TIS Addendum

Upper's Quarry

March 2023 | Contract # 16137

Walker Aggregates Inc.

TYLin

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APPENDICES

1 INTRODUCTION

T.Y. Lin International Canada Inc. (TYLin), formerly The Municipal Infrastructure Group Ltd. (TMIG), was retained by Walker Aggregates Inc., to prepare a Traffic Impact Study (TIS) for the proposed Upper's Quarry. The TIS was submitted in October, 2021 to City of Thorold and Niagara Region Staff. The enclosed TIS Addendum summarizes updates to the traffic analysis and proposed conceptual design of the Upper's Quarry access based on comments received from City and Region Staff, dated August 23, 2022.

The comments from Staff are provided in **Appendix A** for reference purposes, along with the transportation comment responses prepared by TYLin for inclusion in an overall comment response matrix for the Quarry application.

2 TRAFFIC ANALYSIS

2.1 Existing Horizon Year

As per the Region's comments, TYLin's 2018 Turning Movement Count (TMC) data has been updated to reflect 2023 as the baseline year by growing all movements at all study intersections by 2% per annum. Accordingly, all study horizon years were reassessed, and corresponding results, and recommendations have been updated.

Traffic volume figures corresponding to the 2018 TMC volumes and the new 2023 baseline horizon year are provided in **Appendix B**.

2.2 Background Growth Rates

As per the Region's request, a 2% annual growth rate was used to grow 2018 traffic volumes to the 2023 baseline horizon year. The Region's comments also indicated that an annual growth rate of 2% should be applied for the 2025 and 2035 future background horizon years as well.

TYLin is of the opinion that a 2% annual growth rate applied to the 2018 counts through to the final 2035 future horizon year, representing 17 years of growth, is unsustainable in addition to the two considerable background developments already accounted for in the October 2021 TIS. However, TYLin applied background growth beyond the 2023 baseline year by adopting more realistic growth rates used in the 2018 Rolling Meadows Development TIS. An excerpt of the Rolling Meadows TIS is provided in **Appendix C** for reference purposes.

The following annual growth rates were used to grow background traffic beyond the 2023 baseline horizon year:

- Highway 20/Lundy's Lane: 1%
- Thorold Townline: 1%
- Beaverdams Road: 1%
- Highway 58/Davis Road: 0.5%
- Thorold Stone Road: 1%

Although Thorold Stone Road was not a part of the Rolling Meadow's study area, a 1% growth rate was assumed to match most other roads within the Rolling Meadows study.

2.3 Heavy Vehicle Percentages

The Region's comments included the request that the background growth of existing heavy vehicles also be taken into account in the future horizon years, as previously TYLin only adjusted the heavy vehicles percentages for the future horizon years based on existing heavy vehicle volumes (no growth applied) in order to account for aggregate truck site traffic.

The heavy vehicle volumes from the 2018 TMCs were grown by 2% to the 2023 baseline horizon, as a component of the overall 2% annual background growth requested by the Region. The existing heavy vehicles volumes were grown further to the 2025 and 2035 horizon years using the annual growth rates noted for each road in **Section 2.2**.

Heavy vehicle percentages for the 2025 and 2035 future background scenarios were calculated by taking the grown heavy vehicle traffic volume for each movement and dividing by the corresponding total volume of future background traffic (existing traffic, background growth, and background development traffic). Heavy vehicle percentages for the 2025 and 2035 future total scenarios were calculated in the same way, with the addition of site-generated heavy vehicle traffic.

2.4 Updated Traffic Volumes

While the estimated site traffic volumes were not required to be updated by the City or Region, the addition of future background growth has resulted in new sets of volumes for all study area intersections and horizon years. Updated 2025 and 2035 future background and future total traffic volume figures are provided in **Appendix B**.

2.5 Signal Warrants

A signal warrant was conducted at the intersection of Beaverdams Road and Thorold Townline Road in the October 2021 TIS and has been updated accordingly due to increased background traffic volumes for all horizon years.

The traffic signal warrant was conducted according to Justification 7 in Book 12 of the Ontario Traffic Manual (OTM) for both the 2025 future background and future total scenarios. A signal is warranted at the intersection under 2025 future background conditions (Justifications 1A, 1B, and 2B are 100% met; Justification 2A was 61% met). Operational improvements were observed should the intersection become signalized. Capacity analysis was conducted for both signalized and all-way stop control (AWSC).

Signal warrant sheets detailing the results of the warrant process are provided in **Appendix D** for all four future scenarios.

2.6 Capacity Analysis

The Region provided comments on Synchro settings TYLin utilized in the October 2021 TIS, such as Peak Hour Factors (PHF) and saturation flow rate. The ideal saturation flow was adjusted to 1,750 vehicles per hour per lane, as requested by the Region, instead of the previously used default 1,900 saturation flow rate. The PHFs used in the October 2021 TIS were maintained.

Capacity analysis was updated for all horizon years and scenarios due to the reduction in saturation flow rate and the overall increase in traffic volumes due to background traffic growth being applied at the Region's request. As expected, these two factors combined led to an overall increase in delay, v/c ratios, and queue lengths throughout the study area for all horizon years.

In particular, the application of growth rates to already high-volume dedicated turning movements (for example, left-turn volumes) is a large contributor to an overall degradation in capacity results at several intersections compared to the October 2021 TIS.

While TYLin has provided potential mitigation measures that can be applied to address over capacity movements, particularly by the 2035 horizon year, many of these measures may not need to be applied in the future. TYLin believes that the relatively high background growth in conjunction with the two large background developments in the area is an overestimation of future traffic volumes, and that the predicted capacity results presented in this addendum may not be realized in the future.

In addition to the large amount of background growth generated over the course of 17 years (2018 to 2035), growing the historical 2018 TMCs to estimate baseline and future conditions may not accurately reflect any traffic pattern changes that may have occurred in the study area due to the lingering effects of the COVID-19 pandemic on how and when individuals will travel. This is particularly true for individuals that are still able to work at home or have hybrid working arrangements that allow them to either not have to commute to work at all, or only on select days of the week.

Detailed capacity reports and summary tables are provided in **Appendix E** for all horizon years. Results for the 2018 year based on TMC volumes have also been provided as a comparison point to the new 2023 baseline results, as both make use of existing signal timing plans.

The following intersections were identified as having capacity constraints for one or more movements during the a.m. and p.m. peak hours which either resulted in the implementation of mitigation measures or the need for monitoring of the intersection to determine if any mitigating action is required in the future.

2.6.1 Davis Road and Thorold Stone Road

Under 2023 baseline conditions, the westbound left movement experiences high delay and operates with a v/c ratio of 1.30 during the p.m. peak hour. With signal timing optimization for the 2025 future background horizon, overall operations for the p.m. peak hour are moderated compared to the 2023 baseline scenario. During the p.m. peak hour, the maximum v/c ratio experienced by an individual movement is predicted to be 0.95 (shared northbound left/through movement). Both the northbound left and shared left/through movements are approaching capacity and are expected to operate at LOS F due to background growth. Under 2025 future total conditions, the intersection experiences minimal impact from site traffic compared to 2025 future background results. For example, the v/c ratio for the eastbound through movement increases from 0.94 to 0.96 during the p.m. peak hour.

After 10 years of projected growth was applied to all movements at the intersection, modifications to the cycle length and phasing splits were found to be insufficient to address capacity constraints during the p.m. peak hour under 2035 future background conditions. Similar to other intersections where improvements are proposed for the 2035 horizon year, TYLin recommends that the intersection is monitored to determine if the projected volumes and constrained movements are actualized.

It was observed that minimal traffic enters and exits the north leg of the intersection under existing conditions, and that alternate routes to properties north of Thorold Stone Road exist via Thorold Townline Road/Taylor Road and Old Thorold Stone Road. In order to provide additional green time to the high volume northbound left movement and opposing eastbound and westbound movements, TYLin recommends that the north leg of the intersection be restricted to southbound right-out traffic only (existing channelized southbound right) while allowing all inbound movements (northbound on David Road) to remain. This removes the need for southbound green time to be accounted for during the signal's cycle, shifting capacity to critical high-volume movements.

During the a.m. peak hour, a total of three existing trips would be impacted by the proposed turning restriction (2 southbound through and 1 southbound left trip) while a total of 10 existing trips (6 southbound through and 4 southbound left trips) would be impacted during the p.m. peak hour. These trips were reassigned to the southbound right movement under 2035 future background and total conditions.

The recommended mitigation measures allow for all individual movements to operate with a v/c ratio of 1.0 or less during the p.m. peak hour under 2035 future conditions. Despite all movements operating at acceptable levels for a high-volume intersection, an overall v/c ratio of 1.02 is predicted during the p.m. peak hour for both future background and future total conditions. Minimal increases in v/c and delay occur with the addition of site traffic under 2035

future total conditions.

2.6.2 Davis Road and Lundy's Lane

Under 2025 future background conditions, the westbound through movement is expected to operate with a v/c ratio of 0.88 during the p.m. peak hour, increasing to 0.89 under 2025 future total conditions. Similarly, the overall p.m. peak hour v/c ratio for the intersection is expected to increase from 0.92 to 0.93 between 2025 future background and future total conditions.

Under 2035 future background conditions, after 10 years of background growth and the addition of background development traffic, the intersection is predicted to operate above theoretical capacity with an overall v/c ratio of 1.14 during the p.m. peak, and the v/c ratio of individual movements reaching up to 1.11.

Mitigation measures were investigated, however the addition of exclusive turn lanes (where not already incorporated) did not result in a significant impact to operational results, neither did reasonable increases in the cycle length. Due to the high volume of conflicting left-turn movements and eastbound and westbound through movements, the addition of a second through lane in each direction on Lundy's Lane is an option to bring the intersection operations under capacity.

However, due to the intersection not falling on the proposed haul route and minimal amounts of quarry staff expected to travel through the intersection, detailed mitigation measures were not investigated at this time. Also, it is possible that the projected turning volumes, particularly the left-turn volumes during the p.m. peak hour, may not be realized by the 2035 horizon year. TYLin recommends the intersection be monitored as development in the surrounding area continues to determine if any mitigation measures at the intersection will be required in the future.

2.6.3 Thorold Townline Road and Thorold Stone Road

Under 2023 baseline conditions, the northbound left movement will operate with a v/c ratio of 0.94 during the a.m. peak, and 1.05 during the p.m. peak, exceeding theoretical capacity. The shared southbound through/right movement will operate with a v/c ratio of 0.94 during the p.m. peak based on existing signal timing plans.

Under 2025 future background conditions, all individual movements are expected to operate with v/c ratios below 1.0 during both peak hours after adjustments were made to the existing signal timing plan. Several individual movements are predicted to approach capacity during the a.m. and p.m. peak hours, including the shared southbound through/right movement. Similar results are observed under 2025 future total conditions, with minimal increases in v/c ratios and delay due to site traffic. The overall v/c ratio for the intersection is predicted to be 0.97 for both

peak hours under 2025 future background conditions. Upon the addition of site traffic under 2025 future total conditions, the overall v/c ratio of the intersection is estimated to increase to 1.00 and 0.99 during the a.m. and p.m. peak hour, respectively.

Under 2035 future background conditions, it was found that increasing the cycle length was an ineffective way to address the 10 years of traffic volume growth that was applied to the intersection volumes, including turning movements. It is proposed that a dedicated southbound right turn lane be constructed as a mitigation measure to improve southbound operations, and thus allowing for reallocation of green time in the signal cycle to other critical phases. The dedicated southbound right lane will allow for more consistent right-turn-on-red behaviour and reduce the rate at which the southbound through/right queue builds adjacent to the southbound left-turn lane, resulting in reduced blockage of the left-turn lane.

With the southbound right-turn lane constructed for the 2035 horizon year, operations at the intersection remain similar to 2025 capacity levels despite 10 years of background growth and background development traffic.

Under 2035 future background conditions, the overall intersection v/c is predicted to be 0.90 an 0.99 during the a.m. and p.m. peak hours, respectively. Under 2035 future total conditions, the overall v/c ratio is predicted to increase to 0.96 and 1.02 during the a.m. and p.m. peak hours, respectively. Although the total site traffic volumes at the intersection don't change between the 2025 and 2035 horizon years, the overall intersection v/c increases by approximately 0.06 from future background to future total in 2035 compared to an approximate 0.03 increase in 2025. This points to the high volume of vehicles that have been added to the intersection over 10 years, and that the intersection has become more sensitive to increase in traffic in 2035 compared to 2025.

Of note, existing truck traffic from the Walker's quarry to the north is expected to be removed from the local road network upon closure/decommissioning of the existing quarry. Truck traffic from the proposed Upper's Quarry will replace existing quarry traffic in the area, resulting in a generally net zero increase in aggregate truck traffic within the study area. In particular, this means that the heavy truck volumes and associated heavy vehicle percentages used in the capacity analysis are conservative, as southbound truck traffic at the intersection of Thorold Stone Road and Thorold Townline Road was not reduced.

2.6.4 Thorold Townline Road and Beaverdams Road

The unsignalized intersection operates well under 2023 baseline conditions, with individual movements operating at LOS 'B' and with maximum v/c ratios of 0.34 or 0.45 during the a.m. and p.m. peak hour, respectively.

Under 2025 future background conditions, a signal was found to be warranted at the

intersection. Accordingly, signalized operation was applied to the Synchro analysis for both the 2025 and 2035 future horizons years. For comparison purposes, all-way stop control results are also included in **Appendix E** for both the 2025 future background and future total scenarios.

Upon signalization, under 2025 future background conditions, individual movements operate with v/c ratios of less than 0.77 and 0.78 during the a.m. and p.m. peak hours, respectively, with LOS 'C' or better. The intersection operates well with overall LOS 'C' and v/c ratios of 0.46 and 0.54 during the weekday a.m. and p.m. peak hours, respectively. Under 2025 future total conditions, site traffic has a minimal effect on the operations of the intersection. The overall LOS 'C" is maintained for both peak hours, with the overall v/c ratio increasing to 0.52 during the a.m. peak hour and 0.60 during the p.m. peak hour.

Under 2035 future background conditions, the signalized intersection is expected to continue operating well during the weekday a.m. peak hour, with an overall v/c ratio of 0.69 and LOS 'C'. During the p.m. peak hour, the westbound and northbound shared left/through/right movements are approaching capacity with predicted v/c ratios of 0.90 and 0.93, respectively. However, the intersection operates with an overall v/c ratio of 0.91 and LOS 'C', indicating some reserve capacity remains despite high levels of background traffic growth in the 2035 horizon.

During the p.m. peak hour under 2035 future total conditions, the westbound and northbound shared left/through/right movements are predicted to operate with v/c ratios of 0.95 and 0.99, respectively. The intersection operates with an overall v/c ratio of 0.97 and LOS 'D' during the p.m. peak hour.

Increasing the cycle length of the signalized intersection was investigated as a mitigation measure to lower the predicted v/c ratios for both the 2035 future background and future total scenarios, however, the increase in cycle length also worsened the predicted delays without sufficiently decreasing the v/c ratios. As discussed in **Section 2.7.5**, it is recommended that the intersection be monitored in the future to determine if the projected traffic volumes, particularly the turning volumes, will be realized at this intersection. Operations can be improved through the introduction of dedicated left-turn lanes, however, the intersection has natural constraints due to the body of water that surrounds it. A cost-benefit investigation would be required to determine if the improvement in traffic operations would be worth the cost of local widening needed to implement left-turn lanes.

Of note, the proposed mitigation measures are not triggered by the addition of site traffic, but by forecasted background traffic growth and background development traffic.

2.7 Queueing Analysis

Similar to the results presented in the October 2021 TIS, the increase in queue lengths throughout the study area is primarily due to background traffic growth and future developments. As already noted, TYLin believes that the updated volumes assessed in this Addendum are highly conservative. This means that it is possible that some of the movements that are predicted to experience high 95th percentile queue lengths may be overstated compared to future in-field observations. Several movements and intersections will require monitoring to determine if the queue lengths reported will be actualized in the future.

Detailed SimTraffic queueing reports and summary tables are provided in **Appendix F** for all horizon years. Results for the 2018 year based on TMC volumes have also been provided as a comparison point to the new 2023 baseline results.

The following intersections were identified as having one or more movements during the a.m. and p.m. peak hours which are predicted to experience 95th percentile queues that exceed the existing available storage length.

2.7.1 Davis Road and Thorold Stone Road

During the p.m. peak hour, the eastbound right turn movement 95th percentile queue is predicted to extend beyond its available storage under 2023 baseline conditions and future background and total conditions as well. This is not typical of a free-flow channelized right-turn, however, it is likely that the eastbound right-turn lane gets blocked at times by the adjacent eastbound through lane, causing SimTraffic to report queueing at a free-flow movement.

Other movements at the intersection are not expected to exceed available storage by more than one or two vehicle lengths, and are expected to be accommodated within the taper of the turn lane.

2.7.2 Davis Road and Lundy's Lane

During the p.m. peak hour under 2025 future background and future total conditions, the eastbound and southbound left movements are predicted to experience 95th percentile queues that either match or exceed available queue storage lengths. This is largely due to background growth and increased turning volumes at the intersection.

Under 2035 future background and future total conditions, the 95th percentile queues of several movements are estimated to exceed available storage during the p.m. peak hour. The increase in dedicated turning movements with long queues is due to 10 additional years of background growth and background development traffic compared to the 2025 horizon year results.

Minimal site traffic is expected to travel through this intersection and is not considered to be a

significant contributor to the degradation of operations at this intersection.

2.7.3 Thorold Townline Road and Thorold Stone Road

The 95th percentile queue of the eastbound left movement is expected to minimally exceed available storage during the weekday p.m. peak hour under 2023 baseline conditions. Under 2025 future background conditions, the movement is expected to exceed available storage by approximately 40 and 30 metres during the a.m. and p.m. peak hours, respectively. Under 2025 future total conditions, the eastbound left movement is predicted to have 95th percentile queues that exceed available storage by approximately 50 and 30 metres during the a.m. and p.m. peak hours, respectively. This implies that site traffic could marginally impact the predicted eastbound left movement's 95th percentile queue by up to 10 metres during the a.m. peak hour in 2025 (of note, site traffic does not directly increase the volume of this movement).

Under 2035 future background conditions, background growth increases the predicted 95th percentile queue length of the eastbound left movement to exceed available storage by approximately 90 and 30 metres during the a.m. and p.m. peak hours, respectively. Compared to the predicted 2025 future background results, the 95th percentile queue for the eastbound left movement is expected to increase by 60 metres during the a.m. peak.

Under 2035 future total conditions, the eastbound left movement is predicted to have 95th percentile queues exceed available storage by approximately 130 and 40 metres during the a.m. and p.m. peak hour, respectively. Compared to 2035 future background conditions, the queue length is expected to increase by 40 metres during the a.m. peak hour when site traffic is included in the analysis. This is a significant increase between future background and future total conditions compared to the 10 metre increase observed in 2025 despite the volume of site traffic remaining unchanged between horizon years. This is indicative of the intersection approaching capacity and becoming more sensitive to changes in traffic volumes in 2035 due to increased background growth compared to the 2025 horizon year.

The 95th percentile queue of the southbound left movement is expected to exceed available storage by approximately 125 metres during the a.m. peak hour under 2025 future total conditions. During the p.m. peak hour, the movement is expected to exceed available storage by approximately 25 metres under 2025 future background conditions and by 130 metres under 2025 future total conditions. The southbound left queueing issues expected during the 2025 horizon year are generally remedied under 2035 future background and future total conditions due to the addition of a southbound right turn lane removing right-turning vehicles from the adjacent through lane (less blockage of southbound left vehicles). Site traffic is not expected to directly contribute to the increase in southbound left-turning traffic at the intersection, however, it will contribute to the adjacent southbound through and opposing northbound movements.

The westbound and northbound left movements are expected to have 95th percentile queues under 2035 future total conditions that will exceed available storage. Similar to the southbound left movement, the increase in the predicted 95th percentile length between future background and future total conditions is considerably higher in 2035 compared to 2025 results despite estimated site traffic volumes and assignment remaining consistent between the two future horizon years. This is another example of the sensitive nature of changes in traffic volumes under 2035 future conditions due to the large amount of background growth that occurs between 2025 and 2035.

2.7.4 Thorold Townline Road and Lundy's Lane

The predicted 95th percentile queues of the eastbound right and northbound left movements are expected to minimally exceed available storage by up to 15 metres, about the equivalent of two vehicles, under 2023 baseline conditions. A large increase in predicted queue lengths was not observed between 2023 baseline and 2025 future background conditions. Similarly, there was marginal differences in predicted 95th percentile queue lengths between 2025 future background and 2025 future total traffic conditions. Minimal amounts of site staff traffic (automobiles, not aggregate trucks) are predicted to travel through the intersection, resulting in insignificant impacts to predicted queue lengths.

Under 2035 future background and future total conditions, after 10 years of background growth and additional development, the majority of movements at the intersection are expected to exceed storage either during the a.m. or p.m. peak. The storage exceedances are expected to range from approximately 10 to 110 metres.

