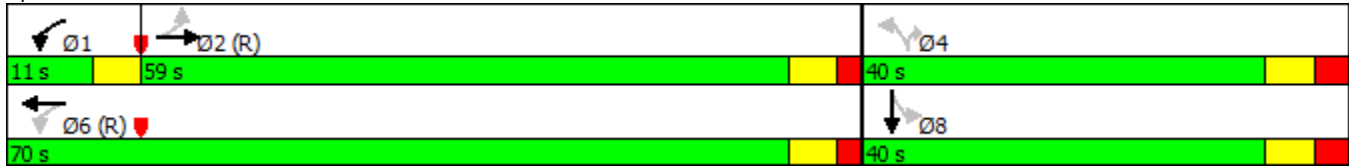
Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56

Lanes, Volumes, Timings
 4: Northshore Blvd & JBH Access

AM Peak Hour
 Future Total (2023)

Intersection Signal Delay: 7.6	Intersection LOS: A
Intersection Capacity Utilization 77.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Northshore Blvd & JBH Access



HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Hour
Future Total (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕		↖		↗	↖	↕	↗
Traffic Volume (vph)	11	1220	146	62	660	11	37	0	41	14	0	12
Future Volume (vph)	11	1220	146	62	660	11	37	0	41	14	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.97	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00		1.00	0.98	1.00	
Frt	1.00	0.98		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1798	3480		1772	3463		1637		1354	1670	1606	
Flt Permitted	0.37	1.00		0.13	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	692	3480		250	3463		1291		1354	1670	1606	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1312	157	70	742	12	40	0	45	15	0	13
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	42	0	12	0
Lane Group Flow (vph)	12	1465	0	70	754	0	40	0	3	15	1	0
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Effective Green, g (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Actuated g/C Ratio	0.72	0.72		0.81	0.81		0.07		0.07	0.07	0.07	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	500	2515		278	2801		93		98	121	116	
v/s Ratio Prot		c0.42		0.01	c0.22						0.00	
v/s Ratio Perm	0.02			0.19			c0.03		0.00	0.01		
v/c Ratio	0.02	0.58		0.25	0.27		0.43		0.03	0.12	0.01	
Uniform Delay, d1	4.3	7.3		4.6	2.6		48.8		47.4	47.7	47.3	
Progression Factor	1.00	1.00		2.47	0.46		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.0		0.5	0.2		3.2		0.1	0.5	0.0	
Delay (s)	4.4	8.3		11.9	1.4		52.0		47.5	48.2	47.3	
Level of Service	A	A		B	A		D		D	D	D	
Approach Delay (s)		8.3			2.3			49.6			47.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	932	115	137	540	34	36	111	246	48	87	157
Future Volume (vph)	228	932	115	137	540	34	36	111	246	48	87	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	1.00		0.99	0.97		0.98	0.98	
Frt		0.984			0.991			0.897			0.904	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	3342	0	1738	3448	0	1547	1610	0	1690	3157	0
Flt Permitted	0.418			0.117			0.588			0.198		
Satd. Flow (perm)	773	3342	0	213	3448	0	946	1610	0	346	3157	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			6			106			171	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		270.1			172.4			278.5			293.6	
Travel Time (s)		16.2			10.3			20.1			21.1	
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Adj. Flow (vph)	256	1047	129	147	581	37	39	121	267	52	95	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	256	1176	0	147	618	0	39	388	0	52	266	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	53.3	50.3		48.3	45.3		35.2	25.7		35.9	27.7	
Actuated g/C Ratio	0.48	0.46		0.44	0.41		0.32	0.23		0.33	0.25	
v/c Ratio	0.50	0.77		0.63	0.43		0.12	0.85		0.27	0.29	
Control Delay	21.8	24.0		37.6	26.3		21.1	45.8		24.0	11.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.8	24.0		37.6	26.3		21.1	45.8		24.0	11.9	
LOS	C	C		D	C		C	D		C	B	
Approach Delay		23.6			28.4			43.6			13.9	
Approach LOS		C			C			D			B	
Queue Length 50th (m)	35.4	116.8		19.7	50.4		5.4	59.4		7.3	8.4	
Queue Length 95th (m)	51.2	#162.5		#54.5	76.0		10.9	86.0		13.4	16.8	
Internal Link Dist (m)		246.1			148.4			254.5			269.6	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	511	1536		232	1424		341	584		198	1121	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.50	0.77		0.63	0.43		0.11	0.66		0.26	0.24	

Intersection Summary	
Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	26.7
Intersection LOS:	C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

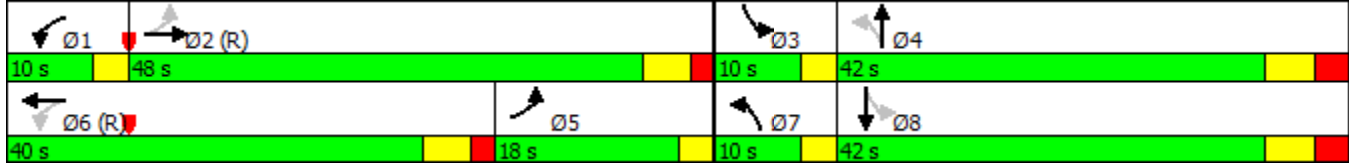
AM Peak Hour
 Future Total (2023)

Intersection Capacity Utilization 86.7% ICU Level of Service E

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Hour
Future Total (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↘		↗	↗↘		↗	↘		↗	↗↘	
Traffic Volume (vph)	228	932	115	137	540	34	36	111	246	48	87	157
Future Volume (vph)	228	932	115	137	540	34	36	111	246	48	87	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.90		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3340		1738	3448		1537	1610		1685	3155	
Flt Permitted	0.42	1.00		0.12	1.00		0.59	1.00		0.20	1.00	
Satd. Flow (perm)	777	3340		215	3448		951	1610		351	3155	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	256	1047	129	147	581	37	39	121	267	52	95	171
RTOR Reduction (vph)	0	8	0	0	4	0	0	81	0	0	128	0
Lane Group Flow (vph)	256	1168	0	147	614	0	39	307	0	52	138	0
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	52.1	49.1		44.1	44.1		30.5	26.3		33.3	27.7	
Effective Green, g (s)	52.1	49.1		44.1	44.1		30.5	26.3		33.3	27.7	
Actuated g/C Ratio	0.47	0.45		0.40	0.40		0.28	0.24		0.30	0.25	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	502	1490		224	1382		286	384		174	794	
v/s Ratio Prot	0.07	c0.35		c0.06	0.18		0.01	c0.19		c0.02	0.04	
v/s Ratio Perm	0.17			0.20			0.03			0.08		
v/c Ratio	0.51	0.78		0.66	0.44		0.14	0.80		0.30	0.17	
Uniform Delay, d1	22.7	25.9		25.8	24.0		29.5	39.4		29.0	32.2	
Progression Factor	0.72	0.74		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	3.7		6.8	1.0		0.2	11.3		1.0	0.1	
Delay (s)	17.0	23.0		32.6	25.1		29.7	50.7		30.0	32.3	
Level of Service	B	C		C	C		C	D		C	C	
Approach Delay (s)		21.9			26.5			48.8			31.9	
Approach LOS		C			C			D			C	

Intersection Summary

HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2023 AM_FT_sim_2.txt

Queuing and Blocking Report AM Peak Period
Future Total (2023)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.0	72.4	104.4	57.1
80.0	21.5				
Average Queue (m)		19.8	33.1	59.5	18.2
45.0	8.3				
95th Queue (m)	34.6	58.2	95.2	36.7	72.4
17.7					
Link Distance (m)		372.2	304.9	304.9	672.0
672.0					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		1	4		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		36.3	42.1	67.2	59.0
81.4	107.0				
Average Queue (m)		18.1	19.0	25.9	23.2
42.9	6.0				
95th Queue (m)	32.1	37.5	55.1	50.5	68.6

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48.8					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B22	B22
B22 WB SB					
Directions Served	L	T	T	T	T
TR LR					
Maximum Queue (m)		9.2	31.5	21.8	77.9
88.0 44.2 3.8	22.7				
Average Queue (m)		6.5	6.5	1.0	4.4
8.8 2.4 0.2	9.9				
95th Queue (m)	13.1	22.2	8.7	31.9	50.8
26.0 2.6 19.3					
Link Distance (m)		14.9	14.9	82.7	82.7
82.7 99.8 91.5					
Upstream Blk Time (%)		0	2	0	0
0 0					
Queuing Penalty (veh)		0	12	3	0
1 0					
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		7	0		
Queuing Penalty (veh)		46	0		

2023 AM_FT_sim_2.txt

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		22.4	98.2	101.4	26.3
41.3 40.3 26.4	23.4	14.4	9.0		
Average Queue (m)		1.9	48.6	54.7	11.3
14.2 14.4 7.5	6.0	3.3	2.6		
95th Queue (m)	11.3	92.7	99.8	22.1	34.1
33.6 19.1 15.7	11.3	9.3			
Link Distance (m)		99.8	99.8		245.5
245.5	132.6	62.4	62.4		
Upstream Blk Time (%)			0	0	
Queuing Penalty (veh)			1	3	
Storage Bay Dist (m)		45.0			70.0
	30.0				
Storage Blk Time (%)			9		
	1	0			
Queuing Penalty (veh)			1		
	0	0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		69.8	103.0	114.4	32.3
124.5 109.2 42.1	100.3	29.2	26.5	48.6	
Average Queue (m)		32.7	48.4	57.8	27.0
57.4 44.3 8.4	52.4	8.8	10.0	17.1	
95th Queue (m)	60.5	94.2	104.9	38.5	104.3
86.9 25.6 84.0	21.0	21.9	35.6		
Link Distance (m)		245.5	245.5		222.7
222.7	221.1	176.9	176.9		

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Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (m)	165.0	30.0
105.0	50.0	

Storage Blk Time (%)		18
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16	0	
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Queuing Penalty (veh)		48
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22	0	
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Network Summary

Network wide Queuing Penalty: 143

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	156	394	843	1057	181	205
Future Volume (vph)	156	394	843	1057	181	205
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.173				0.950	
Satd. Flow (perm)	320	1852	1807	1536	1370	1225
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				416		223
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Peak Hour Factor	0.98	0.98	0.94	0.94	0.80	0.80
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	159	402	897	1124	226	256
Shared Lane Traffic (%)						
Lane Group Flow (vph)	159	402	897	1124	226	256
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	1.02	1.02	1.05	1.05	1.40	1.40
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Maximum Green (s)	8.0	86.0	75.0	21.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.8	-2.8	0.0	0.0	-3.2	-3.2
Total Lost Time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	91.8	88.8	75.0	102.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.85	0.20	0.20
v/c Ratio	0.43	0.29	0.79	0.82	0.82	0.60
Control Delay	12.6	5.8	14.3	9.5	69.7	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	5.8	14.3	9.5	69.7	14.8
LOS	B	A	B	A	E	B
Approach Delay		7.7	11.6		40.6	
Approach LOS		A	B		D	
Queue Length 50th (m)	8.2	27.4	72.7	33.8	51.3	6.4
Queue Length 95th (m)	13.4	39.1	m142.1	m92.7	#73.9	21.1
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	374	1370	1129	1368	276	425
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.29	0.79	0.82	0.82	0.60

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	15.5
Intersection LOS:	B
Intersection Capacity Utilization	86.9%
ICU Level of Service	E
Analysis Period (min)	15

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

PM Peak Hour
 Future Total (2023)

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Hour
Future Total (2023)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	156	394	843	1057	181	205
Future Volume (vph)	156	394	843	1057	181	205
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Total Lost time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lane Util. Factor	1.00	1.00	1.00	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)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.17	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	321	1852	1807	1536	1370	1225
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	159	402	897	1124	226	256
RTOR Reduction (vph)	0	0	0	83	0	178
Lane Group Flow (vph)	159	402	897	1041	226	78
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	91.8	88.8	75.0	96.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.80	0.20	0.20
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	374	1370	1129	1318	276	247
v/s Ratio Prot	c0.04	0.22	0.50	c0.14	0.17	
v/s Ratio Perm	0.29			0.54		0.06
v/c Ratio	0.43	0.29	0.79	0.79	0.82	0.32
Uniform Delay, d1	25.2	5.2	16.8	6.5	45.8	40.8
Progression Factor	1.00	1.00	0.60	1.88	1.00	1.00
Incremental Delay, d2	0.8	0.5	3.7	3.1	23.0	3.3
Delay (s)	25.9	5.7	13.8	15.4	68.8	44.2
Level of Service	C	A	B	B	E	D
Approach Delay (s)		11.5	14.7		55.7	
Approach LOS		B	B		E	

Intersection Summary

HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Hour
Future Total (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑	↘	↗
Traffic Volume (vph)	488	87	0	1642	258	606
Future Volume (vph)	488	87	0	1642	258	606
Ideal Flow (vphpl)	1000	1000	1805	1805	1694	1694
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.98				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	1902	859	0	3433	1611	1441
Flt Permitted					0.950	
Satd. Flow (perm)	1902	838	0	3433	1611	1441
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		93				548
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		3	3			
Peak Hour Factor	0.94	0.94	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Adj. Flow (vph)	519	93	0	1824	284	666
Shared Lane Traffic (%)						
Lane Group Flow (vph)	519	93	0	1824	284	666
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	2.14	2.14	1.05	1.05	1.14	1.14
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Hour
Future Total (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	50.0	50.0		50.0	25.0	
Total Split (s)	95.0	95.0		95.0	25.0	
Total Split (%)	79.2%	79.2%		79.2%	20.8%	
Maximum Green (s)	89.0	89.0		89.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.9	
Total Lost Time (s)	6.0	6.0		6.0	4.1	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effect Green (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
v/c Ratio	0.37	0.14		0.72	1.01	0.46
Control Delay	3.8	0.5		5.4	106.9	1.1
Queue Delay	0.0	0.0		0.1	0.0	0.0
Total Delay	3.8	0.5		5.5	106.9	1.1
LOS	A	A		A	F	A
Approach Delay	3.3			5.5	32.7	
Approach LOS	A			A	C	
Queue Length 50th (m)	11.2	0.0		49.6	-68.8	0.0
Queue Length 95th (m)	m14.7	m0.0		62.3	#123.4	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1410	645		2546	280	1441
Starvation Cap Reductn	0	0		112	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.37	0.14		0.75	1.01	0.46

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.01
 Intersection Signal Delay: 12.8
 Intersection LOS: B
 Intersection Capacity Utilization 72.2%
 ICU Level of Service C
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

PM Peak Hour
 Future Total (2023)

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

Splits and Phases: 2: QEW East Ramp & Northshore Blvd

 Ø2 (R) 95 s	 Ø6 (R) 95 s	 Ø4 25 s
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HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Hour
Future Total (2023)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	488	87	0	1642	258	606
Future Volume (vph)	488	87	0	1642	258	606
Ideal Flow (vphp)	1000	1000	1805	1805	1694	1694
Total Lost time (s)	6.0	6.0		6.0	4.1	1.1
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1902	838		3433	1611	1441
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1902	838		3433	1611	1441
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	519	93	0	1824	284	666
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	519	69	0	1824	284	666
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1410	621		2546	280	1441
v/s Ratio Prot	0.27			c0.53	c0.18	
v/s Ratio Perm		0.08				0.46
v/c Ratio	0.37	0.11		0.72	1.01	0.46
Uniform Delay, d1	5.5	4.4		8.5	49.5	0.0
Progression Factor	0.56	0.10		0.44	1.00	1.00
Incremental Delay, d2	0.7	0.3		1.6	57.5	1.1
Delay (s)	3.7	0.8		5.3	107.0	1.1
Level of Service	A	A		A	F	A
Approach Delay (s)	3.3			5.3	32.7	
Approach LOS	A			A	C	

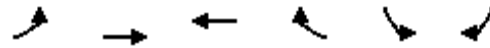
Intersection Summary

HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

PM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	17	912	1522	20	16	25
Future Volume (vph)	17	912	1522	20	16	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.917	
Flt Protected	0.950				0.981	
Satd. Flow (prot)	1825	3614	3601	0	1728	0
Flt Permitted	0.950				0.981	
Satd. Flow (perm)	1825	3614	3601	0	1728	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	21			21	1	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	14%	0%	0%
Adj. Flow (vph)	19	1025	1637	22	17	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	1025	1659	0	44	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	52.7%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	886	29	34	1471	19	62	0	41	8	1	9
Future Volume (vph)	13	886	29	34	1471	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	1.00		1.00		0.98	0.99	0.99	
Frt		0.995			0.998				0.850		0.864	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3558	0	1825	3605	0	1789	0	1633	1825	1489	0
Flt Permitted	0.132			0.259			0.750			0.950		
Satd. Flow (perm)	254	3558	0	496	3605	0	1409	0	1604	1814	1489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			2				64		10	
Link Speed (k/h)		60			60			20			20	
Link Distance (m)		117.6			266.3			150.8			78.0	
Travel Time (s)		7.1			16.0			27.1			14.0	
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Adj. Flow (vph)	14	953	31	38	1653	21	67	0	45	9	1	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	984	0	38	1674	0	67	0	45	9	11	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8	8	
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0	8.0	
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0	38.0	
Total Split (s)	69.0	69.0		11.0	80.0		40.0		40.0	40.0	40.0	
Total Split (%)	57.5%	57.5%		9.2%	66.7%		33.3%		33.3%	33.3%	33.3%	
Maximum Green (s)	63.0	63.0		7.0	74.0		33.0		33.0	33.0	33.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None	None	
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0	12.0	
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0	18.0	
Pedestrian Calls (#/hr)	0	0			0		0		0	0	0	
Act Effct Green (s)	93.6	93.6		100.6	99.8		11.4		11.4	11.4	11.4	
Actuated g/C Ratio	0.78	0.78		0.84	0.83		0.10		0.10	0.10	0.10	
v/c Ratio	0.07	0.35		0.08	0.56		0.50		0.21	0.05	0.07	
Control Delay	6.1	4.8		1.9	3.4		63.7		8.0	47.8	26.0	
Queue Delay	0.0	0.0		0.0	0.1		0.0		0.0	0.0	0.0	
Total Delay	6.1	4.8		1.9	3.5		63.7		8.0	47.8	26.0	
LOS	A	A		A	A		E		A	D	C	
Approach Delay		4.8			3.4			41.3				35.8
Approach LOS		A			A			D				D
Queue Length 50th (m)	0.8	32.0		0.9	28.2		15.3		0.0	2.0	0.2	
Queue Length 95th (m)	m2.2	43.1		m1.8	39.1		28.9		6.6	6.8	5.7	
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	198	2776		493	2998		387		487	498	416	
Starvation Cap Reductn	0	0		0	261		0		0	0	0	
Spillback Cap Reductn	0	0		0	0		0		0	0	0	
Storage Cap Reductn	0	0		0	0		0		0	0	0	
Reduced v/c Ratio	0.07	0.35		0.08	0.61		0.17		0.09	0.02	0.03	

Intersection Summary

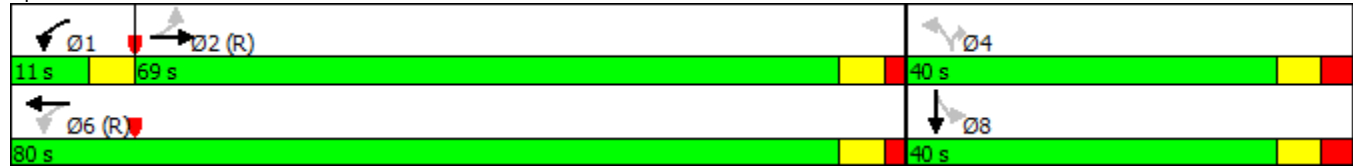
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 5.6
 Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

PM Peak Hour
 Future Total (2023)

Intersection Capacity Utilization 60.2% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Hour
Future Total (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶		↷	↶	↷	↶
Traffic Volume (vph)	13	886	29	34	1471	19	62	0	41	8	1	9
Future Volume (vph)	13	886	29	34	1471	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00		0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1820	3559		1823	3605		1785		1604	1814	1489	
Flt Permitted	0.13	1.00		0.26	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	253	3559		497	3605		1410		1604	1814	1489	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	953	31	38	1653	21	67	0	45	9	1	10
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	9	0
Lane Group Flow (vph)	14	983	0	38	1674	0	67	0	4	9	2	0
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Effective Green, g (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Actuated g/C Ratio	0.75	0.75		0.81	0.81		0.08		0.08	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	188	2651		444	2920		115		130	148	121	
v/s Ratio Prot		0.28		0.00	c0.46						0.00	
v/s Ratio Perm	0.06			0.07			c0.05		0.00	0.00		
v/c Ratio	0.07	0.37		0.09	0.57		0.58		0.03	0.06	0.02	
Uniform Delay, d1	4.1	5.4		2.7	4.0		53.1		50.7	50.9	50.7	
Progression Factor	0.82	0.75		0.67	0.63		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4		0.1	0.6		7.3		0.1	0.2	0.0	
Delay (s)	4.1	4.4		1.9	3.1		60.4		50.8	51.0	50.7	
Level of Service	A	A		A	A		E		D	D	D	
Approach Delay (s)		4.4			3.1			56.6			50.9	
Approach LOS		A			A			E			D	

Intersection Summary

HCM 2000 Control Delay	6.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	663	60	226	1143	63	120	106	146	92	161	259
Future Volume (vph)	212	663	60	226	1143	63	120	106	146	92	161	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor		0.99		0.97	0.99		0.96	0.83		0.83	0.94	
Frt		0.988		0.992			0.913			0.907		
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3513	0	1789	3508	0	1789	1404	0	1755	3068	0
Flt Permitted	0.073			0.274			0.329			0.348		
Satd. Flow (perm)	139	3513	0	498	3508	0	592	1404	0	535	3068	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			5			60			270	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Adj. Flow (vph)	238	745	67	243	1229	68	130	115	159	100	175	282
Shared Lane Traffic (%)												
Lane Group Flow (vph)	238	812	0	243	1297	0	130	274	0	100	457	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	15.0	49.0		15.0	49.0		12.0	44.0		12.0	44.0	
Total Split (%)	12.5%	40.8%		12.5%	40.8%		10.0%	36.7%		10.0%	36.7%	
Maximum Green (s)	12.0	43.0		12.0	43.0		9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	73.3	55.2		67.4	51.7		37.3	24.4		36.9	24.2	
Actuated g/C Ratio	0.61	0.46		0.56	0.43		0.31	0.20		0.31	0.20	
v/c Ratio	0.77	0.50		0.58	0.86		0.48	0.82		0.40	0.55	
Control Delay	59.0	23.5		18.1	39.3		32.9	54.3		30.8	18.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	59.0	23.5		18.1	39.3		32.9	54.3		30.8	18.3	
LOS	E	C		B	D		C	D		C	B	
Approach Delay		31.6			36.0			47.4			20.6	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	45.6	44.8		24.1	147.1		21.7	49.3		16.4	19.7	
Queue Length 95th (m)	#88.0	94.1		45.6	#214.2		32.0	72.9		25.5	32.1	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	311	1619		429	1513		274	474		257	1132	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.77	0.50		0.57	0.86		0.47	0.58		0.39	0.40	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	33.6
Intersection LOS:	C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd









PM Peak Hour
 Future Total (2023)

Intersection Capacity Utilization 95.8% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	49 s	12 s	44 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	49 s	12 s	44 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Hour
Future Total (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	663	60	226	1143	63	120	106	146	92	161	259
Future Volume (vph)	212	663	60	226	1143	63	120	106	146	92	161	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.83		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.95	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	3511		1772	3508		1767	1404		1666	3070	
Flt Permitted	0.07	1.00		0.27	1.00		0.33	1.00		0.35	1.00	
Satd. Flow (perm)	139	3511		511	3508		612	1404		609	3070	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	745	67	243	1229	68	130	115	159	100	175	282
RTOR Reduction (vph)	0	5	0	0	3	0	0	48	0	0	216	0
Lane Group Flow (vph)	238	807	0	243	1294	0	130	226	0	100	241	0
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	71.0	55.2		64.5	51.7		33.2	24.4		32.8	24.2	
Effective Green, g (s)	71.0	55.2		64.5	51.7		33.2	24.4		32.8	24.2	
Actuated g/C Ratio	0.59	0.46		0.54	0.43		0.28	0.20		0.27	0.20	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	308	1615		409	1511		254	285		242	619	
v/s Ratio Prot	c0.10	0.23		0.06	c0.37		c0.04	c0.16		0.03	0.08	
v/s Ratio Perm	0.35			0.26			0.10			0.08		
v/c Ratio	0.77	0.50		0.59	0.86		0.51	0.79		0.41	0.39	
Uniform Delay, d1	32.9	22.7		15.6	30.8		34.2	45.4		34.2	41.5	
Progression Factor	1.61	0.91		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.0	1.1		2.3	6.5		1.7	14.1		1.1	0.4	
Delay (s)	63.9	21.7		18.0	37.3		35.9	59.5		35.3	41.9	
Level of Service	E	C		B	D		D	E		D	D	
Approach Delay (s)		31.3			34.2			51.9			40.7	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2023 PM_FT_sim_2.txt

Queuing and Blocking Report PM Peak Period
Future Total (2023)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.5	245.3	117.2	112.1
71.0	55.9				
Average Queue (m)		34.0	84.3	71.1	64.6
35.6	22.2				
95th Queue (m)	50.8	211.5	101.9	105.6	62.6
43.5					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		25	13		
Queuing Penalty (veh)		99	20		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		26.4	25.8	63.6	58.7
163.4	24.4				
Average Queue (m)		8.1	7.0	26.4	26.2
96.8	0.8				
95th Queue (m)	20.4	19.6	50.4	49.0	178.4

2023 PM_FT_sim_2.txt

18.8					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B22	B22	WB
SB					
Directions Served	L	T	T	T	TR
LR					
Maximum Queue (m)		9.1	21.1	13.5	26.6
9.3	19.2				
Average Queue (m)		3.2	2.7	0.5	1.3
0.4	7.9				
95th Queue (m)	10.2	12.5	10.5	18.4	4.7
17.0					
Link Distance (m)		14.9	82.7	82.7	99.4
91.5					
Upstream Blk Time (%)		0	1		0
Queuing Penalty (veh)		0	3		0
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		6	0		
Queuing Penalty (veh)		26	0		

2023 PM_FT_sim_2.txt

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		12.0	49.6	50.2	13.0
40.9 45.7 29.4	23.7	10.5	16.4		
Average Queue (m)		2.2	17.0	20.3	4.2
15.3 17.9 12.9	5.4	1.8	2.6		
95th Queue (m)	8.1	38.1	40.9	11.5	33.7
37.5 26.0 14.0	7.5	10.1			
Link Distance (m)		99.4	99.4		242.6
242.6	137.1	65.8	65.8		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		45.0			70.0
	30.0				
Storage Blk Time (%)			0		
	1	0			
Queuing Penalty (veh)			0		
	0	0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		74.9	75.4	75.9	32.4
238.4 237.8 56.6	82.8	38.7	58.1	76.2	
Average Queue (m)		38.3	40.4	44.5	27.9
224.3 222.2 21.3	40.8	14.3	22.5	37.5	
95th Queue (m)	67.1	67.4	70.2	40.0	256.8
258.5 40.1 73.0	29.0	44.4	65.3		
Link Distance (m)		242.6	242.6		222.7
222.7	224.7	176.9	176.9		