The movements that are expected to exceed available storage under 2035 future background conditions are also expected to exceed available storage under 2035 future total conditions as well, however, most queues are expected to remain relatively the same or decrease slightly when compared to 2035 future background results, with the exception of the eastbound left movement.

Under 2035 future background conditions, the 95th percentile queue length of the eastbound left movement is predicted to exceed available storage by approximately 40 metres during the p.m. peak hour. Under 2035 future total conditions, the 95th percentile queue is predicted to exceed available storage by approximately 110 metres during the p.m. peak hour. It should be noted that a total of six site trips are added to the intersection under future total conditions, of which only two site trips are added to the eastbound left movement. It is likely that the predicted eastbound left-turn movements are generally caused by high volumes of opposing traffic during the p.m. peak hour under 2035 future conditions.

Minimal site traffic is expected to travel through this intersection and is not considered to be a

significant contributor to the increases in predicted 95th percentile queue lengths at this intersection. It is recommended that the intersection be monitored to confirm whether the projected background growth of traffic will be realized by 2035 and if any further mitigation measures are required to address any potential queueing issues at the intersection.

2.7.5 Thorold Townline Road and Beaverdams Road

Under 2023 baseline conditions and 2025 future conditions, the shared left/through/right movements at the intersection are predicted to operate with 95th percentile queues of approximately 115 metres or less during both peak hours.

Under 2035 future background conditions, the northbound and southbound shared left/through/right movements are predicted to experience 95th percentile queues of approximately 490 and 255 metres, respectively, during the p.m. peak hour. This dramatic increase from 2025 to 2035 future background conditions is due to background growth and development traffic increasing over 10 years. The sensitive state at which the rural signalized intersection is predicted to operate becomes obvious when the estimated 95th percentile queue lengths jump to approximately 940 and 870 metres, respectively, under 2035 future total conditions.

As discussed previously, while this intersection is generally expected to operate with acceptable v/c ratios and delays when signalized in 2025 and 2035, the intersection is approaching capacity under 2035 conditions. This would also be true if the intersection remained as an AWSC intersection. As traffic at the intersection grows, the amount of left-turning traffic and blocking behaviour also increases. It would typically be recommended that left-turn lanes be constructed, however, the intersection of Beaverdams Road and Thorold Townline Road is constricted by natural barriers, i.e. the body of water immediately south of the intersection.

TYLin recommends that the intersection be monitored to determine if the predicted traffic volumes and their associated queues will be realized in the future. At that time, a cost-benefit analysis could be conducted to determine the cost of a local widening at the intersection to construct left-turn lanes to improve traffic operations at the intersection.

3 CONCEPTUAL DESIGN

3.1 Design Vehicle

Town Staff provided comments on the choice of a TAC HSU truck as the design vehicle used to assess the adequacy of the proposed Upper's Quarry access design. The Town requested clarification on the design vehicle to be used in the design, as "Aerial views of the existing quarry show several large truck with trailers that have a combined length of up to 75 feet long".

Through discussion with Walkers staff, it is TYLin's understanding that the large trucks with trailers (up to 75 feet long) on the aerial views described in the City's comment are typical of trucks that service the landfill within the immediate vicinity of the existing quarry north of the proposed Upper's Quarry. These longer design vehicles are not the typical vehicles that are expected to service Upper's Quarry.

Accordingly, an HSU has been maintained as the design vehicle at this time.

3.2 Sightline Analysis

TYLin conducted sightline analysis to determine if the vertical curvature near Upper's Lane would impede a driver's line of sight to the south to assess if the northbound acceleration lane was required, as per the Region's request.

The sightline analysis was completed based on the Thorold Townline Road centreline location and elevations provided to TYLin from MHBC. The location of the centreline was based on drone aerial photography completed by TEC Engineering on January 30, 2020. The elevations of the centreline were based on a topographic survey prepared by TEC Engineering using October 2016 and February 2017 aerial photography.

Drawings that illustrate the results of the sightline analysis are located in **Appendix G**. It was found that drivers of both trucks and passenger vehicles satisfy minimum sightline requirements, per TAC Guidelines, to the south at the existing Upper's Lane location. This would allow drivers to determine if a large enough gap exists to enter the northbound stream of traffic and get up to speed safely without a northbound acceleration lane, as per the Region's comment.

3.3 Access Alternatives

Based on comments from the Region and TYLin's experience with other aggregate applications, three alternative conceptual designs have been prepared for the Region's review and are provided in **Appendix H**.

As per the Region's comment, the conceptual design has been updated to include additional deceleration length for the southbound left-turn lane for all three design alternatives.

The three conceptual design alternatives are designed to address the concerns of the Region that the acceleration and deceleration lanes associated with the quarry have the potential to cause unwanted passing behaviour in the northbound direction. The Region provided a comment on the potential to remove the northbound acceleration lane, "If the sightline is adequate, there is no need for the acceleration lane as drivers might use it for passing." As the sightlines were determined to be adequate, the access design alternatives had the option to not include the northbound acceleration lane, as per the Region's comment.

A summary of the three potential access designs are as follows:

- Design #1: Removal of northbound acceleration lane. Northbound right-turn lane with full deceleration length provided
- Design #2: Removal of northbound acceleration lane. Northbound right-turn lane shortened to reduce possibilities of it being mistaken/used as a passing lane. Also considers that trucks will not typically access the site using the northbound right since with the exception of local deliveries, the prescribed haul route is to/from the north on Thorold Townline Road via Upper's Lane
- Design #3: Maintains previous northbound acceleration lane paired with the shortened northbound right-turn lane. This reduces the overall length of road that drivers may mistake as a 2-lane passing section while maintaining the acceleration lane for trucks to provide safer operations with respect to the separation of truck traffic while getting up to speed.

TYLin recommends that Conceptual Design Alternative 3 be adopted as the preferred access configuration, as it allows for the Region's request that the section of the northbound acceleration and deceleration lanes be minimized to address potential passing concerns while still providing an acceleration lane for heavy vehicle traffic to get up to speed and safely merge into mixed traffic.

Providing the site's truck traffic adequate opportunity to accelerate before merging into mixed traffic will become especially important should the projected 2035 future traffic volumes along Thorold Townline Road be actualized. While there is currently adequate sight distance to the south for drivers to determine if a gap is big enough to exit the site and then accelerate up to

speed without impeding mixed traffic without using an acceleration lane, this is only possible if larger gaps in the northbound stream of traffic are available. As the volume of northbound vehicles increases over time, the number and size of these gaps in traffic will shrink. This may result in changes in driver behaviour exiting the site, accepting smaller gaps than they should, if they do not have a separate acceleration lane to make use of.

4 RECOMMENDATIONS AND CONCLUSIONS

As stated previously, TYLin is of the opinion that the background traffic growth rates applied to the study area road network cause an overestimation of future traffic volumes. In addition to 2018 historical, pre-COVID TMC data being grown for a total of 17 years to the 2035 horizon, significant background developments were also accounted for in the future background volume calculations.

TYLin would like to emphasize that the following recommended mitigation measures are based on the updated, highly conservative traffic analysis of the study area intersections. The conservative nature of the analysis not only originates from the increased background traffic volumes, but also by reducing the default saturation flow of 1,900 vehicles/lane/hour in Synchro to 1,750 at the Region's request.

The proposed intersection improvements/mitigation measures include:

- Construction of southbound right-turn lane at Thorold Townline and Lundy's Lane by the 2025 future background horizon year, as detailed in TYLin's October 2021 TIS
- Convert north leg of Davis Road and Thorold Stone Road to right-out only operations by the 2035 future background horizon year (inbound movements can be maintained)
- Construction of southbound right-turn lane at Thorold Townline and Thorold Stone Road by the 2035 future background horizon year
- Signalization of Thorold Townline Road and Beaverdams Road by the 2025 future background horizon year; monitor intersection and conduct cost-benefit analysis to determine need and constructability of dedicated left-turn lanes by 2035 horizon year
- Monitor weekday p.m. peak hour operations at Davis Road and Lundy's Lane leading up to 2035 horizon year to determine if capacity constraints are present that can't be rectified with signal timing optimization. Additional eastbound and westbound through lane would ease predicted 2035 future background over capacity movements.
- Implement Conceptual Design Option #3. Maintains previous northbound acceleration lane paired with the shortened northbound right-turn lane. This reduces the overall length of road that drivers may mistake as a 2-lane passing section while maintaining the acceleration lane for trucks to provide safer operations with respect to the separation of truck traffic while getting up to speed.

The predicted volume of site traffic to be generated by the quarry is a relatively small component of the overall projected future background traffic growth in the study area. Overall, site traffic has minimal operational impact on the study area intersections compared to predicted background traffic growth and background development traffic.

TYLin recommends that Conceptual Design Alternative 3 be adopted as the preferred access configuration, as it allows for the Region's request that the section of the northbound acceleration and deceleration lanes be minimized to address potential passing concerns while still providing an acceleration lane for heavy vehicle traffic to get up to speed and safely merge into mixed traffic.

Providing the site's truck traffic adequate opportunity to accelerate before merging into mixed traffic will become especially important should the projected 2035 future traffic volumes along Thorold Townline Road be actualized. While there is currently adequate sight distance to the south for drivers to determine if a gap is big enough to exit the site and then accelerate up to speed without impeding mixed traffic without using an acceleration lane, this is only possible if larger gaps in the northbound stream of traffic are available. As the volume of northbound vehicles increases over time, the number and size of these gaps in traffic will shrink. This may result in changes to driver behaviour exiting the site, accepting smaller gaps than they should, if they do not have a separate acceleration lane to make use of.

Of note, existing truck traffic from the Walker's quarry north of the study area is expected to be removed from the local road network upon closure/decommissioning of the quarry. Truck traffic from the proposed Upper's Quarry will replace existing quarry traffic in the area, resulting in a generally net zero increase in aggregate truck traffic within the study area. In particular, this means that the heavy truck volumes and associated heavy vehicle percentages used in the capacity analysis are conservative, as southbound truck traffic at the intersection of Thorold Stone Road and Thorold Townline Road and adjacent intersections was not reduced.

APPENDIX A

1st Submission Comments

Appendix 9: Traffic Impact Study Comments

Regional and City Transportation Staff have reviewed the Traffic Impact Study (TIS) prepared by TMIG (dated October, 2021). The following comments should be addressed through an updated Traffic Impact Study.

Regional Transportation Comments:

1. The Region will require the owner/developer to enter a legal agreement with the Region for the required road improvements, maintenance of the road during operation of the quarry and potential reconstruction of the road after the closing of the quarry if the additional lanes are not required.

2. The TIS hasn't applied any growth rate to the historic traffic volumes dated 2018 and has depended on the increased expected traffic volumes generated from the two background developments (Rolling Meadows and Thorold Townline Road Employment Lands). The Region always requests a growth rate applied to historic traffic counts additional to any background developments.

3. For the capacity analysis, existing conditions should represent factored historical counts using a growth rate of 2% per annum (not present it for 2018 counts as shown in the report).

4. The Region's TIA Guidelines request using ideal saturation flow rates of 1,750 vehicles per hour per lane, and peak hour factors of 0.92 for all movements. The Region will accept the peak hour factors used, however, the saturation flow rate will need to be revised to the 1,750 as noted in the Terms of Reference.

5. For the capacity analysis, the TIS has assumed various % increase in trucks, however, the existing heavy vehicles used in the assumptions should have been factored by 2% growth rate for 2025 and 2035 future background conditions.

6. The capacity analysis for Thorold Townline Rd at Thorold Stone Rd shows that at 2025 & 2035 Future Total Conditions, the SBTR movement is expected to have v/c ratios more than the Region's thresholds. Although this was observed in the 2025 & 2035 Future Background conditions, the subject development has contributed in worsen the traffic conditions. The TIS should have included any geometric/or other improvement(s) for the Region's review.

7. The capacity analysis for Thorold Townline Rd at Lundy's Lane shows significant delays by the NBL movement under 2035 Future Total Conditions and has recommended constructing a dedicated SBR turn-lane to improve both SB & NB operations. LOS at these movements are D & E but v/c ratios are acceptable based on the Region's thresholds for v/c ratios.

8. The TIS stated that: "A signal warrant was conducted for the intersection of Thorold Townline Road and Beaverdams Road under 2025 Background

conditions to confirm if the combined existing and 2025 background traffic would justify the installation of a traffic signal". A signal was found not warranted and the TIS has suggested monitoring the intersection for signalization in 2025.

9. The signal warrant analysis should have been done for 2025 Total Conditions and 2035 Total Conditions if it is not warranted under the 2025 Total Conditions considering site trips in the analysis. (Note: The capacity analysis has included the signal option in 2025 Total Conditions and 2035 Conditions and demonstrated operation improvement).

10. The queueing analysis results shown in Table 7-1 & 7-2 (pages 48 & 50) show that a number of left/right turn-lanes of Thorold Townline Rd intersections would require storage extensions in 2025 & 2035. These are mainly due to background growth.

11. A detailed design for the site access at Uppers Lane is found in Appendix E was reviewed by transportation engineering staff and the following comments are to be addressed:

    a. Given the volume of trucks, they should include deceleration length in the southbound left turn lane.

    b. The northbound deceleration and acceleration lanes extend over 450m. This may result in drivers believing Townline road is 2 lanes in the northbound direction. Unwanted passing may result. This concern should be addressed in the updated TIS.

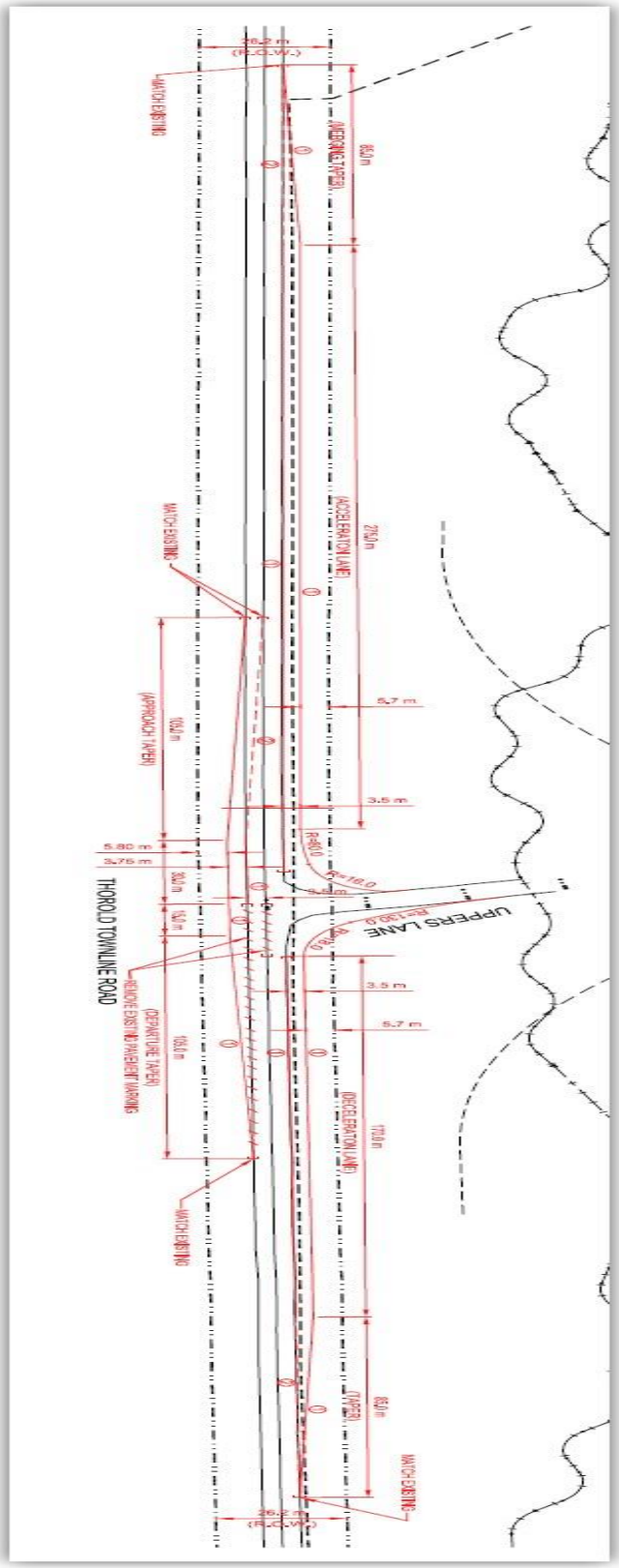
    c. There is a vertical curvature south of Thorold Townline Rd & Uppers lane intersection (site access) which might affect the sightline. We need them to carry out a sightline assessment to verify if the NB acceleration lane is required. If sightline is adequate, there is no need for the acceleration lane as drivers might use it for passing.

    d. Street sweeping as required at the responsible of the Quarry

    e. Once the quarry has been closed – review of the road design will be reviewed and if modifications are required the reconstruction of the road will be the responsibility of the Quarry/owner.

    f. An illumination warrant is to be completed

    g. The functional drawing hasn't shown the opposite existing access for DMZ Paintball, which will be affected by their proposed widening on the west. Future drawings submission should include existing accesses.


THOROLD TOWNLINE ROAD
UPPERS LANE
MATCH EXISTING
(AVERAGING TAPER)
85.0 m
(ACCELERATION LANE)
210.0 m
MATCH EXISTING
(APPROACH TAPER)
100.0 m
3.5 m
5.7 m
R=60.0
30.0 m
15.0 m
REMOVE EXISTING PAVEMENT MARKING
(DEPARTURE TAPER)
100.0 m
(DECELERATION LANE)
170.0 m
(TAPER)
85.0 m
MATCH EXISTING

City Transportation Comments:

12. Beechwood Road is a City arterial road. It has a planned 26.0 metre right-of-way as identified in the City's Official Plan. Beechwood Road is 20.12 metres wide. Accordingly, a 2.94 metre road widening will be required along the Beechwood Road frontage of the subject lands.

13. Upper's Lane is a local City road. It has an approximate 8.0 metre right-of-way. Walker Aggregate Inc. owns the parcels of land that abut Uppers Lane on each side of the road, except for the Bible Baptist Church at the southwest corner of Beechwood Road of Uppers Lane. However, the church has driveway access exclusively on Beechwood Road. There is negligible traffic on Uppers Lane.

14. If Upper's Lane is to remain a public road allowance, its existing 8.0 metre width will not be adequate to accommodate wider lanes for the expected truck use, and provide the required roadside features (shoulders, ditches, placement of utility poles, etc.). This will need to be evaluated through a detailed design of Uppers Lane. The City standard for a rural road is a minimum 20 metre right-of-way. Any additional road allowance width required will need to be dedicated to the municipality.

15. A daylight triangle measuring 7.0 metres by 7.0 metres will be required on the northwest corner of Beechwood Road and Uppers Lane, over and above the aforementioned 2.94 metre road widening for Beechwood Road.

16. A transportation assessment study/report is a requirement of a complete application. A traffic impact study prepared by the Municipal Infrastructure Group Ltd. (TMIG), dated October 2021, was submitted with the additional background materials to support this application. The primary traffic impact of the proposed quarry is on the regional road network, specifically Thorold Townline Road & Taylor Roads (RR# 70), Thorold Stone Road (RR #57) and Lundy's Lane (RR# 20) to access Highway 406 via Highway 58 and/or the Queen Elizabeth Way. Two haul routes are described in the traffic report with preference given to the first route which directs trucks exiting the site at some point along Uppers Lane to proceed west to Thorold Townline Road, then north on Thorold Townline Road and either proceeding left towards Highway 58 then onto Highway 406, proceeding through onto Taylor Road with the goal of reaching the Queen Elizabeth Way via the Glendale Avenue interchange, or turning right onto Thorold Stone Road to the Queen Elizabeth Way interchange east of Montrose Road. It is noted that the proposed haul route will not make use of Beechwood Road, but employees will be able to access the site via Beechwood Road is they choose to do so.

17. The quarry is expected to generate about 100 bidirectional trips in the peak hour, with approximately 90% comprised of truck traffic. The report recommends a southbound left turn lane and a northbound right turn lane on Thorold Townline Road at Uppers Lane. Regional Transportation Staff will provide comments on

the expected operation of the study area intersections as each node analysed is under their jurisdiction.

18. The truck template shown in the traffic report uses a heavy single unit (HSU) truck, which is a 35-foot cube van, but closely mimics the turning path of a dump truck. Aerial views of the existing quarry show several large truck with trailers that have a combined length of up to 75 feet long. Clarification on the design vehicle to be used in design is requested.

19. The report identifies that Uppers Lane is expected to operate satisfactorily as a two-lane road. The travelled portion of the road was measured to be less than 5.0 metres at various points throughout its length, with narrow or non-existent shoulders. The report recommends widening the pavement on Uppers Lane by 1.0 to 1.5 metres between Thorold Townline Road and the quarry entrance, but it will probably need to be even wider (7.0 to 7.5 metres total width, given that the road will need to be designed at a 80 km/h design speed) to meet prevailing road standards. The road appears to be in poor condition for heavy truck traffic; Engineering Staff will provide additional comments on this matter.