2023 PM_FT_sim_2.txt

Upstream Blk Time (%)

67 55

Queuing Penalty (veh)

0 0

Storage Bay Dist (m)

105.0

165.0

50.0

30.0

Storage Blk Time (%)

53

0

0

0

0

15

Queuing Penalty (veh)

120

0

0

0

0

85

Network Summary

Network wide Queuing Penalty: 355

SimTraffic Report 09/04/2018

2023 PM_FT_sim_2.syn Page 0

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	125	424	609	651	275	63
Future Volume (vph)	125	424	609	651	275	63
Ideal Flow (vphp)	2129	2129	1575	1575	1518	1518
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.99	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.223				0.950	
Satd. Flow (perm)	466	2153	1577	1340	1289	1305
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				481		71
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.84	0.84	0.93	0.93	0.89	0.89
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Adj. Flow (vph)	149	505	655	700	309	71
Shared Lane Traffic (%)						
Lane Group Flow (vph)	149	505	655	700	309	71
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	0.85	0.85	1.25	1.25	1.49	1.31
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	12.0	62.0	50.0	33.0	33.0	33.0
Total Split (%)	12.6%	65.3%	52.6%	34.7%	34.7%	34.7%
Maximum Green (s)	9.0	56.0	44.0	26.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.5	-1.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	60.5	57.5	44.0	76.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.80	0.27	0.27
v/c Ratio	0.32	0.39	0.90	0.60	0.87	0.17
Control Delay	12.4	10.8	30.0	3.0	58.8	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.4	10.8	30.0	3.0	58.8	7.8
LOS	B	B	C	A	E	A
Approach Delay		11.1	16.1		49.3	
Approach LOS		B	B		D	
Queue Length 50th (m)	9.7	43.9	61.3	4.3	54.0	0.0
Queue Length 95th (m)	15.6	57.4	m#166.8	m10.5	#98.1	9.6
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	464	1303	730	1168	355	408
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.39	0.90	0.60	0.87	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90

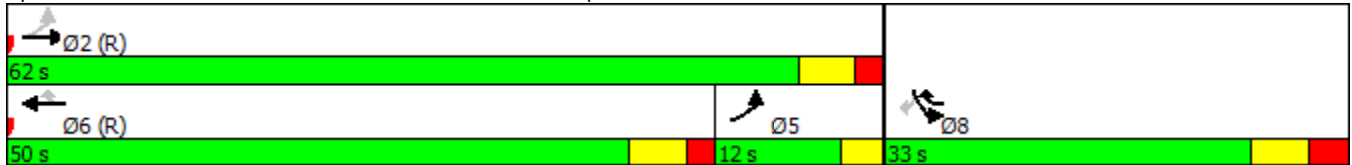
Lanes, Volumes, Timings

1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
Future Total (2023)

Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 78.1%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

Saturday Peak Hour
 Future Total (2023)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	125	424	609	651	275	63
Future Volume (vph)	125	424	609	651	275	63
Ideal Flow (vphpl)	2129	2129	1575	1575	1518	1518
Total Lost time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	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
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)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.22	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	466	2153	1577	1340	1299	1305
Peak-hour factor, PHF	0.84	0.84	0.93	0.93	0.89	0.89
Adj. Flow (vph)	149	505	655	700	309	71
RTOR Reduction (vph)	0	0	0	127	0	52
Lane Group Flow (vph)	149	505	655	573	309	19
Confl. Peds. (#/hr)					5	
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	59.0	56.0	44.0	70.0	26.0	26.0
Effective Green, g (s)	60.5	57.5	44.0	70.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.74	0.27	0.27
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	464	1303	730	1086	355	357
v/s Ratio Prot	0.04	c0.23	c0.42	0.14	c0.24	
v/s Ratio Perm	0.17			0.28		0.01
v/c Ratio	0.32	0.39	0.90	0.53	0.87	0.05
Uniform Delay, d1	21.1	9.7	23.4	5.4	32.9	25.4
Progression Factor	1.00	1.00	0.67	1.39	1.00	1.00
Incremental Delay, d2	0.4	0.9	12.5	1.4	24.1	0.3
Delay (s)	21.5	10.5	28.2	8.9	57.0	25.7
Level of Service	C	B	C	A	E	C
Approach Delay (s)		13.0	18.2		51.2	
Approach LOS		B	B		D	
Intersection Summary						
HCM 2000 Control Delay			22.0		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.82			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	14.5
Intersection Capacity Utilization			78.1%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Total (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	460	238	0	1031	229	645
Future Volume (vph)	460	238	0	1031	229	645
Ideal Flow (vphpl)	1450	1450	1670	1670	1450	1450
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97			1.00	
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2434	1122	0	2859	1254	1122
Flt Permitted					0.950	
Satd. Flow (perm)	2434	1091	0	2859	1252	1122
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		259				576
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		6	6		1	
Peak Hour Factor	0.92	0.92	0.96	0.96	0.76	0.76
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Adj. Flow (vph)	500	259	0	1074	301	849
Shared Lane Traffic (%)						
Lane Group Flow (vph)	500	259	0	1074	301	849
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	1.57	1.57	1.33	1.33	1.57	1.57
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Total (2023)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.2	
Total Lost Time (s)	6.0	6.0		6.0	4.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	59.3	59.3		59.3	24.9	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.26	1.00
v/c Ratio	0.33	0.33		0.60	0.92	0.76
Control Delay	5.8	1.1		12.6	68.7	4.8
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	5.8	1.1		12.6	68.7	4.8
LOS	A	A		B	E	A
Approach Delay	4.2			12.6	21.5	
Approach LOS	A			B	C	
Queue Length 50th (m)	13.2	0.1		57.3	53.3	0.0
Queue Length 95th (m)	m17.1	m0.1		75.6	#75.6	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1520	778		1785	332	1122
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.33	0.33		0.60	0.91	0.76

Intersection Summary

Area Type: CBD
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 13.9
 Intersection LOS: B
 Intersection Capacity Utilization 63.5%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.

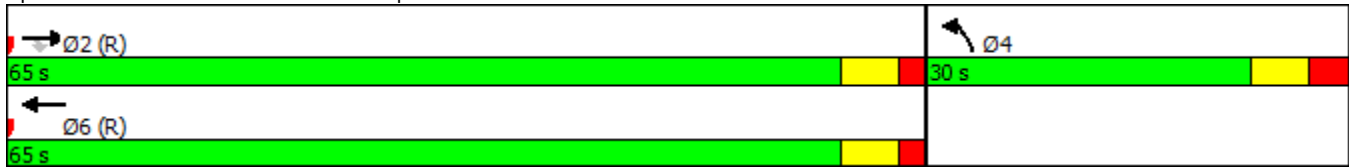
Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
 Future Total (2023)

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Saturday Peak Hour
Future Total (2023)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	460	238	0	1031	229	645
Future Volume (vph)	460	238	0	1031	229	645
Ideal Flow (vphp)	1450	1450	1670	1670	1450	1450
Total Lost time (s)	6.0	6.0		6.0	4.8	1.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2434	1091		2859	1254	1122
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2434	1091		2859	1254	1122
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.76	0.76
Adj. Flow (vph)	500	259	0	1074	301	849
RTOR Reduction (vph)	0	97	0	0	0	0
Lane Group Flow (vph)	500	162	0	1074	301	849
Confl. Peds. (#/hr)		6	6		1	
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	59.3	59.3		59.3	22.7	95.0
Effective Green, g (s)	59.3	59.3		59.3	24.9	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.26	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1519	681		1784	328	1122
v/s Ratio Prot	0.21			0.38	c0.24	
v/s Ratio Perm		0.15				c0.76
v/c Ratio	0.33	0.24		0.60	0.92	0.76
Uniform Delay, d1	8.4	7.9		10.7	34.1	0.0
Progression Factor	0.61	0.15		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.7		1.5	29.3	4.8
Delay (s)	5.6	1.9		12.3	63.3	4.8
Level of Service	A	A		B	E	A
Approach Delay (s)	4.4			12.3	20.1	
Approach LOS	A			B	C	

Intersection Summary

HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

Saturday Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	1078	1165	20	18	27
Future Volume (vph)	28	1078	1165	20	18	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.997		0.920	
Flt Protected	0.950				0.980	
Satd. Flow (prot)	1825	3614	3604	0	1732	0
Flt Permitted	0.950				0.980	
Satd. Flow (perm)	1825	3614	3604	0	1732	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	23			23		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	31	1211	1253	22	20	29
Shared Lane Traffic (%)						
Lane Group Flow (vph)	31	1211	1275	0	49	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.9%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	1017	52	37	1094	19	75	0	51	32	0	16
Future Volume (vph)	27	1017	52	37	1094	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00		1.00		0.98	0.99	0.99	
Frt		0.993			0.997				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3580	0	1825	3601	0	1772	0	1601	1825	1609	0
Flt Permitted	0.223			0.195			0.746			0.950		
Satd. Flow (perm)	427	3580	0	375	3601	0	1388	0	1572	1814	1609	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3				85			85
Link Speed (k/h)		60			60			20				20
Link Distance (m)		117.6			266.3			150.8				78.0
Travel Time (s)		7.1			16.0			27.1				14.0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Adj. Flow (vph)	29	1094	56	42	1229	21	82	0	55	35	0	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1150	0	42	1250	0	82	0	55	35	17	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	38.0	38.0		13.0	38.0		39.0		39.0	39.0		39.0
Total Split (%)	42.2%	42.2%		14.4%	42.2%		43.3%		43.3%	43.3%		43.3%
Maximum Green (s)	32.0	32.0		9.0	32.0		32.0		32.0	32.0		32.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	63.9	63.9		70.9	70.1		11.1		11.1	11.1		11.1
Actuated g/C Ratio	0.71	0.71		0.79	0.78		0.12		0.12	0.12		0.12
v/c Ratio	0.10	0.45		0.11	0.45		0.48		0.21	0.16		0.06
Control Delay	9.1	9.0		3.9	5.3		45.5		5.1	35.4		0.4
Queue Delay	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	9.1	9.0		3.9	5.3		45.5		5.1	35.4		0.4
LOS	A	A		A	A		D		A	D		A
Approach Delay		9.0			5.3			29.3				24.0
Approach LOS		A			A			C				C
Queue Length 50th (m)	1.8	51.8		1.4	37.4		13.5		0.0	5.5		0.0
Queue Length 95th (m)	6.6	80.1		4.4	59.6		25.8		5.0	13.2		0.0
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	303	2542		440	2806		493		613	644		626
Starvation Cap Reductn	0	0		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.10	0.45		0.10	0.45		0.17		0.09	0.05		0.03

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.48
 Intersection Signal Delay: 8.5
 Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

Saturday Peak Hour
 Future Total (2023)

Intersection Capacity Utilization 63.6% ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

Saturday Peak Hour
Future Total (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↕↗		↰	↕↗		↰		↗	↰	↕↗	
Traffic Volume (vph)	27	1017	52	37	1094	19	75	0	51	32	0	16
Future Volume (vph)	27	1017	52	37	1094	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1816	3579		1824	3603		1767		1572	1814	1609	
Flt Permitted	0.22	1.00		0.20	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	427	3579		375	3603		1388		1572	1814	1609	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	1094	56	42	1229	21	82	0	55	35	0	17
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	49	0	15	0
Lane Group Flow (vph)	29	1148	0	42	1249	0	82	0	6	35	2	0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Effective Green, g (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Actuated g/C Ratio	0.66	0.66		0.75	0.75		0.11		0.11	0.11	0.11	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	283	2374		342	2702		146		165	191	169	
v/s Ratio Prot		c0.32		0.01	c0.35							0.00
v/s Ratio Perm	0.07			0.09			c0.06		0.00	0.02		
v/c Ratio	0.10	0.48		0.12	0.46		0.56		0.04	0.18	0.01	
Uniform Delay, d1	5.5	7.5		4.0	4.3		38.3		36.1	36.7	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.7		0.2	0.6		4.9		0.1	0.5	0.0	
Delay (s)	6.2	8.2		4.1	4.9		43.1		36.2	37.2	36.1	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		8.2			4.9			40.4			36.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	723	179	315	671	47	200	127	182	100	256	279
Future Volume (vph)	198	723	179	315	671	47	200	127	182	100	256	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.98	0.99		1.00	1.00		0.99	0.93		0.94	0.99	
Frt		0.970			0.990			0.912			0.922	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3477	0	1807	3548	0	1807	1614	0	1755	3321	0
Flt Permitted	0.304			0.122			0.245			0.267		
Satd. Flow (perm)	569	3477	0	231	3548	0	464	1614	0	466	3321	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			7			69			264	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Adj. Flow (vph)	222	812	201	339	722	51	217	138	198	109	278	303
Shared Lane Traffic (%)												
Lane Group Flow (vph)	222	1013	0	339	773	0	217	336	0	109	581	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Total (2023)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	55.9	42.0		62.9	47.8		35.3	24.3		35.3	24.3	
Actuated g/C Ratio	0.51	0.38		0.57	0.43		0.32	0.22		0.32	0.22	
v/c Ratio	0.52	0.75		0.88	0.50		0.93	0.82		0.47	0.62	
Control Delay	16.9	32.8		51.2	25.8		72.7	47.8		30.1	22.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.9	32.8		51.2	25.8		72.7	47.8		30.1	22.6	
LOS	B	C		D	C		E	D		C	C	
Approach Delay		29.9			33.5			57.6			23.8	
Approach LOS		C			C			E			C	
Queue Length 50th (m)	20.6	95.1		47.3	61.0		34.2	55.6		16.1	31.8	
Queue Length 95th (m)	39.3	117.6		#141.8	97.5		#58.4	79.6		24.8	44.1	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	479	1347		385	1544		234	560		231	1236	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.46	0.75		0.88	0.50		0.93	0.60		0.47	0.47	

Intersection Summary









Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 25 (23%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 34.1
 Intersection LOS: C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
 Future Total (2023)

Intersection Capacity Utilization 93.0% ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
10 s	48 s	10 s	42 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
18 s	40 s	10 s	42 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Saturday Peak Hour
Future Total (2023)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	198	723	179	315	671	47	200	127	182	100	256	279
Future Volume (vph)	198	723	179	315	671	47	200	127	182	100	256	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.93		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.91		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1797	3478		1807	3549		1805	1614		1734	3320	
Flt Permitted	0.30	1.00		0.12	1.00		0.25	1.00		0.27	1.00	
Satd. Flow (perm)	576	3478		232	3549		466	1614		488	3320	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	812	201	339	722	51	217	138	198	109	278	303
RTOR Reduction (vph)	0	20	0	0	4	0	0	54	0	0	206	0
Lane Group Flow (vph)	222	993	0	339	769	0	217	282	0	109	375	0
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	53.9	42.0		62.7	47.8		31.3	24.3		31.3	24.3	
Effective Green, g (s)	53.9	42.0		62.7	47.8		31.3	24.3		31.3	24.3	
Actuated g/C Ratio	0.49	0.38		0.57	0.43		0.28	0.22		0.28	0.22	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	414	1327		385	1542		217	356		218	733	
v/s Ratio Prot	0.06	0.29		c0.14	0.22		c0.06	0.17		0.03	0.11	
v/s Ratio Perm	0.20			c0.36			c0.22			0.11		
v/c Ratio	0.54	0.75		0.88	0.50		1.00	0.79		0.50	0.51	
Uniform Delay, d1	16.6	29.4		26.8	22.5		37.0	40.5		30.9	37.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	3.9		20.2	1.2		61.1	11.5		1.8	0.6	
Delay (s)	17.9	33.3		47.0	23.6		98.1	51.9		32.7	38.2	
Level of Service	B	C		D	C		F	D		C	D	
Approach Delay (s)		30.6			30.7			70.1			37.4	
Approach LOS		C			C			E			D	

Intersection Summary

HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2023 SAT_FT_sim_2.txt

Queuing and Blocking Report Weekend Peak Period
Future Total (2023)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	92.5	105.4	76.6
80.0 20.4					
Average Queue (m)		26.2	40.0	51.6	27.7
43.1 7.0					
95th Queue (m)	44.7	72.9	92.5	57.3	68.8
15.5					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		2	5		
Queuing Penalty (veh)		8	6		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		24.9	23.6	80.6	81.4
69.9 4.1					
Average Queue (m)		9.6	6.9	29.4	29.8
39.6 0.1					
95th Queue (m)	21.1	18.4	63.2	62.9	62.2

2023 SAT_FT_sim_2.txt

3.2

Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)				0	0
Queuing Penalty (veh)				1	0
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B22	B22	WB
SB					
Directions Served	L	T	T	T	TR
LR					
Maximum Queue (m)		9.2	18.8	10.5	14.8
1.0	20.2				
Average Queue (m)		4.1	2.2	0.3	0.5
0.0	9.2				
95th Queue (m)	11.3	10.7	5.1	10.5	0.8
17.5					
Link Distance (m)		14.9	82.7	82.7	99.4
91.5					
Upstream Blk Time (%)		0	0		0
Queuing Penalty (veh)		0	2		0
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		5	0		
Queuing Penalty (veh)		29	0		

2023 SAT_FT_sim_2.txt

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		17.3	71.0	73.1	19.6
70.2 75.0 28.6	24.5	18.2	9.8		
Average Queue (m)		4.7	25.4	30.5	5.5
24.7 29.3 13.8	6.4	6.8	3.4		
95th Queue (m)		12.7	54.1	58.6	14.3
62.3 26.8 17.1	16.5	9.7			
Link Distance (m)		99.4	99.4		242.6
242.6 137.1	65.8	65.8			
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (m)		45.0			70.0
	30.0				
Storage Blk Time (%)			2		
0 1	0				
Queuing Penalty (veh)			0		
0 0	0				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		59.4	87.8	100.2	32.4
222.7 209.9 81.5	101.6	43.7	60.6	76.6	
Average Queue (m)		28.4	53.6	61.7	32.1
163.6 146.5 34.5	46.5	14.4	31.1	40.2	
95th Queue (m)		51.6	85.0	92.6	33.8
242.6 64.7 81.4	29.6	51.3	68.4		
Link Distance (m)		242.6	242.6		222.7
222.7 224.7		176.9	176.9		

2023 SAT_FT_sim_2.txt

Upstream Blk Time (%)

26 2

Queuing Penalty (veh)

0 0

Storage Bay Dist (m)

105.0

165.0

30.0

50.0

Storage Blk Time (%)

19 0 0 0 1

68

Queuing Penalty (veh)

61 0 0 0 1

227

Network Summary

Network wide Queuing Penalty: 336

SimTraffic Report 09/04/2018

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

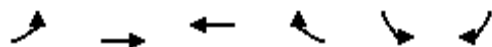
AM Peak Period
09/27/2018



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	156	442	564	462	347	77
Future Volume (vph)	156	442	564	462	347	77
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			0.97		
Fr _t				0.850		0.850
Fl _t Protected	0.950				0.950	
Satd. Flow (prot)	1483	1561	1435	1220	1546	1397
Fl _t Permitted	0.158				0.950	
Satd. Flow (perm)	246	1561	1435	1186	1546	1397
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				369		83
Link Speed (k/h)		50	60		100	
Link Distance (m)		165.3	312.3		178.0	
Travel Time (s)		11.9	18.7		6.4	
Confl. Peds. (#/hr)	4			4		
Peak Hour Factor	0.95	0.95	0.89	0.89	0.93	0.93
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Adj. Flow (vph)	164	465	634	519	373	83
Shared Lane Traffic (%)						
Lane Group Flow (vph)	164	465	634	519	373	83
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	1.25	1.25	1.37	1.37	1.16	1.16
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
09/27/2018



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Maximum Green (s)	8.0	40.0	29.0	20.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-1.4	-1.4
Total Lost Time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	43.5	40.5	29.3	48.3	21.4	21.4
Actuated g/C Ratio	0.60	0.55	0.40	0.66	0.29	0.29
v/c Ratio	0.58	0.54	1.10	0.57	0.82	0.18
Control Delay	16.2	13.2	93.1	3.7	41.6	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	13.2	93.1	3.7	41.6	6.2
LOS	B	B	F	A	D	A
Approach Delay		14.0	52.8		35.1	
Approach LOS		B	D		D	
Queue Length 50th (m)	9.2	37.1	~101.8	4.4	47.4	0.0
Queue Length 95th (m)	20.4	61.2	#156.9	11.4	#90.2	8.8
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	290	866	576	918	453	468
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.54	1.10	0.57	0.82	0.18

Intersection Summary

Area Type:	Other
Cycle Length:	73
Actuated Cycle Length:	73
Offset:	22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.10
Intersection Signal Delay:	38.3
Intersection LOS:	D

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

AM Peak Period
 09/27/2018

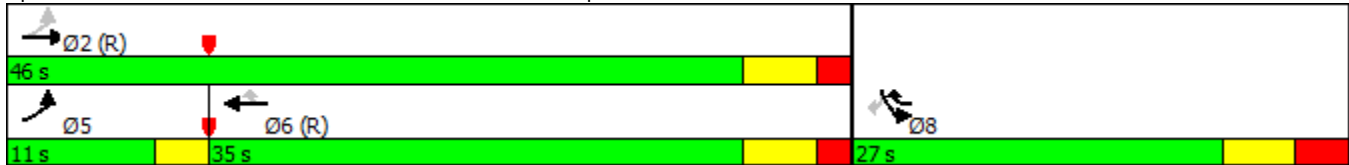
Intersection Capacity Utilization 83.8% ICU Level of Service E

Analysis Period (min) 15

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

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

AM Peak Period
09/27/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	156	442	564	462	347	77
Future Volume (vph)	156	442	564	462	347	77
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Total Lost time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	1483	1561	1435	1200	1546	1397
Flt Permitted	0.16	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	247	1561	1435	1200	1546	1397
Peak-hour factor, PHF	0.95	0.95	0.89	0.89	0.93	0.93
Adj. Flow (vph)	164	465	634	519	373	83
RTOR Reduction (vph)	0	0	0	120	0	59
Lane Group Flow (vph)	164	465	634	399	373	24
Confl. Peds. (#/hr)	4			4		
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	29.3	49.3	20.0	20.0
Effective Green, g (s)	40.5	40.5	29.3	49.3	21.4	21.4
Actuated g/C Ratio	0.55	0.55	0.40	0.68	0.29	0.29
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	275	866	575	810	453	409
v/s Ratio Prot	c0.07	0.30	c0.44	0.13	c0.24	
v/s Ratio Perm	0.26			0.20		0.02
v/c Ratio	0.60	0.54	1.10	0.49	0.82	0.06
Uniform Delay, d1	11.9	10.3	21.9	5.8	24.0	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	2.4	68.8	2.1	15.5	0.3
Delay (s)	15.3	12.7	90.6	7.9	39.5	18.8
Level of Service	B	B	F	A	D	B
Approach Delay (s)		13.4	53.4		35.8	
Approach LOS		B	D		D	

Intersection Summary			
HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
09/27/2018



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	650	139	0	773	254	1006
Future Volume (vph)	650	139	0	773	254	1006
Ideal Flow (vphpl)	1440	1440	1246	1246	1266	1266
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2660	1202	0	2302	1192	1046
Flt Permitted					0.950	
Satd. Flow (perm)	2660	1165	0	2302	1192	1046
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		149				468
Link Speed (k/h)	60			60	48	
Link Distance (m)	312.3			111.4	163.6	
Travel Time (s)	18.7			6.7	12.3	
Confl. Peds. (#/hr)		8	8			
Peak Hour Factor	0.93	0.93	0.89	0.89	0.91	0.91
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Adj. Flow (vph)	699	149	0	869	279	1105
Shared Lane Traffic (%)						
Lane Group Flow (vph)	699	149	0	869	279	1105
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	1.40	1.40	1.66	1.66	1.63	1.63
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
09/27/2018



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.6	
Total Lost Time (s)	6.0	6.0		6.0	4.4	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	59.7	59.7		59.7	24.9	95.0
Actuated g/C Ratio	0.63	0.63		0.63	0.26	1.00
v/c Ratio	0.42	0.19		0.60	0.89	1.06
Control Delay	10.0	1.9		12.9	65.1	49.6
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	10.0	1.9		12.9	65.1	49.6
LOS	A	A		B	E	D
Approach Delay	8.6			12.9	52.7	
Approach LOS	A			B	D	
Queue Length 50th (m)	31.6	0.0		46.5	48.8	-22.7
Queue Length 95th (m)	43.0	6.7		63.2	#93.2	#96.9
Internal Link Dist (m)	288.3			87.4	139.6	
Turn Bay Length (m)						
Base Capacity (vph)	1671	786		1446	321	1046
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.42	0.19		0.60	0.87	1.06

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 29.5
 Intersection Capacity Utilization 62.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B

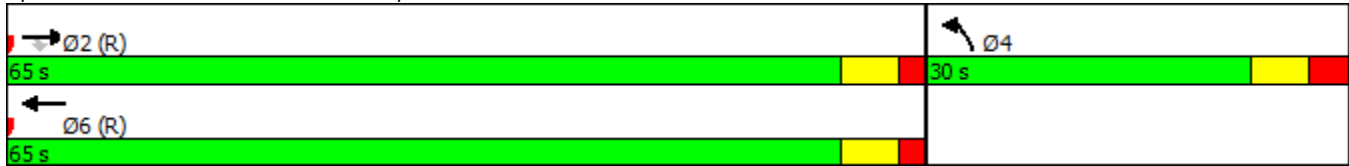
~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

AM Peak Period
 09/27/2018

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

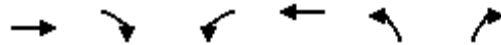
Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
09/27/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	650	139	0	773	254	1006
Future Volume (vph)	650	139	0	773	254	1006
Ideal Flow (vphp)	1440	1440	1246	1246	1266	1266
Total Lost time (s)	6.0	6.0		6.0	4.4	1.4
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2660	1165		2302	1192	1046
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2660	1165		2302	1192	1046
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.91	0.91
Adj. Flow (vph)	699	149	0	869	279	1105
RTOR Reduction (vph)	0	55	0	0	0	0
Lane Group Flow (vph)	699	94	0	869	279	1105
Confl. Peds. (#/hr)		8	8			
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	59.7	59.7		59.7	22.3	95.0
Effective Green, g (s)	59.7	59.7		59.7	24.9	95.0
Actuated g/C Ratio	0.63	0.63		0.63	0.26	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1671	732		1446	312	1046
v/s Ratio Prot	0.26			0.38	0.23	
v/s Ratio Perm		0.08				c1.06
v/c Ratio	0.42	0.13		0.60	0.89	1.06
Uniform Delay, d1	8.9	7.1		10.5	33.8	47.5
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.4		1.9	26.0	44.0
Delay (s)	9.7	7.5		12.4	59.8	91.5
Level of Service	A	A		B	E	F
Approach Delay (s)	9.3			12.4	85.1	
Approach LOS	A			B	F	

Intersection Summary

HCM 2000 Control Delay	44.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

AM Peak Period
09/27/2018



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	83	1486	763	36	28	24
Future Volume (vph)	83	1486	763	36	28	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.993		0.937	
Flt Protected	0.950				0.974	
Satd. Flow (prot)	1825	3544	3459	0	1753	0
Flt Permitted	0.950				0.974	
Satd. Flow (perm)	1825	3544	3459	0	1753	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	111.5		90.6	
Travel Time (s)		6.7	6.7		16.3	
Confl. Peds. (#/hr)	9			9		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	0%	0%	0%
Adj. Flow (vph)	93	1670	820	39	30	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	1670	859	0	56	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.1%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Period
09/27/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1357	146	62	750	11	37	0	41	14	0	12
Future Volume (vph)	11	1357	146	62	750	11	37	0	41	14	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			1.00		1.00		0.97	0.98	0.98	
Frt		0.985			0.998				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3485	0	1772	3465	0	1644	0	1400	1706	1606	0
Flt Permitted	0.331			0.107			0.749			0.950		
Satd. Flow (perm)	628	3485	0	200	3465	0	1291	0	1354	1670	1606	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			2				69			149
Link Speed (k/h)		60			60			20				20
Link Distance (m)		111.5			270.1			136.0				79.6
Travel Time (s)		6.7			16.2			24.5				14.3
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Adj. Flow (vph)	12	1459	157	70	843	12	40	0	45	15	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1616	0	70	855	0	40	0	45	15	13	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	1.13	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Period
09/27/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm		NA
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	59.0	59.0		11.0	70.0		40.0		40.0	40.0		40.0
Total Split (%)	53.6%	53.6%		10.0%	63.6%		36.4%		36.4%	36.4%		36.4%
Maximum Green (s)	53.0	53.0		7.0	64.0		33.0		33.0	33.0		33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	82.9	82.9		92.4	91.6		9.6		9.6	9.6		9.6
Actuated g/C Ratio	0.75	0.75		0.84	0.83		0.09		0.09	0.09		0.09
v/c Ratio	0.03	0.61		0.27	0.30		0.36		0.25	0.10		0.05
Control Delay	6.2	9.9		10.7	1.7		55.6		8.1	46.6		0.3
Queue Delay	0.0	0.3		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	6.2	10.1		10.7	1.7		55.6		8.1	46.6		0.3
LOS	A	B		B	A		E		A	D		A
Approach Delay		10.1			2.4			30.5				25.1
Approach LOS		B			A			C				C
Queue Length 50th (m)	0.7	86.5		1.5	8.4		8.3		0.0	3.0		0.0
Queue Length 95th (m)	3.0	131.3		12.5	12.6		18.7		5.5	9.1		0.0
Internal Link Dist (m)		87.5			246.1			112.0				55.6
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	473	2630		272	2886		387		454	501		586
Starvation Cap Reductn	0	360		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.03	0.71		0.26	0.30		0.10		0.10	0.03		0.02

Intersection Summary

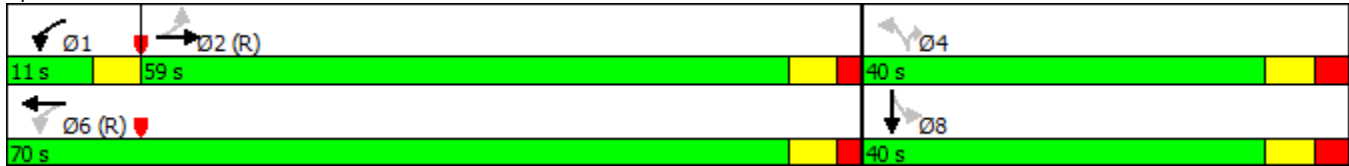
Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61

Lanes, Volumes, Timings
 4: Northshore Blvd & JBH Access

AM Peak Period
 09/27/2018

Intersection Signal Delay: 8.2	Intersection LOS: A
Intersection Capacity Utilization 80.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Northshore Blvd & JBH Access



HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Period
09/27/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	1357	146	62	750	11	37	0	41	14	0	12
Future Volume (vph)	11	1357	146	62	750	11	37	0	41	14	0	12
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.97	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00		1.00	0.98	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1802	3486		1772	3464		1637		1354	1670	1606	
Flt Permitted	0.33	1.00		0.11	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	628	3486		200	3464		1291		1354	1670	1606	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1459	157	70	843	12	40	0	45	15	0	13
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	42	0	12	0
Lane Group Flow (vph)	12	1612	0	70	855	0	40	0	3	15	1	0
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Effective Green, g (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Actuated g/C Ratio	0.72	0.72		0.81	0.81		0.07		0.07	0.07	0.07	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	453	2519		240	2802		93		98	121	116	
v/s Ratio Prot		c0.46		0.01	c0.25						0.00	
v/s Ratio Perm	0.02			0.22			c0.03		0.00	0.01		
v/c Ratio	0.03	0.64		0.29	0.31		0.43		0.03	0.12	0.01	
Uniform Delay, d1	4.3	7.9		5.9	2.7		48.8		47.4	47.7	47.3	
Progression Factor	1.00	1.00		3.80	0.50		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.3		0.6	0.3		3.2		0.1	0.5	0.0	
Delay (s)	4.4	9.1		23.2	1.6		52.0		47.5	48.2	47.3	
Level of Service	A	A		C	A		D		D	D	D	
Approach Delay (s)		9.1			3.2			49.6			47.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
09/27/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	1069	115	137	630	34	36	117	246	48	91	157
Future Volume (vph)	228	1069	115	137	630	34	36	117	246	48	91	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	1.00		0.99	0.97		0.98	0.98	
Frt		0.985			0.992			0.898			0.905	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	3361	0	1738	3456	0	1547	1613	0	1690	3161	0
Flt Permitted	0.380			0.119			0.585			0.197		
Satd. Flow (perm)	704	3361	0	217	3456	0	942	1613	0	344	3161	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			5			101			171	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		270.1			172.4			278.5			293.6	
Travel Time (s)		16.2			10.3			20.1			21.1	
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Adj. Flow (vph)	256	1201	129	147	677	37	39	127	267	52	99	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	256	1330	0	147	714	0	39	394	0	52	270	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
09/27/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	52.9	49.9		47.8	44.8		35.7	26.2		36.4	28.2	
Actuated g/C Ratio	0.48	0.45		0.43	0.41		0.32	0.24		0.33	0.26	
v/c Ratio	0.53	0.87		0.64	0.51		0.11	0.85		0.27	0.29	
Control Delay	22.2	28.3		38.1	27.9		20.8	46.7		23.7	12.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.2	28.3		38.1	27.9		20.8	46.7		23.7	12.0	
LOS	C	C		D	C		C	D		C	B	
Approach Delay		27.3			29.6			44.3			13.9	
Approach LOS		C			C			D			B	
Queue Length 50th (m)	35.5	143.8		19.9	61.3		5.4	61.6		7.2	8.7	
Queue Length 95th (m)	45.3	#198.8		#54.0	89.7		10.9	89.2		13.4	17.4	
Internal Link Dist (m)		246.1			148.4			254.5			269.6	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	484	1531		231	1411		345	582		199	1122	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.53	0.87		0.64	0.51		0.11	0.68		0.26	0.24	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.87
Intersection Signal Delay:	28.9
Intersection LOS:	C

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

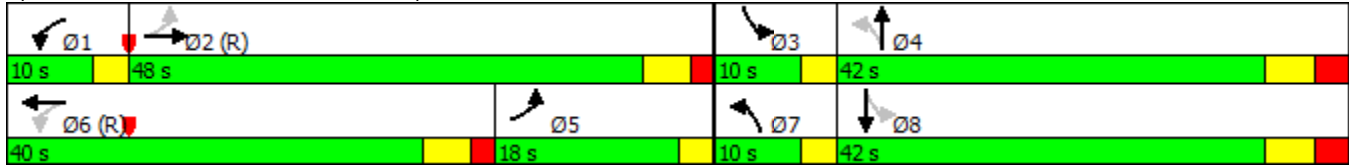
AM Peak Period
 09/27/2018

Intersection Capacity Utilization 89.3% ICU Level of Service E

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd



HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
09/27/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	228	1069	115	137	630	34	36	117	246	48	91	157
Future Volume (vph)	228	1069	115	137	630	34	36	117	246	48	91	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3363		1738	3456		1537	1613		1686	3161	
Flt Permitted	0.38	1.00		0.12	1.00		0.59	1.00		0.20	1.00	
Satd. Flow (perm)	707	3363		217	3456		947	1613		349	3161	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	256	1201	129	147	677	37	39	127	267	52	99	171
RTOR Reduction (vph)	0	7	0	0	3	0	0	76	0	0	127	0
Lane Group Flow (vph)	256	1323	0	147	711	0	39	318	0	52	143	0
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	51.7	48.7		43.6	43.6		31.0	26.8		33.8	28.2	
Effective Green, g (s)	51.7	48.7		43.6	43.6		31.0	26.8		33.8	28.2	
Actuated g/C Ratio	0.47	0.44		0.40	0.40		0.28	0.24		0.31	0.26	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	476	1488		222	1369		289	392		175	810	
v/s Ratio Prot	0.07	c0.39		c0.06	0.21		0.01	c0.20		c0.02	0.05	
v/s Ratio Perm	0.18			0.20			0.03			0.08		
v/c Ratio	0.54	0.89		0.66	0.52		0.13	0.81		0.30	0.18	
Uniform Delay, d1	24.2	28.2		26.3	25.2		29.1	39.2		28.7	31.9	
Progression Factor	0.68	0.72		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	7.1		7.2	1.4		0.2	12.0		1.0	0.1	
Delay (s)	17.5	27.3		33.5	26.6		29.3	51.2		29.7	32.0	
Level of Service	B	C		C	C		C	D		C	C	
Approach Delay (s)		25.7			27.8			49.2			31.6	
Approach LOS		C			C			D			C	

Intersection Summary

HCM 2000 Control Delay	30.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2028 AM_FT_sim_2.txt

Queuing and Blocking Report AM Peak Period
Future Total (2028)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	85.7	138.2	53.9
102.8	23.8				
Average Queue (m)		24.5	37.3	67.8	19.1
53.9	9.3				
95th Queue (m)	42.9	64.7	114.6	38.0	86.7
18.6					
Link Distance (m)		372.2	304.9	304.9	672.0
672.0					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		1	4		
Queuing Penalty (veh)		4	5		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		43.8	44.0	68.5	69.0
306.4	341.4				
Average Queue (m)		20.3	20.5	25.5	22.9
127.3	197.7				
95th Queue (m)	37.1	39.6	55.7	53.1	404.9

2028 AM_FT_sim_2.txt

476.8					
Link Distance (m)	304.9	304.9	82.9	82.9	659.2
659.2					
Upstream Blk Time (%)				0	0
0					
Queuing Penalty (veh)				0	0
0					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement			EB	EB	EB	B22	B22
B22	WB	SB					
Directions Served			L	T	T	T	T
	TR	LR					
Maximum Queue (m)				9.2	29.1	22.6	22.4
44.1	18.8	7.0	45.4				
Average Queue (m)				6.6	7.0	2.3	1.1
2.5	0.6	0.3	14.4				
95th Queue (m)				13.0	22.2	13.6	24.1
12.0	3.1	36.1					
Link Distance (m)				14.9	14.9	82.9	82.9
82.9	99.8	91.5					
Upstream Blk Time (%)				0	2	1	
0	0						
Queuing Penalty (veh)				0	15	6	
0	0						
Storage Bay Dist (m)				5.0			
Storage Blk Time (%)				8	0		
Queuing Penalty (veh)				56	0		

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Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		27.9	100.3	100.3	27.8
45.4 47.0 26.0	21.4	15.4	10.1		
Average Queue (m)		2.0	52.9	59.7	11.8
18.1 17.8 9.0	6.9	3.4	2.4		
95th Queue (m)		12.9	97.2	104.1	23.8
38.1 21.1 16.2	10.6	9.0			
Link Distance (m)		99.8	99.8		245.5
245.5 132.6	62.4	62.4			
Upstream Blk Time (%)			0	1	
Queuing Penalty (veh)			2	5	
Storage Bay Dist (m)		45.0			70.0
30.0					
Storage Blk Time (%)		0	10		
0 0					
Queuing Penalty (veh)		0	1		
0 0					

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		64.0	136.1	136.4	32.3
123.4 113.2 56.6	102.2	31.5	33.6	52.7	
Average Queue (m)		31.3	63.4	72.5	27.6
69.8 55.4 9.2	55.3	8.5	13.8	18.9	
95th Queue (m)		55.4	119.2	128.8	39.4
100.9 30.6 93.1	21.3	27.8	40.9		
Link Distance (m)		245.5	245.5		222.7
222.7 221.1		176.9	176.9		

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (m)		165.0	30.0
	105.0	50.0	
Storage Blk Time (%)			22
20	0	1	
Queuing Penalty (veh)			69
27	0	0	

Intersection: 16:

- Movement
- Directions Served
- Maximum Queue (m)
- Average Queue (m)
- 95th Queue (m)
- Link Distance (m)
- Upstream Blk Time (%)
- Queuing Penalty (veh)
- Storage Bay Dist (m)
- Storage Blk Time (%)
- Queuing Penalty (veh)

Intersection: 18:

- Movement
- Directions Served
- Maximum Queue (m)
- Average Queue (m)
- 95th Queue (m)
- Link Distance (m)
- Upstream Blk Time (%)
- Queuing Penalty (veh)
- Storage Bay Dist (m)
- Storage Blk Time (%)
- Queuing Penalty (veh)

2028 AM_FT_sim_2.txt

Network Summary

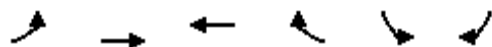
Network wide Queuing Penalty: 192

SimTraffic Report 09/04/2018

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
09/27/2018



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	172	420	903	1164	199	227
Future Volume (vph)	172	420	903	1164	199	227
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.137				0.950	
Satd. Flow (perm)	254	1852	1807	1536	1370	1225
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				322		203
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Peak Hour Factor	0.98	0.98	0.94	0.94	0.80	0.80
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	176	429	961	1238	249	284
Shared Lane Traffic (%)						
Lane Group Flow (vph)	176	429	961	1238	249	284
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	1.02	1.02	1.05	1.05	1.40	1.40
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
09/27/2018



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Maximum Green (s)	8.0	86.0	75.0	21.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.8	-2.8	0.0	0.0	-3.2	-3.2
Total Lost Time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	91.8	88.8	75.0	102.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.85	0.20	0.20
v/c Ratio	0.53	0.31	0.85	0.92	0.90	0.69
Control Delay	21.6	6.0	17.3	15.0	81.5	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	6.0	17.3	15.0	81.5	23.3
LOS	C	A	B	B	F	C
Approach Delay		10.5	16.0		50.5	
Approach LOS		B	B		D	
Queue Length 50th (m)	9.2	29.8	107.1	67.3	57.7	16.7
Queue Length 95th (m)	17.9	42.2	m160.9	m#212.1	#85.7	35.1
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	329	1370	1129	1353	276	409
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.31	0.85	0.92	0.90	0.69

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.92
Intersection Signal Delay:	20.5
Intersection LOS:	C
Intersection Capacity Utilization:	94.8%
ICU Level of Service:	F
Analysis Period (min):	15

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

PM Peak Period
 09/27/2018

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

PM Peak Period
 09/27/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	172	420	903	1164	199	227
Future Volume (vph)	172	420	903	1164	199	227
Ideal Flow (vphp)	1850	1850	1805	1805	1440	1440
Total Lost time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lane Util. Factor	1.00	1.00	1.00	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)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.14	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	253	1852	1807	1536	1370	1225
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	176	429	961	1238	249	284
RTOR Reduction (vph)	0	0	0	64	0	162
Lane Group Flow (vph)	176	429	961	1174	249	122
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	91.8	88.8	75.0	96.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.80	0.20	0.20
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	329	1370	1129	1318	276	247
v/s Ratio Prot	c0.05	0.23	0.53	c0.16	0.18	
v/s Ratio Perm	0.36			0.61		0.10
v/c Ratio	0.53	0.31	0.85	0.89	0.90	0.49
Uniform Delay, d1	32.6	5.3	18.0	8.3	46.7	42.5
Progression Factor	1.00	1.00	0.65	1.56	1.00	1.00
Incremental Delay, d2	1.7	0.6	4.6	5.4	34.0	6.9
Delay (s)	34.2	5.9	16.4	18.4	80.7	49.4
Level of Service	C	A	B	B	F	D
Approach Delay (s)		14.1	17.5		64.0	
Approach LOS		B	B		E	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
09/27/2018



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	523	96	0	1782	285	668
Future Volume (vph)	523	96	0	1782	285	668
Ideal Flow (vphpl)	1000	1000	1805	1805	1694	1694
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.98				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	1902	859	0	3433	1611	1441
Flt Permitted					0.950	
Satd. Flow (perm)	1902	838	0	3433	1611	1441
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		102				525
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		3	3			
Peak Hour Factor	0.94	0.94	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Adj. Flow (vph)	556	102	0	1980	313	734
Shared Lane Traffic (%)						
Lane Group Flow (vph)	556	102	0	1980	313	734
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	2.14	2.14	1.05	1.05	1.14	1.14
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
09/27/2018



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	50.0	50.0		50.0	25.0	
Total Split (s)	95.0	95.0		95.0	25.0	
Total Split (%)	79.2%	79.2%		79.2%	20.8%	
Maximum Green (s)	89.0	89.0		89.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.9	
Total Lost Time (s)	6.0	6.0		6.0	4.1	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effect Green (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
v/c Ratio	0.39	0.16		0.78	1.12	0.51
Control Delay	3.9	0.5		5.8	134.8	1.3
Queue Delay	0.0	0.0		0.2	0.0	0.0
Total Delay	3.9	0.5		6.1	134.8	1.3
LOS	A	A		A	F	A
Approach Delay	3.3			6.1	41.2	
Approach LOS	A			A	D	
Queue Length 50th (m)	12.0	0.0		49.0	-84.6	0.0
Queue Length 95th (m)	m15.0	m0.0		82.8	#139.5	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1410	647		2546	280	1441
Starvation Cap Reductn	0	0		113	0	0
Spillback Cap Reductn	0	0		25	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.39	0.16		0.81	1.12	0.51

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.12
 Intersection Signal Delay: 15.6
 Intersection LOS: B
 Intersection Capacity Utilization 78.0%
 ICU Level of Service D
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

PM Peak Period
 09/27/2018

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

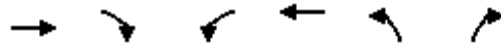
Splits and Phases: 2: QEW East Ramp & Northshore Blvd

 Ø2 (R) 95 s	 Ø6 (R) 95 s	 Ø4 25 s
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HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
09/27/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	523	96	0	1782	285	668
Future Volume (vph)	523	96	0	1782	285	668
Ideal Flow (vphp)	1000	1000	1805	1805	1694	1694
Total Lost time (s)	6.0	6.0		6.0	4.1	1.1
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1902	838		3433	1611	1441
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1902	838		3433	1611	1441
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	556	102	0	1980	313	734
RTOR Reduction (vph)	0	26	0	0	0	0
Lane Group Flow (vph)	556	76	0	1980	313	734
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1410	621		2546	280	1441
v/s Ratio Prot	0.29			c0.58	c0.19	
v/s Ratio Perm		0.09				0.51
v/c Ratio	0.39	0.12		0.78	1.12	0.51
Uniform Delay, d1	5.7	4.4		9.5	49.5	0.0
Progression Factor	0.54	0.07		0.39	1.00	1.00
Incremental Delay, d2	0.7	0.3		2.0	89.3	1.3
Delay (s)	3.8	0.7		5.7	138.8	1.3
Level of Service	A	A		A	F	A
Approach Delay (s)	3.3			5.7	42.4	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

PM Peak Period
09/27/2018



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	17	1009	1700	20	16	25
Future Volume (vph)	17	1009	1700	20	16	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.917	
Flt Protected	0.950				0.981	
Satd. Flow (prot)	1825	3614	3601	0	1728	0
Flt Permitted	0.950				0.981	
Satd. Flow (perm)	1825	3614	3601	0	1728	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	21			21	1	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	14%	0%	0%
Adj. Flow (vph)	19	1134	1828	22	17	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	1134	1850	0	44	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	57.7%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Period
09/27/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	983	29	34	1649	19	62	0	41	8	1	9
Future Volume (vph)	13	983	29	34	1649	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	1.00		1.00		0.98	0.99	0.99	
Frt		0.996			0.998				0.850		0.864	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3562	0	1825	3605	0	1789	0	1633	1825	1489	0
Flt Permitted	0.100			0.228			0.750			0.950		
Satd. Flow (perm)	192	3562	0	437	3605	0	1409	0	1604	1814	1489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			2				64		10	
Link Speed (k/h)		60			60			20			20	
Link Distance (m)		117.6			266.3			150.8			78.0	
Travel Time (s)		7.1			16.0			27.1			14.0	
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Adj. Flow (vph)	14	1057	31	38	1853	21	67	0	45	9	1	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	1088	0	38	1874	0	67	0	45	9	11	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Period
09/27/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	69.0	69.0		11.0	80.0		40.0		40.0	40.0		40.0
Total Split (%)	57.5%	57.5%		9.2%	66.7%		33.3%		33.3%	33.3%		33.3%
Maximum Green (s)	63.0	63.0		7.0	74.0		33.0		33.0	33.0		33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	93.6	93.6		100.6	99.8		11.4		11.4	11.4		11.4
Actuated g/C Ratio	0.78	0.78		0.84	0.83		0.10		0.10	0.10		0.10
v/c Ratio	0.09	0.39		0.09	0.63		0.50		0.21	0.05		0.07
Control Delay	6.8	4.9		1.8	5.5		63.7		8.0	47.8		26.0
Queue Delay	0.0	0.0		0.0	0.1		0.0		0.0	0.0		0.0
Total Delay	6.8	4.9		1.8	5.6		63.7		8.0	47.8		26.0
LOS	A	A		A	A		E		A	D		C
Approach Delay		5.0			5.5			41.3				35.8
Approach LOS		A			A			D				D
Queue Length 50th (m)	0.8	36.0		0.8	28.7		15.3		0.0	2.0		0.2
Queue Length 95th (m)	m1.9	48.1		m1.4	m37.0		28.9		6.6	6.8		5.7
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	149	2779		447	2998		387		487	498		416
Starvation Cap Reductn	0	0		0	252		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.09	0.39		0.09	0.68		0.17		0.09	0.02		0.03

Intersection Summary

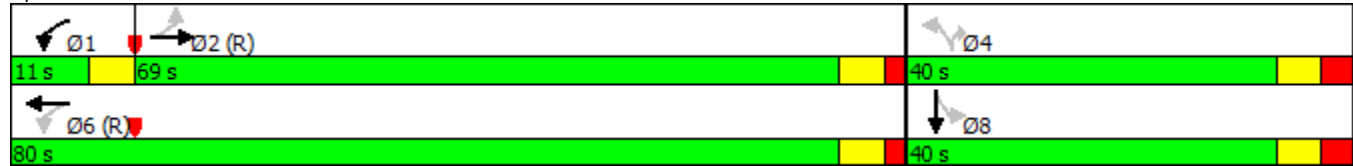
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 85
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 6.8
 Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

PM Peak Period
 09/27/2018

Intersection Capacity Utilization 65.1% ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Period
09/27/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	13	983	29	34	1649	19	62	0	41	8	1	9
Future Volume (vph)	13	983	29	34	1649	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00		0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1822	3561		1824	3606		1785		1604	1814	1489	
Flt Permitted	0.10	1.00		0.23	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	192	3561		438	3606		1410		1604	1814	1489	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1057	31	38	1853	21	67	0	45	9	1	10
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	9	0
Lane Group Flow (vph)	14	1087	0	38	1874	0	67	0	4	9	2	0
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Effective Green, g (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Actuated g/C Ratio	0.75	0.75		0.81	0.81		0.08		0.08	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	143	2652		398	2920		115		130	148	121	
v/s Ratio Prot		0.31		0.00	c0.52						0.00	
v/s Ratio Perm	0.07			0.07			c0.05		0.00	0.00		
v/c Ratio	0.10	0.41		0.10	0.64		0.58		0.03	0.06	0.02	
Uniform Delay, d1	4.2	5.6		2.9	4.5		53.1		50.7	50.9	50.7	
Progression Factor	0.82	0.74		0.59	0.96		1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.4		0.1	0.6		7.3		0.1	0.2	0.0	
Delay (s)	4.7	4.6		1.8	4.9		60.4		50.8	51.0	50.7	
Level of Service	A	A		A	A		E		D	D	D	
Approach Delay (s)		4.6			4.9			56.6			50.9	
Approach LOS		A			A			E			D	

Intersection Summary

HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
09/27/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	760	60	226	1323	63	120	112	146	92	170	259
Future Volume (vph)	212	760	60	226	1323	63	120	112	146	92	170	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor		0.99		0.97	0.99		0.96	0.84		0.83	0.94	
Frt		0.989			0.993			0.915			0.909	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3523	0	1789	3517	0	1789	1416	0	1755	3078	0
Flt Permitted	0.075			0.209			0.325			0.343		
Satd. Flow (perm)	143	3523	0	383	3517	0	586	1416	0	529	3078	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			4			57			268	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Adj. Flow (vph)	238	854	67	243	1423	68	130	122	159	100	185	282
Shared Lane Traffic (%)												
Lane Group Flow (vph)	238	921	0	243	1491	0	130	281	0	100	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)		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	

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
 09/27/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	15.0	49.0		15.0	49.0		12.0	44.0		12.0	44.0	
Total Split (%)	12.5%	40.8%		12.5%	40.8%		10.0%	36.7%		10.0%	36.7%	
Maximum Green (s)	12.0	43.0		12.0	43.0		9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	72.2	53.1		68.4	51.2		37.9	25.1		37.5	24.9	
Actuated g/C Ratio	0.60	0.44		0.57	0.43		0.32	0.21		0.31	0.21	
v/c Ratio	0.77	0.59		0.63	0.99		0.48	0.83		0.40	0.55	
Control Delay	59.1	26.4		20.2	56.9		32.4	54.8		30.4	18.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	59.1	26.4		20.2	56.9		32.4	54.8		30.4	18.8	
LOS	E	C		C	E		C	D		C	B	
Approach Delay		33.1			51.8			47.7			20.9	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	45.2	58.3		24.5	~200.5		21.5	51.5		16.3	21.0	
Queue Length 95th (m)	#89.4	107.7		46.2	#265.3		31.6	75.2		25.2	33.4	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	309	1562		390	1502		276	476		258	1134	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.77	0.59		0.62	0.99		0.47	0.59		0.39	0.41	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.99
 Intersection Signal Delay: 41.2
 Intersection LOS: D

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
 09/27/2018









Intersection Capacity Utilization 100.7% ICU Level of Service G

Analysis Period (min) 15

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

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	49 s	12 s	44 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	49 s	12 s	44 s