COMMENT RESPONSE MATRIX
UPPER'S QUARRY

DATE: March 17, 2023

	Comment	Source of Comment	Responder	Reference	Applicant Response
City of Niagara Falls Inter-Departmental Memo: Municipal Works - Transportation Services (dated December 3, 2021)					
1.	Municipal Works - Transportation Services Staff has the following comments on these applications to amend the City's Official Plan to re-designate the subject lands from Good General Agricultural, in part, Environmental Conservation, in part, and Environmental Protection Area, in part, to an Extractive Industrial designation, as well as to amend the zoning of the subject lands from Agricultural, in part, and Hazard Land, in part, to a Extractive Industrial zone, with site-specific regulations permitting a pit or quarry, processing of materials and recycled aggregate material, concrete or asphalt mixing plant and accessory buildings and structures, along with site-specific regulations for yard width and depth, building and structure heights, and lot definitions: The proposed quarry site abuts the following highways: Thorold Townline Road is a Niagara Region arterial road. Beechwood Road is a City arterial road. It has a planned 26.0 metre right-of-way as identified in the City's Official Plan. Beechwood Road is 20.12 metres wide. Accordingly, a 2.94 metre road widening will be required along the Beechwood Road frontage of the subject lands. Upper's Lane is a local City road. It has an approximate 8.0 metre right-of-way. Walker Aggregate Inc. owns the parcels of land that abut Uppers Lane on each side of the road, except for the Bible Baptist Church at the southwest corner of Beechwood Road of Uppers Lane. However, the church has driveway access exclusively on Beechwood Road. There is negligible traffic on Uppers Lane.	John Grubich, C.E.T. Traffic Planning Supervisor, City of Niagara Falls			Walker/MHBC to provide response
2.	If Upper's Lane is to remain a public road allowance, its existing 8.0 metre width will not be adequate to accommodate wider lanes for the expected truck use, and provide the required roadside				It is MHBC's understanding that the City of Niagara Falls have no legal authority to require the dedication of land at no cost as part of the Local Official Plan Amendment (LOPA) application submitted as part of the proposed Upper's Quarry. In accordance with the provisions of the Planning Act, municipalities may only

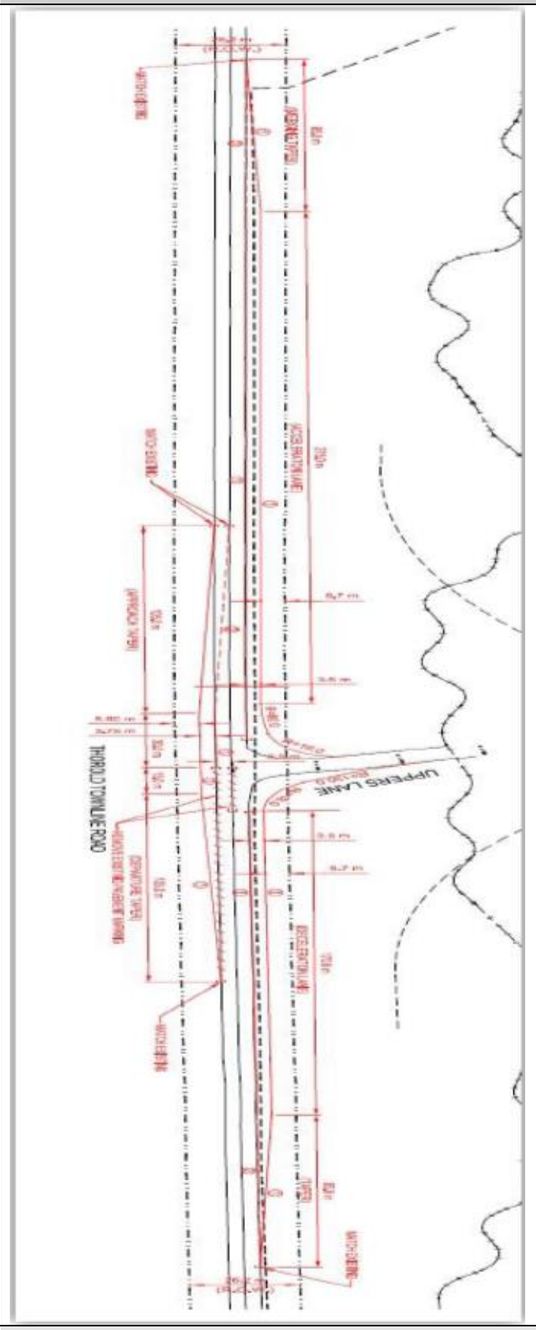
	Comment	Source of Comment	Responder	Reference	Applicant Response
	features (shoulders, ditches, placement of utility poles, etc.). This will need to be evaluated through a detailed design of Uppers Lane. The City standard for a rural road is a minimum 20 metre right-of-way. Any additional road allowance width required will need to be dedicated to the municipality.				obtain land at no expense for road widening through site plan control, plan of subdivision and/or consent. The proposed quarry application does not include site plan control, plan of subdivision and/or consent.
3.	A daylight triangle measuring 7.0 metres by 7.0 metres will be required on the northwest corner of Beechwood Road and Uppers Lane, over and above the aforementioned 2.94 metre road widening for Beechwood Road.				Noted. See response to Comment #1.
4.	A transportation assessment study/report is a requirement of a complete application. A traffic impact study prepared by the Municipal Infrastructure Group Ltd. (TMIG), dated October 2021, was submitted with the additional background materials to support this application. The primary traffic impact of the proposed quarry is on the regional road network, specifically Thorold Townline Road & Taylor Roads (RR# 70), Thorold Stone Road (RR #57) and Lundy's Lane (RR# 20) to access Highway 406 via Highway 58 and/or the Queen Elizabeth Way. Two haul routes are described in the traffic report with preference given to the first route which directs trucks exiting the site at some point along Uppers Lane to proceed west to Thorold Townline Road, then north on Thorold Townline Road and either proceeding left towards Highway 58 then onto Highway 406, proceeding through onto Taylor Road with the goal of reaching the Queen Elizabeth Way via the Glendale Avenue interchange, or turning right onto Thorold Stone Road to the Queen Elizabeth Way interchange east of Montrose Road. It is noted that the proposed haul route will not make use of Beechwood Road, but employees will be able to access the site via Beechwood Road is they choose to do so.				Noted. Dependent upon the final location of the quarry access and internal communication to staff, employees may be restricted to entering the quarry via Thorold Townline/Upper's Lane, as assumed as part of TYLin's traffic analysis.
5.	The quarry is expected to generate about 100 bidirectional trips in the peak hour, with approximately 90% comprised of truck traffic. The report recommends a southbound left turn lane and a northbound right turn lane on Thorold Townline Road at Uppers Lane. Regional Transportation Staff will provide comments on the expected operation of the study area intersections as each node analysed is under their jurisdiction.				Noted.
6.	The truck template shown in the traffic report uses a heavy single unit (HSU) truck, which is a 35-foot cube van, but closely mimics the turning path of a dump truck. Aerial views of the existing				Through discussion with Walkers staff, it is TYLin's understanding that the large trucks with trailers (up to 75 feet long) on the aerial views described in the City's comment, are typical of trucks that service the landfill

	Comment	Source of Comment	Responder	Reference	Applicant Response
	quarry show several large truck with trailers that have a combined length of up to 75- feet long. Clarification on the design vehicle to be used in design is requested.				within the immediate vicinity of the existing quarry north of the proposed Upper's Quarry. These longer design vehicles are not the typical vehicles that are expected to service Upper's Quarry.
7.	The report identifies that Uppers Lane is expected to operate satisfactorily as a two-lane road. The travelled portion of the road was measured to be less than 5.0 metres at various points throughout its length, with narrow or non-existent shoulders. The report recommends widening the pavement on Uppers Lane by 1.0 to 1.5 metres between Thorold Townline Road and the quarry entrance, but it will probably need to be even wider (7.0 to 7.5 metres total width, given that the road will need to be designed at a 80 km/h design speed) to meet prevailing road standards. The road appears to be in poor condition for heavy truck traffic; Engineering Staff will provide additional comments on this matter.				MHBC to provide fulsome response regarding the potential for Upper's Lane to be closed / acquired by Walkers. Also, this road should not be considered for an 80 km/h design speed, considering it will primarily act as an access to the proposed quarry, not as a through road.
8.	Municipal Works – Transportation Staff has no objections to the applications, subject to the upgrade to Uppers Lane.				Noted.

	Comment	Source of Comment	Responder	Reference	Applicant Response
Joint Agency Review Team (JART) Comments (dated August 23, 2022)					
Summary					
	Transportation				
	Provincial and Regional policies require that transportation systems be provided that are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs. Specific to proposed new or expansions to existing pits and quarries, the ROP states that consideration be given to the proposed haulage roads and the possible effect on the roads and on adjacent development (policy 6.C.5e). In this regard, a Traffic Impact Study, prepared by TMIG, (dated October 2021) was submitted with the applications to address transportation impacts on the local and Regional roads. The TIS was reviewed by Regional and City transportation staff, and detailed comments are provided in Appendix 9.	JART – Sean Norman	TMIG		See detailed responses further below re Appendix 9
Appendix 9: Traffic Impact Study Comments					
	Regional and City Transportation Staff have reviewed the Traffic Impact Study (TIS) prepared by TMIG (dated October, 2021). The following comments should be addressed through an updated Traffic Impact Study.		TMIG		Noted. TYLin, formerly TMIG, has provided responses to City's and Region's comments in addition to a March 2023 addendum to the October 2021 TIS that provides updated analysis, results, and recommendations, as per changes requested by Staff.
	Regional Transportation Comments:				
1.	The Region will require the owner/developer to enter a legal agreement with the Region for the required road improvements, maintenance of the road during operation of the quarry and potential reconstruction of the road after the closing of the quarry if the additional lanes are not required.		Walker		
2.	The TIS hasn't applied any growth rate to the historic traffic volumes dated 2018 and has depended on the increased expected traffic volumes generated from the two background developments (Rolling Meadows and Thorold Townline Road Employment Lands). The Region always requests a growth rate applied to historic traffic counts additional to any background developments.		TMIG		As is typical of quarry applications, the TIS has been under development as part of the multi-year process, and existing TMCs were collected pre-COVID. At the outset of the TIS process, a growth rate was not needed to bring the TMCs to a baseline year. However, to address comments by the Region, the TMCs have been grown to a baseline year of 2023.
3.	For the capacity analysis, existing conditions should represent factored historical counts using a growth rate of 2% per annum (not present it for 2018 counts as shown in the report).		TMIG		2018 TMC data has been updated to reflect 2023 as the baseline year by growing all movements at all study intersections by 2% per annum. All study horizon years were reassessed and corresponding analysis, results, and recommendations are provided in TYLin's March 2023 Addendum to the October 2021 TIS.
4.	The Region's TIA Guidelines request using ideal saturation flow rates of 1,750 vehicles per hour per lane, and peak hour factors of 0.92 for all movements. The Region will accept the peak hour factors used, however, the saturation flow rate will need to be revised to the 1,750 as noted in the Terms of Reference.		TMIG		Noted. The ideal saturation flow was adjusted to 1,750 vehicles per hour per lane. Peak Hour Factors used in the October 2021 TIS were maintained.
5.	For the capacity analysis, the TIS has assumed various % increase in trucks, however, the existing heavy vehicles used in the assumptions should have been factored by 2% growth rate for 2025 and 2035 future background conditions.		TMIG		Noted. The heavy vehicle volumes from the 2018 TMCs were also grown by 2% to the 2023 baseline horizon, as a component of the overall 2% annual background growth. Of note, TYLin is of the opinion that a 2% annual growth rate applied to

	Comment	Source of Comment	Responder	Reference	Applicant Response
					2018 counts to the final 2035 future horizon year, representing 17 years of growth, is unsustainable in addition to the two considerable background developments already accounted for in the TIS. However, TYLin applied background growth beyond the 2023 baseline year by adopting more realistic growth rates used in the 2018 Rolling Meadows Development TIS. The following annual growth rates were applied to grow background traffic beyond the 2023 baseline horizon year: • Highway 20/Lundy's Lane: 1% • Thorold Townline: 1% • Beaverdams Road: 1% • Highway 58/Davis Road: 0.5% • Thorold Stone Road: 1% Although Thorold Stone Road was not a part of the study area in the Rolling Meadows TIS, a 1% growth rate was assumed to match the majority of other roads within the Rolling Meadows study. Heavy Vehicle volumes were also grown beyond 2023 as per the above noted growth rates.
6.	The capacity analysis for Thorold Townline Rd at Thorold Stone Rd shows that at 2025 & 2035 Future Total Conditions, the SBTR movement is expected to have v/c ratios more than the Region's thresholds. Although this was observed in the 2025 & 2035 Future Background conditions, the subject development has contributed in worsen the traffic conditions. The TIS should have included any geometric/or other improvement(s) for the Region's review.		TMIG		Noted. TYLin has provided recommended improvements to the intersection of Thorold Townline Road and Thorold Stone Road in the TIS March 2023 Addendum due to the increased background traffic travelling through the intersection compared to the volumes analyzed in the October 2021 TIS.
7.	The capacity analysis for Thorold Townline Rd at Lundy's Lane shows significant delays by the NBL movement under 2035 Future Total Conditions and has recommended constructing a dedicated SBR turn-lane to improve both SB & NB operations. LOS at these movements are D & E but v/c ratios are acceptable based on the Region's thresholds for v/c ratios.		TMIG		Noted.
8.	The TIS stated that: "A signal warrant was conducted for the intersection of Thorold Townline Road and Beaverdams Road under 2025 Background conditions to confirm if the combined existing and 2025 background traffic would justify the installation of a traffic signal". A signal was found not warranted and the TIS has suggested monitoring the intersection for signalization in 2025.		TMIG		Noted, revised signal warrants and recommendations are provided in the TIS March 2023 Addendum. The updated capacity and warrant analysis determined traffic signals are warranted for the intersection of Thorold Townline Road and Beaverdams Road under 2025 Background conditions.
9.	The signal warrant analysis should have been done for 2025 Total Conditions and 2035 Total Conditions if it is not warranted under the 2025 Total Conditions considering site trips in the analysis. (Note: The capacity analysis has included the signal option in 2025 Total Conditions and 2035 Conditions and demonstrated operation improvement).		TMIG		Noted, see response above.
Same as above10.	The queueing analysis results shown in Table 7-1 & 7-2 (pages 48 & 50) show that a number of left/right turn-lanes of Thorold Townline Rd intersections		TMIG		Noted.

	Comment	Source of Comment	Responder	Reference	Applicant Response
	would require storage extensions in 2025 & 2035. These are mainly due to background growth.				
11.	A detailed design for the site access at Uppers Lane is found in Appendix E was reviewed by transportation engineering staff and the following comments are to be addressed: a. Given the volume of trucks, they should include deceleration length in the southbound left turn lane. b. The northbound deceleration and acceleration lanes extend over 450m. This may result in drivers believing Townline road is 2 lanes in the northbound direction. Unwanted passing may result. This concern should be addressed in the updated TIS. c. There is a vertical curvature south of Thorold Townline Rd & Uppers lane intersection (site access) which might affect the sightline. We need them to carry out a sightline assessment to verify if the NB acceleration lane is required. If sightline is adequate, there is no need for the acceleration lane as drivers might use it for passing. d. Street sweeping as required at the responsible of the Quarry e. Once the quarry has been closed – review of the road design will be reviewed and if modifications are required the reconstruction of the road will be the responsibility of the Quarry/owner. f. An illumination warrant is to be completed g. The functional drawing hasn't shown the opposite existing access for DMZ Paintball, which will be affected by their proposed widening on the west. Future drawings submission should include existing accesses.		TMIG		Based on comments from the Region and TYLin's experience with other aggregate applications, three alternative conceptual designs have been prepared for the Region's review and are provided as an appendix to the TIS Addendum. a. The conceptual design has been updated to include deceleration length for the southbound left-turn lane for all three design alternatives. b. Noted. The three conceptual design alternatives appended to the TIS addendum address the concerns of the Region that the acceleration and deceleration lanes associated with the quarry have the potential to cause unwanted passing behaviour in the northbound direction. c. TYLin conducted sightline analysis to determine if the vertical curvature near Upper's Lane would impede a driver's line of sight to the south in order to determine if the northbound acceleration lane was required, as per the Region's request. The sightline analysis was completed based on the Thorold Townline Road centreline location and elevations provided to TYLin from MHBC. The location of the centreline was based on drone aerial photography completed by TEC Engineering on January 30, 2020. The elevations of the centreline were based on a topographic survey prepared by TEC Engineering using October 2016 and February 2017 aerial photography. Drawings prepared by TYLin to illustrate the results of the sightline analysis are appended to the TIS Addendum. IT was found that drivers of both trucks and passenger vehicles have acceptable sightlines to the south at the existing Upper's Lane location to determine if a large enough gap exists to enter the northbound stream of traffic without a northbound acceleration lane, as per the Region's comment. d. Noted. MHBC/Walkers to add to response e. Noted. MHBC/Walkers to add to response f. Noted. MHBC/Walkers to add to response g. The updated conceptual design drawings all include the existing DMZ Paintball access opposite the proposed Upper's Quarry access. Of note, TYLin recommends that Conceptual Design Alternative 3 be adopted as the preferred access configuration, as it allows for the Region's request that the section of the northbound acceleration and deceleration lanes be minimized to address potential passing concerns while still providing an acceleration lane for heavy vehicle traffic to get up to speed and more safely merge into mixed traffic. Further details are provided in the TIS Addendum.

	Comment	Source of Comment	Responder	Reference	Applicant Response
					
	City Transportation Comments:				

	Comment	Source of Comment	Responder	Reference	Applicant Response
12.	Beechwood Road is a City arterial road. It has a planned 26.0 metre right-of-way as identified in the City's Official Plan. Beechwood Road is 20.12 metres wide. Accordingly, a 2.94 metre road widening will be required along the Beechwood Road frontage of the subject lands.				Noted. (MHBC to provide further commentary as needed)
13.	Upper's Lane is a local City road. It has an approximate 8.0 metre right-of-way. Walker Aggregate Inc. owns the parcels of land that abut Uppers Lane on each side of the road, except for the Bible Baptist Church at the southwest corner of Beechwood Road of Uppers Lane. However, the church has driveway access exclusively on Beechwood Road. There is negligible traffic on Uppers Lane. If Upper's Lane is to remain a public road allowance, its existing 8.0 metre width will not be adequate to accommodate wider lanes for the expected truck use, and provide the required roadside features (shoulders, ditches, placement of utility poles, etc.). This will need to be evaluated through a detailed design of Uppers Lane. The City standard for a rural road is a minimum 20 metre right-of-way. Any additional road allowance width required will need to be dedicated to the municipality.	TMIG			It is MHBC's understanding that the City of Niagara Falls have no legal authority to require the dedication of land at no cost as part of the Local Official Plan Amendment (LOPA) application submitted as part of the proposed Upper's Quarry. In accordance with the provisions of the Planning Act, municipalities may only obtain land at no expense for road widening through site plan control, plan of subdivision and/or consent. The proposed quarry application does not include site plan control, plan of subdivision and/or consent.
15.	A daylight triangle measuring 7.0 metres by 7.0 metres will be required on the northwest corner of Beechwood Road and Uppers Lane, over and above the aforementioned 2.94 metre road widening for Beechwood Road.	TMIG			Noted. See response to comment #12.
16.	A transportation assessment study/report is a requirement of a complete application. A traffic impact study prepared by the Municipal Infrastructure Group Ltd. (TMIG), dated October 2021, was submitted with the additional background materials to support this application. The primary traffic impact of the proposed quarry is on the regional road network, specifically Thorold Townline Road & Taylor Roads (RR# 70), Thorold Stone Road (RR #57) and Lundy's Lane (RR# 20) to access Highway 406 via Highway 58 and/or the Queen Elizabeth Way. Two haul routes are described in the traffic report with preference given to the first route which directs trucks exiting the site at some point along Uppers Lane to proceed west to Thorold Townline Road, then north on Thorold Townline Road and either proceeding left towards Highway 58 then onto Highway 406, proceeding through onto Taylor Road with the goal of reaching the Queen Elizabeth Way via the Glendale Avenue interchange, or turning right onto Thorold Stone Road to the Queen Elizabeth Way interchange east of Montrose Road. It is noted that the proposed haul route will not make use of Beechwood Road, but employees will be able to access the site via Beechwood Road is they choose to do so.				Noted. Dependent upon the final location of the quarry access and internal communication to staff, employees may be restricted to entering the quarry via Thorold Townline/Upper's Lane, as assumed as part of TYLin's traffic analysis.
17.	The quarry is expected to generate about 100 bidirectional trips in the peak hour, with approximately 90% comprised of truck traffic. The report recommends a southbound left turn lane and a northbound right turn lane on				Noted.