HCM Signalized Intersection Capacity Analysis
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
09/27/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	212	760	60	226	1323	63	120	112	146	92	170	259
Future Volume (vph)	212	760	60	226	1323	63	120	112	146	92	170	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.84		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.95	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	3523		1780	3517		1768	1416		1669	3080	
Flt Permitted	0.08	1.00		0.21	1.00		0.33	1.00		0.34	1.00	
Satd. Flow (perm)	143	3523		391	3517		605	1416		602	3080	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	854	67	243	1423	68	130	122	159	100	185	282
RTOR Reduction (vph)	0	4	0	0	2	0	0	45	0	0	212	0
Lane Group Flow (vph)	238	917	0	243	1489	0	130	236	0	100	255	0
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	69.2	53.1		65.4	51.2		33.9	25.1		33.5	24.9	
Effective Green, g (s)	69.2	53.1		65.4	51.2		33.9	25.1		33.5	24.9	
Actuated g/C Ratio	0.58	0.44		0.55	0.43		0.28	0.21		0.28	0.21	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	305	1558		377	1500		256	296		244	639	
v/s Ratio Prot	c0.10	0.26		0.08	c0.42		c0.04	c0.17		0.03	0.08	
v/s Ratio Perm	0.34			0.27			0.11			0.08		
v/c Ratio	0.78	0.59		0.64	0.99		0.51	0.80		0.41	0.40	
Uniform Delay, d1	34.2	25.2		16.4	34.2		33.7	45.0		33.7	41.1	
Progression Factor	1.61	0.91		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.6	1.6		3.8	21.5		1.6	13.8		1.1	0.4	
Delay (s)	66.5	24.5		20.2	55.7		35.3	58.8		34.8	41.5	
Level of Service	E	C		C	E		D	E		C	D	
Approach Delay (s)		33.2			50.7			51.4			40.3	
Approach LOS		C			D			D			D	

Intersection Summary

HCM 2000 Control Delay	44.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	100.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

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Queuing and Blocking Report PM Peak Period
Future Total (2028)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.5	291.3	110.1	118.1
75.5 64.3					
Average Queue (m)		38.5	131.7	71.3	72.1
35.8 28.0					
95th Queue (m)	49.8	286.9	98.8	103.9	63.8
51.4					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)			0		
Queuing Penalty (veh)			0		
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		38	20		
Queuing Penalty (veh)		160	34		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		33.8	31.8	57.5	59.5
217.4 143.3					
Average Queue (m)		7.2	6.9	23.8	27.6
149.5 14.8					
95th Queue (m)	21.8	22.3	48.1	52.1	270.3

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113.0					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)				0	0
Queuing Penalty (veh)				0	0
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement			EB	EB	EB	B22	B22
WB	WB	SB					
Directions Served			L	T	T	T	T
T	TR	LR					
Maximum Queue (m)				9.1	19.4	7.8	6.0
4.2	2.7	10.0	22.3				
Average Queue (m)				3.0	2.6	0.3	0.4
0.1	0.1	0.5	8.1				
95th Queue (m)			9.9	11.8	3.7	5.9	3.2
2.4	5.4	18.6					
Link Distance (m)				14.9	14.9	82.7	82.7
99.4	99.4	91.5					
Upstream Blk Time (%)				0	1	0	
Queuing Penalty (veh)				0	4	0	
Storage Bay Dist (m)				5.0			
Storage Blk Time (%)				7	0		
Queuing Penalty (veh)				38	0		

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Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		15.2	56.1	62.4	13.8
42.7 46.9 30.1	23.4	10.4	14.4		
Average Queue (m)		2.5	19.9	24.1	4.6
16.0 18.3 12.7	5.4	1.9	2.5		
95th Queue (m)	10.1	46.3	50.9	11.7	34.8
37.9 26.9 15.1	7.7	9.8			
Link Distance (m)		99.4	99.4		242.6
242.6	137.1	65.8	65.8		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		45.0			70.0
	30.0				
Storage Blk Time (%)			1		
	1				
Queuing Penalty (veh)			0		
	1				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		74.9	93.2	95.9	32.3
237.7 235.7 41.8	100.4	39.2	60.2	83.9	
Average Queue (m)		34.4	50.1	55.2	27.6
228.1 226.9 20.3	44.9	14.1	23.5	38.6	
95th Queue (m)	61.3	82.4	88.3	39.7	239.1
244.1 35.7 84.4	29.2	44.7	66.2		
Link Distance (m)		242.6	242.6		222.7
222.7	224.7	176.9	176.9		

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Upstream Blk Time (%)				
73	63			
Queuing Penalty (veh)				
0	0			
Storage Bay Dist (m)		165.0		30.0
	105.0	50.0		
Storage Blk Time (%)				12
53	0	0	0	
Queuing Penalty (veh)				80
120	0	0	0	

Intersection: 16:

Movement
 Directions Served
 Maximum Queue (m)
 Average Queue (m)
 95th Queue (m)
 Link Distance (m)
 Upstream Blk Time (%)
 Queuing Penalty (veh)
 Storage Bay Dist (m)
 Storage Blk Time (%)
 Queuing Penalty (veh)

Intersection: 18:

Movement
 Directions Served
 Maximum Queue (m)
 Average Queue (m)
 95th Queue (m)
 Link Distance (m)
 Upstream Blk Time (%)
 Queuing Penalty (veh)
 Storage Bay Dist (m)
 Storage Blk Time (%)
 Queuing Penalty (veh)

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Network Summary

Network wide Queuing Penalty: 439

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Weekend Peak Period
Future Total (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	138	459	652	717	303	69
Future Volume (vph)	138	459	652	717	303	69
Ideal Flow (vphp)	2129	2129	1575	1575	1518	1518
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.99	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.187				0.950	
Satd. Flow (perm)	391	2153	1577	1340	1289	1305
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				406		78
Link Speed (k/h)		50	60		100	
Link Distance (m)		381.9	315.5		681.6	
Travel Time (s)		27.5	18.9		24.5	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.84	0.84	0.93	0.93	0.89	0.89
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Adj. Flow (vph)	164	546	701	771	340	78
Shared Lane Traffic (%)						
Lane Group Flow (vph)	164	546	701	771	340	78
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	0.85	0.85	1.25	1.25	1.49	1.31
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Weekend Peak Period
Future Total (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	12.0	62.0	50.0	33.0	33.0	33.0
Total Split (%)	12.6%	65.3%	52.6%	34.7%	34.7%	34.7%
Maximum Green (s)	9.0	56.0	44.0	26.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.5	-1.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	60.5	57.5	44.0	76.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.80	0.27	0.27
v/c Ratio	0.39	0.42	0.96	0.67	0.96	0.19
Control Delay	15.9	11.1	38.2	4.5	74.2	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	11.1	38.2	4.5	74.2	7.7
LOS	B	B	D	A	E	A
Approach Delay		12.2	20.6		61.8	
Approach LOS		B	C		E	
Queue Length 50th (m)	10.8	48.7	89.6	6.3	61.3	0.0
Queue Length 95th (m)	17.0	63.1	m#178.0	m29.8	#112.0	10.0
Internal Link Dist (m)		357.9	291.5		657.6	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	425	1303	730	1153	355	413
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.42	0.96	0.67	0.96	0.19

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

Weekend Peak Period
Future Total (2028)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	138	459	652	717	303	69
Future Volume (vph)	138	459	652	717	303	69
Ideal Flow (vphpl)	2129	2129	1575	1575	1518	1518
Total Lost time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	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
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)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.19	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	391	2153	1577	1340	1299	1305
Peak-hour factor, PHF	0.84	0.84	0.93	0.93	0.89	0.89
Adj. Flow (vph)	164	546	701	771	340	78
RTOR Reduction (vph)	0	0	0	107	0	57
Lane Group Flow (vph)	164	546	701	664	340	21
Confl. Peds. (#/hr)					5	
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	59.0	56.0	44.0	70.0	26.0	26.0
Effective Green, g (s)	60.5	57.5	44.0	70.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.74	0.27	0.27
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	425	1303	730	1086	355	357
v/s Ratio Prot	0.04	c0.25	c0.44	0.17	c0.26	
v/s Ratio Perm	0.20			0.33		0.02
v/c Ratio	0.39	0.42	0.96	0.61	0.96	0.06
Uniform Delay, d1	24.4	9.9	24.7	6.0	34.0	25.5
Progression Factor	1.00	1.00	0.67	1.36	1.00	1.00
Incremental Delay, d2	0.6	1.0	19.1	1.7	38.2	0.3
Delay (s)	25.0	10.9	35.8	9.9	72.2	25.8
Level of Service	C	B	D	A	E	C
Approach Delay (s)		14.2	22.2		63.5	
Approach LOS		B	C		E	
Intersection Summary						
HCM 2000 Control Delay			26.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.89			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	14.5
Intersection Capacity Utilization			83.4%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Weekend Peak Period
Future Total (2028)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	498	263	0	1117	252	711
Future Volume (vph)	498	263	0	1117	252	711
Ideal Flow (vphpl)	1450	1450	1670	1670	1450	1450
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97			1.00	
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2434	1122	0	2859	1254	1122
Flt Permitted					0.950	
Satd. Flow (perm)	2434	1091	0	2859	1252	1122
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		286				554
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	672.6	
Travel Time (s)	18.9			6.7	40.4	
Confl. Peds. (#/hr)		6	6		1	
Peak Hour Factor	0.92	0.92	0.96	0.96	0.76	0.76
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Adj. Flow (vph)	541	286	0	1164	332	936
Shared Lane Traffic (%)						
Lane Group Flow (vph)	541	286	0	1164	332	936
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	1.57	1.57	1.33	1.33	1.57	1.57
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Weekend Peak Period
Future Total (2028)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.2	
Total Lost Time (s)	6.0	6.0		6.0	4.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	59.0	59.0		59.0	25.2	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
v/c Ratio	0.36	0.36		0.66	1.00	0.83
Control Delay	5.9	1.2		13.7	86.5	8.1
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	5.9	1.2		13.7	86.5	8.1
LOS	A	A		B	F	A
Approach Delay	4.3			13.7	28.6	
Approach LOS	A			B	C	
Queue Length 50th (m)	14.1	0.1		65.5	60.8	0.0
Queue Length 95th (m)	m18.3	m0.1		86.2	#87.1	0.0
Internal Link Dist (m)	291.5			87.4	648.6	
Turn Bay Length (m)						
Base Capacity (vph)	1511	785		1775	332	1122
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.36	0.36		0.66	1.00	0.83

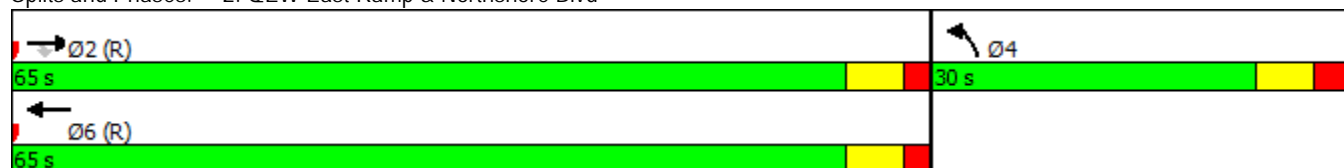
Intersection Summary

Area Type: CBD
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 17.1
 Intersection Capacity Utilization 68.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C
 # 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

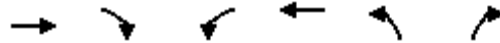
Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Weekend Peak Period
Future Total (2028)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	498	263	0	1117	252	711
Future Volume (vph)	498	263	0	1117	252	711
Ideal Flow (vphp)	1450	1450	1670	1670	1450	1450
Total Lost time (s)	6.0	6.0		6.0	4.8	1.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2434	1091		2859	1254	1122
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2434	1091		2859	1254	1122
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.76	0.76
Adj. Flow (vph)	541	286	0	1164	332	936
RTOR Reduction (vph)	0	108	0	0	0	0
Lane Group Flow (vph)	541	178	0	1164	332	936
Confl. Peds. (#/hr)		6	6		1	
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	59.0	59.0		59.0	23.0	95.0
Effective Green, g (s)	59.0	59.0		59.0	25.2	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1511	677		1775	332	1122
v/s Ratio Prot	0.22			0.41	c0.26	
v/s Ratio Perm		0.16				c0.83
v/c Ratio	0.36	0.26		0.66	1.00	0.83
Uniform Delay, d1	8.8	8.1		11.5	34.9	0.0
Progression Factor	0.61	0.15		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.7		1.9	49.4	7.3
Delay (s)	5.8	2.0		13.4	84.3	7.3
Level of Service	A	A		B	F	A
Approach Delay (s)	4.5			13.4	27.5	
Approach LOS	A			B	C	

Intersection Summary

HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

Weekend Peak Period
Future Total (2028)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	1182	1267	20	18	27
Future Volume (vph)	28	1182	1267	20	18	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.920	
Flt Protected	0.950				0.980	
Satd. Flow (prot)	1825	3614	3607	0	1732	0
Flt Permitted	0.950				0.980	
Satd. Flow (perm)	1825	3614	3607	0	1732	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	23			23		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	31	1328	1362	22	20	29
Shared Lane Traffic (%)						
Lane Group Flow (vph)	31	1328	1384	0	49	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.7%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Weekend Peak Period
Future Total (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	1121	52	37	1196	19	75	0	51	32	0	16
Future Volume (vph)	27	1121	52	37	1196	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00		1.00		0.98	0.99	0.99	
Frt		0.993			0.998				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3581	0	1825	3605	0	1772	0	1601	1825	1609	0
Flt Permitted	0.195			0.166			0.746			0.950		
Satd. Flow (perm)	373	3581	0	319	3605	0	1388	0	1572	1814	1609	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			2				85			85
Link Speed (k/h)		60			60			20				20
Link Distance (m)		117.6			266.3			150.8				78.0
Travel Time (s)		7.1			16.0			27.1				14.0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Adj. Flow (vph)	29	1205	56	42	1344	21	82	0	55	35	0	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1261	0	42	1365	0	82	0	55	35	17	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Weekend Peak Period
Future Total (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	38.0	38.0		13.0	38.0		39.0		39.0	39.0		39.0
Total Split (%)	42.2%	42.2%		14.4%	42.2%		43.3%		43.3%	43.3%		43.3%
Maximum Green (s)	32.0	32.0		9.0	32.0		32.0		32.0	32.0		32.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	63.9	63.9		70.9	70.1		11.1		11.1	11.1		11.1
Actuated g/C Ratio	0.71	0.71		0.79	0.78		0.12		0.12	0.12		0.12
v/c Ratio	0.11	0.50		0.12	0.49		0.48		0.21	0.16		0.06
Control Delay	9.5	9.5		4.1	5.7		45.5		5.1	35.4		0.4
Queue Delay	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	9.5	9.5		4.1	5.7		45.5		5.1	35.4		0.4
LOS	A	A		A	A		D		A	D		A
Approach Delay		9.5			5.7			29.3				24.0
Approach LOS		A			A			C				C
Queue Length 50th (m)	1.9	59.6		1.4	43.2		13.5		0.0	5.5		0.0
Queue Length 95th (m)	6.8	91.5		4.4	68.2		25.8		5.0	13.2		0.0
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	265	2543		401	2809		493		613	644		626
Starvation Cap Reductn	0	0		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.11	0.50		0.10	0.49		0.17		0.09	0.05		0.03

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	85
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.50
Intersection Signal Delay:	8.8
Intersection LOS:	A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

Weekend Peak Period
 Future Total (2028)

Intersection Capacity Utilization 66.5% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

Weekend Peak Period
Future Total (2028)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↕↗		↰	↕↗		↰		↗	↰	↕↗	
Traffic Volume (vph)	27	1121	52	37	1196	19	75	0	51	32	0	16
Future Volume (vph)	27	1121	52	37	1196	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1818	3582		1824	3604		1767		1572	1814	1609	
Flt Permitted	0.19	1.00		0.17	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	373	3582		319	3604		1388		1572	1814	1609	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	1205	56	42	1344	21	82	0	55	35	0	17
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	49	0	15	0
Lane Group Flow (vph)	29	1259	0	42	1365	0	82	0	6	35	2	0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Effective Green, g (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Actuated g/C Ratio	0.66	0.66		0.75	0.75		0.11		0.11	0.11	0.11	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	247	2376		302	2703		146		165	191	169	
v/s Ratio Prot		c0.35		0.01	c0.38							0.00
v/s Ratio Perm	0.08			0.10			c0.06		0.00	0.02		
v/c Ratio	0.12	0.53		0.14	0.50		0.56		0.04	0.18	0.01	
Uniform Delay, d1	5.5	7.9		4.4	4.5		38.3		36.1	36.7	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.9		0.2	0.7		4.9		0.1	0.5	0.0	
Delay (s)	6.5	8.7		4.6	5.2		43.1		36.2	37.2	36.1	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		8.7			5.2			40.4			36.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Weekend Peak Period
Future Total (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	831	179	315	773	47	200	134	182	100	270	279
Future Volume (vph)	198	831	179	315	773	47	200	134	182	100	270	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	0.99		1.00	1.00		0.99	0.93		0.95	0.99	
Frt		0.973			0.991			0.914			0.924	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3491	0	1807	3556	0	1807	1621	0	1755	3330	0
Flt Permitted	0.232			0.089			0.241			0.266		
Satd. Flow (perm)	436	3491	0	169	3556	0	456	1621	0	465	3330	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			6			65			251	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			231.3			236.6			191.7	
Travel Time (s)		16.0			13.9			17.0			13.8	
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Adj. Flow (vph)	222	934	201	339	831	51	217	146	198	109	293	303
Shared Lane Traffic (%)												
Lane Group Flow (vph)	222	1135	0	339	882	0	217	344	0	109	596	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Weekend Peak Period
Future Total (2028)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	56.5	42.0		61.5	46.4		36.1	25.1		36.1	25.1	
Actuated g/C Ratio	0.51	0.38		0.56	0.42		0.33	0.23		0.33	0.23	
v/c Ratio	0.58	0.84		0.98	0.59		0.92	0.82		0.47	0.62	
Control Delay	19.2	37.1		77.3	28.4		71.2	47.6		29.2	23.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.2	37.1		77.3	28.4		71.2	47.6		29.2	23.6	
LOS	B	D		E	C		E	D		C	C	
Approach Delay		34.2			42.0			56.8			24.5	
Approach LOS		C			D			E			C	
Queue Length 50th (m)	20.9	112.7		55.6	75.3		33.8	58.0		15.9	34.8	
Queue Length 95th (m)	40.4	138.1		#156.4	114.3		#56.6	81.3		24.3	46.5	
Internal Link Dist (m)		242.3			207.3			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	423	1349		346	1502		235	560		234	1230	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.52	0.84		0.98	0.59		0.92	0.61		0.47	0.48	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 25 (23%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 38.2
 Intersection LOS: D

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd









Weekend Peak Period
 Future Total (2028)

Intersection Capacity Utilization 96.0% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
10 s	48 s	10 s	42 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
18 s	40 s	10 s	42 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Weekend Peak Period
Future Total (2028)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↕		↰	↕		↰	↕		↰	↕	
Traffic Volume (vph)	198	831	179	315	773	47	200	134	182	100	270	279
Future Volume (vph)	198	831	179	315	773	47	200	134	182	100	270	279
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.93		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.91		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1801	3493		1807	3557		1805	1620		1734	3329	
Flt Permitted	0.23	1.00		0.09	1.00		0.24	1.00		0.27	1.00	
Satd. Flow (perm)	441	3493		169	3557		458	1620		485	3329	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	934	201	339	831	51	217	146	198	109	293	303
RTOR Reduction (vph)	0	17	0	0	3	0	0	50	0	0	194	0
Lane Group Flow (vph)	222	1118	0	339	879	0	217	294	0	109	402	0
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.5	42.0		61.9	46.4		32.1	25.1		32.1	25.1	
Effective Green, g (s)	54.5	42.0		61.9	46.4		32.1	25.1		32.1	25.1	
Actuated g/C Ratio	0.50	0.38		0.56	0.42		0.29	0.23		0.29	0.23	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	373	1333		346	1500		219	369		221	759	
v/s Ratio Prot	0.07	0.32		c0.15	0.25		c0.06	0.18		0.03	0.12	
v/s Ratio Perm	0.23			c0.40			c0.23			0.11		
v/c Ratio	0.60	0.84		0.98	0.59		0.99	0.80		0.49	0.53	
Uniform Delay, d1	16.9	30.9		33.4	24.4		36.4	40.0		30.3	37.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	6.5		42.4	1.7		58.0	11.3		1.7	0.7	
Delay (s)	19.5	37.4		75.8	26.1		94.5	51.3		32.0	38.0	
Level of Service	B	D		E	C		F	D		C	D	
Approach Delay (s)		34.5			39.9			68.0			37.1	
Approach LOS		C			D			E			D	

Intersection Summary

HCM 2000 Control Delay	41.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2028 SAT_FT_sim_2.txt

Queuing and Blocking Report Weekend Peak Period
Future Total (2028)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.2	95.6	134.4	83.0
87.0	21.2				
Average Queue (m)		26.2	43.1	60.6	31.9
48.1	7.9				
95th Queue (m)	45.1	79.5	110.6	67.1	78.6
17.1					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		3	7		
Queuing Penalty (veh)		13	9		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B22
B22					
NB					
Directions Served	T	T	T	T	T
T					
L					
R					
Maximum Queue (m)		25.6	27.6	92.8	89.2
7.9	3.0	72.0	46.7		
Average Queue (m)		9.4	8.9	34.3	34.5
0.3	0.1	42.0	14.5		
95th Queue (m)	21.0	22.0	72.0	72.9	4.0

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2.0	66.7	36.5					
Link Distance (m)			304.9	304.9	82.9	82.9	14.9
14.9	659.2	659.2					
Upstream Blk Time (%)						0	0
0							
Queuing Penalty (veh)						3	2
0							
Storage Bay Dist (m)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B22	WB	SB
Directions Served	L	T	T	TR	LR
Maximum Queue (m)		9.2	22.6	16.3	1.9
30.1					
Average Queue (m)		4.5	3.1	0.6	0.1
9.0					
95th Queue (m)	11.7	13.7	10.1	1.5	21.2
Link Distance (m)		14.9	82.9	99.4	91.5
Upstream Blk Time (%)		0	1		
Queuing Penalty (veh)		0	5		
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		7	0		
Queuing Penalty (veh)		43	0		

Intersection: 4: JBH Access & Northshore Blvd

Movement			EB	EB	EB	WB	WB
WB	NB	NB	SB	SB			

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Directions Served			L	T	TR	L	T
TR	L	R	L	TR			
Maximum Queue (m)				14.4	67.4	74.0	16.3
65.7	65.1	28.0	23.1	23.2	12.2		
Average Queue (m)				3.6	27.3	33.9	4.3
26.8	29.9	12.8	6.4	7.7	3.0		
95th Queue (m)				10.8	55.9	61.7	11.9
56.6	25.1	15.7	18.1	10.0			
Link Distance (m)				99.4	99.4		242.6
242.6		137.1	65.8	65.8			
Upstream Blk Time (%)							

Queuing Penalty (veh)

Storage Bay Dist (m)				45.0			70.0
		30.0					
Storage Blk Time (%)					2		
0	0	0	0				
Queuing Penalty (veh)					0		
0	0	0	0				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement			EB	EB	EB	WB	WB
WB	NB	NB	SB	SB	SB		
Directions Served			L	T	TR	L	T
TR	L	TR	L	T	TR		
Maximum Queue (m)				65.6	109.9	121.7	32.4
235.4	234.2	96.0	123.2	50.9	63.0	91.2	
Average Queue (m)				29.5	64.6	71.8	32.3
223.4	213.0	40.0	53.9	16.5	34.0	44.3	
95th Queue (m)				53.5	101.5	110.4	255.2
268.5	77.7	100.0	35.1	55.7	74.9		
Link Distance (m)				242.6	242.6		222.7
222.7		224.7		176.9	176.9		
Upstream Blk Time (%)							
86	22						
Queuing Penalty (veh)							
0	0						

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Storage Bay Dist (m)			165.0		30.0
	105.0		50.0		
Storage Blk Time (%)					81
17	0	1	0	1	
Queuing Penalty (veh)					314
54	1	2	0	1	

Network Summary

Network wide Queuing Penalty: 447

SimTraffic Report 09/04/2018

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	172	472	602	509	381	85
Future Volume (vph)	172	472	602	509	381	85
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			0.97		
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1483	1561	1435	1220	1546	1397
Flt Permitted	0.124				0.950	
Satd. Flow (perm)	193	1561	1435	1186	1546	1397
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				293		91
Link Speed (k/h)		50	60		100	
Link Distance (m)		165.3	312.3		178.0	
Travel Time (s)		11.9	18.7		6.4	
Confl. Peds. (#/hr)	4			4		
Peak Hour Factor	0.95	0.95	0.89	0.89	0.93	0.93
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Adj. Flow (vph)	181	497	676	572	410	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	181	497	676	572	410	91
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	1.25	1.25	1.37	1.37	1.16	1.16
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

AM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	46.0	35.0	27.0	27.0	27.0
Total Split (%)	15.1%	63.0%	47.9%	37.0%	37.0%	37.0%
Maximum Green (s)	8.0	40.0	29.0	20.0	20.0	20.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-1.4	-1.4
Total Lost Time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	43.5	40.5	29.2	48.2	21.4	21.4
Actuated g/C Ratio	0.60	0.55	0.40	0.66	0.29	0.29
v/c Ratio	0.69	0.57	1.18	0.64	0.91	0.19
Control Delay	26.1	13.9	122.4	5.7	51.7	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	13.9	122.4	5.7	51.7	6.0
LOS	C	B	F	A	D	A
Approach Delay		17.2	68.9		43.4	
Approach LOS		B	E		D	
Queue Length 50th (m)	10.3	40.9	~114.0	9.2	53.8	0.0
Queue Length 95th (m)	#35.4	67.4	#170.3	21.0	#103.0	9.3
Internal Link Dist (m)		141.3	288.3		154.0	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	265	866	573	891	453	473
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.57	1.18	0.64	0.91	0.19

Intersection Summary

Area Type:	Other
Cycle Length:	73
Actuated Cycle Length:	73
Offset:	22 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.18
Intersection Signal Delay:	49.2
Intersection LOS:	D

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

AM Peak Period
 Future Total (2033)

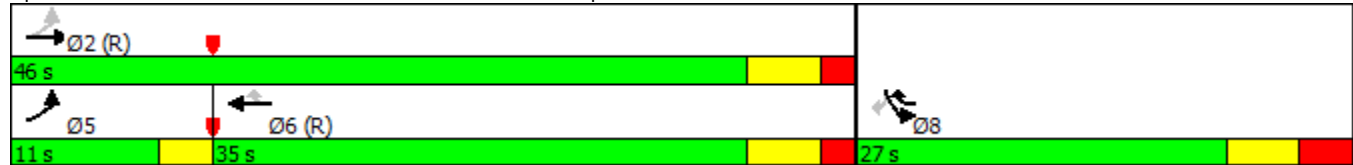
Intersection Capacity Utilization 89.6% ICU Level of Service E

Analysis Period (min) 15

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

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

AM Peak Period
 Future Total (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	172	472	602	509	381	85
Future Volume (vph)	172	472	602	509	381	85
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Total Lost time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	1483	1561	1435	1200	1546	1397
Flt Permitted	0.12	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	194	1561	1435	1200	1546	1397
Peak-hour factor, PHF	0.95	0.95	0.89	0.89	0.93	0.93
Adj. Flow (vph)	181	497	676	572	410	91
RTOR Reduction (vph)	0	0	0	96	0	64
Lane Group Flow (vph)	181	497	676	476	410	27
Confl. Peds. (#/hr)	4			4		
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	40.0	40.0	29.2	49.2	20.0	20.0
Effective Green, g (s)	40.5	40.5	29.2	49.2	21.4	21.4
Actuated g/C Ratio	0.55	0.55	0.40	0.67	0.29	0.29
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	254	866	574	808	453	409
v/s Ratio Prot	c0.08	0.32	c0.47	0.16	c0.27	
v/s Ratio Perm	0.31			0.24		0.02
v/c Ratio	0.71	0.57	1.18	0.59	0.91	0.07
Uniform Delay, d1	13.1	10.6	21.9	6.4	24.8	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	2.8	97.1	3.1	24.2	0.3
Delay (s)	22.2	13.4	119.0	9.6	49.0	18.9
Level of Service	C	B	F	A	D	B
Approach Delay (s)		15.7	68.8		43.5	
Approach LOS		B	E		D	

Intersection Summary			
HCM 2000 Control Delay	48.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	700	153	0	832	280	1105
Future Volume (vph)	700	153	0	832	280	1105
Ideal Flow (vphpl)	1440	1440	1246	1246	1266	1266
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.97				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2660	1202	0	2302	1192	1046
Flt Permitted					0.950	
Satd. Flow (perm)	2660	1165	0	2302	1192	1046
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		165				449
Link Speed (k/h)	60			60	48	
Link Distance (m)	312.3			111.4	163.6	
Travel Time (s)	18.7			6.7	12.3	
Confl. Peds. (#/hr)		8	8			
Peak Hour Factor	0.93	0.93	0.89	0.89	0.91	0.91
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Adj. Flow (vph)	753	165	0	935	308	1214
Shared Lane Traffic (%)						
Lane Group Flow (vph)	753	165	0	935	308	1214
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	1.40	1.40	1.66	1.66	1.63	1.63
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.6	
Total Lost Time (s)	6.0	6.0		6.0	4.4	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	59.0	59.0		59.0	25.6	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
v/c Ratio	0.46	0.21		0.65	0.96	1.16
Control Delay	10.6	1.9		14.2	77.3	91.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	10.6	1.9		14.2	77.3	91.2
LOS	B	A		B	E	F
Approach Delay	9.0			14.2	88.4	
Approach LOS	A			B	F	
Queue Length 50th (m)	35.1	0.0		52.5	55.6	-64.6
Queue Length 95th (m)	47.5	7.0		71.3	#106.3	#139.9
Internal Link Dist (m)	288.3			87.4	139.6	
Turn Bay Length (m)						
Base Capacity (vph)	1652	786		1429	321	1046
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.46	0.21		0.65	0.96	1.16

Intersection Summary

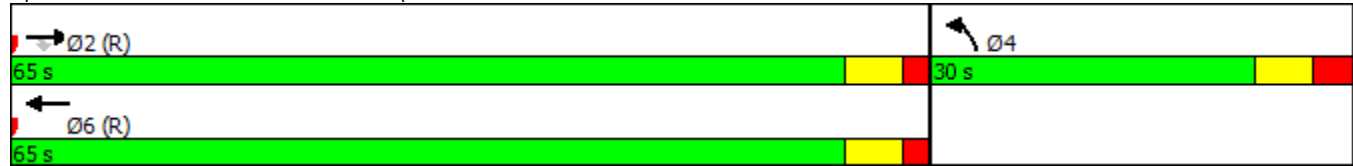
Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.16
 Intersection Signal Delay: 46.3
 Intersection LOS: D
 Intersection Capacity Utilization 67.0%
 ICU Level of Service C
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

AM Peak Period
 Future Total (2033)

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

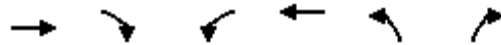
Splits and Phases: 2: QEW East Ramp & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2033)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	700	153	0	832	280	1105
Future Volume (vph)	700	153	0	832	280	1105
Ideal Flow (vphp)	1440	1440	1246	1246	1266	1266
Total Lost time (s)	6.0	6.0		6.0	4.4	1.4
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2660	1165		2302	1192	1046
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2660	1165		2302	1192	1046
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.91	0.91
Adj. Flow (vph)	753	165	0	935	308	1214
RTOR Reduction (vph)	0	63	0	0	0	0
Lane Group Flow (vph)	753	102	0	935	308	1214
Confl. Peds. (#/hr)		8	8			
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	59.0	59.0		59.0	23.0	95.0
Effective Green, g (s)	59.0	59.0		59.0	25.6	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1652	723		1429	321	1046
v/s Ratio Prot	0.28			0.41	0.26	
v/s Ratio Perm		0.09				c1.16
v/c Ratio	0.46	0.14		0.65	0.96	1.16
Uniform Delay, d1	9.5	7.5		11.5	34.2	47.5
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	0.4		2.3	39.0	83.1
Delay (s)	10.4	7.9		13.8	73.1	130.6
Level of Service	B	A		B	E	F
Approach Delay (s)	10.0			13.8	119.0	
Approach LOS	A			B	F	

Intersection Summary

HCM 2000 Control Delay	60.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

AM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	83	1635	858	36	28	24
Future Volume (vph)	83	1635	858	36	28	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.994		0.937	
Flt Protected	0.950				0.974	
Satd. Flow (prot)	1825	3544	3462	0	1753	0
Flt Permitted	0.950				0.974	
Satd. Flow (perm)	1825	3544	3462	0	1753	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	111.5		90.6	
Travel Time (s)		6.7	6.7		16.3	
Confl. Peds. (#/hr)	9			9		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	3%	5%	0%	0%	0%
Adj. Flow (vph)	93	1837	923	39	30	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	1837	962	0	56	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.2%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1506	146	62	845	11	37	0	41	14	0	12
Future Volume (vph)	11	1506	146	62	845	11	37	0	41	14	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			1.00		1.00		0.97	0.98	0.98	
Frt		0.987			0.998				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3492	0	1772	3465	0	1644	0	1400	1706	1606	0
Flt Permitted	0.298			0.082			0.749			0.950		
Satd. Flow (perm)	566	3492	0	153	3465	0	1291	0	1354	1670	1606	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			2				69			116
Link Speed (k/h)		60			60			20				20
Link Distance (m)		111.5			270.1			136.0				79.6
Travel Time (s)		6.7			16.2			24.5				14.3
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Adj. Flow (vph)	12	1619	157	70	949	12	40	0	45	15	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	1776	0	70	961	0	40	0	45	15	13	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	1.13	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0							0.0
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm		NA
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	59.0	59.0		11.0	70.0		40.0		40.0	40.0		40.0
Total Split (%)	53.6%	53.6%		10.0%	63.6%		36.4%		36.4%	36.4%		36.4%
Maximum Green (s)	53.0	53.0		7.0	64.0		33.0		33.0	33.0		33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	82.9	82.9		92.4	91.6		9.6		9.6	9.6		9.6
Actuated g/C Ratio	0.75	0.75		0.84	0.83		0.09		0.09	0.09		0.09
v/c Ratio	0.03	0.67		0.31	0.33		0.36		0.25	0.10		0.05
Control Delay	6.3	11.1		15.1	2.3		55.6		8.1	46.6		0.4
Queue Delay	0.0	0.4		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	6.3	11.4		15.1	2.3		55.6		8.1	46.6		0.4
LOS	A	B		B	A		E		A	D		A
Approach Delay		11.4			3.1			30.5				25.2
Approach LOS		B			A			C				C
Queue Length 50th (m)	0.7	104.0		2.7	9.4		8.3		0.0	3.0		0.0
Queue Length 95th (m)	3.0	158.0		m13.8	24.8		18.7		5.5	9.1		0.0
Internal Link Dist (m)		87.5			246.1			112.0				55.6
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	426	2635		236	2886		387		454	501		563
Starvation Cap Reductn	0	330		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.03	0.77		0.30	0.33		0.10		0.10	0.03		0.02

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 5 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67

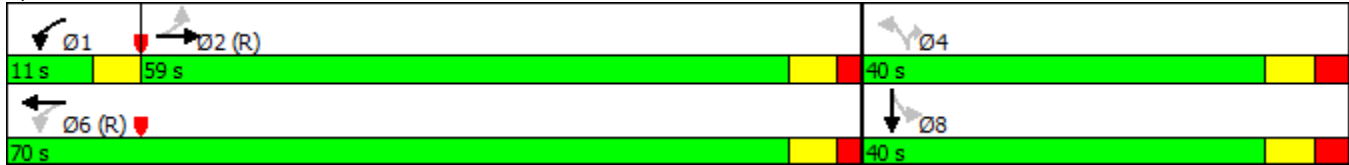
Lanes, Volumes, Timings
 4: Northshore Blvd & JBH Access

AM Peak Period
 Future Total (2033)

Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 85.0%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 4: Northshore Blvd & JBH Access



HCM Signalized Intersection Capacity Analysis

4: Northshore Blvd & JBH Access

AM Peak Period
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	1506	146	62	845	11	37	0	41	14	0	12
Future Volume (vph)	11	1506	146	62	845	11	37	0	41	14	0	12
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.97	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00		1.00	0.98	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1805	3491		1772	3465		1637		1354	1670	1606	
Flt Permitted	0.30	1.00		0.08	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	566	3491		154	3465		1291		1354	1670	1606	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1619	157	70	949	12	40	0	45	15	0	13
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	42	0	12	0
Lane Group Flow (vph)	12	1772	0	70	961	0	40	0	3	15	1	0
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Effective Green, g (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Actuated g/C Ratio	0.72	0.72		0.81	0.81		0.07		0.07	0.07	0.07	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	409	2523		205	2803		93		98	121	116	
v/s Ratio Prot		c0.51		0.02	c0.28							0.00
v/s Ratio Perm	0.02			0.26			c0.03		0.00	0.01		
v/c Ratio	0.03	0.70		0.34	0.34		0.43		0.03	0.12	0.01	
Uniform Delay, d1	4.3	8.6		8.2	2.8		48.8		47.4	47.7	47.3	
Progression Factor	1.00	1.00		5.41	0.66		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.7		0.9	0.3		3.2		0.1	0.5	0.0	
Delay (s)	4.5	10.3		45.2	2.1		52.0		47.5	48.2	47.3	
Level of Service	A	B		D	A		D		D	D	D	
Approach Delay (s)		10.2			5.1			49.6			47.8	
Approach LOS		B			A			D			D	

Intersection Summary

HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	1218	115	137	725	34	36	124	246	48	97	157
Future Volume (vph)	228	1218	115	137	725	34	36	124	246	48	97	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	1.00		0.99	0.97		0.98	0.98	
Frt		0.987			0.993			0.900			0.907	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	3382	0	1738	3462	0	1547	1617	0	1690	3170	0
Flt Permitted	0.322			0.121			0.582			0.196		
Satd. Flow (perm)	597	3382	0	221	3462	0	937	1617	0	343	3170	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			4			95			171	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		270.1			172.4			278.5			293.6	
Travel Time (s)		16.2			10.3			20.1			21.1	
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Adj. Flow (vph)	256	1369	129	147	780	37	39	135	267	52	105	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	256	1498	0	147	817	0	39	402	0	52	276	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	52.3	49.3		47.1	44.1		36.4	26.9		37.1	28.9	
Actuated g/C Ratio	0.48	0.45		0.43	0.40		0.33	0.24		0.34	0.26	
v/c Ratio	0.58	0.98		0.64	0.59		0.11	0.86		0.26	0.29	
Control Delay	24.2	41.8		38.7	29.9		20.5	47.8		23.3	12.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.2	41.8		38.7	29.9		20.5	47.8		23.3	12.1	
LOS	C	D		D	C		C	D		C	B	
Approach Delay		39.2			31.3			45.4			13.9	
Approach LOS		D			C			D			B	
Queue Length 50th (m)	35.5	~193.9		20.2	74.0		5.3	64.3		7.1	9.2	
Queue Length 95th (m)	40.5	#238.7		#53.5	105.4		10.9	93.2		13.4	17.9	
Internal Link Dist (m)		246.1			148.4			254.5			269.6	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	444	1522		229	1391		349	579		201	1125	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.58	0.98		0.64	0.59		0.11	0.69		0.26	0.25	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	26 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.98
Intersection Signal Delay:	35.4
Intersection LOS:	D

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
 Future Total (2033)

Intersection Capacity Utilization 93.5% ICU Level of Service F

Analysis Period (min) 15

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

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Ø1 Ø2 (R)	Ø3 Ø4
10 s 48 s	10 s 42 s
Ø6 (R) Ø5	Ø7 Ø8
40 s 18 s	10 s 42 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	1218	115	137	725	34	36	124	246	48	97	157
Future Volume (vph)	228	1218	115	137	725	34	36	124	246	48	97	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	3383		1738	3463		1537	1618		1686	3170	
Flt Permitted	0.32	1.00		0.12	1.00		0.58	1.00		0.20	1.00	
Satd. Flow (perm)	600	3383		221	3463		942	1618		348	3170	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	256	1369	129	147	780	37	39	135	267	52	105	171
RTOR Reduction (vph)	0	6	0	0	2	0	0	71	0	0	126	0
Lane Group Flow (vph)	256	1492	0	147	815	0	39	331	0	52	150	0
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	51.1	48.1		42.9	42.9		31.7	27.5		34.5	28.9	
Effective Green, g (s)	51.1	48.1		42.9	42.9		31.7	27.5		34.5	28.9	
Actuated g/C Ratio	0.46	0.44		0.39	0.39		0.29	0.25		0.31	0.26	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	438	1479		221	1350		294	404		177	832	
v/s Ratio Prot	0.08	c0.44		c0.06	0.24		0.01	c0.20		c0.01	0.05	
v/s Ratio Perm	0.19			0.20			0.03			0.08		
v/c Ratio	0.58	1.01		0.67	0.60		0.13	0.82		0.29	0.18	
Uniform Delay, d1	26.6	30.9		26.5	26.8		28.6	38.9		28.3	31.4	
Progression Factor	0.67	0.70		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	22.9		7.3	2.0		0.2	12.2		0.9	0.1	
Delay (s)	19.5	44.6		33.9	28.8		28.8	51.1		29.2	31.5	
Level of Service	B	D		C	C		C	D		C	C	
Approach Delay (s)		40.9			29.5			49.1			31.1	
Approach LOS		D			C			D			C	

Intersection Summary

HCM 2000 Control Delay	37.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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Queuing and Blocking Report AM Peak Period
Future Total (2033)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	78.4	163.8	102.8
106.2 22.9					
Average Queue (m)		26.3	38.4	86.9	26.8
57.9 8.9					
95th Queue (m)	44.2	64.2	151.5	62.2	98.4
18.3					
Link Distance (m)		372.2	304.9	304.9	672.0
672.0					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		1	5		
Queuing Penalty (veh)		5	8		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		48.9	47.4	68.0	69.8
359.3 415.8					
Average Queue (m)		24.1	23.6	30.5	29.6
142.7 142.0					
95th Queue (m)	41.7	42.6	62.1	61.2	448.9

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500.7					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)				0	0
6	7				
Queuing Penalty (veh)				0	0
0	0				
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement			EB	EB	EB	B22	B22
B22	WB	SB					
Directions Served			L	T	T	T	T
	TR	LR					
Maximum Queue (m)				9.2	34.4	35.1	82.3
93.7	99.5	8.8	53.8				
Average Queue (m)				6.9	15.8	12.7	22.2
30.4	21.4	0.3	22.6				
95th Queue (m)			13.0	36.5	36.3	75.5	93.4
87.1	3.6	63.3					
Link Distance (m)				14.9	14.9	82.7	82.7
82.7	99.8	91.5					
Upstream Blk Time (%)				0	10	10	0
3	4		5				
Queuing Penalty (veh)				0	93	93	2
16	24		0				
Storage Bay Dist (m)				5.0			
Storage Blk Time (%)				10	7		
Queuing Penalty (veh)				82	6		

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Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		29.9	107.2	108.6	35.9
51.6 59.4 29.1	24.8	17.8	12.0		
Average Queue (m)		2.8	75.4	79.7	12.3
21.8 23.4 9.1	7.1	4.0	2.9		
95th Queue (m)	15.2	124.8	126.1	25.9	45.3
49.0 22.5 18.7	12.9	9.9			
Link Distance (m)		99.8	99.8		245.5
245.5 132.6	62.4	62.4			
Upstream Blk Time (%)			7	9	
Queuing Penalty (veh)			58	74	
Storage Bay Dist (m)		45.0			70.0
30.0					
Storage Blk Time (%)		0	24		
1	0				
Queuing Penalty (veh)		0	3		
0	0				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		152.4	211.8	215.8	32.4
173.5 160.3 65.4	123.2	23.2	32.1	47.2	
Average Queue (m)		77.9	150.9	157.3	29.4
103.1 89.7 8.4	60.5	7.8	12.3	18.8	
95th Queue (m)	182.1	279.4	281.4	38.8	189.5
174.6 32.7 106.5	17.8	26.1	35.9		
Link Distance (m)		245.5	245.5		222.7
222.7 221.1		176.9	176.9		

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Upstream Blk Time (%)			3	4	
2	0				
Queuing Penalty (veh)			25	31	
0	0				
Storage Bay Dist (m)			165.0		30.0
	105.0		50.0		
Storage Blk Time (%)			0	11	40
20	0	2			
Queuing Penalty (veh)			1	25	146
28	0	1			

Network Summary

Network wide Queuing Penalty: 722

SimTraffic Report 09/07/2018

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	190	449	971	1283	220	250
Future Volume (vph)	190	449	971	1283	220	250
Ideal Flow (vphpl)	1850	1850	1805	1805	1440	1440
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.095				0.950	
Satd. Flow (perm)	176	1852	1807	1536	1370	1225
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				218		183
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Peak Hour Factor	0.98	0.98	0.94	0.94	0.80	0.80
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	194	458	1033	1365	275	313
Shared Lane Traffic (%)						
Lane Group Flow (vph)	194	458	1033	1365	275	313
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	1.02	1.02	1.05	1.05	1.40	1.40
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

PM Peak Period
 Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	11.0	92.0	81.0	28.0	28.0	28.0
Total Split (%)	9.2%	76.7%	67.5%	23.3%	23.3%	23.3%
Maximum Green (s)	8.0	86.0	75.0	21.0	21.0	21.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.8	-2.8	0.0	0.0	-3.2	-3.2
Total Lost Time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effct Green (s)	91.8	88.8	75.0	102.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.85	0.20	0.20
v/c Ratio	0.70	0.33	0.91	1.02	1.00	0.80
Control Delay	40.8	6.2	20.8	31.9	101.7	34.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	6.2	20.8	31.9	101.7	34.7
LOS	D	A	C	C	F	C
Approach Delay		16.5	27.2		66.0	
Approach LOS		B	C		E	
Queue Length 50th (m)	14.6	32.4	132.3	-208.0	65.2	30.0
Queue Length 95th (m)	#42.7	45.7 m#243.4 m#383.5			#98.4	50.2
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	277	1370	1129	1338	276	393
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.33	0.91	1.02	1.00	0.80

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	2 (2%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle:	130
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.02
Intersection Signal Delay:	31.5
Intersection LOS:	C
Intersection Capacity Utilization	103.6%
ICU Level of Service	G
Analysis Period (min)	15

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

PM Peak Period
 Future Total (2033)

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	190	449	971	1283	220	250
Future Volume (vph)	190	449	971	1283	220	250
Ideal Flow (vphp)	1850	1850	1805	1805	1440	1440
Total Lost time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lane Util. Factor	1.00	1.00	1.00	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)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.10	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	176	1852	1807	1536	1370	1225
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	194	458	1033	1365	275	312
RTOR Reduction (vph)	0	0	0	44	0	146
Lane Group Flow (vph)	194	458	1033	1321	275	167
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	91.8	88.8	75.0	96.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.80	0.20	0.20
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	277	1370	1129	1318	276	247
v/s Ratio Prot	c0.06	0.25	0.57	c0.18	0.20	
v/s Ratio Perm	0.47			0.68		0.14
v/c Ratio	0.70	0.33	0.91	1.00	1.00	0.68
Uniform Delay, d1	38.4	5.4	19.7	12.0	47.9	44.3
Progression Factor	1.00	1.00	0.68	1.18	1.00	1.00
Incremental Delay, d2	7.8	0.7	6.2	16.6	53.3	13.9
Delay (s)	46.2	6.0	19.6	30.8	101.1	58.1
Level of Service	D	A	B	C	F	E
Approach Delay (s)		18.0	26.0		78.2	
Approach LOS		B	C		E	

Intersection Summary

HCM 2000 Control Delay	33.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	563	106	0	1935	315	736
Future Volume (vph)	563	106	0	1935	315	736
Ideal Flow (vphpl)	1000	1000	1805	1805	1694	1694
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Ped Bike Factor		0.98				
Frt		0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	1902	859	0	3433	1611	1441
Flt Permitted					0.950	
Satd. Flow (perm)	1902	838	0	3433	1611	1441
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		113				500
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		3	3			
Peak Hour Factor	0.94	0.94	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Adj. Flow (vph)	599	113	0	2150	346	809
Shared Lane Traffic (%)						
Lane Group Flow (vph)	599	113	0	2150	346	809
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	2.14	2.14	1.05	1.05	1.14	1.14
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	50.0	50.0		50.0	25.0	
Total Split (s)	95.0	95.0		95.0	25.0	
Total Split (%)	79.2%	79.2%		79.2%	20.8%	
Maximum Green (s)	89.0	89.0		89.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.9	
Total Lost Time (s)	6.0	6.0		6.0	4.1	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effect Green (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
v/c Ratio	0.42	0.17		0.84	1.24	0.56
Control Delay	4.0	0.5		6.8	174.7	1.6
Queue Delay	0.0	0.0		0.5	0.0	0.0
Total Delay	4.0	0.5		7.3	174.7	1.6
LOS	A	A		A	F	A
Approach Delay	3.4			7.3	53.5	
Approach LOS	A			A	D	
Queue Length 50th (m)	13.0	0.0		54.7	~100.8	0.0
Queue Length 95th (m)	m15.4	m0.0		110.9	#158.1	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1410	650		2546	280	1441
Starvation Cap Reductn	0	0		115	0	0
Spillback Cap Reductn	0	0		68	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.42	0.17		0.88	1.24	0.56

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.24
 Intersection Signal Delay: 19.9
 Intersection Capacity Utilization 84.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

PM Peak Period
 Future Total (2033)

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

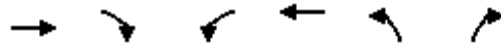
Splits and Phases: 2: QEW East Ramp & Northshore Blvd

 Ø2 (R) 95 s	 Ø6 (R) 95 s	 Ø4 25 s
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HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2033)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	563	106	0	1935	315	736
Future Volume (vph)	563	106	0	1935	315	736
Ideal Flow (vphp)	1000	1000	1805	1805	1694	1694
Total Lost time (s)	6.0	6.0		6.0	4.1	1.1
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1902	838		3433	1611	1441
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1902	838		3433	1611	1441
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	599	113	0	2150	346	809
RTOR Reduction (vph)	0	29	0	0	0	0
Lane Group Flow (vph)	599	84	0	2150	346	809
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	89.0	89.0		89.0	18.0	120.0
Effective Green, g (s)	89.0	89.0		89.0	20.9	120.0
Actuated g/C Ratio	0.74	0.74		0.74	0.17	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1410	621		2546	280	1441
v/s Ratio Prot	0.31			c0.63	c0.21	
v/s Ratio Perm		0.10				0.56
v/c Ratio	0.42	0.13		0.84	1.24	0.56
Uniform Delay, d1	5.8	4.4		10.7	49.5	0.0
Progression Factor	0.53	0.04		0.35	1.00	1.00
Incremental Delay, d2	0.8	0.4		2.8	133.0	1.6
Delay (s)	3.9	0.6		6.6	182.5	1.6
Level of Service	A	A		A	F	A
Approach Delay (s)	3.4			6.6	55.8	
Approach LOS	A			A	E	

Intersection Summary

HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

PM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	17	1117	1895	20	16	25
Future Volume (vph)	17	1117	1895	20	16	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.917	
Flt Protected	0.950				0.981	
Satd. Flow (prot)	1825	3614	3602	0	1728	0
Flt Permitted	0.950				0.981	
Satd. Flow (perm)	1825	3614	3602	0	1728	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	21			21	1	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	14%	0%	0%
Adj. Flow (vph)	19	1255	2038	22	17	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	1255	2060	0	44	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	63.0%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	1091	29	34	1844	19	62	0	41	8	1	9
Future Volume (vph)	13	1091	29	34	1844	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00		1.00		0.98	0.99	0.99	
Frt		0.996			0.998				0.850		0.864	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3562	0	1825	3605	0	1789	0	1633	1825	1489	0
Flt Permitted	0.071			0.197			0.750			0.950		
Satd. Flow (perm)	136	3562	0	378	3605	0	1409	0	1604	1814	1489	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			2				64		10	
Link Speed (k/h)		60			60			20			20	
Link Distance (m)		117.6			266.3			150.8			78.0	
Travel Time (s)		7.1			16.0			27.1			14.0	
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Adj. Flow (vph)	14	1173	31	38	2072	21	67	0	45	9	1	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	1204	0	38	2093	0	67	0	45	9	11	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0	8.0	8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0	38.0	38.0
Total Split (s)	69.0	69.0		11.0	80.0		40.0		40.0	40.0	40.0	40.0
Total Split (%)	57.5%	57.5%		9.2%	66.7%		33.3%		33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	63.0	63.0		7.0	74.0		33.0		33.0	33.0	33.0	33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None	None	None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0	12.0	12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0	0	0
Act Effct Green (s)	93.6	93.6		100.6	99.8		11.4		11.4	11.4	11.4	11.4
Actuated g/C Ratio	0.78	0.78		0.84	0.83		0.10		0.10	0.10	0.10	0.10
v/c Ratio	0.13	0.43		0.10	0.70		0.50		0.21	0.05	0.07	
Control Delay	8.3	5.1		1.5	9.1		63.7		8.0	47.8	26.0	
Queue Delay	0.0	0.0		0.0	0.2		0.0		0.0	0.0	0.0	
Total Delay	8.3	5.1		1.5	9.3		63.7		8.0	47.8	26.0	
LOS	A	A		A	A		E		A	D	C	
Approach Delay		5.2			9.2			41.3				35.8
Approach LOS		A			A			D				D
Queue Length 50th (m)	0.8	40.9		0.7	36.9		15.3		0.0	2.0	0.2	
Queue Length 95th (m)	m1.9	54.2		m1.2	m33.4		28.9		6.6	6.8	5.7	
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	106	2779		401	2998		387		487	498	416	
Starvation Cap Reductn	0	0		0	244		0		0	0	0	
Spillback Cap Reductn	0	0		0	8		0		0	0	0	
Storage Cap Reductn	0	0		0	0		0		0	0	0	
Reduced v/c Ratio	0.13	0.43		0.09	0.76		0.17		0.09	0.02	0.03	