	Comment	Source of Comment	Responder	Reference	Applicant Response
	Thorold Townline Road at Uppers Lane. Regional Transportation Staff will provide comments on the expected operation of the study area intersections as each node analysed is under their jurisdiction.				
18.	The truck template shown in the traffic report uses a heavy single unit (HSU) truck, which is a 35-foot cube van, but closely mimics the turning path of a dump truck. Aerial views of the existing quarry show several large truck with trailers that have a combined length of up to 75 feet long. Clarification on the design vehicle to be used in design is requested.		TMIG		Through discussion with Walkers staff, it is TYLin's understanding that the large trucks with trailers (up to 75 feet long) on the aerial views described in the City's comment, are typical of trucks that service the landfill within the immediate vicinity of the existing quarry north of the proposed Upper's Quarry. These longer design vehicles are not the typical vehicles that are expected to service Upper's Quarry.
19.	The report identifies that Uppers Lane is expected to operate satisfactorily as a two-lane road. The travelled portion of the road was measured to be less than 5.0 metres at various points throughout its length, with narrow or non-existent shoulders. The report recommends widening the pavement on Uppers Lane by 1.0 to 1.5 metres between Thorold Townline Road and the quarry entrance, but it will probably need to be even wider (7.0 to 7.5 metres total width, given that the road will need to be designed at a 80 km/h design speed) to meet prevailing road standards. The road appears to be in poor condition for heavy truck traffic; Engineering Staff will provide additional comments on this matter.		TMIG		MHBC to provide fulsome response regarding the potential for Upper's Lane to be closed / acquired by Walkers. Also, this road should not be considered for an 80 km/h design speed, considering it will primarily act as an access to the proposed quarry, not as a through road.

APPENDIX B

Traffic Volume Figures

LEGEND

- Upper's Quarry Boundary
- XX — AM Peak Hour Volumes
- (XX) — PM Peak Hour Volumes
- Stop Control
- Signal Control
- Rolling Meadows Secondary Plan Area
- Provincial Road
- Regional Road
- Local Road

HWY 58

TAYLOR ROAD

THOROLD STONE ROAD (R.R. 57)

NIAGARA FALLS ROAD

BEAVERDAMS ROAD

DAVIS ROAD (HWY 58)

THOROLD TOWNLINE ROAD (R.R. 70)

PROPOSED UPPER'S QUARRY ACCESS

LUNDY'S LANE (R.R. 20)

18 (28) 2 (6) 1 (4)

6 (1) 1053 (1108) 67 (78)

205 (272) 81 (138) 52 (48)

73 (35) 807 (821) 20 (30)

(24) 21 (1209) 866 (427) 226

398 (412) 15 (5) 149 (86)

(227) 321 (1020) 656 (31) 34

64 (69) 112 (83) 24 (24)

44 (105) 172 (244) 82 (170)

166 (147) 17 (44) 24 (42)

17 (35) 104 (150) 11 (20)

22 (21) 167 (166) 8 (11)

(90) 110 (32) 31 (4) 7

4 (5) 267 (275) 30 (31)

(24) 14 (197) 115 (16) 16

19 (26) 155 (148) 5 (7)

115 (162) 0 (1)

0 (1) 1 (0)

211 (189) 1 (1)

74 (113) 89 (122) 55 (74)

47 (59) 305 (452) 29 (24)

26 (38) 86 (118) 13 (25)

8 (18) 304 (401) 38 (44)

(105) 118 (464) 428 (28) 18

22 (46) 137 (134) 20 (30)

(33) 53 (434) 380 (96) 86

66 (100) 120 (117) 37 (50)

2018 TRAFFIC VOLUMES

FIGURE B-1

LEGEND

- Upper's Quarry Boundary
- XX — AM Peak Hour Volumes
- (XX) — PM Peak Hour Volumes
- Stop Control
- Signal Control
- Rolling Meadows Secondary Plan Area
- Provincial Road
- Regional Road
- Local Road

HWY 58

TAYLOR ROAD

THOROLD STONE ROAD (R.R. 57)

NIAGARA FALLS ROAD

BEAVERDAMS ROAD

DAVIS ROAD (HWY 58)

THOROLD TOWNLINE ROAD (R.R. 70)

PROPOSED UPPER'S QUARRY ACCESS

LUNDY'S LANE (R.R. 20)

2023 BASELINE TRAFFIC VOLUMES

FIGURE B-2

LEGEND

- Upper's Quarry Boundary
- XX — AM Peak Hour Volumes
- (XX) — PM Peak Hour Volumes
- Stop Control
- Signal Control
- Rolling Meadows Secondary Plan Area
- Provincial Road
- Regional Road
- Local Road

HWY 58

TAYLOR ROAD

THOROLD STONE ROAD (R.R. 57)

NIAGARA FALLS ROAD

BEAVERDAMS ROAD

DAVIS ROAD (HWY 58)

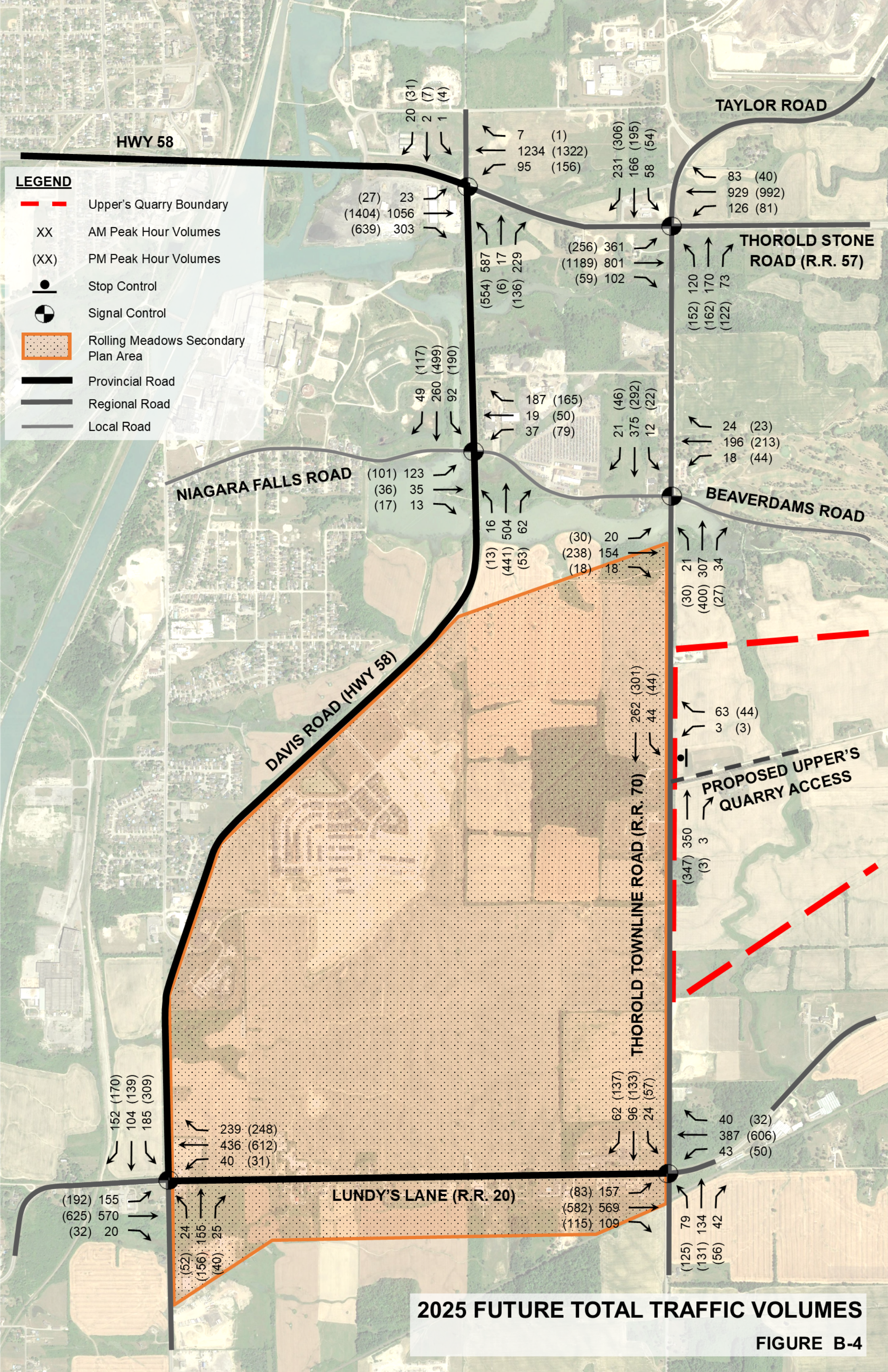
THOROLD TOWNLINE ROAD (R.R. 70)

LUNDY'S LANE (R.R. 20)

PROPOSED UPPER'S QUARRY ACCESS

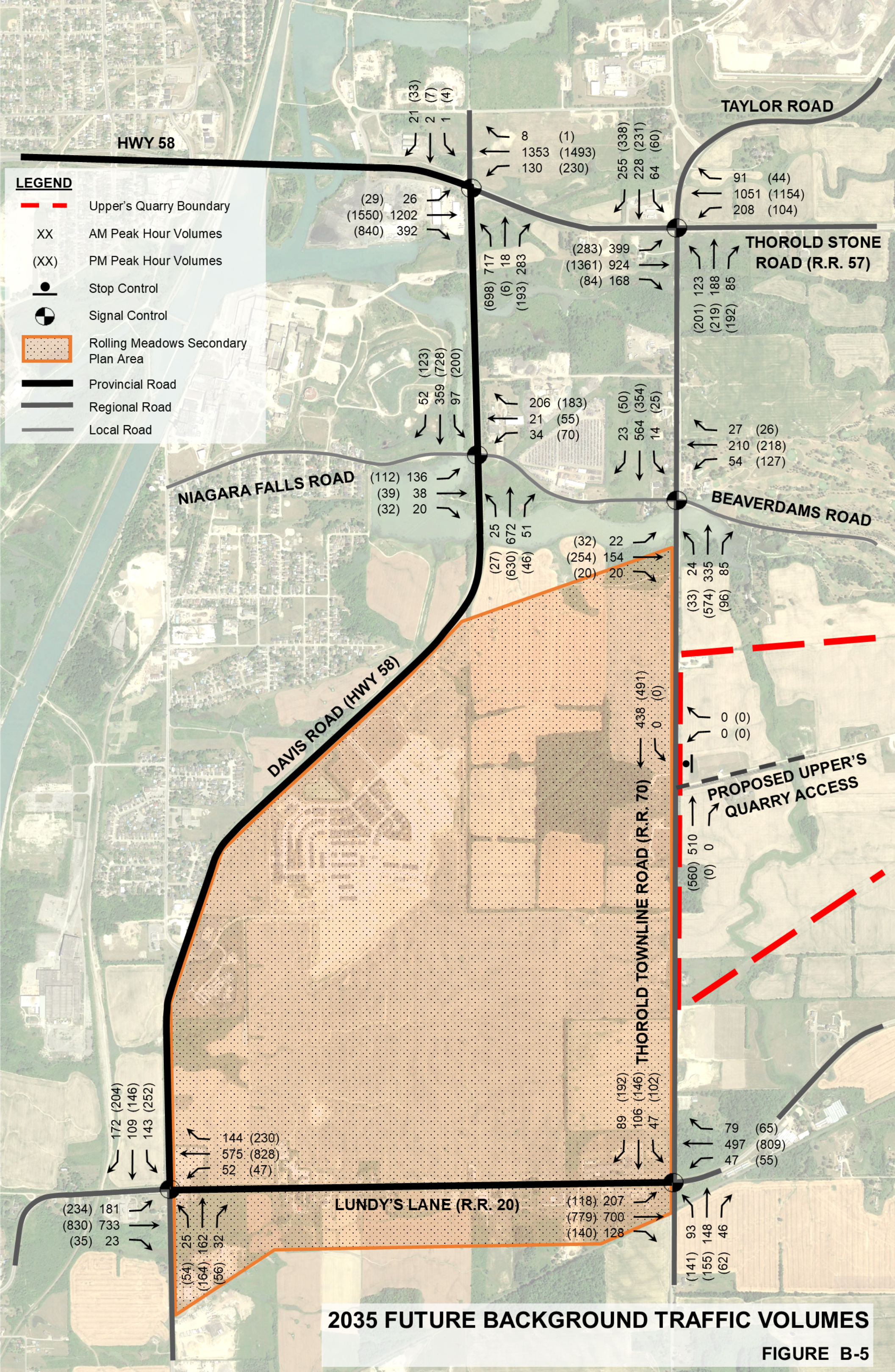
2025 FUTURE BACKGROUND TRAFFIC VOLUMES

FIGURE B-3



2025 FUTURE TOTAL TRAFFIC VOLUMES

FIGURE B-4



2035 FUTURE BACKGROUND TRAFFIC VOLUMES

FIGURE B-5

HWY 58

TAYLOR ROAD

THOROLD STONE ROAD (R.R. 57)

NIAGARA FALLS ROAD

BEAVERDAMS ROAD

DAVIS ROAD (HWY 58)

THOROLD TOWNLINE ROAD (R.R. 70)

LUNDY'S LANE (R.R. 20)

PROPOSED UPPER'S QUARRY ACCESS

LEGEND

- Upper's Quarry Boundary
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- Stop Control
- Signal Control
- Rolling Meadows Secondary Plan Area
- Provincial Road
- Regional Road
- Local Road

2035 FUTURE TOTAL TRAFFIC VOLUMES

FIGURE B-6

APPENDIX C

2018 Rolling Meadows Development TIS Excerpt

3. Future Background Traffic Conditions

3.1 Future Background Volumes

Historical traffic volume data from the MTO Provincial Highways Publication was reviewed over the last ten years (2007-2016). The data trends identified Highway 20 having a growth rate of less than 2%. Traffic growth on Highway 58 has been negligible or negative in the last 10 years. For the purposes of this analysis, it was assumed that 1% annual growth would be applied to project Highway 20 and all other boundary roadways. However, on Highway 58 an annual growth rate of 0.5% was assumed. Considering that future traffic volumes are forecasted to the 2040 horizon year (10-years after full build-out or 22 years from the base year) applying a greater growth rate over such long time periods would be too conservative. It is anticipated that the majority of growth in the area will be from any proposed developments including the subject Rolling Meadows development.

Future background traffic volumes were projected to 2019, 2023, 2028, 2030, 2035 and 2040 horizon years using growth rates discussed above. Future background traffic volumes for each horizon year are illustrated in **Figure 3-1** through **Figure 3-14**.

APPENDIX D

Signal Warrant Summary Sheets

Traffic Signal Warrant - Input Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Upper's Quarry			**Project No.:**	16137
				Date:	2023-02-21
Horizon:	Future Background	**Horizon Year:**	2025	**Analyst:**	KZ

Study Intersection Summary

Major Street:	Thorold Townline Road	**Direction:**	North/South
Minor Street:	Beaverdams Road	**Direction:**	East/West

Intersection Details for Warrant Parameters

Flow Conditions:	Free Flow (Rural)	**Number of Lanes:**	1
Number of Legs:	Four	**Intersection Type:**	Existing

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Thorold Townline Road						Minor: Beaverdams Road						Pedestrians Crossing Major
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
AM	21	244	34	12	331	21	20	154	18	18	196	24	0
PM	30	356	27	22	248	46	30	238	18	44	213	23	0
AHV[1]	**13**	**150**	**15**	**9**	**145**	**17**	**13**	**98**	**9**	**16**	**102**	**12**	**0**

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then AHV = $(AM_{PHV} + PM_{PHV}) / 4$. In the case that only one estimate is available then AHV = $AM_{PHV} / 2$ **or** AHV = $PM_{PHV} / 2$.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	599	Justification 2A: Major Street Both Approaches	349
Justification 1B: Minor Street Both Approaches	250	Justification 2B: Traffic Crossing Major Street	131

Note: The crossing volume is defined as the sum of:

(1) Left turns from both minor street approaches:			29
(2) The heaviest through volume from the minor street:			102
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:			0
(a) The left turn volume > 120 vph	13	FALSE	
(b) The left turn volume plus the opposing volume > 720 vph	158	FALSE	
(4) Pedestrians crossing the major street:			0
		Total	**131**

Traffic Signal Warrant - Output Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Upper's Quarry			**Project No.:**	16137
				Date:	2023-02-21
Horizon:	Future Background	**Horizon Year:**	2025	**Analyst:**	KZ

Study Intersection Summary

Major Street:	Thorold Townline Road	**Direction:**	North/South
Minor Street:	Beaverdams Road	**Direction:**	East/West

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	**480**	720	600	900
1B: Minor Street Both Approaches	**120**	170	120	170
2A: Major Street Both Approaches	**480**	720	600	900
2B: Traffic Crossing Major Street	**50**	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).
The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	Existing Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	120%	-	**576**
1B: Minor Street Both Approaches	120	120%	100%	**144**
2A: Major Street Both Approaches	480	120%	-	**576**
2B: Traffic Crossing Major Street	50	120%	-	**60**

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T' intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	599	**576**	100%	**Yes**
1B: Minor Street Both Approaches	250	**144**	100%	
2A: Major Street Both Approaches	349	**576**	61%	**No**
2B: Traffic Crossing Major Street	131	**60**	100%	

Notes:
When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Warranted

Traffic Signal Warrant - Input Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Upper's Quarry			**Project No.:**	16137
				Date:	2023-02-21
Horizon:	Future Total	**Horizon Year:**	2025	**Analyst:**	KZ

Study Intersection Summary

Major Street:	Thorold Townline Road	**Direction:**	North/South
Minor Street:	Beaverdams Road	**Direction:**	East/West

Intersection Details for Warrant Parameters

Flow Conditions:	Free Flow (Rural)	**Number of Lanes:**	1
Number of Legs:	Four	**Intersection Type:**	Existing

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Thorold Townline Road						Minor: Beaverdams Road						Pedestrians Crossing Major
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
AM	21	307	34	12	375	21	20	154	18	18	196	24	0
PM	30	400	27	22	292	46	30	238	18	44	213	23	0
AHV[1]	**13**	**177**	**15**	**9**	**167**	**17**	**13**	**98**	**9**	**16**	**102**	**12**	**0**

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then AHV = (AM_{PHV} + PM_{PHV}) / 4. In the case that only one estimate is available then AHV = AM_{PHV} / 2 **or** AHV = PM_{PHV} / 2.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	648	Justification 2A: Major Street Both Approaches	398
Justification 1B: Minor Street Both Approaches	250	Justification 2B: Traffic Crossing Major Street	131

Note: The crossing volume is defined as the sum of:

(1) Left turns from both minor street approaches:			29
(2) The heaviest through volume from the minor street:			102
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:			0
(a) The left turn volume > 120 vph	13	FALSE	
(b) The left turn volume plus the opposing volume > 720 vph	180	FALSE	
(4) Pedestrians crossing the major street:			0
		Total	**131**

TYLin

Traffic Signal Warrant - Output Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Upper's Quarry			**Project No.:**	16137
				Date:	2023-02-21
Horizon:	Future Total	**Horizon Year:**	2025	**Analyst:**	KZ

Study Intersection Summary

Major Street:	Thorold Townline Road	**Direction:**	North/South
Minor Street:	Beaverdams Road	**Direction:**	East/West

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	**480**	720	600	900
1B: Minor Street Both Approaches	**120**	170	120	170
2A: Major Street Both Approaches	**480**	720	600	900
2B: Traffic Crossing Major Street	**50**	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).
The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	Existing Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	120%	-	**576**
1B: Minor Street Both Approaches	120	120%	100%	**144**
2A: Major Street Both Approaches	480	120%	-	**576**
2B: Traffic Crossing Major Street	50	120%	-	**60**

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T' intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	648	**576**	100%	**Yes**
1B: Minor Street Both Approaches	250	**144**	100%	
2A: Major Street Both Approaches	398	**576**	69%	**No**
2B: Traffic Crossing Major Street	131	**60**	100%	

Notes:
When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Warranted

Traffic Signal Warrant - Input Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Upper's Quarry			**Project No.:**	16137
				Date:	2023-02-21
Horizon:	Future Background	**Horizon Year:**	2035	**Analyst:**	KZ

Study Intersection Summary

Major Street:	Thorold Townline Road	**Direction:**	North/South
Minor Street:	Beaverdams Road	**Direction:**	East/West

Intersection Details for Warrant Parameters

Flow Conditions:	Free Flow (Rural)	**Number of Lanes:**	1
Number of Legs:	Four	**Intersection Type:**	Existing

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Thorold Townline Road						Minor: Beaverdams Road						Pedestrians Crossing Major
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
AM	24	335	85	14	564	23	22	154	20	54	210	27	0
PM	33	574	96	25	354	50	32	254	20	127	218	26	0
AHV[1]	**14**	**227**	**45**	**10**	**230**	**18**	**14**	**102**	**10**	**45**	**107**	**13**	**0**

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then AHV = (AM_{PHV} + PM_{PHV}) / 4. In the case that only one estimate is available then AHV = AM_{PHV} / 2 **or** AHV = PM_{PHV} / 2.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	835	Justification 2A: Major Street Both Approaches	544
Justification 1B: Minor Street Both Approaches	291	Justification 2B: Traffic Crossing Major Street	166

Note: The crossing volume is defined as the sum of:

(1) Left turns from both minor street approaches:			59
(2) The heaviest through volume from the minor street:			107
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:			0
(a) The left turn volume > 120 vph	14	FALSE	
(b) The left turn volume plus the opposing volume > 720 vph	244	FALSE	
(4) Pedestrians crossing the major street:			0
		Total	**166**

Traffic Signal Warrant - Output Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Upper's Quarry			**Project No.:**	16137
				Date:	2023-02-21
Horizon:	Future Background	**Horizon Year:**	2035	**Analyst:**	KZ

Study Intersection Summary

Major Street:	Thorold Townline Road	**Direction:**	North/South
Minor Street:	Beaverdams Road	**Direction:**	East/West

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	**480**	720	600	900
1B: Minor Street Both Approaches	**120**	170	120	170
2A: Major Street Both Approaches	**480**	720	600	900
2B: Traffic Crossing Major Street	**50**	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).
The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	Existing Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	120%	-	**576**
1B: Minor Street Both Approaches	120	120%	100%	**144**
2A: Major Street Both Approaches	480	120%	-	**576**
2B: Traffic Crossing Major Street	50	120%	-	**60**

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T' intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	835	**576**	100%	**Yes**
1B: Minor Street Both Approaches	291	**144**	100%	
2A: Major Street Both Approaches	544	**576**	94%	**No**
2B: Traffic Crossing Major Street	166	**60**	100%	

Notes:
When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Warranted

Traffic Signal Warrant - Input Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Upper's Quarry			**Project No.:**	16137
				Date:	2023-02-21
Horizon:	Future Total	**Horizon Year:**	2035	**Analyst:**	KZ

Study Intersection Summary

Major Street:	Thorold Townline Road	**Direction:**	North/South
Minor Street:	Beaverdams Road	**Direction:**	East/West

Intersection Details for Warrant Parameters

Flow Conditions:	Free Flow (Rural)	**Number of Lanes:**	1
Number of Legs:	Four	**Intersection Type:**	Existing

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Thorold Townline Road						Minor: Beaverdams Road						Pedestrians Crossing Major
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
AM	24	398	85	14	608	23	22	154	20	54	210	27	0
PM	33	618	96	25	398	50	32	254	20	127	218	26	0
AHV[1]	**14**	**254**	**45**	**10**	**252**	**18**	**14**	**102**	**10**	**45**	**107**	**13**	**0**

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then AHV = (AM_{PHV} + PM_{PHV}) / 4. In the case that only one estimate is available then AHV = AM_{PHV} / 2 **or** AHV = PM_{PHV} / 2.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	884	Justification 2A: Major Street Both Approaches	593
Justification 1B: Minor Street Both Approaches	291	Justification 2B: Traffic Crossing Major Street	166

Note: The crossing volume is defined as the sum of:

(1) Left turns from both minor street approaches:			59
(2) The heaviest through volume from the minor street:			107
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:			0
(a) The left turn volume > 120 vph	14	FALSE	
(b) The left turn volume plus the opposing volume > 720 vph	266	FALSE	
(4) Pedestrians crossing the major street:			0
		Total	**166**

Traffic Signal Warrant - Output Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Upper's Quarry			**Project No.:**	16137
				Date:	2023-02-21
Horizon:	Future Total	**Horizon Year:**	2035	**Analyst:**	KZ

Study Intersection Summary

Major Street:	Thorold Townline Road	**Direction:**	North/South
Minor Street:	Beaverdams Road	**Direction:**	East/West

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	**480**	720	600	900
1B: Minor Street Both Approaches	**120**	170	120	170
2A: Major Street Both Approaches	**480**	720	600	900
2B: Traffic Crossing Major Street	**50**	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).
The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	Existing Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	120%	-	**576**
1B: Minor Street Both Approaches	120	120%	100%	**144**
2A: Major Street Both Approaches	480	120%	-	**576**
2B: Traffic Crossing Major Street	50	120%	-	**60**

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T' intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	884	**576**	100%	**Yes**
1B: Minor Street Both Approaches	291	**144**	100%	
2A: Major Street Both Approaches	593	**576**	100%	**Yes**
2B: Traffic Crossing Major Street	166	**60**	100%	

Notes:
When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Warranted

APPENDIX E

Synchro Capacity Reports

Table E-1 2018 Existing Capacity Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Signalized							
Davis Road & Thorold Stone Road	*Overall*	*0.65*	*22*	*C*	*0.73*	*23*	*C*
	EBL	0.14	15	B	0.22	18	B
	EBT	0.54	18	B	0.74	23	C
	EBR	0.18	0	A	0.31	1	A
	WBL	0.34	19	B	0.76	59	E
	WBTR	0.65	20	B	0.68	21	C
	NBL	0.68	45	D	0.67	45	D
	NBTL	0.68	45	D	0.67	45	D
	NBR	0.11	34	C	0.07	34	C
	SBL	0.03	50	D	0.04	48	D
	SBT	0.05	50	D	0.07	49	D
	SBR	0.02	50	D	0.02	48	D
Davis Road & Niagara Falls Road/Beaverdams Road	*Overall*	*0.30*	*22*	*C*	*0.38*	*23*	*C*
	EBLTR	0.26	11	B	0.22	13	B
	WBLTR	0.17	10	A	0.25	13	B
	NBL	0.02	26	C	0.02	23	C
	NBTR	0.40	30	C	0.33	26	C
	SBL	0.34	30	C	0.62	34	C
	SBT	0.25	28	C	0.27	25	C
	SBR	0.04	26	C	0.08	24	C
Davis Road & Lundy's Lane	*Overall*	*0.46*	*16*	*B*	*0.49*	*21*	*C*
	EBL	0.21	7	A	0.37	19	B
	EBTR	0.42	8	A	0.64	22	C
	WBL	0.07	6	A	0.10	14	B
	WBT	0.30	7	A	0.58	21	C
	WBR	0.04	5	A	0.05	13	B
	NBL	0.13	32	C	0.11	20	B
	NBTR	0.62	39	D	0.30	22	C
	SBL	0.36	34	C	0.20	21	C
	SBT	0.37	34	C	0.23	21	C
	SBR	0.06	32	C	0.08	19	B
Thorold Townline Road & Thorold Stone Road	*Overall*	*0.80*	*24*	*C*	*0.73*	*27*	*C*
	EBL	0.74	15	B	0.63	14	B
	EBT	0.30	7	A	0.52	13	B
	EBR	0.03	5	A	0.02	8	A
	WBL	0.07	14	B	0.15	18	B
	WBT	0.49	18	B	0.54	22	C
	WBR	0.06	13	B	0.03	15	B
	NBL	**0.94**	132	F	**0.90**	108	F
	NBTR	0.48	42	D	0.25	33	C
	SBL	0.29	40	D	0.17	33	C
	SBTR	0.80	60	E	0.91	64	E

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Thorold Townline Road & Lundy's Lane	*Overall*	*0.40*	*17*	*B*	*0.46*	*19*	*B*
	EBL	0.10	5	A	0.07	5	A
	EBT	0.35	7	A	0.40	8	A
	EBR	0.08	5	A	0.09	5	A
	WBL	0.07	5	A	0.09	5	A
	WBTR	0.29	6	A	0.39	8	A
	NBL	0.39	41	D	0.69	55	D
	NBTR	0.60	45	D	0.57	43	D
	SBL	0.09	36	D	0.18	37	D
	SBTR	0.44	41	D	0.55	43	D
Unsignalized							
Thorold Townline Road at Beaverdams Road	EBLTR	0.23	10	A	0.39	12	B
	WBLTR	0.30	10	B	0.33	11	B
	NBLTR	0.29	11	B	0.31	11	B
	SBLTR	0.22	10	A	0.34	12	B
Thorold Townline Road at Proposed Upper's Quarry Access	WBLR	<0.01	11	B	<0.01	11	B
	NBTR	0.13	0	-	0.12	0	-
	SBLT	<0.01	0	-	<0.01	0	A

Table E-2 2023 Baseline Capacity Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Signalized							
Davis Road & Thorold Stone Road	*Overall*	*0.73*	*24*	*C*	***1.08***	*31*	*C*
	EBL	0.21	18	B	0.33	26	C
	EBT	0.61	20	C	0.84	28	C
	EBR	0.20	0	A	0.34	1	A
	WBL	0.47	26	C	**1.30**	234	F
	WBTR	0.75	24	C	0.78	25	C
	NBL	0.69	44	D	0.69	44	D
	NBTL	0.69	44	D	0.68	44	D
	NBR	0.13	32	C	0.07	33	C
	SBL	0.03	50	D	0.04	48	D
	SBT	0.05	50	D	0.08	49	D
	SBR	0.02	50	D	0.02	48	D
Davis Road & Niagara Falls Road/Beaverdams Road	*Overall*	*0.33*	*22*	*C*	*0.44*	*23*	*C*
	EBLTR	0.29	11	B	0.25	14	B
	WBLTR	0.19	10	A	0.29	14	B
	NBL	0.02	26	C	0.02	22	C
	NBTR	0.44	30	C	0.35	25	C
	SBL	0.40	31	C	0.67	36	D
	SBT	0.28	28	C	0.28	24	C
	SBR	0.04	26	C	0.08	23	C
Davis Road & Lundys Lane	*Overall*	*0.51*	*16*	*B*	*0.54*	*22*	*C*
	EBL	0.24	7	A	0.47	22	C
	EBTR	0.47	9	A	0.70	24	C
	WBL	0.09	6	A	0.12	15	B
	WBT	0.34	8	A	0.64	22	C
	WBR	0.04	6	A	0.05	13	B
	NBL	0.15	32	C	0.13	20	C
	NBTR	0.66	40	D	0.33	23	C
	SBL	0.40	34	C	0.22	22	C
	SBT	0.39	34	C	0.26	22	C
	SBR	0.07	31	C	0.09	20	B
Thorold Townline Road & Thorold Stone Road	*Overall*	*0.87*	*29*	*C*	*0.87*	*32*	*C*
	EBL	0.81	28	C	0.76	24	C
	EBT	0.35	8	A	0.59	15	B
	EBR	0.03	6	A	0.03	9	A
	WBL	0.10	19	B	0.20	22	C
	WBT	0.64	27	C	0.65	27	C
	WBR	0.06	18	B	0.03	18	B
	NBL	**0.97**	138	F	**1.05**	160	F
	NBTR	0.48	40	D	0.26	32	C
	SBL	0.29	38	D	0.17	31	C
	SBTR	0.84	62	E	**0.94**	69	E

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Thorold Townline Road & Lundys Lane	*Overall*	*0.44*	*17*	*B*	*0.52*	*20*	*B*
	EBL	0.11	6	A	0.09	6	A
	EBT	0.39	8	A	0.46	9	A
	EBR	0.09	6	A	0.10	6	A
	WBL	0.08	6	A	0.11	6	A
	WBTR	0.33	7	A	0.44	9	A
	NBL	0.42	40	D	0.74	59	E
	NBTR	0.62	45	D	0.59	42	D
	SBL	0.10	36	D	0.19	36	D
	SBTR	0.46	40	D	0.57	42	D
Unsignalized							
Thorold Townline Road at Beaverdams Road	EBLTR	0.26	10	B	0.45	13	B
	WBLTR	0.34	11	B	0.38	12	B
	NBLTR	0.33	11	B	0.36	13	B
	SBLTR	0.25	11	B	0.40	13	B
Thorold Townline Road at Proposed Upper's Quarry Access	WBLR	<0.01	11	B	<0.01	11	B
	NBTR	0.15	0	-	0.14	0	-
	SBLT	<0.01	0	-	<0.01	0	A

Table E-3 2025 Future Background Capacity Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Signalized							
Davis Road & Thorold Stone Road	*Overall*	*0.79*	*31*	*C*	*0.93*	*38*	*D*
	EBL	0.24	22	C	0.28	28	C
	EBT	0.67	24	C	**0.94**	45	D
	EBR	0.23	0	A	0.46	1	A
	WBL	0.71	48	D	0.84	66	E
	WBTR	0.78	28	C	0.72	22	C
	NBL	0.84	59	E	**0.92**	85	F
	NBTL	**0.85**	61	E	**0.95**	90	F
	NBR	0.17	35	D	0.10	44	D
	SBL	0.02	55	D	0.05	62	E
	SBT	0.03	55	D	0.10	63	E
	SBR	0.02	54	D	0.02	62	E
Davis Road & Niagara Falls Road/Beaverdams Road	*Overall*	*0.43*	*27*	*C*	*0.57*	*24*	*C*
	EBLTR	0.30	13	B	0.31	18	B
	WBLTR	0.21	12	B	0.42	19	B
	NBL	0.06	26	C	0.05	20	C
	NBTR	0.67	34	C	0.44	24	C
	SBL	0.63	42	D	0.77	43	D
	SBT	0.33	29	C	0.44	24	C
	SBR	0.04	26	C	0.08	20	C
Davis Road & Lundys Lane	*Overall*	*0.67*	*19*	*B*	*0.92*	*41*	*D*
	EBL	0.37	12	B	0.88	52	D
	EBTR	0.61	14	B	0.77	29	C
	WBL	0.15	9	A	0.18	24	C
	WBT	0.46	12	B	**0.88**	47	D
	WBR	0.17	8	A	0.22	41	D
	NBL	0.12	27	C	0.23	42	D
	NBTR	0.54	31	C	0.65	54	D
	SBL	0.81	50	D	0.87	53	D
	SBT	0.32	28	C	0.27	29	C
	SBR	0.12	27	C	0.12	26	C
Thorold Townline Road & Thorold Stone Road	*Overall*	*0.97*	*53*	*D*	*0.97*	*53*	*D*
	EBL	**0.99**	85	F	**0.98**	90	F
	EBT	0.56	28	C	**0.86**	40	D
	EBR	0.10	21	C	0.04	21	C
	WBL	0.40	28	C	0.62	41	D
	WBT	**0.96**	65	E	**0.96**	62	E
	WBR	0.06	33	C	0.03	30	C
	NBL	0.58	37	D	0.73	42	D
	NBTR	0.38	33	C	0.45	32	C
	SBL	0.22	39	D	0.17	29	C
	SBTR	**0.96**	83	F	**0.95**	72	E

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Thorold Townline Road & Lundys Lane	*Overall*	*0.55*	*16*	*B*	*0.62*	*22*	*C*
	EBL	0.31	8	A	0.23	7	A
	EBT	0.53	10	A	0.54	11	B
	EBR	0.10	6	A	0.11	6	A
	WBL	0.11	6	A	0.13	7	A
	WBTR	0.40	8	A	0.58	11	B
	NBL	0.42	39	D	0.74	63	E
	NBTR	0.63	44	D	0.63	50	D
	SBL	0.15	35	C	0.42	47	D
	SBT	0.37	37	D	0.46	45	D
	SBR	0.05	34	C	0.10	40	D
Thorold Townline Road & Beaverdams Road	*Overall*	*0.46*	*24*	*C*	*0.54*	*23*	*C*
	EBLTR	0.23	11	B	0.37	14	B
	WBLTR	0.28	12	B	0.37	14	B
	NBLTR	0.66	29	C	0.78	33	C
	SBLTR	0.77	34	C	0.60	26	C
Unsignalized							
Thorold Townline Road at Proposed Upper's Quarry Access	WBLR	<0.01	0	A	<0.01	0	A
	NBTR	0.22	0	-	0.22	0	-
	SBLT	<0.01	0	-	<0.01	0	-

2025 Future Background AWSC Sensitivity

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Unsignalized							
Thorold Townline Road at Beaverdams Road	EBLTR	0.41	15	B	0.71	30	D
	WBLTR	0.49	16	C	0.70	29	D
	NBLTR	0.60	19	C	**0.96**	61	**F**
	SBLTR	0.71	23	C	0.77	33	D

Table E-4 2025 Future Total Capacity Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Signalized							
Davis Road & Thorold Stone Road	*Overall*	*0.81*	*32*	*C*	*0.95*	*39*	*D*
	EBL	0.26	23	C	0.29	29	C
	EBT	0.69	25	C	**0.96**	49	D
	EBR	0.23	0	A	0.46	1	A
	WBL	0.73	52	D	0.84	66	E
	WBTR	0.81	29	C	0.73	23	C
	NBL	0.84	59	E	**0.92**	85	F
	NBTL	**0.85**	61	E	**0.95**	90	F
	NBR	0.17	35	D	0.10	44	D
	SBL	0.02	55	D	0.05	62	E
	SBT	0.03	55	D	0.10	63	E
	SBR	0.02	54	D	0.02	62	E
Davis Road & Niagara Falls Road/Beaverdams Road	*Overall*	*0.43*	*27*	*C*	*0.57*	*24*	*C*
	EBLTR	0.30	13	B	0.31	18	B
	WBLTR	0.21	12	B	0.42	19	B
	NBL	0.06	26	C	0.05	20	C
	NBTR	0.67	34	C	0.44	24	C
	SBL	0.63	42	D	0.77	43	D
	SBT	0.33	29	C	0.44	24	C
	SBR	0.04	26	C	0.08	20	C
Davis Road & Lundys Lane	*Overall*	*0.67*	*19*	*B*	*0.93*	*41*	*D*
	EBL	0.38	12	B	0.89	54	D
	EBTR	0.61	14	B	0.78	29	C
	WBL	0.15	9	A	0.18	24	C
	WBT	0.47	12	B	**0.89**	47	D
	WBR	0.17	8	A	0.22	41	D
	NBL	0.12	27	C	0.23	42	D
	NBTR	0.54	31	C	0.65	54	D
	SBL	0.81	50	D	0.87	53	D
	SBT	0.32	28	C	0.27	29	C
	SBR	0.12	27	C	0.12	26	C
Thorold Townline Road & Thorold Stone Road	*Overall*	***1.00***	*56*	*E*	*0.99*	*58*	*E*
	EBL	**0.99**	87	F	**0.99**	91	F
	EBT	0.58	29	C	**0.89**	44	D
	EBR	0.13	22	C	0.06	23	C
	WBL	0.48	29	C	0.82	72	E
	WBT	**0.98**	70	E	**0.99**	69	E
	WBR	0.06	33	C	0.03	31	C
	NBL	0.81	63	E	0.88	66	E
	NBTR	0.49	34	C	0.51	33	C
	SBL	0.22	38	D	0.17	28	C
	SBTR	**0.98**	88	F	**0.97**	76	E

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Thorold Townline Road & Lundys Lane	*Overall*	*0.55*	*16*	*B*	*0.62*	*22*	*C*
	EBL	0.32	8	A	0.24	7	A
	EBT	0.53	10	A	0.54	11	B
	EBR	0.10	6	A	0.11	6	A
	WBL	0.11	6	A	0.13	7	A
	WBTR	0.41	8	A	0.58	11	B
	NBL	0.42	39	D	0.74	63	E
	NBTR	0.63	44	D	0.63	50	D
	SBL	0.16	35	D	0.43	47	D
	SBT	0.37	37	D	0.46	45	D
	SBR	0.05	34	C	0.10	40	D
Thorold Townline Road & Beaverdams Road	*Overall*	*0.52*	*20*	*C*	*0.60*	*24*	*C*
	EBLTR	0.38	25	C	0.42	19	B
	WBLTR	0.46	26	C	0.43	19	B
	NBLTR	0.54	17	B	0.79	30	C
	SBLTR	0.56	17	B	0.63	24	C
Unsignalized							
Thorold Townline Road at Proposed Upper's Quarry Access	WBLR	0.14	13	B	0.10	13	B
	NBTR	0.22	0	-	0.23	0	-
	SBL	0.06	10	A	0.06	10	A
	SBT	0.17	0	-	0.19	0	-

2025 Future Total AWSC Sensitivity

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Unsignalized							
Thorold Townline Road at Beaverdams Road	EBLTR	0.46	17	C	0.74	32	D
	WBLTR	0.55	20	C	0.72	31	D
	NBLTR	0.81	34	D	1.14	114	F
	SBLTR	0.88	43	E	0.90	51	F