Intersection Summary

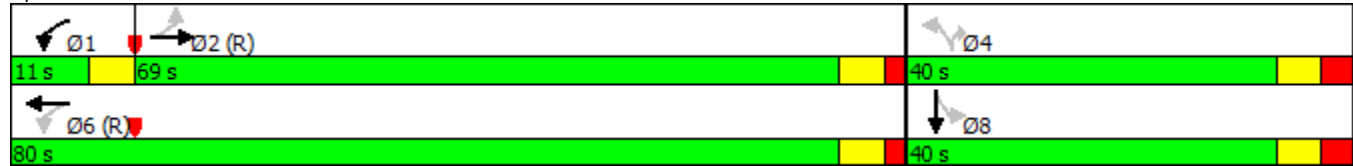
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 116 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 95
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 8.9
 Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

PM Peak Period
 Future Total (2033)

Intersection Capacity Utilization 70.5% ICU Level of Service C
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷		↶		↷	↶	↷	↶
Traffic Volume (vph)	13	1091	29	34	1844	19	62	0	41	8	1	9
Future Volume (vph)	13	1091	29	34	1844	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00		0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1823	3563		1824	3607		1785		1604	1814	1489	
Flt Permitted	0.07	1.00		0.20	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	136	3563		379	3607		1410		1604	1814	1489	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1173	31	38	2072	21	67	0	45	9	1	10
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	9	0
Lane Group Flow (vph)	14	1203	0	38	2093	0	67	0	4	9	2	0
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Effective Green, g (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Actuated g/C Ratio	0.75	0.75		0.81	0.81		0.08		0.08	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	101	2654		352	2921		115		130	148	121	
v/s Ratio Prot		0.34		0.00	c0.58						0.00	
v/s Ratio Perm	0.10			0.08			c0.05		0.00	0.00		
v/c Ratio	0.14	0.45		0.11	0.72		0.58		0.03	0.06	0.02	
Uniform Delay, d1	4.4	5.9		3.2	5.2		53.1		50.7	50.9	50.7	
Progression Factor	0.80	0.72		0.53	1.45		1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.5	0.5		0.0	0.5		7.3		0.1	0.2	0.0	
Delay (s)	6.0	4.7		1.7	8.0		60.4		50.8	51.0	50.7	
Level of Service	A	A		A	A		E		D	D	D	
Approach Delay (s)		4.8			7.8			56.6			50.9	
Approach LOS		A			A			E			D	

Intersection Summary

HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	868	60	226	1518	63	120	118	146	92	179	259
Future Volume (vph)	212	868	60	226	1518	63	120	118	146	92	179	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor		0.99		0.98	0.99		0.96	0.84		0.84	0.94	
Frt		0.990		0.994			0.917			0.911		
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3533	0	1789	3525	0	1789	1426	0	1755	3088	0
Flt Permitted	0.081			0.134			0.320			0.339		
Satd. Flow (perm)	154	3533	0	248	3525	0	577	1426	0	524	3088	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			4			54			267	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Adj. Flow (vph)	238	975	67	243	1632	68	130	128	159	100	195	282
Shared Lane Traffic (%)												
Lane Group Flow (vph)	238	1042	0	243	1700	0	130	287	0	100	477	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	15.0	49.0		15.0	49.0		12.0	44.0		12.0	44.0	
Total Split (%)	12.5%	40.8%		12.5%	40.8%		10.0%	36.7%		10.0%	36.7%	
Maximum Green (s)	12.0	43.0		12.0	43.0		9.0	37.0		9.0	37.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	68.7	49.5		70.8	50.6		38.5	25.7		38.1	25.5	
Actuated g/C Ratio	0.57	0.41		0.59	0.42		0.32	0.21		0.32	0.21	
v/c Ratio	0.77	0.71		0.66	1.14		0.47	0.83		0.39	0.55	
Control Delay	57.9	31.3		27.5	106.1		32.0	55.1		29.9	19.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	57.9	31.3		27.5	106.1		32.0	55.1		29.9	19.3	
LOS	E	C		C	F		C	E		C	B	
Approach Delay		36.3			96.3			47.9			21.1	
Approach LOS		D			F			D			C	
Queue Length 50th (m)	44.2	101.6		25.3	~259.2		21.4	53.5		16.2	22.2	
Queue Length 95th (m)	#88.9	124.8		#73.2	#319.7		31.4	77.5		25.0	34.6	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	310	1462		366	1487		276	477		260	1136	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.77	0.71		0.66	1.14		0.47	0.60		0.38	0.42	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.14
Intersection Signal Delay:	63.0
Intersection LOS:	E

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
 Future Total (2033)









Intersection Capacity Utilization 106.1% ICU Level of Service G

Analysis Period (min) 15

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

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
15 s	49 s	12 s	44 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
15 s	49 s	12 s	44 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	212	868	60	226	1518	63	120	118	146	92	179	259
Future Volume (vph)	212	868	60	226	1518	63	120	118	146	92	179	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.84		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.95	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	3534		1786	3525		1769	1426		1671	3089	
Flt Permitted	0.08	1.00		0.13	1.00		0.32	1.00		0.34	1.00	
Satd. Flow (perm)	154	3534		251	3525		597	1426		597	3089	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	975	67	243	1632	68	130	128	159	100	195	282
RTOR Reduction (vph)	0	4	0	0	2	0	0	42	0	0	210	0
Lane Group Flow (vph)	238	1038	0	243	1698	0	130	245	0	100	267	0
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	65.6	49.5		67.8	50.6		34.5	25.7		34.1	25.5	
Effective Green, g (s)	65.6	49.5		67.8	50.6		34.5	25.7		34.1	25.5	
Actuated g/C Ratio	0.55	0.41		0.56	0.42		0.29	0.21		0.28	0.21	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	305	1457		361	1486		257	305		246	656	
v/s Ratio Prot	c0.10	0.29		c0.10	c0.48		c0.04	c0.17		0.03	0.09	
v/s Ratio Perm	0.32			0.28			0.11			0.09		
v/c Ratio	0.78	0.71		0.67	1.14		0.51	0.80		0.41	0.41	
Uniform Delay, d1	33.2	29.3		18.5	34.7		33.2	44.7		33.2	40.7	
Progression Factor	1.58	0.92		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.4	2.8		4.9	72.7		1.6	14.0		1.1	0.4	
Delay (s)	64.0	29.8		23.3	107.4		34.8	58.8		34.3	41.1	
Level of Service	E	C		C	F		C	E		C	D	
Approach Delay (s)		36.2			96.9			51.3			40.0	
Approach LOS		D			F			D			D	

Intersection Summary

HCM 2000 Control Delay	66.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	106.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Queuing and Blocking Report PM Peak Period
 Future Total (2033)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.5	384.7	105.8	126.1
92.7 60.6					
Average Queue (m)		41.3	280.6	68.7	74.0
49.0 27.0					
95th Queue (m)	47.7	485.8	96.1	114.7	84.5
48.6					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)			47		
Queuing Penalty (veh)			0		
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		53	37		
Queuing Penalty (veh)		238	70		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB
NB					
Directions Served	T	T	T	T	L
R					
Maximum Queue (m)		29.2	29.2	49.5	54.5
388.2 313.1					
Average Queue (m)		5.0	4.7	23.1	27.8
253.8 66.8					
95th Queue (m)	19.8	19.5	42.5	50.4	448.7

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305.1					
Link Distance (m)	304.9	304.9	82.7	82.7	662.3
662.3					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B22	WB
WB SB					
Directions Served	L	T	T	T	T
TR LR					
Maximum Queue (m)		9.2	19.3	8.6	5.2
7.0 9.3 21.3					
Average Queue (m)		3.1	2.7	0.4	0.3
0.3 0.4 8.1					
95th Queue (m)	10.1	13.9	4.7	3.3	3.6
4.3 18.1					
Link Distance (m)		14.9	14.9	82.7	99.4
99.4 91.5					
Upstream Blk Time (%)		0	1	0	
Queuing Penalty (veh)		0	6	1	
Storage Bay Dist (m)		5.0			
Storage Blk Time (%)		6	0		
Queuing Penalty (veh)		31	0		

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Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		9.9	65.0	66.3	10.2
44.3 46.9 31.6	31.4	11.3	15.0		
Average Queue (m)		1.7	22.4	26.8	4.1
17.1 20.4 13.8	6.1	1.9	2.4		
95th Queue (m)	6.8	50.5	55.3	10.8	37.3
40.6 27.3 18.1	7.7	9.6			
Link Distance (m)		99.4	99.4		242.6
242.6	137.1	65.8	65.8		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		45.0			70.0
	30.0				
Storage Blk Time (%)			1		
	2	0			
Queuing Penalty (veh)			0		
	1	0			

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		78.3	92.4	96.7	32.3
237.2 236.7 54.6	91.9	44.0	56.6	83.4	
Average Queue (m)		37.1	56.3	60.7	26.3
228.9 228.5 21.7	44.5	14.3	24.3	37.2	
95th Queue (m)	69.1	86.6	91.5	40.1	233.7
233.2 41.1 74.8	30.3	44.9	64.8		
Link Distance (m)		242.6	242.6		222.7
222.7	224.7	176.9	176.9		

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Upstream Blk Time (%)					
75	67				
Queuing Penalty (veh)					
0	0				
Storage Bay Dist (m)			165.0		30.0
	105.0		50.0		
Storage Blk Time (%)					10
56	0	0	0	0	
Queuing Penalty (veh)					80
127	0	0	0	0	

Network Summary
Network wide Queuing Penalty: 555

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Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Weekend Peak Period
Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	152	498	701	790	334	77
Future Volume (vph)	152	498	701	790	334	77
Ideal Flow (vphpl)	2129	2129	1575	1575	1518	1518
Storage Length (m)	40.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.99	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.146				0.950	
Satd. Flow (perm)	305	2153	1577	1340	1289	1305
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				319		87
Link Speed (k/h)		50	60		100	
Link Distance (m)		160.6	315.5		174.8	
Travel Time (s)		11.6	18.9		6.3	
Confl. Peds. (#/hr)					5	
Peak Hour Factor	0.84	0.84	0.93	0.93	0.89	0.89
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Adj. Flow (vph)	181	593	754	849	375	87
Shared Lane Traffic (%)						
Lane Group Flow (vph)	181	593	754	849	375	87
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	0.85	0.85	1.25	1.25	1.49	1.31
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	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						

Lanes, Volumes, Timings
1: Northshore Blvd & QEW West Ramp

Weekend Peak Period
Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Detector 2 Extend (s)		0.0	0.0			
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Detector Phase	5	2	6	8	8	8
Switch Phase						
Minimum Initial (s)	6.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	10.0	35.0	35.0	26.0	26.0	26.0
Total Split (s)	12.0	62.0	50.0	33.0	33.0	33.0
Total Split (%)	12.6%	65.3%	52.6%	34.7%	34.7%	34.7%
Maximum Green (s)	9.0	56.0	44.0	26.0	26.0	26.0
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.5	-1.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	Max	Max	Max
Walk Time (s)		8.0	8.0	8.0	8.0	8.0
Flash Dont Walk (s)		20.0	20.0	10.0	10.0	10.0
Pedestrian Calls (#/hr)		0	0	0	0	0
Act Effect Green (s)	60.5	57.5	44.0	76.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.80	0.27	0.27
v/c Ratio	0.48	0.46	1.03	0.75	1.06	0.21
Control Delay	22.4	11.6	54.6	6.7	98.9	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	11.6	54.6	6.7	98.9	7.4
LOS	C	B	D	A	F	A
Approach Delay		14.2	29.3		81.6	
Approach LOS		B	C		F	
Queue Length 50th (m)	12.0	54.5	~151.5	17.9	~75.8	0.0
Queue Length 95th (m)	18.5	69.8	m#194.1	m47.8	#127.0	10.4
Internal Link Dist (m)		136.6	291.5		150.8	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	379	1303	730	1135	355	420
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.46	1.03	0.75	1.06	0.21

Intersection Summary

Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.06

Lanes, Volumes, Timings
 1: Northshore Blvd & QEW West Ramp

Weekend Peak Period
 Future Total (2033)

Intersection Signal Delay: 33.7 Intersection LOS: C

Intersection Capacity Utilization 89.4% ICU Level of Service E

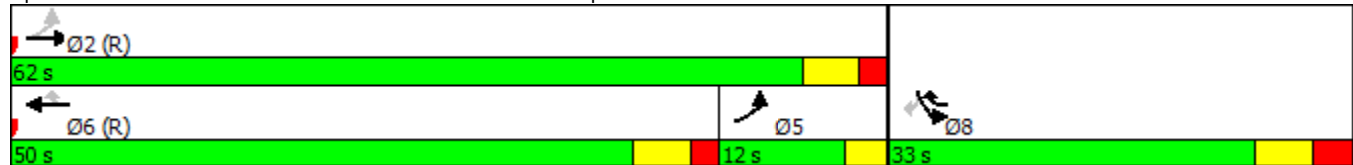
Analysis Period (min) 15

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

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

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

Splits and Phases: 1: Northshore Blvd & QEW West Ramp



HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

Weekend Peak Period
Future Total (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	152	498	701	790	334	77
Future Volume (vph)	152	498	701	790	334	77
Ideal Flow (vphpl)	2129	2129	1575	1575	1518	1518
Total Lost time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	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
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)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.15	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	305	2153	1577	1340	1299	1305
Peak-hour factor, PHF	0.84	0.84	0.93	0.93	0.89	0.89
Adj. Flow (vph)	181	593	754	849	375	87
RTOR Reduction (vph)	0	0	0	84	0	63
Lane Group Flow (vph)	181	593	754	765	375	24
Confl. Peds. (#/hr)					5	
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	59.0	56.0	44.0	70.0	26.0	26.0
Effective Green, g (s)	60.5	57.5	44.0	70.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.74	0.27	0.27
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	379	1303	730	1086	355	357
v/s Ratio Prot	c0.05	0.28	c0.48	0.19	c0.29	
v/s Ratio Perm	0.25			0.38		0.02
v/c Ratio	0.48	0.46	1.03	0.70	1.06	0.07
Uniform Delay, d1	29.1	10.2	25.5	6.8	34.5	25.5
Progression Factor	1.00	1.00	0.69	1.34	1.00	1.00
Incremental Delay, d2	1.0	1.1	34.1	2.2	63.4	0.4
Delay (s)	30.1	11.4	51.7	11.4	97.9	25.9
Level of Service	C	B	D	B	F	C
Approach Delay (s)		15.7	30.4		84.3	
Approach LOS		B	C		F	
Intersection Summary						
HCM 2000 Control Delay			35.2		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.96			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	14.5
Intersection Capacity Utilization			89.4%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Weekend Peak Period
Future Total (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	540	291	0	1212	279	783
Future Volume (vph)	540	291	0	1212	279	783
Ideal Flow (vphpl)	1450	1450	1670	1670	1450	1450
Lane Util. Factor	0.91	0.91	1.00	0.95	1.00	1.00
Ped Bike Factor	1.00	0.98			1.00	
Frt	0.990	0.850				0.850
Flt Protected					0.950	
Satd. Flow (prot)	2310	1021	0	2859	1254	1122
Flt Permitted					0.950	
Satd. Flow (perm)	2310	1004	0	2859	1252	1122
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	15	272				530
Link Speed (k/h)	60			60	60	
Link Distance (m)	315.5			111.4	169.1	
Travel Time (s)	18.9			6.7	10.1	
Confl. Peds. (#/hr)		6	6		1	
Peak Hour Factor	0.92	0.92	0.96	0.96	0.76	0.76
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Adj. Flow (vph)	587	316	0	1263	367	1030
Shared Lane Traffic (%)		14%				
Lane Group Flow (vph)	631	272	0	1263	367	1030
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	1.57	1.57	1.33	1.33	1.57	1.57
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2	1		2	1	1
Detector Template	Thru	Right		Thru	Left	Right
Leading Detector (m)	30.5	6.1		30.5	6.1	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	1.8	6.1		1.8	6.1	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)	28.7			28.7		
Detector 2 Size(m)	1.8			1.8		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free

Lanes, Volumes, Timings
2: QEW East Ramp & Northshore Blvd

Weekend Peak Period
Future Total (2033)



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Detector Phase	2	2		6	4	
Switch Phase						
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	43.0	43.0		43.0	15.0	
Total Split (s)	65.0	65.0		65.0	30.0	
Total Split (%)	68.4%	68.4%		68.4%	31.6%	
Maximum Green (s)	59.0	59.0		59.0	23.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	-2.2	
Total Lost Time (s)	6.0	6.0		6.0	4.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	None	
Walk Time (s)	30.0	30.0		30.0		
Flash Dont Walk (s)	7.0	7.0		7.0		
Pedestrian Calls (#/hr)	0	0		0		
Act Effct Green (s)	59.0	59.0		59.0	25.2	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
v/c Ratio	0.44	0.37		0.71	1.11	0.92
Control Delay	6.2	1.2		15.1	115.7	15.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	6.2	1.2		15.1	115.7	15.2
LOS	A	A		B	F	B
Approach Delay	4.7			15.1	41.6	
Approach LOS	A			B	D	
Queue Length 50th (m)	17.9	0.0		75.4	~77.2	0.0
Queue Length 95th (m)	m22.5	m0.1		99.7	#99.8	0.0
Internal Link Dist (m)	291.5			87.4	145.1	
Turn Bay Length (m)						
Base Capacity (vph)	1440	726		1775	332	1122
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.44	0.37		0.71	1.11	0.92

Intersection Summary

Area Type: CBD
 Cycle Length: 95
 Actuated Cycle Length: 95
 Offset: 87 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.11
 Intersection Signal Delay: 22.9
 Intersection Capacity Utilization 73.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D
 ~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 2: QEW East Ramp & Northshore Blvd

Weekend Peak Period
 Future Total (2033)

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

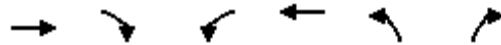
Splits and Phases: 2: QEW East Ramp & Northshore Blvd

 Ø2 (R) 65 s	 Ø4 30 s
 Ø6 (R) 65 s	

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

Weekend Peak Period
Future Total (2033)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	540	291	0	1212	279	783
Future Volume (vph)	540	291	0	1212	279	783
Ideal Flow (vphp)	1450	1450	1670	1670	1450	1450
Total Lost time (s)	6.0	6.0		6.0	4.8	1.8
Lane Util. Factor	0.91	0.91		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	0.99	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2309	1004		2859	1254	1122
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2309	1004		2859	1254	1122
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.76	0.76
Adj. Flow (vph)	587	316	0	1262	367	1030
RTOR Reduction (vph)	6	103	0	0	0	0
Lane Group Flow (vph)	625	169	0	1263	367	1030
Confl. Peds. (#/hr)		6	6		1	
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	59.0	59.0		59.0	23.0	95.0
Effective Green, g (s)	59.0	59.0		59.0	25.2	95.0
Actuated g/C Ratio	0.62	0.62		0.62	0.27	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1434	623		1775	332	1122
v/s Ratio Prot	0.27			0.44	c0.29	
v/s Ratio Perm		0.17				c0.92
v/c Ratio	0.44	0.27		0.71	1.11	0.92
Uniform Delay, d1	9.4	8.2		12.2	34.9	0.0
Progression Factor	0.59	0.14		1.00	1.00	1.00
Incremental Delay, d2	0.7	0.8		2.5	80.8	13.2
Delay (s)	6.3	1.9		14.7	115.7	13.2
Level of Service	A	A		B	F	B
Approach Delay (s)	4.9			14.7	40.1	
Approach LOS	A			B	D	

Intersection Summary

HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Northshore Blvd & Site Driveway

Weekend Peak Period
Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	1296	1380	20	18	27
Future Volume (vph)	28	1296	1380	20	18	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	5.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.920	
Flt Protected	0.950				0.980	
Satd. Flow (prot)	1825	3614	3607	0	1732	0
Flt Permitted	0.950				0.980	
Satd. Flow (perm)	1825	3614	3607	0	1732	0
Link Speed (k/h)		60	60		20	
Link Distance (m)		111.4	117.6		102.6	
Travel Time (s)		6.7	7.1		18.5	
Confl. Peds. (#/hr)	23			23		
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Adj. Flow (vph)	31	1456	1484	22	20	29
Shared Lane Traffic (%)						
Lane Group Flow (vph)	31	1456	1506	0	49	0
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
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	48.8%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Weekend Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	1235	52	37	1309	19	75	0	51	32	0	16
Future Volume (vph)	27	1235	52	37	1309	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	70.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00		1.00		0.98	0.99	0.99	
Fr't		0.994			0.998				0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3585	0	1825	3605	0	1772	0	1601	1825	1609	0
Flt Permitted	0.164			0.138			0.746			0.950		
Satd. Flow (perm)	314	3585	0	265	3605	0	1388	0	1572	1814	1609	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			2				85			85
Link Speed (k/h)		60			60			20				20
Link Distance (m)		117.6			266.3			150.8				78.0
Travel Time (s)		7.1			16.0			27.1				14.0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Adj. Flow (vph)	29	1328	56	42	1471	21	82	0	55	35	0	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1384	0	42	1492	0	82	0	55	35	17	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		1	1		2
Detector Template	Left	Thru		Left	Thru		Left		Right	Left		Thru
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1		6.1	6.1		30.5
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1		6.1	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
Detector 2 Size(m)		1.8			1.8							1.8
Detector 2 Type		Cl+Ex			Cl+Ex							Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0							0.0

Lanes, Volumes, Timings
4: JBH Access & Northshore Blvd

Weekend Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6							8
Permitted Phases	2			6			4		4	8		
Detector Phase	2	2		1	6		4		4	8		8
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	8.0		8.0		8.0	8.0		8.0
Minimum Split (s)	32.0	32.0		11.0	32.0		38.0		38.0	38.0		38.0
Total Split (s)	38.0	38.0		13.0	38.0		39.0		39.0	39.0		39.0
Total Split (%)	42.2%	42.2%		14.4%	42.2%		43.3%		43.3%	43.3%		43.3%
Maximum Green (s)	32.0	32.0		9.0	32.0		32.0		32.0	32.0		32.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0		4.0	4.0		4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		3.0		3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0		7.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0		3.0
Recall Mode	C-Max	C-Max		None	C-Max		None		None	None		None
Walk Time (s)	10.0	10.0			10.0		12.0		12.0	12.0		12.0
Flash Dont Walk (s)	15.0	15.0			15.0		18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	0	0			0		0		0	0		0
Act Effct Green (s)	63.9	63.9		70.9	70.1		11.1		11.1	11.1		11.1
Actuated g/C Ratio	0.71	0.71		0.79	0.78		0.12		0.12	0.12		0.12
v/c Ratio	0.13	0.54		0.13	0.53		0.48		0.21	0.16		0.06
Control Delay	10.2	10.2		4.2	6.1		45.5		5.1	35.4		0.4
Queue Delay	0.0	0.0		0.0	0.0		0.0		0.0	0.0		0.0
Total Delay	10.2	10.2		4.2	6.1		45.5		5.1	35.4		0.4
LOS	B	B		A	A		D		A	D		A
Approach Delay		10.2			6.1			29.3				24.0
Approach LOS		B			A			C				C
Queue Length 50th (m)	1.9	69.2		1.4	50.1		13.5		0.0	5.5		0.0
Queue Length 95th (m)	7.2	105.9		4.4	78.8		25.8		5.0	13.2		0.0
Internal Link Dist (m)		93.6			242.3			126.8				54.0
Turn Bay Length (m)	45.0			70.0			30.0					
Base Capacity (vph)	222	2545		364	2809		493		613	644		626
Starvation Cap Reductn	0	0		0	0		0		0	0		0
Spillback Cap Reductn	0	0		0	0		0		0	0		0
Storage Cap Reductn	0	0		0	0		0		0	0		0
Reduced v/c Ratio	0.13	0.54		0.12	0.53		0.17		0.09	0.05		0.03

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 7 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 9.3

Intersection LOS: A

Lanes, Volumes, Timings
 4: JBH Access & Northshore Blvd

Weekend Peak Period
 Future Total (2033)

Intersection Capacity Utilization 69.7% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 4: JBH Access & Northshore Blvd



HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

Weekend Peak Period
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↕	↱	↰	↕	↱	↰	↕	↱	↰	↕	↱
Traffic Volume (vph)	27	1235	52	37	1309	19	75	0	51	32	0	16
Future Volume (vph)	27	1235	52	37	1309	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1819	3585		1825	3604		1767		1572	1814	1609	
Flt Permitted	0.16	1.00		0.14	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	314	3585		265	3604		1388		1572	1814	1609	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	1328	56	42	1471	21	82	0	55	35	0	17
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	49	0	15	0
Lane Group Flow (vph)	29	1382	0	42	1492	0	82	0	6	35	2	0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Effective Green, g (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Actuated g/C Ratio	0.66	0.66		0.75	0.75		0.11		0.11	0.11	0.11	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	208	2378		264	2703		146		165	191	169	
v/s Ratio Prot		c0.39		0.01	c0.41							0.00
v/s Ratio Perm	0.09			0.11			c0.06		0.00	0.02		
v/c Ratio	0.14	0.58		0.16	0.55		0.56		0.04	0.18	0.01	
Uniform Delay, d1	5.6	8.3		5.0	4.8		38.3		36.1	36.7	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.4	1.0		0.3	0.8		4.9		0.1	0.5	0.0	
Delay (s)	7.0	9.3		5.3	5.6		43.1		36.2	37.2	36.1	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		9.3			5.6			40.4			36.8	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Weekend Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	941	179	315	886	47	200	141	182	100	285	279
Future Volume (vph)	198	941	179	315	886	47	200	141	182	100	285	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	165.0		0.0	30.0		0.0	105.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	1.00		1.00	0.94		0.95	0.99	
Frt		0.976			0.992			0.915			0.926	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3504	0	1807	3562	0	1807	1625	0	1755	3338	0
Flt Permitted	0.168			0.089			0.233			0.263		
Satd. Flow (perm)	317	3504	0	169	3562	0	441	1625	0	460	3338	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			5			62			235	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		266.3			172.2			236.6			191.7	
Travel Time (s)		16.0			10.3			17.0			13.8	
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Peak Hour Factor	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Adj. Flow (vph)	222	1057	201	339	953	51	217	153	198	109	310	303
Shared Lane Traffic (%)												
Lane Group Flow (vph)	222	1258	0	339	1004	0	217	351	0	109	613	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	