Table E-5 2035 Future Background Capacity Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Signalized							
Davis Road & Thorold Stone Road	*Overall*	*0.83*	*30*	*C*	***1.02***	*40*	*D*
	EBL	0.26	24	C	0.34	30	C
	EBT	0.81	31	C	**0.97**	48	D
	EBR	0.30	1	A	0.60	2	A
	WBL	0.72	31	C	**1.00**	105	F
	WBTR	0.77	23	C	0.74	18	B
	NBL	0.86	56	E	**0.98**	93	F
	NBTL	0.87	57	E	**1.00**	99	F
	NBR	0.43	35	D	0.14	41	D
	SBR	0.02	30	C	0.03	39	D
Davis Road & Niagara Falls Road/Beaverdams Road	*Overall*	*0.53*	*27*	*C*	*0.70*	*27*	*C*
	EBLTR	0.39	17	B	0.44	25	C
	WBLTR	0.29	15	B	0.49	39	D
	NBL	0.09	23	C	0.13	17	B
	NBTR	0.71	32	C	0.50	21	C
	SBL	0.73	51	D	0.89	59	E
	SBT	0.37	25	C	0.54	21	C
	SBR	0.04	22	C	0.09	16	B
Davis Road & Lundys Lane	*Overall*	*0.76*	*20*	*B*	***1.14***	*65*	*E*
	EBL	0.53	15	B	**1.11**	139	F
	EBTR	0.75	17	B	**0.87**	32	C
	WBL	0.25	10	A	0.37	30	C
	WBT	0.58	12	B	**1.05**	80	E
	WBR	0.11	7	A	0.24	22	C
	NBL	0.14	29	C	0.28	53	D
	NBTR	0.66	36	D	0.85	82	F
	SBL	0.79	51	D	**1.08**	127	F
	SBT	0.38	31	C	0.36	42	D
	SBR	0.13	29	C	0.15	38	D
Thorold Townline Road & Thorold Stone Road	*Overall*	*0.90*	*46*	*D*	*0.99*	*48*	*D*
	EBL	**0.90**	58	E	**0.97**	84	F
	EBT	0.58	24	C	**0.86**	34	C
	EBR	0.16	17	B	0.07	17	B
	WBL	0.65	27	C	0.73	42	D
	WBT	**0.99**	68	E	**0.94**	53	D
	WBR	0.07	29	C	0.03	25	C
	NBL	0.67	48	D	0.74	50	D
	NBTR	0.67	46	D	**0.94**	75	E
	SBL	0.40	48	D	0.50	40	D
	SBT	0.80	65	E	0.57	44	D
	SBR	0.21	45	D	0.38	41	D

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Thorold Townline Road & Lundys Lane	*Overall*	*0.66*	*18*	*B*	*0.81*	*28*	*C*
	EBL	0.55	14	B	0.64	25	C
	EBT	0.66	13	B	0.73	16	B
	EBR	0.13	6	A	0.14	7	A
	WBL	0.16	7	A	0.22	9	A
	WBTR	0.56	11	B	0.82	20	B
	NBL	0.46	38	D	0.81	69	E
	NBTR	0.65	44	D	0.68	52	D
	SBL	0.30	36	D	0.78	72	E
	SBT	0.38	36	D	0.47	44	D
	SBR	0.07	33	C	0.24	41	D
Thorold Townline Road & Beaverdams Road	*Overall*	*0.69*	*22*	*C*	*0.91*	*34*	*C*
	EBLTR	0.44	28	C	0.54	20	C
	WBLTR	0.67	35	D	**0.90**	53	D
	NBLTR	0.55	15	B	**0.93**	40	D
	SBLTR	0.70	18	B	0.58	19	B
Unsignalized							
Thorold Townline Road at Proposed Upper's Quarry Access	WBLR	0.18	0	A	<0.01	0	A
	NBTR	0.32	0	-	0.36	0	-
	SBL	<0.01	0	-	<0.01	0	-
	SBT	0.28	0	-	0.32	0	-

Table E-6 2035 Future Total Capacity Analysis

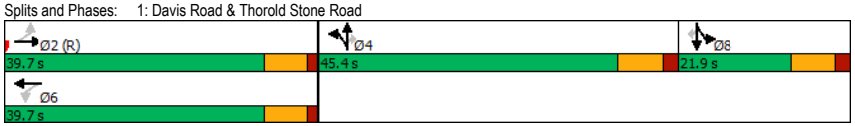
Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Signalized							
Davis Road & Thorold Stone Road	*Overall*	*0.85*	*31*	*C*	***1.02***	*42*	*D*
	EBL	0.28	25	C	0.36	31	C
	EBT	0.84	32	C	**0.99**	52	D
	EBR	0.30	1	A	0.60	2	A
	WBL	0.73	32	C	**1.00**	106	F
	WBTR	0.80	24	C	0.76	19	B
	NBL	0.86	56	E	**0.98**	93	F
	NBTL	**0.87**	57	E	**1.00**	99	F
	NBR	0.43	35	D	0.14	41	D
	SBR	0.02	30	C	0.03	39	D
Davis Road & Niagara Falls Road/Beaverdams Road	*Overall*	*0.53*	*27*	*C*	*0.70*	*27*	*C*
	EBLTR	0.39	17	B	0.44	25	C
	WBLTR	0.29	15	B	0.49	38	D
	NBL	0.09	23	C	0.13	17	B
	NBTR	0.71	32	C	0.50	21	C
	SBL	0.73	51	D	0.89	59	E
	SBT	0.37	25	C	0.54	21	C
	SBR	0.04	22	C	0.09	16	B
Davis Road & Lundys Lane	*Overall*	*0.76*	*20*	*B*	***1.14***	*65*	*E*
	EBL	0.53	15	B	**1.11**	139	F
	EBTR	0.75	17	B	0.87	33	C
	WBL	0.25	10	A	0.38	30	C
	WBT	0.58	12	B	**1.05**	81	F
	WBR	0.11	7	A	0.24	22	C
	NBL	0.14	29	C	0.28	53	D
	NBTR	0.66	36	D	0.85	82	F
	SBL	0.79	51	D	**1.08**	127	F
	SBT	0.38	31	C	0.36	42	D
	SBR	0.13	29	C	0.15	38	D
Thorold Townline Road & Thorold Stone Road	*Overall*	*0.96*	*49*	*D*	***1.02***	*55*	*D*
	EBL	**0.94**	67	E	**0.99**	91	F
	EBT	0.61	26	C	**0.90**	40	D
	EBR	0.20	19	B	0.10	19	B
	WBL	0.70	29	C	**0.95**	93	F
	WBT	**0.99**	68	E	**0.98**	62	E
	WBR	0.07	29	C	0.03	26	C
	NBL	0.87	76	E	0.82	57	E
	NBTR	0.79	53	D	**0.98**	82	F
	SBL	0.44	47	D	0.48	38	D
	SBT	0.82	65	E	0.57	42	D
	SBR	0.21	44	D	0.37	39	D

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Thorold Townline Road & Lundys Lane	*Overall*	*0.66*	*18*	*B*	*0.82*	*28*	*C*
	EBL	0.55	14	B	0.65	26	C
	EBT	0.66	13	B	0.73	16	B
	EBR	0.13	6	A	0.14	7	A
	WBL	0.16	7	A	0.22	9	A
	WBTR	0.56	11	B	0.82	20	B
	NBL	0.46	38	D	0.81	69	E
	NBTR	0.65	44	D	0.68	52	D
	SBL	0.31	36	D	0.79	73	E
	SBT	0.38	36	D	0.47	44	D
	SBR	0.07	33	C	0.24	41	D
Thorold Townline Road & Beaverdams Road	*Overall*	*0.75*	*24*	*C*	*0.97*	*42*	*D*
	EBLTR	0.44	28	C	0.57	22	C
	WBLTR	0.67	35	D	**0.95**	64	E
	NBLTR	0.69	19	B	**0.99**	54	D
	SBLTR	0.79	23	C	0.66	21	C
Unsignalized							
Thorold Townline Road at Proposed Upper's Quarry Access	WBLR	0.18	16	C	0.15	17	C
	NBTR	0.32	0	-	0.36	0	-
	SBL	0.07	10	B	0.07	11	B
	SBT	0.28	0	-	0.32	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	21	866	226	67	1053	398	15	149	1	2	18
Future Volume (vph)	21	866	226	67	1053	398	15	149	1	2	18
Turn Type	Perm	NA	Free	Perm	NA	Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6	4	4		8	8	
Permitted Phases	2		Free	6				4			8
Detector Phase	2	2		6	6	4	4	4	8	8	8
Switch Phase											
Minimum Initial (s)	20.0	20.0		20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		28.9	28.9	29.7	29.7	29.7	21.7	21.7	21.7
Total Split (s)	39.7	39.7		39.7	39.7	45.4	45.4	45.4	21.9	21.9	21.9
Total Split (%)	37.1%	37.1%		37.1%	37.1%	42.4%	42.4%	42.4%	20.5%	20.5%	20.5%
Yellow Time (s)	5.4	5.4		5.4	5.4	5.7	5.7	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		6.9	6.9	7.7	7.7	7.7	7.7	7.7	7.7
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max		Max	Max	None	None	None	None	None	None
Act Effct Green (s)	61.7	61.7	107.0	61.7	61.7	23.6	23.6	23.6	10.0	10.0	10.0
Actuated g/C Ratio	0.58	0.58	1.00	0.58	0.58	0.22	0.22	0.22	0.09	0.09	0.09
v/c Ratio	0.13	0.50	0.18	0.32	0.61	0.68	0.68	0.37	0.01	0.02	0.09
Control Delay	20.3	18.1	0.3	23.8	20.3	47.9	48.1	7.3	45.0	44.5	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	18.1	0.3	23.8	20.3	47.9	48.1	7.3	45.0	44.5	0.8
LOS	C	B	A	C	C	D	D	A	D	D	A
Approach Delay		14.5			20.5		37.2			6.8	
Approach LOS		B			C		D			A	

Intersection Summary			
Cycle Length: 107			
Actuated Cycle Length: 107			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 21.4		Intersection LOS: C	
Intersection Capacity Utilization 85.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Davis Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	866	226	67	1053	6	398	15	149	1	2	18
Future Volume (vph)	21	866	226	67	1053	6	398	15	149	1	2	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1525	3137	1328	1421	3156		1449	1441	1359	831	1167	1202
Flt Permitted	0.18	1.00	1.00	0.26	1.00		0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	293	3137	1328	382	3156		1449	1441	1359	831	1167	1202
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	22	902	235	70	1097	6	415	16	155	1	2	19
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	121	0	0	18
Lane Group Flow (vph)	22	902	235	70	1103	0	216	215	34	1	2	1
Confl. Peds. (#/hr)	1					1	1		1	1		1
Heavy Vehicles (%)	9%	6%	12%	17%	5%	50%	9%	26%	8%	100%	50%	22%
Turn Type	Perm	NA	Free	Perm	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6		4	4		8	8	
Permitted Phases	2		Free	6					4			8
Actuated Green, G (s)	57.1	57.1	107.0	57.1	57.1		23.6	23.6	23.6	4.0	4.0	4.0
Effective Green, g (s)	57.1	57.1	107.0	57.1	57.1		23.6	23.6	23.6	4.0	4.0	4.0
Actuated g/C Ratio	0.53	0.53	1.00	0.53	0.53		0.22	0.22	0.22	0.04	0.04	0.04
Clearance Time (s)	6.9	6.9		6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	156	1674	1328	203	1684		319	317	299	31	43	44
v/s Ratio Prot		0.29			c0.35		0.15	c0.15		0.00	0.00	
v/s Ratio Perm	0.08		c0.18	0.18					0.03			0.00
v/c Ratio	0.14	0.54	0.18	0.34	0.65		0.68	0.68	0.11	0.03	0.05	0.02
Uniform Delay, d1	12.6	16.3	0.0	14.3	17.9		38.2	38.2	33.3	49.6	49.7	49.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	1.2	0.3	4.6	2.0		6.6	6.7	0.3	0.7	0.8	0.3
Delay (s)	14.5	17.6	0.3	18.9	19.9		44.8	44.9	33.6	50.4	50.4	49.9
Level of Service	B	B	A	B	B		D	D	C	D	D	D
Approach Delay (s)		14.0			19.8			41.9			49.9	
Approach LOS		B			B			D			D	

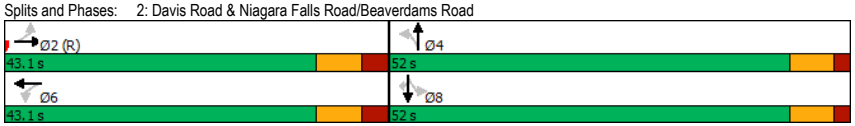
Intersection Summary					
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.65				
Actuated Cycle Length (s)	107.0	Sum of lost time (s)		22.3	
Intersection Capacity Utilization	85.5%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	110	31	24	17	4	267	82	172	44
Future Volume (vph)	110	31	24	17	4	267	82	172	44
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	43.1	43.1	43.1	43.1	52.0	52.0	52.0	52.0	52.0
Total Split (%)	45.3%	45.3%	45.3%	45.3%	54.7%	54.7%	54.7%	54.7%	54.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		55.0		55.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio		0.58		0.58	0.26	0.26	0.26	0.26	0.26
v/c Ratio		0.26		0.24	0.02	0.40	0.34	0.25	0.12
Control Delay		11.1		3.1	26.5	29.2	32.9	28.8	6.1
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		11.1		3.1	26.5	29.2	32.9	28.8	6.1
LOS		B		A	C	C	C	C	A
Approach Delay		11.1		3.1		29.1		26.6	
Approach LOS		B		A		C		C	

Intersection Summary			
Cycle Length: 95.1			
Actuated Cycle Length: 95.1			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 19.9		Intersection LOS: B	
Intersection Capacity Utilization 89.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



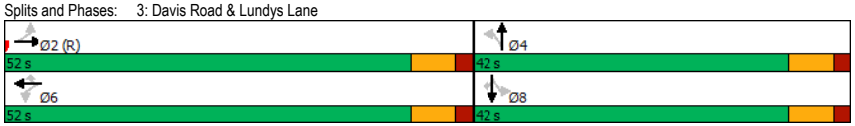
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	31	7	24	17	166	4	267	30	82	172	44
Future Volume (vph)	110	31	7	24	17	166	4	267	30	82	172	44
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		0.99			0.89		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.96			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1534			1512		1108	2893		1646	2748	1293
Flt Permitted		0.66			0.96		0.64	1.00		0.56	1.00	1.00
Satd. Flow (perm)		1047			1456		744	2893		971	2748	1293
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	33	7	25	18	175	4	281	32	86	181	46
RTOR Reduction (vph)	0	1	0	0	74	0	0	13	0	0	0	34
Lane Group Flow (vph)	0	155	0	0	144	0	4	300	0	86	181	12
Heavy Vehicles (%)	10%	6%	14%	8%	11%	1%	50%	14%	6%	1%	21%	15%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		55.0			55.0		25.0	25.0		25.0	25.0	25.0
Effective Green, g (s)		55.0			55.0		25.0	25.0		25.0	25.0	25.0
Actuated g/C Ratio		0.58			0.58		0.26	0.26		0.26	0.26	0.26
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		605			842		195	760		255	722	339
v/s Ratio Prot								c0.10			0.07	
v/s Ratio Perm		c0.15			0.10		0.01			0.09		0.01
v/c Ratio		0.26			0.17		0.02	0.40		0.34	0.25	0.04
Uniform Delay, d1		9.9			9.4		26.0	28.8		28.3	27.7	26.1
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.0			0.4		0.1	0.7		1.6	0.4	0.1
Delay (s)		10.9			9.8		26.1	29.5		30.0	28.0	26.2
Level of Service		B			A		C	C		C	C	C
Approach Delay (s)		10.9			9.8			29.5			28.3	
Approach LOS		B			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.30				
Actuated Cycle Length (s)	95.1	Sum of lost time (s)		15.1	
Intersection Capacity Utilization	89.2%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	118	428	29	305	47	22	137	55	89	74
Future Volume (vph)	118	428	29	305	47	22	137	55	89	74
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases		2		6			4		8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	2	2	6	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	52.0	52.0	52.0	52.0	52.0	42.0	42.0	42.0	42.0	42.0
Total Split (%)	55.3%	55.3%	55.3%	55.3%	55.3%	44.7%	44.7%	44.7%	44.7%	44.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	62.9	62.9	62.9	62.9	62.9	17.1	17.1	17.1	17.1	17.1
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.67	0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.21	0.42	0.07	0.30	0.06	0.13	0.63	0.36	0.37	0.27
Control Delay	7.6	9.0	6.8	7.8	2.2	32.7	44.6	39.1	37.4	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	9.0	6.8	7.8	2.2	32.7	44.6	39.1	37.4	9.7
LOS	A	A	A	A	A	C	D	D	D	A
Approach Delay		8.7		7.0			43.2		28.4	
Approach LOS		A		A			D		C	

Intersection Summary			
Cycle Length: 94			
Actuated Cycle Length: 94			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 92.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 3: Davis Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	428	18	29	305	47	22	137	20	55	89	74
Future Volume (vph)	118	428	18	29	305	47	22	137	20	55	89	74
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1525	1675		1340	1620	1328	1309	1412		1409	1411	1282
Flt Permitted	0.56	1.00		0.46	1.00	1.00	0.70	1.00		0.62	1.00	1.00
Satd. Flow (perm)	906	1675		648	1620	1328	958	1412		917	1411	1282
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	126	455	19	31	324	50	23	146	21	59	95	79
RTOR Reduction (vph)	0	1	0	0	0	17	0	7	0	0	0	65
Lane Group Flow (vph)	126	473	0	31	324	33	23	160	0	59	95	14
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	9%	3%	22%	24%	8%	12%	27%	19%	40%	18%	24%	16%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	62.9	62.9		62.9	62.9	62.9	17.1	17.1		17.1	17.1	17.1
Effective Green, g (s)	62.9	62.9		62.9	62.9	62.9	17.1	17.1		17.1	17.1	17.1
Actuated g/C Ratio	0.67	0.67		0.67	0.67	0.67	0.18	0.18		0.18	0.18	0.18
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	606	1120		433	1084	888	174	256		166	256	233
v/s Ratio Prot		c0.28			0.20			c0.11			0.07	
v/s Ratio Perm	0.14			0.05		0.03	0.02			0.06		0.01
v/c Ratio	0.21	0.42		0.07	0.30	0.04	0.13	0.62		0.36	0.37	0.06
Uniform Delay, d1	6.0	7.2		5.4	6.4	5.3	32.2	35.5		33.6	33.7	31.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	1.2		0.3	0.7	0.1	0.1	3.4		0.5	0.3	0.0
Delay (s)	6.8	8.3		5.7	7.1	5.4	32.4	38.9		34.1	34.1	31.9
Level of Service	A	A		A	A	A	C	D		C	C	C
Approach Delay (s)		8.0			6.8			38.1			33.3	
Approach LOS		A			A			D			C	

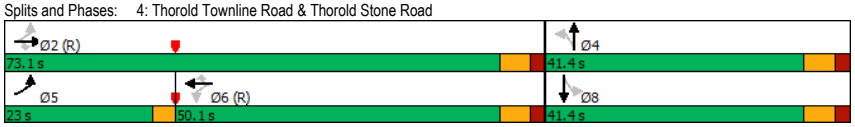
Intersection Summary					
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.46				
Actuated Cycle Length (s)	94.0	Sum of lost time (s)		14.0	
Intersection Capacity Utilization	92.3%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	321	656	34	20	807	73	64	112	52	81
Future Volume (vph)	321	656	34	20	807	73	64	112	52	81
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	5	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	35.1	35.1	35.1	35.1	35.1	41.4	41.4	41.4	41.4
Total Split (s)	23.0	73.1	73.1	50.1	50.1	50.1	41.4	41.4	41.4	41.4
Total Split (%)	20.1%	63.8%	63.8%	43.8%	43.8%	43.8%	36.2%	36.2%	36.2%	36.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4	6.4	6.4
Lead/Lag	Lead			Lag	Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	83.3	80.2	80.2	60.6	60.6	60.6	21.8	21.8	21.8	21.8
Actuated g/C Ratio	0.73	0.70	0.70	0.53	0.53	0.53	0.19	0.19	0.19	0.19
v/c Ratio	0.72	0.30	0.04	0.07	0.49	0.10	0.94	0.49	0.29	0.86
Control Delay	17.4	8.0	2.9	20.3	21.3	5.3	136.5	42.2	40.0	48.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	8.0	2.9	20.3	21.3	5.3	136.5	42.2	40.0	48.9
LOS	B	A	A	C	C	A	F	D	D	D
Approach Delay		10.8			19.9			72.4		47.5
Approach LOS		B			B			E		D

Intersection Summary			
Cycle Length: 114.5			
Actuated Cycle Length: 114.5			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 24.3		Intersection LOS: C	
Intersection Capacity Utilization 89.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	321	656	34	20	807	73	64	112	24	52	81	205
Future Volume (vph)	321	656	34	20	807	73	64	112	24	52	81	205
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4		6.4	6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	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	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1525	3228	1240	1330	3228	1339	1374	1470		1525	1340	
Flt Permitted	0.26	1.00	1.00	0.39	1.00	1.00	0.26	1.00		0.62	1.00	
Satd. Flow (perm)	416	3228	1240	549	3228	1339	376	1470		994	1340	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	334	683	35	21	841	76	67	117	25	54	84	214
RTOR Reduction (vph)	0	0	10	0	0	36	0	8	0	0	93	0
Lane Group Flow (vph)	334	683	25	21	841	40	67	134	0	54	205	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	9%	3%	20%	25%	3%	8%	21%	14%	25%	9%	18%	16%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2		2	6		6	4			8		
Actuated Green, G (s)	80.2	80.2	80.2	60.6	60.6	60.6	21.8	21.8		21.8	21.8	
Effective Green, g (s)	80.2	80.2	80.2	60.6	60.6	60.6	21.8	21.8		21.8	21.8	
Actuated g/C Ratio	0.70	0.70	0.70	0.53	0.53	0.53	0.19	0.19		0.19	0.19	
Clearance Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4		6.4	6.4	
Vehicle Extension (s)	2.5	6.0	6.0	6.0	6.0	6.0	2.3	2.3		2.3	2.3	
Lane Grp Cap (vph)	452	2261	868	290	1708	708	71	279		189	255	
v/s Ratio Prot	c0.11	0.21			0.26			0.09			0.15	
v/s Ratio Perm	c0.41		0.02	0.04		0.03	c0.18			0.05		
v/c Ratio	0.74	0.30	0.03	0.07	0.49	0.06	0.94	0.48		0.29	0.80	
Uniform Delay, d1	9.0	6.5	5.2	13.2	17.2	13.1	45.7	41.3		39.7	44.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.9	0.3	0.1	0.5	1.0	0.2	86.5	0.8		0.5	15.9	
Delay (s)	14.9	6.9	5.3	13.7	18.2	13.2	132.3	42.1		40.2	60.2	
Level of Service	B	A	A	B	B	B	F	D		D	E	
Approach Delay (s)		9.4			17.7			71.0			57.2	
Approach LOS		A			B			E			E	

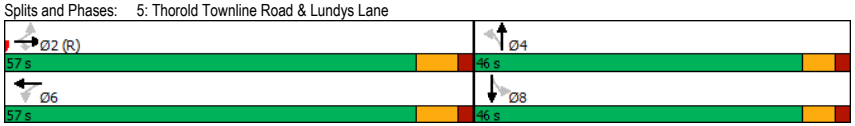
Intersection Summary					
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.80				
Actuated Cycle Length (s)	114.5	Sum of lost time (s)	15.5		
Intersection Capacity Utilization	89.3%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	53	380	86	38	304	66	120	13	86
Future Volume (vph)	53	380	86	38	304	66	120	13	86
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		4		8
Permitted Phases	2		2	6		4		8	
Detector Phase	2	2	2	6	6	4	4	8	8
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0
Total Split (s)	57.0	57.0	57.0	57.0	57.0	46.0	46.0	46.0	46.0
Total Split (%)	55.3%	55.3%	55.3%	55.3%	55.3%	44.7%	44.7%	44.7%	44.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	Max	Max	None	None	None	None
Act Effct Green (s)	72.2	72.2	72.2	72.2	72.2	17.8	17.8	17.8	17.8
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.17	0.17	0.17	0.17
v/c Ratio	0.10	0.35	0.09	0.07	0.29	0.39	0.62	0.09	0.47
Control Delay	6.6	7.8	3.4	6.5	7.3	42.5	44.3	34.2	37.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	7.8	3.4	6.5	7.3	42.5	44.3	34.2	37.5
LOS	A	A	A	A	A	D	D	C	D
Approach Delay		7.0			7.2		43.8		37.2
Approach LOS		A			A		D		D

Intersection Summary		
Cycle Length: 103		
Actuated Cycle Length: 103		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 65		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.62		
Intersection Signal Delay: 16.9	Intersection LOS: B	
Intersection Capacity Utilization 66.8%	ICU Level of Service C	
Analysis Period (min) 15		

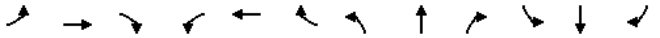
Splits and Phases: 5: Thorold Townline Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	380	86	38	304	8	66	120	37	13	86	26
Future Volume (vph)	53	380	86	38	304	8	66	120	37	13	86	26
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	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	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1444	1683	1377	1583	1646		1484	1499		1554	1407	
Flt Permitted	0.56	1.00	1.00	0.51	1.00		0.68	1.00		0.55	1.00	
Satd. Flow (perm)	848	1683	1377	845	1646		1057	1499		895	1407	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	57	409	92	41	327	9	71	129	40	14	92	28
RTOR Reduction (vph)	0	0	16	0	1	0	0	15	0	0	14	0
Lane Group Flow (vph)	57	409	76	41	335	0	71	154	0	14	106	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	15%	4%	8%	5%	6%	0%	12%	15%	5%	7%	17%	30%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	72.2	72.2	72.2	72.2	72.2		17.8	17.8		17.8	17.8	
Effective Green, g (s)	72.2	72.2	72.2	72.2	72.2		17.8	17.8		17.8	17.8	
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70		0.17	0.17		0.17	0.17	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	594	1179	965	592	1153		182	259		154	243	
v/s Ratio Prot		c0.24			0.20			c0.10			0.08	
v/s Ratio Perm	0.07		0.06	0.05			0.07			0.02		
v/c Ratio	0.10	0.35	0.08	0.07	0.29		0.39	0.60		0.09	0.44	
Uniform Delay, d1	4.9	6.1	4.9	4.8	5.8		37.8	39.3		35.8	38.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.8	0.2	0.2	0.6		2.9	5.5		0.5	2.6	
Delay (s)	5.3	6.9	5.0	5.1	6.4		40.7	44.7		36.3	40.7	
Level of Service	A	A	A	A	A		D	D		D	D	
Approach Delay (s)		6.4			6.3			43.5			40.3	
Approach LOS		A			A			D			D	

Intersection Summary				
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	66.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	14	115	16	8	167	22	19	155	5	11	104	17
Future Volume (vph)	14	115	16	8	167	22	19	155	5	11	104	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	125	17	9	182	24	21	168	5	12	113	18

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	157	215	194	143
Volume Left (vph)	15	9	21	12
Volume Right (vph)	17	24	5	18
Hadj (s)	-0.01	-0.04	0.27	0.27
Departure Headway (s)	5.2	5.1	5.4	5.5
Degree Utilization, x	0.23	0.30	0.29	0.22
Capacity (veh/h)	640	663	623	604
Control Delay (s)	9.7	10.2	10.6	10.0
Approach Delay (s)	9.7	10.2	10.6	10.0
Approach LOS	A	B	B	A

Intersection Summary				
Delay			10.1	
Level of Service			B	
Intersection Capacity Utilization			35.0%	ICU Level of Service
Analysis Period (min)			15	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	0	211	1	0	115
Future Volume (Veh/h)	1	0	211	1	0	115
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	0	227	1	0	124
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	352	228			228	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	352	228			228	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	650	817			1352	

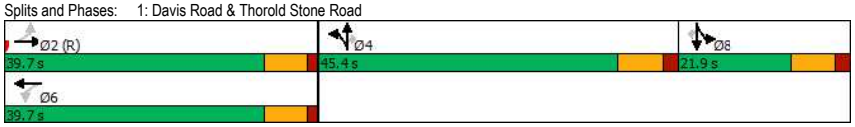
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	228	124
Volume Left	1	0	0
Volume Right	0	1	0
cSH	650	1700	1352
Volume to Capacity	0.00	0.13	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	10.5	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.5	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			22.1%	ICU Level of Service
Analysis Period (min)			15	A

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	24	1209	427	78	1108	412	5	86	4	6	28
Future Volume (vph)	24	1209	427	78	1108	412	5	86	4	6	28
Turn Type	Perm	NA	Free	Perm	NA	Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6	4	4		8	8	
Permitted Phases	2		Free	6				4			8
Detector Phase	2	2		6	6	4	4	4	8	8	8
Switch Phase											
Minimum Initial (s)	20.0	20.0		20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		28.9	28.9	29.7	29.7	29.7	21.7	21.7	21.7
Total Split (s)	39.7	39.7		39.7	39.7	45.4	45.4	45.4	21.9	21.9	21.9
Total Split (%)	37.1%	37.1%		37.1%	37.1%	42.4%	42.4%	42.4%	20.5%	20.5%	20.5%
Yellow Time (s)	5.4	5.4		5.4	5.4	5.7	5.7	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		6.9	6.9	7.7	7.7	7.7	7.7	7.7	7.7
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max		Max	Max	None	None	None	None	None	None
Act Effct Green (s)	59.3	59.3	107.0	59.3	59.3	22.5	22.5	22.5	10.0	10.0	10.0
Actuated g/C Ratio	0.55	0.55	1.00	0.55	0.55	0.21	0.21	0.21	0.09	0.09	0.09
v/c Ratio	0.20	0.70	0.31	0.72	0.65	0.67	0.67	0.24	0.03	0.04	0.12
Control Delay	24.2	23.5	0.6	62.7	22.1	48.4	48.2	4.4	44.8	45.0	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	23.5	0.6	62.7	22.1	48.4	48.2	4.4	44.8	45.0	1.0
LOS	C	C	A	E	C	D	D	A	D	D	A
Approach Delay		17.6			24.8		40.8			12.3	
Approach LOS		B			C		D			B	

Intersection Summary			
Cycle Length: 107			
Actuated Cycle Length: 107			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 23.5		Intersection LOS: C	
Intersection Capacity Utilization 90.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Davis Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	1209	427	78	1108	1	412	5	86	4	6	28
Future Volume (vph)	24	1209	427	78	1108	1	412	5	86	4	6	28
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1330	3292	1444	1539	3259		1564	1556	1352	1662	1509	1424
Flt Permitted	0.16	1.00	1.00	0.13	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	222	3292	1444	207	3259		1564	1556	1352	1662	1509	1424
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	1273	449	82	1166	1	434	5	91	4	6	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	72	0	0	27
Lane Group Flow (vph)	25	1273	449	82	1167	0	221	218	19	4	6	2
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	25%	1%	3%	8%	2%	0%	1%	40%	10%	0%	16%	3%
Turn Type	Perm	NA	Free	Perm	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6		4	4		8	8	
Permitted Phases	2		Free	6					4			8
Actuated Green, G (s)	56.2	56.2	107.0	56.2	56.2		22.5	22.5	22.5	6.0	6.0	6.0
Effective Green, g (s)	56.2	56.2	107.0	56.2	56.2		22.5	22.5	22.5	6.0	6.0	6.0
Actuated g/C Ratio	0.53	0.53	1.00	0.53	0.53		0.21	0.21	0.21	0.06	0.06	0.06
Clearance Time (s)	6.9	6.9		6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	116	1729	1444	108	1711		328	327	284	93	84	79
v/s Ratio Prot		0.39			0.36		c0.14	0.14		0.00	0.00	
v/s Ratio Perm	0.11		c0.31	c0.40					0.01			0.00
v/c Ratio	0.22	0.74	0.31	0.76	0.68		0.67	0.67	0.07	0.04	0.07	0.02
Uniform Delay, d1	13.6	19.7	0.0	20.1	18.8		38.9	38.8	33.8	47.8	47.9	47.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	2.8	0.6	38.7	2.2		6.3	6.1	0.2	0.3	0.6	0.2
Delay (s)	17.8	22.5	0.6	58.8	21.0		45.2	44.9	34.0	48.1	48.5	47.9
Level of Service	B	C	A	E	C		D	D	C	D	D	D
Approach Delay (s)		16.8			23.5			43.1			48.0	
Approach LOS		B			C			D			D	

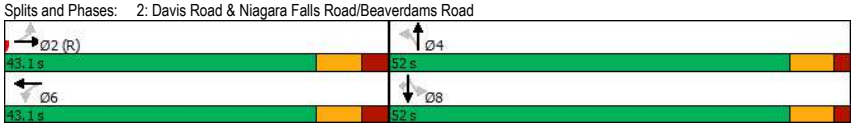
Intersection Summary					
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.73				
Actuated Cycle Length (s)	107.0	Sum of lost time (s)	22.3		
Intersection Capacity Utilization	90.1%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	90	32	42	44	5	275	170	244	105
Future Volume (vph)	90	32	42	44	5	275	170	244	105
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	43.1	43.1	43.1	43.1	52.0	52.0	52.0	52.0	52.0
Total Split (%)	45.3%	45.3%	45.3%	45.3%	54.7%	54.7%	54.7%	54.7%	54.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		51.0		51.0	29.0	29.0	29.0	29.0	29.0
Actuated g/C Ratio		0.54		0.54	0.30	0.30	0.30	0.30	0.30
v/c Ratio		0.22		0.30	0.02	0.34	0.62	0.27	0.21
Control Delay		14.3		9.0	19.8	24.4	37.1	24.9	4.9
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		14.3		9.0	19.8	24.4	37.1	24.9	4.9
LOS		B		A	B	C	D	C	A
Approach Delay		14.3		9.0		24.3		24.8	
Approach LOS		B		A		C		C	

Intersection Summary			
Cycle Length: 95.1			
Actuated Cycle Length: 95.1			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 20.5		Intersection LOS: C	
Intersection Capacity Utilization 83.0%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	32	4	42	44	147	5	275	31	170	244	105
Future Volume (vph)	90	32	4	42	44	147	5	275	31	170	244	105
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00			0.91		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1623			1555		1662	3063		1630	3107	1473
Flt Permitted		0.66			0.93		0.59	1.00		0.56	1.00	1.00
Satd. Flow (perm)		1114			1454		1037	3063		955	3107	1473
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	34	4	44	46	155	5	289	33	179	257	111
RTOR Reduction (vph)	0	1	0	0	48	0	0	12	0	0	0	77
Lane Group Flow (vph)	0	132	0	0	197	0	5	310	0	179	257	34
Heavy Vehicles (%)	2%	3%	50%	2%	2%	2%	0%	7%	6%	2%	7%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		51.0			51.0		29.0	29.0		29.0	29.0	29.0
Effective Green, g (s)		51.0			51.0		29.0	29.0		29.0	29.0	29.0
Actuated g/C Ratio		0.54			0.54		0.30	0.30		0.30	0.30	0.30
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		597			779		316	934		291	947	449
v/s Ratio Prot								0.10			0.08	
v/s Ratio Perm		0.12			c0.14		0.00			c0.19		0.02
v/c Ratio		0.22			0.25		0.02	0.33		0.62	0.27	0.08
Uniform Delay, d1		11.6			11.8		23.1	25.6		28.3	25.0	23.5
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.9			0.8		0.0	0.4		5.5	0.3	0.2
Delay (s)		12.5			12.6		23.1	26.0		33.8	25.4	23.7
Level of Service		B			B		C	C		C	C	C
Approach Delay (s)		12.5			12.6			26.0			27.8	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.38				
Actuated Cycle Length (s)	95.1	Sum of lost time (s)	15.1		
Intersection Capacity Utilization	83.0%	ICU Level of Service	E		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	105	464	24	452	59	46	134	74	122	113
Future Volume (vph)	105	464	24	452	59	46	134	74	122	113
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases		2		6			4		8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	2	2	6	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	52.0	52.0	52.0	52.0	52.0	42.0	42.0	42.0	42.0	42.0
Total Split (%)	55.3%	55.3%	55.3%	55.3%	55.3%	44.7%	44.7%	44.7%	44.7%	44.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	45.0	45.0	45.0	45.0	45.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.37	0.37	0.37	0.37	0.37
v/c Ratio	0.37	0.64	0.10	0.58	0.09	0.11	0.31	0.20	0.23	0.20
Control Delay	20.1	22.7	14.8	21.2	4.0	20.3	21.1	21.8	21.7	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.1	22.7	14.8	21.2	4.0	20.3	21.1	21.8	21.7	4.7
LOS	C	C	B	C	A	C	C	C	C	A
Approach Delay		22.2		19.0			20.9		15.5	
Approach LOS		C		B			C		B	

Intersection Summary		
Cycle Length: 94		
Actuated Cycle Length: 94		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 70		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.64		
Intersection Signal Delay: 19.7	Intersection LOS: B	
Intersection Capacity Utilization 103.4%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 3: Davis Road & Lundys Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	464	28	24	452	59	46	134	30	74	122	113
Future Volume (vph)	105	464	28	24	452	59	46	134	30	74	122	113
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1644	1726		1598	1750	1384	1662	1496		1581	1522	1473
Flt Permitted	0.37	1.00		0.33	1.00	1.00	0.67	1.00		0.65	1.00	1.00
Satd. Flow (perm)	634	1726		552	1750	1384	1178	1496		1075	1522	1473
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	113	499	30	26	486	63	49	144	32	80	131	122
RTOR Reduction (vph)	0	2	0	0	0	33	0	9	0	0	0	77
Lane Group Flow (vph)	113	527	0	26	486	30	49	167	0	80	131	45
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	1%	0%	7%	4%	0%	5%	0%	15%	6%	5%	15%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	45.0	45.0		45.0	45.0	45.0	35.0	35.0		35.0	35.0	35.0
Effective Green, g (s)	45.0	45.0		45.0	45.0	45.0	35.0	35.0		35.0	35.0	35.0
Actuated g/C Ratio	0.48	0.48		0.48	0.48	0.48	0.37	0.37		0.37	0.37	0.37
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	303	826		264	837	662	438	557		400	566	548
v/s Ratio Prot		c0.31			0.28			c0.11			0.09	
v/s Ratio Perm	0.18			0.05		0.02	0.04			0.07		0.03
v/c Ratio	0.37	0.64		0.10	0.58	0.05	0.11	0.30		0.20	0.23	0.08
Uniform Delay, d1	15.5	18.4		13.4	17.7	13.1	19.3	20.8		20.0	20.3	19.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.5	3.8		0.7	2.9	0.1	0.5	1.4		1.1	1.0	0.3
Delay (s)	19.0	22.1		14.1	20.6	13.2	19.8	22.2		21.1	21.2	19.4
Level of Service	B	C		B	C	B	B	C		C	C	B
Approach Delay (s)		21.6			19.5			21.7			20.5	
Approach LOS		C			B			C			C	

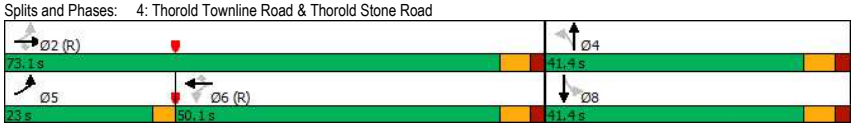
Intersection Summary					
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.49				
Actuated Cycle Length (s)	94.0	Sum of lost time (s)		14.0	
Intersection Capacity Utilization	103.4%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	227	1020	31	30	821	35	69	83	48	138
Future Volume (vph)	227	1020	31	30	821	35	69	83	48	138
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	5	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	35.1	35.1	35.1	35.1	35.1	41.4	41.4	41.4	41.4
Total Split (s)	23.0	73.1	73.1	50.1	50.1	50.1	41.4	41.4	41.4	41.4
Total Split (%)	20.1%	63.8%	63.8%	43.8%	43.8%	43.8%	36.2%	36.2%	36.2%	36.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4	6.4	6.4
Lead/Lag	Lead			Lag	Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	74.7	71.6	71.6	55.6	55.6	55.6	30.4	30.4	30.4	30.4
Actuated g/C Ratio	0.65	0.63	0.63	0.49	0.49	0.49	0.27	0.27	0.27	0.27
v/c Ratio	0.61	0.52	0.04	0.15	0.54	0.05	0.90	0.27	0.17	0.92
Control Delay	16.3	13.7	3.5	23.1	24.0	2.2	118.0	29.5	31.7	57.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	13.7	3.5	23.1	24.0	2.2	118.0	29.5	31.7	57.4
LOS	B	B	A	C	C	A	F	C	C	E
Approach Delay		14.0			23.1			64.3		54.7
Approach LOS		B			C			E		D

Intersection Summary			
Cycle Length: 114.5			
Actuated Cycle Length: 114.5			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 26.7		Intersection LOS: C	
Intersection Capacity Utilization 94.1%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