Lanes, Volumes, Timings
5: Lakeshore Rd/Maple Ave & Northshore Blvd

Weekend Peak Period
Future Total (2033)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	6.0	8.0		6.0	8.0		6.0	8.0		6.0	8.0	
Minimum Split (s)	10.0	38.0		10.0	38.0		10.0	40.0		10.0	40.0	
Total Split (s)	18.0	48.0		10.0	40.0		10.0	42.0		10.0	42.0	
Total Split (%)	16.4%	43.6%		9.1%	36.4%		9.1%	38.2%		9.1%	38.2%	
Maximum Green (s)	15.0	42.0		7.0	34.0		7.0	35.0		7.0	35.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	3.0		0.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		12.0			12.0			8.0			8.0	
Flash Dont Walk (s)		19.0			19.0			24.0			24.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effect Green (s)	56.6	42.0		60.7	45.5		36.7	25.7		36.7	25.7	
Actuated g/C Ratio	0.51	0.38		0.55	0.41		0.33	0.23		0.33	0.23	
v/c Ratio	0.66	0.93		1.01	0.68		0.93	0.82		0.46	0.64	
Control Delay	23.2	45.2		85.0	31.2		72.4	48.2		28.8	25.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.2	45.2		85.0	31.2		72.4	48.2		28.8	25.2	
LOS	C	D		F	C		E	D		C	C	
Approach Delay		41.9			44.8			57.4			25.7	
Approach LOS		D			D			E			C	
Queue Length 50th (m)	21.3	132.5		56.4	91.9		33.4	59.9		15.8	38.3	
Queue Length 95th (m)	41.0	#173.1		#157.2	#145.9		#57.6	83.6		24.2	50.2	
Internal Link Dist (m)		242.3			148.2			212.6			167.7	
Turn Bay Length (m)	165.0			30.0			105.0			50.0		
Base Capacity (vph)	377	1352		336	1476		233	559		235	1222	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.59	0.93		1.01	0.68		0.93	0.63		0.46	0.50	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	25 (23%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	42.2
Intersection LOS:	D

Lanes, Volumes, Timings
 5: Lakeshore Rd/Maple Ave & Northshore Blvd









Weekend Peak Period
 Future Total (2033)

Intersection Capacity Utilization 99.0% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

 Ø1 10 s	 Ø2 (R) 48 s	 Ø3 10 s	 Ø4 42 s
 Ø5 18 s	 Ø6 (R) 40 s	 Ø7 10 s	 Ø8 42 s

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Weekend Peak Period
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	941	179	315	886	47	200	141	182	100	285	279
Future Volume (vph)	198	941	179	315	886	47	200	141	182	100	285	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.94		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3504		1807	3564		1805	1626		1735	3337	
Flt Permitted	0.17	1.00		0.09	1.00		0.23	1.00		0.26	1.00	
Satd. Flow (perm)	319	3504		169	3564		444	1626		480	3337	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	1057	201	339	953	51	217	153	198	109	310	303
RTOR Reduction (vph)	0	14	0	0	3	0	0	48	0	0	180	0
Lane Group Flow (vph)	222	1244	0	339	1001	0	217	303	0	109	433	0
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.8	42.0		61.3	45.5		32.7	25.7		32.7	25.7	
Effective Green, g (s)	54.8	42.0		61.3	45.5		32.7	25.7		32.7	25.7	
Actuated g/C Ratio	0.50	0.38		0.56	0.41		0.30	0.23		0.30	0.23	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	331	1337		336	1474		218	379		222	779	
v/s Ratio Prot	0.08	0.35		c0.15	0.28		c0.06	0.19		0.03	0.13	
v/s Ratio Perm	0.26			c0.41			c0.23			0.11		
v/c Ratio	0.67	0.93		1.01	0.68		1.00	0.80		0.49	0.56	
Uniform Delay, d1	18.1	32.6		34.3	26.3		36.1	39.7		29.9	37.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	12.8		51.4	2.5		59.3	11.5		1.7	0.9	
Delay (s)	23.4	45.4		85.6	28.8		95.4	51.2		31.6	38.0	
Level of Service	C	D		F	C		F	D		C	D	
Approach Delay (s)		42.1			43.2			68.1			37.0	
Approach LOS		D			D			E			D	

Intersection Summary

HCM 2000 Control Delay	45.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

2033 SAT_FT_sim_3.txt

Queuing and Blocking Report Weekend Peak Period
Future Total (2033)

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB
SB					
Directions Served	L	T	T	R	L
R					
Maximum Queue (m)		42.4	136.4	145.9	81.3
97.4 34.3					
Average Queue (m)		30.8	55.2	66.7	32.0
55.5 8.9					
95th Queue (m)	48.8	117.2	122.4	64.0	92.9
21.4					
Link Distance (m)		370.5	304.9	304.9	670.1
670.1					
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		40.0			
Storage Blk Time (%)		6	9		
Queuing Penalty (veh)		31	14		

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B22
NB NB					
Directions Served	T	T	T	T	T
L R					
Maximum Queue (m)		27.4	30.7	78.4	85.2
1.1 90.2 14.0					
Average Queue (m)		11.4	10.8	32.2	35.0
0.1 50.8 0.7					
95th Queue (m)	23.0	24.8	64.0	69.9	1.2

2033 SAT_FT_sim_3.txt

79.9	9.8					
Link Distance (m)		304.9	304.9	82.7	82.7	14.9
662.3	662.3					
Upstream Blk Time (%)					0	0
Queuing Penalty (veh)					0	2
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Northshore Blvd & Site Driveway

Movement			EB	EB	EB	B22	B22
B22	WB	WB	SB				
Directions Served			L	T	T	T	T
	T	TR	LR				
Maximum Queue (m)				9.2	18.9	2.1	13.8
4.4	1.8	2.5	1.1	29.0			
Average Queue (m)				5.2	3.6	0.1	0.6
0.1	0.1	0.1	0.0	9.9			
95th Queue (m)				12.3	14.1	1.6	10.1
1.4	1.9	0.9	24.0				
Link Distance (m)				14.9	14.9	82.7	82.7
82.7	99.4	99.4	91.5				
Upstream Blk Time (%)				0	1	0	
Queuing Penalty (veh)				0	5	0	
Storage Bay Dist (m)				5.0			
Storage Blk Time (%)				7	0		
Queuing Penalty (veh)				43	0		

2033 SAT_FT_sim_3.txt

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB			
Directions Served	L	T	TR	L	T
TR L R	L	TR			
Maximum Queue (m)		31.1	83.2	89.3	13.9
67.7 68.0 31.1	37.8	25.3	13.1		
Average Queue (m)		5.2	34.4	39.6	4.9
25.6 29.8 13.6	7.4	8.4	3.2		
95th Queue (m)		16.3	70.2	74.8	12.1
58.1 28.3 20.7	19.9	9.8			
Link Distance (m)		99.4	99.4		242.6
242.6 137.1	65.8	65.8			
Upstream Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	
Storage Bay Dist (m)		45.0			70.0
	30.0				
Storage Blk Time (%)		0	4		
0 2	0				
Queuing Penalty (veh)		0	1		
0 1	0				

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB
WB NB NB	SB	SB	SB		
Directions Served	L	T	TR	L	T
TR L TR	L	T	TR		
Maximum Queue (m)		79.6	138.1	136.1	32.4
235.8 235.2 75.9	109.4	49.3	71.0	87.9	
Average Queue (m)		29.5	81.4	88.2	32.3
226.3 217.6 36.9	54.6	17.7	33.9	43.8	
95th Queue (m)		57.7	128.2	133.3	32.3
263.1 65.9 93.1	37.7	57.5	76.1		
Link Distance (m)		242.6	242.6		222.7
222.7 224.7		176.9	176.9		

2033 SAT_FT_sim_3.txt

Upstream Blk Time (%)

91 33

Queuing Penalty (veh)

0 0

Storage Bay Dist (m)

165.0	30.0
105.0	50.0

Storage Blk Time (%)

15	0	1	0	1	87
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Queuing Penalty (veh)

47	0	1	0	1	385
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Network Summary

Network wide Queuing Penalty: 533

SimTraffic Report 09/07/2018

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Appendix I

Future Total (Optimized) Synchro and SimTraffic Reports

Queues

AM Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	181	497	676	572	410	91
v/c Ratio	0.67	0.55	1.00	0.59	0.89	0.19
Control Delay	22.0	14.9	54.9	6.5	54.9	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	14.9	54.9	6.5	54.9	6.6
Queue Length 50th (m)	13.3	51.7	134.2	57.6	71.5	0.0
Queue Length 95th (m)	#26.0	79.0	#197.5	36.5	#124.1	10.6
Internal Link Dist (m)		357.8	291.5		657.6	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	269	911	679	970	462	481
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.55	1.00	0.59	0.89	0.19

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 1: Northshore Blvd & QEW West Ramp

AM Peak Period
 Future Total (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗	↑	↖	↘
Traffic Volume (vph)	172	472	602	509	381	85
Future Volume (vph)	172	472	602	509	381	85
Ideal Flow (vphpl)	1575	1575	1462	1462	1674	1674
Total Lost time (s)	2.5	5.5	6.0	7.0	5.6	5.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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)	1483	1561	1435	1197	1546	1397
Flt Permitted	0.18	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	284	1561	1435	1197	1546	1397
Peak-hour factor, PHF	0.95	0.95	0.89	0.89	0.93	0.93
Adj. Flow (vph)	181	497	676	572	410	91
RTOR Reduction (vph)	0	0	0	72	0	64
Lane Group Flow (vph)	181	497	676	500	410	27
Confl. Peds. (#/hr)	4			4		
Heavy Vehicles (%)	2%	2%	3%	3%	4%	3%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	55.0	55.0	45.0	72.0	27.0	27.0
Effective Green, g (s)	55.5	55.5	45.0	72.0	28.4	28.4
Actuated g/C Ratio	0.58	0.58	0.47	0.76	0.30	0.30
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	260	911	679	907	462	417
v/s Ratio Prot	c0.05	0.32	c0.47	0.16	c0.27	
v/s Ratio Perm	0.35			0.26		0.02
v/c Ratio	0.70	0.55	1.00	0.55	0.89	0.07
Uniform Delay, d1	14.5	12.1	24.9	4.8	31.8	23.8
Progression Factor	1.00	1.00	1.02	3.27	1.00	1.00
Incremental Delay, d2	7.9	2.3	27.8	1.7	21.6	0.3
Delay (s)	22.4	14.4	53.2	17.3	53.3	24.1
Level of Service	C	B	D	B	D	C
Approach Delay (s)		16.5	36.8		48.0	
Approach LOS		B	D		D	

Intersection Summary			
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2033)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	753	165	935	308	1214
v/c Ratio	0.50	0.23	0.71	0.80	1.16
Control Delay	12.3	2.8	20.1	45.3	91.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	2.8	20.1	45.3	91.2
Queue Length 50th (m)	29.1	0.7	64.2	49.7	~64.6
Queue Length 95th (m)	m46.1	m4.2	95.0	77.8	#139.9
Internal Link Dist (m)	291.5		64.1	648.6	
Turn Bay Length (m)					
Base Capacity (vph)	1512	733	1308	446	1046
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.50	0.23	0.71	0.69	1.16

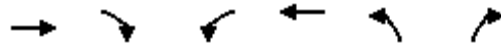
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

AM Peak Period
Future Total (2033)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	700	153	0	832	280	1105
Future Volume (vph)	700	153	0	832	280	1105
Ideal Flow (vphpl)	1440	1440	1246	1246	1266	1266
Total Lost time (s)	6.0	6.0		6.0	4.4	1.4
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2660	1165		2302	1192	1046
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2660	1165		2302	1192	1046
Peak-hour factor, PHF	0.93	0.93	0.89	0.89	0.91	0.91
Adj. Flow (vph)	753	165	0	935	308	1214
RTOR Reduction (vph)	0	71	0	0	0	0
Lane Group Flow (vph)	753	94	0	935	308	1214
Confl. Peds. (#/hr)		8	8			
Heavy Vehicles (%)	4%	3%	0%	4%	2%	4%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	54.0	54.0		54.0	28.0	95.0
Effective Green, g (s)	54.0	54.0		54.0	30.6	95.0
Actuated g/C Ratio	0.57	0.57		0.57	0.32	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1512	662		1308	383	1046
v/s Ratio Prot	0.28			0.41	0.26	
v/s Ratio Perm		0.08				c1.16
v/c Ratio	0.50	0.14		0.71	0.80	1.16
Uniform Delay, d1	12.3	9.6		14.9	29.5	47.5
Progression Factor	0.84	1.07		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3		3.4	11.6	83.1
Delay (s)	11.2	10.6		18.3	41.1	130.6
Level of Service	B	B		B	D	F
Approach Delay (s)	11.1			18.3	112.5	
Approach LOS	B			B	F	

Intersection Summary

HCM 2000 Control Delay	58.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

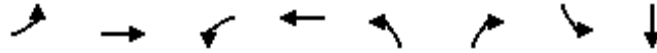
AM Peak Period
Future Total (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	1635	858	36	28	24
Future Volume (Veh/h)	83	1635	858	36	28	24
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	93	1837	923	39	30	26
Pedestrians					9	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage veh			2			
Upstream signal (m)		111	118			
pX, platoon unblocked	0.93				0.89	0.93
vC, conflicting volume	971				2056	490
vC1, stage 1 conf vol					952	
vC2, stage 2 conf vol					1104	
vCu, unblocked vol	821				1598	304
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	88				88	96
cM capacity (veh/h)	754				244	644
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	93	918	918	615	347	56
Volume Left	93	0	0	0	0	30
Volume Right	0	0	0	0	39	26
cSH	754	1700	1700	1700	1700	343
Volume to Capacity	0.12	0.54	0.54	0.36	0.20	0.16
Queue Length 95th (m)	3.2	0.0	0.0	0.0	0.0	4.4
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	17.5
Lane LOS	B					C
Approach Delay (s)	0.5			0.0		17.5
Approach LOS						C
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			55.2%		ICU Level of Service	B
Analysis Period (min)			15			

Queues
4: JBH Access & Northshore Blvd

AM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	12	1776	70	961	40	45	15	13
v/c Ratio	0.03	0.67	0.31	0.33	0.36	0.25	0.10	0.05
Control Delay	6.3	11.1	15.2	2.3	55.6	8.1	46.6	0.4
Queue Delay	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	11.4	15.2	2.3	55.6	8.1	46.6	0.4
Queue Length 50th (m)	0.7	104.0	2.7	10.9	8.3	0.0	3.0	0.0
Queue Length 95th (m)	3.0	158.0	m14.0	24.1	18.7	5.5	9.1	0.0
Internal Link Dist (m)		93.6		242.3				50.6
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	426	2635	236	2886	387	454	501	563
Starvation Cap Reductn	0	330	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.77	0.30	0.33	0.10	0.10	0.03	0.02

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

AM Peak Period
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	↖
Traffic Volume (vph)	11	1506	146	62	845	11	37	0	41	14	0	12
Future Volume (vph)	11	1506	146	62	845	11	37	0	41	14	0	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.97	1.00	0.98	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00		1.00	0.98	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1805	3491		1772	3465		1637		1354	1670	1606	
Flt Permitted	0.30	1.00		0.08	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	566	3491		154	3465		1291		1354	1670	1606	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	1619	157	70	949	12	40	0	45	15	0	13
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	42	0	12	0
Lane Group Flow (vph)	12	1772	0	70	961	0	40	0	3	15	1	0
Confl. Peds. (#/hr)	19		8	8		19	4		19	19		4
Heavy Vehicles (%)	0%	3%	1%	3%	5%	9%	11%	0%	5%	7%	0%	0%
Parking (#/hr)									0			
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Effective Green, g (s)	79.5	79.5		89.0	89.0		8.0		8.0	8.0	8.0	
Actuated g/C Ratio	0.72	0.72		0.81	0.81		0.07		0.07	0.07	0.07	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	409	2523		205	2803		93		98	121	116	
v/s Ratio Prot		c0.51		0.02	c0.28							0.00
v/s Ratio Perm	0.02			0.26			c0.03		0.00	0.01		
v/c Ratio	0.03	0.70		0.34	0.34		0.43		0.03	0.12	0.01	
Uniform Delay, d1	4.3	8.6		8.2	2.8		48.8		47.4	47.7	47.3	
Progression Factor	1.00	1.00		5.48	0.69		1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.1	1.7		0.9	0.3		3.2		0.1	0.5	0.0	
Delay (s)	4.5	10.3		45.8	2.2		52.0		47.5	48.2	47.3	
Level of Service	A	B		D	A		D		D	D	D	
Approach Delay (s)		10.2			5.2			49.6			47.8	
Approach LOS		B			A			D			D	

Intersection Summary

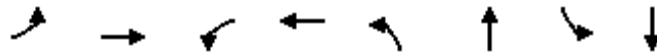
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

AM Peak Period

5: Lakeshore Rd/Maple Ave & Northshore Blvd

Future Total (2033)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	256	1498	147	817	39	402	52	276
v/c Ratio	0.57	0.97	0.66	0.58	0.11	0.87	0.27	0.29
Control Delay	23.4	37.8	39.7	29.4	21.0	50.3	23.9	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.4	37.8	39.7	29.4	21.0	50.3	23.9	12.4
Queue Length 50th (m)	36.1	~192.6	20.2	73.9	5.3	65.0	7.1	9.2
Queue Length 95th (m)	38.3	#231.1	#52.3	102.3	11.3	96.6	13.9	18.4
Internal Link Dist (m)		242.3		207.3		209.0		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	447	1547	222	1403	346	549	196	1071
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.97	0.66	0.58	0.11	0.73	0.27	0.26

Intersection Summary

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

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

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

AM Peak Period
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	228	1218	115	137	725	34	36	124	246	48	97	157
Future Volume (vph)	228	1218	115	137	725	34	36	124	246	48	97	157
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	3383		1738	3463		1537	1618		1686	3170	
Flt Permitted	0.32	1.00		0.12	1.00		0.58	1.00		0.19	1.00	
Satd. Flow (perm)	596	3383		216	3463		942	1618		336	3170	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	256	1369	129	147	780	37	39	135	267	52	105	171
RTOR Reduction (vph)	0	6	0	0	3	0	0	69	0	0	127	0
Lane Group Flow (vph)	256	1492	0	147	814	0	39	333	0	52	149	0
Confl. Peds. (#/hr)	11		23	23		11	16		38	38		16
Heavy Vehicles (%)	3%	3%	40%	5%	4%	15%	18%	4%	3%	8%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	51.9	48.9		43.3	43.3		31.3	27.1		34.1	28.5	
Effective Green, g (s)	51.9	48.9		43.3	43.3		31.3	27.1		34.1	28.5	
Actuated g/C Ratio	0.47	0.44		0.39	0.39		0.28	0.25		0.31	0.26	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	441	1503		215	1363		290	398		172	821	
v/s Ratio Prot	0.08	c0.44		c0.06	0.24		0.01	c0.21		c0.02	0.05	
v/s Ratio Perm	0.19			0.21			0.03			0.08		
v/c Ratio	0.58	0.99		0.68	0.60		0.13	0.84		0.30	0.18	
Uniform Delay, d1	26.4	30.4		26.5	26.4		28.9	39.3		28.6	31.7	
Progression Factor	0.67	0.70		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	18.8		8.7	1.9		0.2	14.1		1.0	0.1	
Delay (s)	19.1	40.0		35.2	28.4		29.1	53.4		29.6	31.8	
Level of Service	B	D		D	C		C	D		C	C	
Approach Delay (s)		36.9			29.4			51.3			31.4	
Approach LOS		D			C			D			C	

Intersection Summary

HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	42.4	145.1	145.7	73.5	118.0	26.4
Average Queue (m)	28.9	52.3	79.3	25.2	64.9	9.5
95th Queue (m)	47.9	104.5	126.5	52.0	104.6	20.1
Link Distance (m)		372.2	304.9	304.9	672.0	672.0
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	7	8				
Queuing Penalty (veh)	35	14				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	T	T	T	L	R
Maximum Queue (m)	52.2	50.0	73.7	77.0	417.5	441.2
Average Queue (m)	23.6	23.4	30.4	29.6	137.8	186.8
95th Queue (m)	43.3	42.2	64.6	62.5	386.3	501.8
Link Distance (m)	304.9	304.9	82.7	82.7	662.3	662.3
Upstream Blk Time (%)			0	0		
Queuing Penalty (veh)			0	0		
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B22	B22	B22	WB	WB	SB
Directions Served	L	T	T	T	T		T	TR	LR
Maximum Queue (m)	9.2	31.5	36.9	83.2	90.3	77.6	1.6	6.9	44.9
Average Queue (m)	7.0	13.2	9.2	11.7	15.0	4.9	0.1	0.4	15.1
95th Queue (m)	13.0	32.2	30.8	53.2	63.2	39.0	1.3	3.2	34.5
Link Distance (m)		14.9	14.9	82.7	82.7	82.7	99.8	99.8	91.5
Upstream Blk Time (%)	0	5	5	0	1	1			
Queuing Penalty (veh)	0	47	41	1	4	4			
Storage Bay Dist (m)	5.0								
Storage Blk Time (%)	9	3							
Queuing Penalty (veh)	73	3							

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	35.2	107.9	108.8	28.5	51.2	54.5	25.1	27.5	14.7	11.1
Average Queue (m)	3.1	72.0	77.9	11.5	25.2	25.7	8.5	7.0	4.1	2.6
95th Queue (m)	16.5	118.8	121.0	23.3	46.5	48.6	20.7	18.2	12.2	9.4
Link Distance (m)		99.8	99.8		245.5	245.5		132.6	62.4	62.4
Upstream Blk Time (%)		3	5							
Queuing Penalty (veh)		24	38							
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)	0	18					0	0		
Queuing Penalty (veh)	0	2					0	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	150.2	225.6	224.4	32.3	179.7	165.3	77.6	161.2	23.5	29.8	45.2
Average Queue (m)	75.8	152.3	158.0	29.0	96.1	82.1	13.6	71.0	7.3	12.0	18.0
95th Queue (m)	183.8	263.5	264.7	38.2	170.2	156.5	52.9	135.5	17.7	24.5	33.4
Link Distance (m)		245.5	245.5		222.7	222.7		221.1		176.9	176.9
Upstream Blk Time (%)		1	2		0			0			
Queuing Penalty (veh)		10	12		0			0			
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)	0	10		37	20		0	8			
Queuing Penalty (veh)	1	23		133	28		0	3			

Network Summary

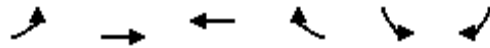
Network wide Queuing Penalty: 497

Queues

PM Peak Period

1: Northshore Blvd & QEW West Ramp

Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	194	458	1033	1365	275	313
v/c Ratio	0.70	0.33	0.91	1.02	1.00	0.80
Control Delay	40.8	6.2	19.2	31.9	101.7	34.7
Queue Delay	0.0	0.0	0.0	2.2	0.0	0.0
Total Delay	40.8	6.2	19.2	34.1	101.7	34.7
Queue Length 50th (m)	14.6	32.4	125.8	~201.4	65.2	30.0
Queue Length 95th (m)	#42.7	45.7	m199.5	m#393.5	#98.4	50.2
Internal Link Dist (m)		357.9	291.5		657.6	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	277	1370	1129	1338	276	393
Starvation Cap Reductn	0	0	0	9	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.33	0.91	1.03	1.00	0.80

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Northshore Blvd & QEW West Ramp

PM Peak Period
Future Total (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	190	449	971	1283	220	250
Future Volume (vph)	190	449	971	1283	220	250
Ideal Flow (vphp)	1850	1850	1805	1805	1440	1440
Total Lost time (s)	0.2	3.2	6.0	7.0	3.8	3.8
Lane Util. Factor	1.00	1.00	1.00	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)	1759	1852	1807	1536	1370	1225
Flt Permitted	0.10	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	176	1852	1807	1536	1370	1225
Peak-hour factor, PHF	0.98	0.98	0.94	0.94	0.80	0.80
Adj. Flow (vph)	194	458	1033	1365	275	312
RTOR Reduction (vph)	0	0	0	44	0	146
Lane Group Flow (vph)	194	458	1033	1321	275	167
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	89.0	86.0	75.0	96.0	21.0	21.0
Effective Green, g (s)	91.8	88.8	75.0	96.0	24.2	24.2
Actuated g/C Ratio	0.76	0.74	0.62	0.80	0.20	0.20
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	277	1370	1129	1318	276	247
v/s Ratio Prot	c0.06	0.25	0.57	c0.18	0.20	
v/s Ratio Perm	0.47			0.68		0.14
v/c Ratio	0.70	0.33	0.91	1.00	1.00	0.68
Uniform Delay, d1	38.4	5.4	19.7	12.0	47.9	44.3
Progression Factor	1.00	1.00	0.62	1.29	1.00	1.00
Incremental Delay, d2	7.8	0.7	5.7	16.0	53.3	13.9
Delay (s)	46.2	6.0	17.9	31.4	101.1	58.1
Level of Service	D	A	B	C	F	E
Approach Delay (s)		18.0	25.6		78.2	
Approach LOS		B	C		E	

Intersection Summary

HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2033)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	599	113	2150	346	809
v/c Ratio	0.46	0.19	0.92	0.93	0.56
Control Delay	5.9	0.6	12.1	77.0	1.6
Queue Delay	0.0	0.0	0.8	0.0	0.0
Total Delay	5.9	0.6	12.9	77.0	1.6
Queue Length 50th (m)	16.5	0.0	64.7	80.1	0.0
Queue Length 95th (m)	m18.9	m0.0	98.8	#135.1	0.0
Internal Link Dist (m)	291.5		64.1	648.6	
Turn Bay Length (m)					
Base Capacity (vph)	1300	608	2346	374	1441
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	52	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.46	0.19	0.94	0.93	0.56

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

PM Peak Period
Future Total (2033)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	563	106	0	1935	315	736
Future Volume (vph)	563	106	0	1935	315	736
Ideal Flow (vphp)	1000	1000	1805	1805	1694	1694
Total Lost time (s)	6.0	6.0		6.0	4.1	1.1
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	1902	838		3433	1611	1441
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	1902	838		3433	1611	1441
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.91	0.91
Adj. Flow (vph)	599	113	0	2150	346	809
RTOR Reduction (vph)	0	36	0	0	0	0
Lane Group Flow (vph)	599	77	0	2150	346	809
Confl. Peds. (#/hr)		3	3			
Heavy Vehicles (%)	1%	0%	0%	1%	1%	1%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	82.0	82.0		82.0	25.0	120.0
Effective Green, g (s)	82.0	82.0		82.0	27.9	120.0
Actuated g/C Ratio	0.68	0.68		0.68	0.23	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1299	572		2345	374	1441
v/s Ratio Prot	0.31			c0.63	c0.21	
v/s Ratio Perm		0.09				0.56
v/c Ratio	0.46	0.13		0.92	0.93	0.56
Uniform Delay, d1	8.8	6.6		16.1	45.0	0.0
Progression Factor	0.55	0.04		0.36	1.00	1.00
Incremental Delay, d2	1.0	0.4		5.6	28.2	1.6
Delay (s)	5.8	0.7		11.4	73.2	1.6
Level of Service	A	A		B	E	A
Approach Delay (s)	5.0			11.4	23.1	
Approach LOS	A			B	C	

Intersection Summary

HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.1
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

PM Peak Period
Future Total (2033)



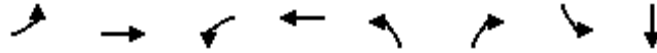
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	1117	1895	20	16	25
Future Volume (Veh/h)	17	1117	1895	20	16	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	19	1255	2038	22	17	27
Pedestrians			1		21	
Lane Width (m)			3.7		3.7	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			0		2	
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage veh			2			
Upstream signal (m)		111	118			
pX, platoon unblocked	0.66				0.66	0.66
vC, conflicting volume	2081				2736	1051
vC1, stage 1 conf vol					2070	
vC2, stage 2 conf vol					666	
vCu, unblocked vol	1617				2604	67
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	93				82	96
cM capacity (veh/h)	266				95	644
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	19	628	628	1359	701	44
Volume Left	19	0	0	0	0	17
Volume Right	0	0	0	0	22	27
cSH	266	1700	1700	1700	1700	199
Volume to Capacity	0.07	0.37	0.37	0.80	0.41	0.22
Queue Length 95th (m)	1.7	0.0	0.0	0.0	0.0	6.2
Control Delay (s)	19.6	0.0	0.0	0.0	0.0	28.1
Lane LOS	C					D
Approach Delay (s)	0.3			0.0		28.1
Approach LOS						D
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			63.0%		ICU Level of Service	B
Analysis Period (min)			15			

Queues

4: JBH Access & Northshore Blvd

PM Peak Period

Future Total (2033)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	14	1204	38	2093	67	45	9	11
v/c Ratio	0.13	0.43	0.10	0.70	0.50	0.21	0.05	0.07
Control Delay	8.1	4.9	1.9	5.6	63.7	8.0	47.8	26.0
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Delay	8.1	4.9	1.9	5.8	63.7	8.0	47.8	26.0
Queue Length 50th (m)	0.7	38.3	1.0	38.6	15.3	0.0	2.0	0.2
Queue Length 95th (m)	m1.7	51.2	m1.4	m40.5	28.9	6.6	6.8	5.7
Internal Link Dist (m)		93.6		242.3				54.0
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	106	2779	401	2998	387	487	498	416
Starvation Cap Reductn	0	0	0	220	0	0	0	0
Spillback Cap Reductn	0	0	0	38	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.43	0.09	0.75	0.17	0.09	0.02	0.03

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: JBH Access & Northshore Blvd

PM Peak Period
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↕↗		↰	↕↗		↰		↗	↰	↕↗	
Traffic Volume (vph)	13	1091	29	34	1844	19	62	0	41	8	1	9
Future Volume (vph)	13	1091	29	34	1844	19	62	0	41	8	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00		0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1823	3563		1824	3607		1785		1604	1814	1489	
Flt Permitted	0.07	1.00		0.20	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	136	3563		379	3607		1410		1604	1814	1489	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1173	31	38	2072	21	67	0	45	9	1	10
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	41	0	9	0
Lane Group Flow (vph)	14	1203	0	38	2093	0	67	0	4	9	2	0
Confl. Peds. (#/hr)	13		9	9		13	2		5	5		2
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	2%	0%	0%	0%	0%	11%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Effective Green, g (s)	89.4	89.4		97.2	97.2		9.8		9.8	9.8	9.8	
Actuated g/C Ratio	0.75	0.75		0.81	0.81		0.08		0.08	0.08	0.08	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	101	2654		352	2921		115		130	148	121	
v/s Ratio Prot		0.34		0.00	c0.58						0.00	
v/s Ratio Perm	0.10			0.08			c0.05		0.00	0.00		
v/c Ratio	0.14	0.45		0.11	0.72		0.58		0.03	0.06	0.02	
Uniform Delay, d1	4.4	5.9		3.2	5.2		53.1		50.7	50.9	50.7	
Progression Factor	0.77	0.69		0.65	0.87		1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.5	0.5		0.0	0.5		7.3		0.1	0.2	0.0	
Delay (s)	5.8	4.6		2.1	5.0		60.4		50.8	51.0	50.7	
Level of Service	A	A		A	A		E		D	D	D	
Approach Delay (s)		4.6			4.9			56.6			50.9	
Approach LOS		A			A			E			D	

Intersection Summary

HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2033)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	238	1042	243	1700	130	287	100	477
v/c Ratio	0.76	0.65	0.69	1.11	0.53	0.85	0.44	0.59
Control Delay	54.9	27.3	23.6	92.3	36.6	58.5	33.6	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.9	27.3	23.6	92.3	36.6	58.5	33.6	27.1
Queue Length 50th (m)	45.0	93.8	23.7	~241.6	21.9	54.1	16.6	31.2
Queue Length 95th (m)	#107.0	121.7	47.8	#284.6	33.7	80.8	26.8	44.6
Internal Link Dist (m)		242.3		207.3		212.6		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	314	1598	383	1531	245	429	226	989
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.65	0.63	1.11	0.53	0.67	0.44	0.48

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

PM Peak Period
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↕↗		↰	↕↗		↰	↕↗		↰	↕↗	
Traffic Volume (vph)	212	868	60	226	1518	63	120	118	146	92	179	259
Future Volume (vph)	212	868	60	226	1518	63	120	118	146	92	179	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.84		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.95	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1807	3534		1784	3525		1768	1426		1674	3089	
Flt Permitted	0.07	1.00		0.17	1.00		0.32	1.00		0.33	1.00	
Satd. Flow (perm)	140	3534		311	3525		596	1426		581	3089	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	238	975	67	243	1632	68	130	128	159	100	195	282
RTOR Reduction (vph)	0	4	0	0	2	0	0	40	0	0	153	0
Lane Group Flow (vph)	238	1038	0	243	1698	0	130	247	0	100	324	0
Confl. Peds. (#/hr)	94		128	128		94	81		250	250		81
Heavy Vehicles (%)	1%	1%	5%	2%	2%	5%	2%	0%	7%	4%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	70.9	54.2		66.7	52.1		32.2	25.2		32.2	25.2	
Effective Green, g (s)	70.9	54.2		66.7	52.1		32.2	25.2		32.2	25.2	
Actuated g/C Ratio	0.59	0.45		0.56	0.43		0.27	0.21		0.27	0.21	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	314	1596		352	1530		228	299		219	648	
v/s Ratio Prot	c0.11	0.29		0.08	c0.48		c0.03	c0.17		0.03	0.10	
v/s Ratio Perm	0.34			0.30			0.12			0.10		
v/c Ratio	0.76	0.65		0.69	1.11		0.57	0.83		0.46	0.50	
Uniform Delay, d1	34.1	25.5		17.1	34.0		35.0	45.3		34.7	41.8	
Progression Factor	1.41	0.92		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.4	1.9		5.7	59.2		3.4	16.7		1.5	0.6	
Delay (s)	57.5	25.4		22.8	93.2		38.4	62.0		36.2	42.4	
Level of Service	E	C		C	F		D	E		D	D	
Approach Delay (s)		31.3			84.4			54.6			41.4	
Approach LOS		C			F			D			D	

Intersection Summary

HCM 2000 Control Delay	59.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	106.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	42.5	381.0	194.3	262.5	110.7	83.6
Average Queue (m)	42.1	348.5	106.0	145.8	56.8	39.5
95th Queue (m)	43.0	461.7	252.5	293.2	100.0	70.4
Link Distance (m)		370.5	304.9	304.9	670.1	670.1
Upstream Blk Time (%)		70	1	2		
Queuing Penalty (veh)		0	7	27		
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	60	38				
Queuing Penalty (veh)	271	73				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B22	B22	NB	NB
Directions Served	T	T	T	T	T	T	L	R
Maximum Queue (m)	30.1	32.0	87.6	91.2	11.9	11.6	142.1	5.0
Average Queue (m)	2.7	2.9	52.2	54.1	1.5	2.0	82.0	0.2
95th Queue (m)	15.7	16.0	90.8	92.5	11.4	12.9	131.5	3.8
Link Distance (m)	304.9	304.9	82.7	82.7	14.9	14.9	662.3	662.3
Upstream Blk Time (%)			3	4	1	2		
Queuing Penalty (veh)			28	41	10	20		
Storage Bay Dist (m)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	EB	B22	B22	WB	WB	SB
Directions Served	L	T	T	T	T	T	TR	LR
Maximum Queue (m)	9.2	21.1	5.6	26.7	16.0	21.8	16.9	27.3
Average Queue (m)	3.9	3.2	0.2	1.0	0.5	1.4	1.9	11.4
95th Queue (m)	10.7	14.3	2.7	13.9	10.3	13.2	16.1	22.2
Link Distance (m)		14.9	14.9	82.7	82.7	99.4	99.4	91.5
Upstream Blk Time (%)	0	1	0					
Queuing Penalty (veh)	0	5	0					
Storage Bay Dist (m)	5.0							
Storage Blk Time (%)	8	0						
Queuing Penalty (veh)	45	0						

Queuing and Blocking Report
PM Peak Period

09/10/2018

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	11.0	54.3	56.1	12.0	51.8	58.0	31.1	26.8	11.5	14.0
Average Queue (m)	2.4	21.7	26.6	4.4	20.1	22.8	15.6	6.6	2.3	3.0
95th Queue (m)	8.1	46.6	50.6	11.2	42.1	45.6	29.3	18.4	8.4	9.8
Link Distance (m)		99.4	99.4		242.6	242.6		137.1	65.8	65.8
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)		1			0		2	0		
Queuing Penalty (veh)		0			0		1	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	125.8	128.9	127.2	32.4	238.4	238.4	107.3	138.8	45.6	68.8	89.6
Average Queue (m)	82.9	63.5	59.9	27.3	228.8	228.5	30.5	70.4	16.2	28.0	53.3
95th Queue (m)	162.2	133.6	110.8	39.1	233.8	234.1	78.0	128.3	35.6	53.7	85.4
Link Distance (m)		242.6	242.6		222.7	222.7		224.7		176.9	176.9
Upstream Blk Time (%)					68	60					
Queuing Penalty (veh)					0	0					
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)	7	0		7	50		0	5	0	0	
Queuing Penalty (veh)	29	1		53	113		0	5	0	0	

Network Summary

Network wide Queuing Penalty: 730

Queues
1: Northshore Blvd & QEW West Ramp

IBI Group
Future Total (2033)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	181	593	754	849	375	87
v/c Ratio	0.48	0.46	1.03	0.75	1.06	0.21
Control Delay	22.4	11.6	54.9	8.2	98.9	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	11.6	54.9	8.2	98.9	7.4
Queue Length 50th (m)	12.0	54.5	~104.8	29.9	~75.8	0.0
Queue Length 95th (m)	18.5	69.8	#215.0	79.4	#127.0	10.4
Internal Link Dist (m)		357.9	291.5		657.6	
Turn Bay Length (m)	40.0					
Base Capacity (vph)	379	1303	730	1135	355	420
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.46	1.03	0.75	1.06	0.21

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Northshore Blvd & QEW West Ramp

IBI Group
Future Total (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	152	498	701	790	334	77
Future Volume (vph)	152	498	701	790	334	77
Ideal Flow (vphpl)	2129	2129	1575	1575	1518	1518
Total Lost time (s)	1.5	4.5	6.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	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
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)	1985	2153	1577	1340	1299	1305
Flt Permitted	0.15	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	305	2153	1577	1340	1299	1305
Peak-hour factor, PHF	0.84	0.84	0.93	0.93	0.89	0.89
Adj. Flow (vph)	181	593	754	849	375	87
RTOR Reduction (vph)	0	0	0	84	0	63
Lane Group Flow (vph)	181	593	754	765	375	24
Confl. Peds. (#/hr)					5	
Heavy Vehicles (%)	3%	0%	1%	1%	1%	0%
Parking (#/hr)					0	
Turn Type	pm+pt	NA	NA	pm+ov	Prot	Perm
Protected Phases	5	2	6	8	8	
Permitted Phases	2			6		8
Actuated Green, G (s)	59.0	56.0	44.0	70.0	26.0	26.0
Effective Green, g (s)	60.5	57.5	44.0	70.0	26.0	26.0
Actuated g/C Ratio	0.64	0.61	0.46	0.74	0.27	0.27
Clearance Time (s)	3.0	6.0	6.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	5.0	5.0	5.0
Lane Grp Cap (vph)	379	1303	730	1086	355	357
v/s Ratio Prot	c0.05	0.28	c0.48	0.19	c0.29	
v/s Ratio Perm	0.25			0.38		0.02
v/c Ratio	0.48	0.46	1.03	0.70	1.06	0.07
Uniform Delay, d1	29.1	10.2	25.5	6.8	34.5	25.5
Progression Factor	1.00	1.00	0.72	1.83	1.00	1.00
Incremental Delay, d2	1.0	1.1	33.9	2.2	63.4	0.4
Delay (s)	30.1	11.4	52.2	14.7	97.9	25.9
Level of Service	C	B	D	B	F	C
Approach Delay (s)		15.7	32.3		84.3	
Approach LOS		B	C		F	
Intersection Summary						
HCM 2000 Control Delay			36.3		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.96			
Actuated Cycle Length (s)			95.0		Sum of lost time (s)	14.5
Intersection Capacity Utilization			89.4%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

Queues
2: QEW East Ramp & Northshore Blvd

IBI Group
Future Total (2033)



Lane Group	EBT	EBR	WBT	NBL	NBR
Lane Group Flow (vph)	587	316	1263	367	1030
v/c Ratio	0.44	0.43	0.81	0.86	0.92
Control Delay	8.8	1.4	23.9	49.2	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	1.4	23.9	49.2	15.2
Queue Length 50th (m)	21.6	0.0	100.6	58.9	0.0
Queue Length 95th (m)	m27.0	m0.1	132.8	73.3	0.0
Internal Link Dist (m)	291.5		64.1	648.6	
Turn Bay Length (m)					
Base Capacity (vph)	1326	738	1558	464	1122
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.44	0.43	0.81	0.79	0.92

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: QEW East Ramp & Northshore Blvd

IBI Group
Future Total (2033)



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑	↑	↑
Traffic Volume (vph)	540	291	0	1212	279	783
Future Volume (vph)	540	291	0	1212	279	783
Ideal Flow (vphp)	1450	1450	1670	1670	1450	1450
Total Lost time (s)	6.0	6.0		6.0	4.8	1.8
Lane Util. Factor	0.95	1.00		0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	1.00	1.00		1.00	0.95	1.00
Satd. Flow (prot)	2434	1091		2859	1254	1122
Flt Permitted	1.00	1.00		1.00	0.95	1.00
Satd. Flow (perm)	2434	1091		2859	1254	1122
Peak-hour factor, PHF	0.92	0.92	0.96	0.96	0.76	0.76
Adj. Flow (vph)	587	316	0	1262	367	1030
RTOR Reduction (vph)	0	144	0	0	0	0
Lane Group Flow (vph)	587	172	0	1263	367	1030
Confl. Peds. (#/hr)		6	6		1	
Heavy Vehicles (%)	3%	0%	0%	1%	0%	0%
Turn Type	NA	Perm		NA	Prot	Free
Protected Phases	2			6	4	
Permitted Phases		2				Free
Actuated Green, G (s)	51.8	51.8		51.8	30.2	95.0
Effective Green, g (s)	51.8	51.8		51.8	32.4	95.0
Actuated g/C Ratio	0.55	0.55		0.55	0.34	1.00
Clearance Time (s)	6.0	6.0		6.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1327	594		1558	427	1122
v/s Ratio Prot	0.24			0.44	0.29	
v/s Ratio Perm		0.16				c0.92
v/c Ratio	0.44	0.29		0.81	0.86	0.92
Uniform Delay, d1	12.9	11.7		17.6	29.2	0.0
Progression Factor	0.58	0.08		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.9		4.7	15.7	13.2
Delay (s)	8.3	1.8		22.3	44.9	13.2
Level of Service	A	A		C	D	B
Approach Delay (s)	6.0			22.3	21.5	
Approach LOS	A			C	C	

Intersection Summary

HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.8
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

3: Northshore Blvd & Site Driveway

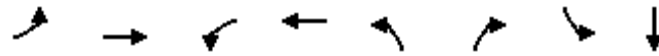
IBI Group
Future Total (2033)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	1296	1380	20	18	27
Future Volume (Veh/h)	28	1296	1380	20	18	27
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.93	0.93	0.92	0.92
Hourly flow rate (vph)	31	1456	1484	22	20	29
Pedestrians					23	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage veh			2			
Upstream signal (m)		111	118			
pX, platoon unblocked	0.81				0.86	0.81
vC, conflicting volume	1529				2308	776
vC1, stage 1 conf vol					1518	
vC2, stage 2 conf vol					790	
vCu, unblocked vol	1195				1758	271
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	93				89	95
cM capacity (veh/h)	471				187	584
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	31	728	728	989	517	49
Volume Left	31	0	0	0	0	20
Volume Right	0	0	0	0	22	29
cSH	471	1700	1700	1700	1700	313
Volume to Capacity	0.07	0.43	0.43	0.58	0.30	0.16
Queue Length 95th (m)	1.6	0.0	0.0	0.0	0.0	4.2
Control Delay (s)	13.2	0.0	0.0	0.0	0.0	18.6
Lane LOS	B					C
Approach Delay (s)	0.3			0.0		18.6
Approach LOS						C
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			48.8%		ICU Level of Service	A
Analysis Period (min)			15			

Queues
4: JBH Access & Northshore Blvd

IBI Group
Future Total (2033)



Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	29	1384	42	1492	82	55	35	17
v/c Ratio	0.13	0.54	0.13	0.53	0.48	0.21	0.16	0.06
Control Delay	10.2	10.2	4.2	6.1	45.5	5.1	35.4	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	10.2	4.2	6.1	45.5	5.1	35.4	0.4
Queue Length 50th (m)	1.9	69.2	1.4	50.1	13.5	0.0	5.5	0.0
Queue Length 95th (m)	7.2	105.9	4.4	78.8	25.8	5.0	13.2	0.0
Internal Link Dist (m)		93.6		242.3				54.0
Turn Bay Length (m)	45.0		70.0		30.0			
Base Capacity (vph)	222	2545	364	2809	493	613	644	626
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.54	0.12	0.53	0.17	0.09	0.05	0.03

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 4: JBH Access & Northshore Blvd

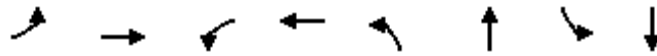
IBI Group
 Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖		↗	↖	↗	
Traffic Volume (vph)	27	1235	52	37	1309	19	75	0	51	32	0	16
Future Volume (vph)	27	1235	52	37	1309	19	75	0	51	32	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00		0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00		1.00	0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00		0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	1819	3585		1825	3604		1767		1572	1814	1609	
Flt Permitted	0.16	1.00		0.14	1.00		0.75		1.00	0.95	1.00	
Satd. Flow (perm)	314	3585		265	3604		1388		1572	1814	1609	
Peak-hour factor, PHF	0.93	0.93	0.93	0.89	0.89	0.89	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	1328	56	42	1471	21	82	0	55	35	0	17
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	49	0	15	0
Lane Group Flow (vph)	29	1382	0	42	1492	0	82	0	6	35	2	0
Confl. Peds. (#/hr)	15		12	12		15	3		7	7		3
Heavy Vehicles (%)	0%	1%	2%	0%	1%	0%	3%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm		Perm	Perm	NA	
Protected Phases		2		1	6						8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Effective Green, g (s)	59.7	59.7		67.5	67.5		9.5		9.5	9.5	9.5	
Actuated g/C Ratio	0.66	0.66		0.75	0.75		0.11		0.11	0.11	0.11	
Clearance Time (s)	6.0	6.0		4.0	6.0		7.0		7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	208	2378		264	2703		146		165	191	169	
v/s Ratio Prot		c0.39		0.01	c0.41							0.00
v/s Ratio Perm	0.09			0.11			c0.06		0.00	0.02		
v/c Ratio	0.14	0.58		0.16	0.55		0.56		0.04	0.18	0.01	
Uniform Delay, d1	5.6	8.3		5.0	4.8		38.3		36.1	36.7	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.4	1.0		0.3	0.8		4.9		0.1	0.5	0.0	
Delay (s)	7.0	9.3		5.3	5.6		43.1		36.2	37.2	36.1	
Level of Service	A	A		A	A		D		D	D	D	
Approach Delay (s)		9.3			5.6			40.4			36.8	
Approach LOS		A			A			D			D	

Intersection Summary		
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.59	A
Actuated Cycle Length (s)	90.0	Sum of lost time (s)
Intersection Capacity Utilization	69.7%	17.0
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	222	1258	339	1004	217	351	109	613
v/c Ratio	0.66	0.93	1.01	0.68	0.93	0.82	0.46	0.64
Control Delay	23.2	45.2	85.0	31.2	72.4	48.2	28.8	25.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	45.2	85.0	31.2	72.4	48.2	28.8	25.2
Queue Length 50th (m)	21.3	132.5	56.4	91.9	33.4	59.9	15.8	38.3
Queue Length 95th (m)	41.0	#173.1	#157.2	#145.9	#57.6	83.6	24.2	50.2
Internal Link Dist (m)		242.3		207.3		212.6		167.7
Turn Bay Length (m)	165.0		30.0		105.0		50.0	
Base Capacity (vph)	377	1352	336	1476	233	559	235	1222
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.93	1.01	0.68	0.93	0.63	0.46	0.50

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

5: Lakeshore Rd/Maple Ave & Northshore Blvd

IBI Group
Future Total (2033)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	941	179	315	886	47	200	141	182	100	285	279
Future Volume (vph)	198	941	179	315	886	47	200	141	182	100	285	279
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.94		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3504		1807	3564		1805	1626		1735	3337	
Flt Permitted	0.17	1.00		0.09	1.00		0.23	1.00		0.26	1.00	
Satd. Flow (perm)	319	3504		169	3564		444	1626		480	3337	
Peak-hour factor, PHF	0.89	0.89	0.89	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	1057	201	339	953	51	217	153	198	109	310	303
RTOR Reduction (vph)	0	14	0	0	3	0	0	48	0	0	180	0
Lane Group Flow (vph)	222	1244	0	339	1001	0	217	303	0	109	433	0
Confl. Peds. (#/hr)	38		18	18		32	13		102	102		13
Heavy Vehicles (%)	1%	1%	2%	1%	1%	6%	1%	0%	2%	4%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.8	42.0		61.3	45.5		32.7	25.7		32.7	25.7	
Effective Green, g (s)	54.8	42.0		61.3	45.5		32.7	25.7		32.7	25.7	
Actuated g/C Ratio	0.50	0.38		0.56	0.41		0.30	0.23		0.30	0.23	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	331	1337		336	1474		218	379		222	779	
v/s Ratio Prot	0.08	0.35		c0.15	0.28		c0.06	0.19		0.03	0.13	
v/s Ratio Perm	0.26			c0.41			c0.23			0.11		
v/c Ratio	0.67	0.93		1.01	0.68		1.00	0.80		0.49	0.56	
Uniform Delay, d1	18.1	32.6		34.3	26.3		36.1	39.7		29.9	37.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	12.8		51.4	2.5		59.3	11.5		1.7	0.9	
Delay (s)	23.4	45.4		85.6	28.8		95.4	51.2		31.6	38.0	
Level of Service	C	D		F	C		F	D		C	D	
Approach Delay (s)		42.1			43.2			68.1			37.0	
Approach LOS		D			D			E			D	

Intersection Summary

HCM 2000 Control Delay	45.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Queuing and Blocking Report
Weekend Peak Period

09/10/2018

Intersection: 1: Northshore Blvd & QEW West Ramp

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (m)	42.4	108.9	130.4	88.0	103.1	24.1
Average Queue (m)	29.0	44.4	59.4	32.8	54.0	8.5
95th Queue (m)	46.9	83.0	107.5	66.4	94.8	18.3
Link Distance (m)		370.5	304.9	304.9	670.1	670.1
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	40.0					
Storage Blk Time (%)	5	7				
Queuing Penalty (veh)	23	11				

Intersection: 2: QEW East Ramp & Northshore Blvd

Movement	EB	EB	WB	WB	B22	B22	NB	NB
Directions Served	T	T	T	T	T	T	L	R
Maximum Queue (m)	38.3	37.2	88.6	87.9	1.0	8.1	89.3	10.1
Average Queue (m)	15.0	13.2	37.3	38.6	0.1	0.3	48.3	0.3
95th Queue (m)	30.3	28.3	74.4	73.5	1.1	4.5	76.5	7.8
Link Distance (m)	304.9	304.9	82.7	82.7	14.9	14.9	662.3	662.3
Upstream Blk Time (%)			0	0		0		
Queuing Penalty (veh)			2	3		1		
Storage Bay Dist (m)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 3: Northshore Blvd & Site Driveway

Movement	EB	EB	B22	B22	WB	WB	SB
Directions Served	L	T	T	T	T	TR	LR
Maximum Queue (m)	9.2	28.6	10.7	24.3	1.5	2.7	20.0
Average Queue (m)	3.5	2.7	0.4	0.8	0.1	0.1	8.5
95th Queue (m)	10.7	13.2	4.0	13.4	1.2	1.8	17.3
Link Distance (m)		14.9	82.7	82.7	99.4	99.4	91.5
Upstream Blk Time (%)	0	1					
Queuing Penalty (veh)	0	4					
Storage Bay Dist (m)	5.0						
Storage Blk Time (%)	5	0					
Queuing Penalty (veh)	33	0					

Queuing and Blocking Report
Weekend Peak Period

09/10/2018

Intersection: 4: JBH Access & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	R	L	TR
Maximum Queue (m)	26.3	87.8	88.6	27.4	77.9	80.5	28.1	20.7	18.1	8.6
Average Queue (m)	4.5	34.5	41.0	5.6	28.0	31.6	12.8	7.1	6.5	3.0
95th Queue (m)	15.4	71.1	76.7	17.5	59.9	63.6	25.0	17.2	15.8	9.1
Link Distance (m)		99.4	99.4		242.6	242.6		137.1	65.8	65.8
Upstream Blk Time (%)		0	0							
Queuing Penalty (veh)		0	0							
Storage Bay Dist (m)	45.0			70.0			30.0			
Storage Blk Time (%)	0	4		0	0		0	0		
Queuing Penalty (veh)	0	1		0	0		0	0		

Intersection: 5: Lakeshore Rd/Maple Ave & Northshore Blvd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	T	TR
Maximum Queue (m)	76.4	138.6	143.8	32.4	234.3	235.1	84.3	117.0	42.4	69.6	86.3
Average Queue (m)	30.7	81.2	87.5	32.3	225.1	218.2	36.2	51.1	15.5	33.3	45.8
95th Queue (m)	63.4	129.5	136.5	32.4	244.4	262.9	70.3	94.8	33.3	56.1	76.1
Link Distance (m)		242.6	242.6		222.7	222.7		224.7		176.9	176.9
Upstream Blk Time (%)					88	35					
Queuing Penalty (veh)					0	0					
Storage Bay Dist (m)	165.0			30.0			105.0		50.0		
Storage Blk Time (%)	0	0		82	19		0	1	0	1	
Queuing Penalty (veh)	0	1		364	59		0	2	1	1	

Network Summary

Network wide Queuing Penalty: 506