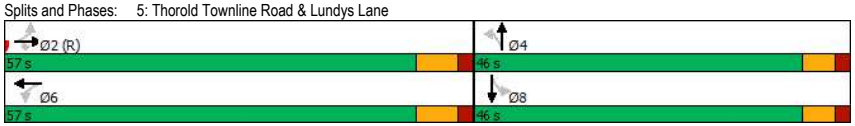
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	1020	31	30	821	35	69	83	24	48	138	272
Future Volume (vph)	227	1020	31	30	821	35	69	83	24	48	138	272
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4		6.4	6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	3292	1444	1511	3260	1417	1599	1529		1539	1506	
Flt Permitted	0.24	1.00	1.00	0.27	1.00	1.00	0.18	1.00		0.69	1.00	
Satd. Flow (perm)	389	3292	1444	428	3260	1417	303	1529		1111	1506	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	236	1062	32	31	855	36	72	86	25	50	144	283
RTOR Reduction (vph)	0	0	12	0	0	19	0	10	0	0	65	0
Lane Group Flow (vph)	236	1063	20	31	855	17	72	101	0	50	362	0
Heavy Vehicles (%)	7%	1%	3%	10%	2%	5%	4%	9%	16%	8%	4%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2		2	6		6	4			8		
Actuated Green, G (s)	71.6	71.6	71.6	55.6	55.6	55.6	30.4	30.4		30.4	30.4	
Effective Green, g (s)	71.6	71.6	71.6	55.6	55.6	55.6	30.4	30.4		30.4	30.4	
Actuated g/C Ratio	0.63	0.63	0.63	0.49	0.49	0.49	0.27	0.27		0.27	0.27	
Clearance Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4		6.4	6.4	
Vehicle Extension (s)	2.5	6.0	6.0	6.0	6.0	6.0	2.3	2.3		2.3	2.3	
Lane Grp Cap (vph)	375	2058	902	207	1583	688	80	405		294	399	
v/s Ratio Prot	c0.07	0.32			0.26			0.07			c0.24	
v/s Ratio Perm	c0.32		0.01	0.07		0.01	0.24			0.05		
v/c Ratio	0.63	0.52	0.02	0.15	0.54	0.03	0.90	0.25		0.17	0.91	
Uniform Delay, d1	11.6	11.9	8.1	16.3	20.5	15.3	40.6	33.1		32.3	40.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	0.9	0.0	1.5	1.3	0.1	67.4	0.2		0.2	23.4	
Delay (s)	14.4	12.8	8.2	17.9	21.9	15.4	108.0	33.3		32.5	64.0	
Level of Service	B	B	A	B	C	B	F	C		C	E	
Approach Delay (s)		13.0			21.5			62.7			60.7	
Approach LOS		B			C			E			E	

Intersection Summary					
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.73				
Actuated Cycle Length (s)	114.5	Sum of lost time (s)		15.5	
Intersection Capacity Utilization	94.1%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	33	434	96	44	401	100	117	25	118
Future Volume (vph)	33	434	96	44	401	100	117	25	118
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		4		8
Permitted Phases	2		2	6		4		8	
Detector Phase	2	2	2	6	6	4	4	8	8
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0
Total Split (s)	57.0	57.0	57.0	57.0	57.0	46.0	46.0	46.0	46.0
Total Split (%)	55.3%	55.3%	55.3%	55.3%	55.3%	44.7%	44.7%	44.7%	44.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	Max	Max	None	None	None	None
Act Effct Green (s)	71.6	71.6	71.6	71.6	71.6	18.4	18.4	18.4	18.4
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.18	0.18	0.18	0.18
v/c Ratio	0.07	0.40	0.10	0.09	0.39	0.69	0.60	0.17	0.58
Control Delay	7.0	8.9	3.9	7.1	8.6	60.5	40.9	35.6	41.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	8.9	3.9	7.1	8.6	60.5	40.9	35.6	41.1
LOS	A	A	A	A	A	E	D	D	D
Approach Delay		7.9			8.5		48.3		40.3
Approach LOS		A			A		D		D

Intersection Summary		
Cycle Length: 103		
Actuated Cycle Length: 103		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 65		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.69		
Intersection Signal Delay: 19.4	Intersection LOS: B	
Intersection Capacity Utilization 73.9%	ICU Level of Service D	
Analysis Period (min) 15		

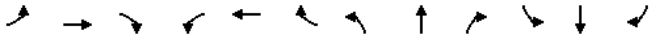
Splits and Phases: 5: Thorold Townline Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	434	96	44	401	18	100	117	50	25	118	38
Future Volume (vph)	33	434	96	44	401	18	100	117	50	25	118	38
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	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	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1483	1699	1430	1599	1709		1554	1604		1599	1594	
Flt Permitted	0.47	1.00	1.00	0.46	1.00		0.54	1.00		0.51	1.00	
Satd. Flow (perm)	736	1699	1430	775	1709		891	1604		866	1594	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	36	477	105	48	441	20	110	129	55	27	130	42
RTOR Reduction (vph)	0	0	16	0	1	0	0	20	0	0	15	0
Lane Group Flow (vph)	36	477	89	48	460	0	110	164	0	27	157	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	12%	3%	4%	4%	1%	16%	7%	6%	0%	4%	6%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	71.6	71.6	71.6	71.6	71.6		18.4	18.4		18.4	18.4	
Effective Green, g (s)	71.6	71.6	71.6	71.6	71.6		18.4	18.4		18.4	18.4	
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70		0.18	0.18		0.18	0.18	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	511	1181	994	538	1188		159	286		154	284	
v/s Ratio Prot		c0.28			0.27			0.10			0.10	
v/s Ratio Perm	0.05		0.06	0.06			c0.12			0.03		
v/c Ratio	0.07	0.40	0.09	0.09	0.39		0.69	0.57		0.18	0.55	
Uniform Delay, d1	5.0	6.7	5.1	5.1	6.5		39.6	38.7		35.9	38.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.0	0.2	0.3	1.0		15.3	4.4		1.1	3.9	
Delay (s)	5.3	7.7	5.3	5.4	7.5		54.9	43.1		37.0	42.5	
Level of Service	A	A	A	A	A		D	D		D	D	
Approach Delay (s)		7.1			7.3			47.5			41.7	
Approach LOS		A			A			D			D	

Intersection Summary					
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.46				
Actuated Cycle Length (s)	103.0	Sum of lost time (s)		13.0	
Intersection Capacity Utilization	73.9%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	197	16	11	166	21	26	148	7	20	150	35
Future Volume (vph)	24	197	16	11	166	21	26	148	7	20	150	35
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	26	212	17	12	178	23	28	159	8	22	161	38

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	255	213	195	221
Volume Left (vph)	26	12	28	22
Volume Right (vph)	17	23	8	38
Hadj (s)	0.00	-0.03	0.15	0.01
Departure Headway (s)	5.5	5.5	5.8	5.6
Degree Utilization, x	0.39	0.33	0.31	0.34
Capacity (veh/h)	606	595	562	588
Control Delay (s)	11.9	11.2	11.4	11.5
Approach Delay (s)	11.9	11.2	11.4	11.5
Approach LOS	B	B	B	B

Intersection Summary				
Delay			11.5	
Level of Service			B	
Intersection Capacity Utilization			43.5%	ICU Level of Service
Analysis Period (min)			15	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	1	189	1	1	162
Future Volume (Veh/h)	0	1	189	1	1	162
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	1	208	1	1	178
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	388	208			209	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	388	208			209	
tC, single (s)	6.4	7.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.2			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	619	636			1374	

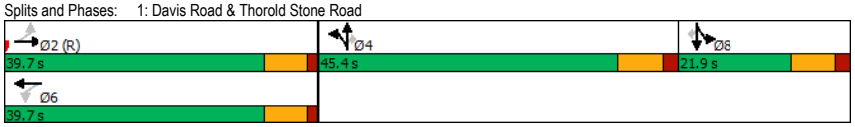
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	209	179
Volume Left	0	0	1
Volume Right	1	1	0
cSH	636	1700	1374
Volume to Capacity	0.00	0.12	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	10.7	0.0	0.0
Lane LOS	B		A
Approach Delay (s)	10.7	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			20.9%	ICU Level of Service
Analysis Period (min)			15	A

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	23	956	250	74	1163	439	17	165	1	2	20
Future Volume (vph)	23	956	250	74	1163	439	17	165	1	2	20
Turn Type	Perm	NA	Free	Perm	NA	Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6	4	4		8	8	
Permitted Phases	2		Free	6				4			8
Detector Phase	2	2		6	6	4	4	4	8	8	8
Switch Phase											
Minimum Initial (s)	20.0	20.0		20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		28.9	28.9	29.7	29.7	29.7	21.7	21.7	21.7
Total Split (s)	39.7	39.7		39.7	39.7	45.4	45.4	45.4	21.9	21.9	21.9
Total Split (%)	37.1%	37.1%		37.1%	37.1%	42.4%	42.4%	42.4%	20.5%	20.5%	20.5%
Yellow Time (s)	5.4	5.4		5.4	5.4	5.7	5.7	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		6.9	6.9	7.7	7.7	7.7	7.7	7.7	7.7
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max		Max	Max	None	None	None	None	None	None
Act Effct Green (s)	59.9	59.9	107.0	59.9	59.9	25.4	25.4	25.4	10.0	10.0	10.0
Actuated g/C Ratio	0.56	0.56	1.00	0.56	0.56	0.24	0.24	0.24	0.09	0.09	0.09
v/c Ratio	0.19	0.57	0.20	0.43	0.70	0.69	0.69	0.38	0.01	0.02	0.10
Control Delay	24.7	20.6	0.3	31.7	23.7	46.9	46.9	6.7	45.0	44.5	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	20.6	0.3	31.7	23.7	46.9	46.9	6.7	45.0	44.5	0.8
LOS	C	C	A	C	C	D	D	A	D	D	A
Approach Delay		16.6			24.2		36.2			6.3	
Approach LOS		B			C		D			A	

Intersection Summary			
Cycle Length: 107			
Actuated Cycle Length: 107			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 23.4		Intersection LOS: C	
Intersection Capacity Utilization 90.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Davis Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	956	250	74	1163	7	439	17	165	1	2	20
Future Volume (vph)	23	956	250	74	1163	7	439	17	165	1	2	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1539	3137	1328	1421	3128		1449	1444	1372	831	1167	1222
Flt Permitted	0.14	1.00	1.00	0.21	1.00		0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	227	3137	1328	319	3128		1449	1444	1372	831	1167	1222
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	24	996	260	77	1211	7	457	18	172	1	2	21
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	131	0	0	20
Lane Group Flow (vph)	24	996	260	77	1218	0	238	237	41	1	2	1
Confl. Peds. (#/hr)	1					1	1		1	1		1
Heavy Vehicles (%)	8%	6%	12%	17%	6%	42%	9%	23%	7%	100%	50%	20%
Turn Type	Perm	NA	Free	Perm	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6		4	4		8	8	
Permitted Phases	2		Free	6					4			8
Actuated Green, G (s)	55.3	55.3	107.0	55.3	55.3		25.4	25.4	25.4	4.0	4.0	4.0
Effective Green, g (s)	55.3	55.3	107.0	55.3	55.3		25.4	25.4	25.4	4.0	4.0	4.0
Actuated g/C Ratio	0.52	0.52	1.00	0.52	0.52		0.24	0.24	0.24	0.04	0.04	0.04
Clearance Time (s)	6.9	6.9		6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	117	1621	1328	164	1616		343	342	325	31	43	45
v/s Ratio Prot		0.32			c0.39		c0.16	0.16		0.00	0.00	
v/s Ratio Perm	0.11		c0.20	0.24					0.03			0.00
v/c Ratio	0.21	0.61	0.20	0.47	0.75		0.69	0.69	0.13	0.03	0.05	0.02
Uniform Delay, d1	14.0	18.3	0.0	16.5	20.5		37.3	37.2	32.1	49.6	49.7	49.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	1.8	0.3	9.3	3.3		6.9	6.9	0.3	0.7	0.8	0.3
Delay (s)	17.9	20.1	0.3	25.8	23.8		44.1	44.1	32.4	50.4	50.4	49.9
Level of Service	B	C	A	C	C		D	D	C	D	D	D
Approach Delay (s)		16.0			23.9			41.0			49.9	
Approach LOS		B			C			D			D	

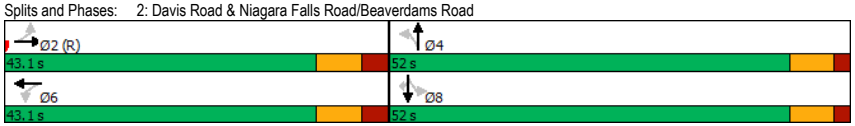
Intersection Summary					
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.73				
Actuated Cycle Length (s)	107.0	Sum of lost time (s)		22.3	
Intersection Capacity Utilization	90.1%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	121	34	26	19	4	295	91	190	49
Future Volume (vph)	121	34	26	19	4	295	91	190	49
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	43.1	43.1	43.1	43.1	52.0	52.0	52.0	52.0	52.0
Total Split (%)	45.3%	45.3%	45.3%	45.3%	54.7%	54.7%	54.7%	54.7%	54.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		55.0		55.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio		0.58		0.58	0.26	0.26	0.26	0.26	0.26
v/c Ratio		0.29		0.26	0.02	0.45	0.40	0.28	0.14
Control Delay		11.6		3.1	26.5	30.0	35.0	29.1	7.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		11.6		3.1	26.5	30.0	35.0	29.1	7.4
LOS		B		A	C	C	C	C	A
Approach Delay		11.6		3.1		29.9		27.5	
Approach LOS		B		A		C		C	

Intersection Summary			
Cycle Length: 95.1			
Actuated Cycle Length: 95.1			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 20.5		Intersection LOS: C	
Intersection Capacity Utilization 91.5%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



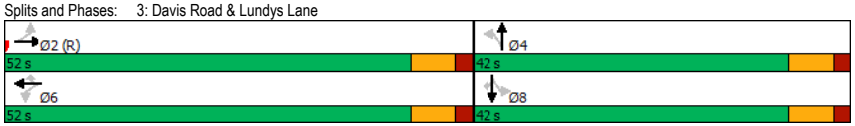
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	34	8	26	19	183	4	295	33	91	190	49
Future Volume (vph)	121	34	8	26	19	183	4	295	33	91	190	49
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		0.99			0.89		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.96			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1548			1515		1108	2893		1646	2748	1282
Flt Permitted		0.64			0.96		0.63	1.00		0.52	1.00	1.00
Satd. Flow (perm)		1028			1456		731	2893		909	2748	1282
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	127	36	8	27	20	193	4	311	35	96	200	52
RTOR Reduction (vph)	0	1	0	0	81	0	0	13	0	0	0	38
Lane Group Flow (vph)	0	170	0	0	159	0	4	333	0	96	200	14
Heavy Vehicles (%)	9%	5%	12%	7%	10%	1%	50%	14%	6%	1%	21%	16%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		55.0			55.0		25.0	25.0		25.0	25.0	25.0
Effective Green, g (s)		55.0			55.0		25.0	25.0		25.0	25.0	25.0
Actuated g/C Ratio		0.58			0.58		0.26	0.26		0.26	0.26	0.26
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		594			842		192	760		238	722	337
v/s Ratio Prot								c0.12			0.07	
v/s Ratio Perm		c0.17			0.11		0.01			0.11		0.01
v/c Ratio		0.29			0.19		0.02	0.44		0.40	0.28	0.04
Uniform Delay, d1		10.1			9.5		26.0	29.2		28.9	27.9	26.1
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.2			0.5		0.1	0.8		2.3	0.4	0.1
Delay (s)		11.3			10.0		26.1	30.1		31.2	28.3	26.2
Level of Service		B			A		C	C		C	C	C
Approach Delay (s)		11.3			10.0			30.0			28.8	
Approach LOS		B			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.33				
Actuated Cycle Length (s)	95.1	Sum of lost time (s)		15.1	
Intersection Capacity Utilization	91.5%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	130	473	32	337	52	24	151	61	98	82
Future Volume (vph)	130	473	32	337	52	24	151	61	98	82
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases		2		6			4		8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	2	2	6	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	52.0	52.0	52.0	52.0	52.0	42.0	42.0	42.0	42.0	42.0
Total Split (%)	55.3%	55.3%	55.3%	55.3%	55.3%	44.7%	44.7%	44.7%	44.7%	44.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	62.1	62.1	62.1	62.1	62.1	17.9	17.9	17.9	17.9	17.9
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.66	0.19	0.19	0.19	0.19	0.19
v/c Ratio	0.24	0.47	0.09	0.34	0.06	0.15	0.67	0.40	0.39	0.28
Control Delay	8.6	10.2	7.5	8.6	2.3	32.0	45.4	39.8	36.8	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	10.2	7.5	8.6	2.3	32.0	45.4	39.8	36.8	9.0
LOS	A	B	A	A	A	C	D	D	D	A
Approach Delay		9.9		7.8			43.8		28.1	
Approach LOS		A		A			D		C	

Intersection Summary		
Cycle Length: 94		
Actuated Cycle Length: 94		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 70		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.67		
Intersection Signal Delay: 16.7	Intersection LOS: B	
Intersection Capacity Utilization 95.0%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 3: Davis Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	473	20	32	337	52	24	151	22	61	98	82
Future Volume (vph)	130	473	20	32	337	52	24	151	22	61	98	82
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1525	1676		1329	1620	1316	1289	1412		1409	1411	1293
Flt Permitted	0.54	1.00		0.42	1.00	1.00	0.69	1.00		0.58	1.00	1.00
Satd. Flow (perm)	864	1676		593	1620	1316	936	1412		863	1411	1293
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	138	503	21	34	359	55	26	161	23	65	104	87
RTOR Reduction (vph)	0	1	0	0	0	19	0	7	0	0	0	70
Lane Group Flow (vph)	138	523	0	34	359	36	26	177	0	65	104	17
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	9%	3%	20%	25%	8%	13%	29%	19%	40%	18%	24%	15%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	62.1	62.1		62.1	62.1	62.1	17.9	17.9		17.9	17.9	17.9
Effective Green, g (s)	62.1	62.1		62.1	62.1	62.1	17.9	17.9		17.9	17.9	17.9
Actuated g/C Ratio	0.66	0.66		0.66	0.66	0.66	0.19	0.19		0.19	0.19	0.19
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	570	1107		391	1070	869	178	268		164	268	246
v/s Ratio Prot		c0.31			0.22			c0.13			0.07	
v/s Ratio Perm	0.16			0.06		0.03	0.03			0.08		0.01
v/c Ratio	0.24	0.47		0.09	0.34	0.04	0.15	0.66		0.40	0.39	0.07
Uniform Delay, d1	6.4	7.9		5.7	7.0	5.6	31.7	35.2		33.3	33.3	31.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	1.4		0.4	0.8	0.1	0.1	4.4		0.6	0.3	0.0
Delay (s)	7.4	9.3		6.2	7.8	5.7	31.8	39.7		33.9	33.6	31.2
Level of Service	A	A		A	A	A	C	D		C	C	C
Approach Delay (s)		8.9			7.4			38.7			32.9	
Approach LOS		A			A			D			C	

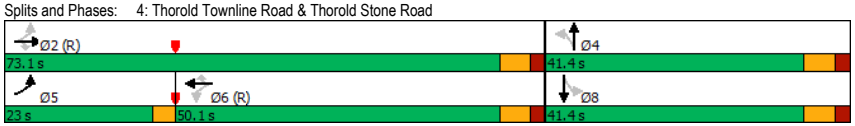
Intersection Summary					
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.51				
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	14.0		
Intersection Capacity Utilization	95.0%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	354	724	38	22	891	81	71	124	57	89
Future Volume (vph)	354	724	38	22	891	81	71	124	57	89
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	5	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	35.1	35.1	35.1	35.1	35.1	41.4	41.4	41.4	41.4
Total Split (s)	23.0	73.1	73.1	50.1	50.1	50.1	41.4	41.4	41.4	41.4
Total Split (%)	20.1%	63.8%	63.8%	43.8%	43.8%	43.8%	36.2%	36.2%	36.2%	36.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4	6.4	6.4
Lead/Lag	Lead			Lag	Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	80.7	77.6	77.6	51.4	51.4	51.4	24.4	24.4	24.4	24.4
Actuated g/C Ratio	0.70	0.68	0.68	0.45	0.45	0.45	0.21	0.21	0.21	0.21
v/c Ratio	0.80	0.35	0.05	0.10	0.64	0.13	0.97	0.49	0.29	0.88
Control Delay	29.3	9.4	3.1	23.8	28.8	5.4	141.0	40.5	38.3	50.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	9.4	3.1	23.8	28.8	5.4	141.0	40.5	38.3	50.9
LOS	C	A	A	C	C	A	F	D	D	D
Approach Delay		15.5			26.8			72.8		49.0
Approach LOS		B			C			E		D

Intersection Summary			
Cycle Length: 114.5			
Actuated Cycle Length: 114.5			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 28.9		Intersection LOS: C	
Intersection Capacity Utilization 95.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	354	724	38	22	891	81	71	124	26	57	89	226
Future Volume (vph)	354	724	38	22	891	81	71	124	26	57	89	226
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4		6.4	6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	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	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1525	3197	1229	1309	3228	1339	1374	1468		1511	1337	
Flt Permitted	0.19	1.00	1.00	0.37	1.00	1.00	0.25	1.00		0.60	1.00	
Satd. Flow (perm)	309	3197	1229	504	3228	1339	357	1468		955	1337	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	369	754	40	23	928	84	74	129	27	59	93	235
RTOR Reduction (vph)	0	0	13	0	0	46	0	7	0	0	90	0
Lane Group Flow (vph)	369	754	27	23	928	38	74	149	0	59	238	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	9%	4%	21%	27%	3%	8%	21%	14%	26%	10%	19%	16%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2		2	6		6	4			8		
Actuated Green, G (s)	77.6	77.6	77.6	51.4	51.4	51.4	24.4	24.4		24.4	24.4	
Effective Green, g (s)	77.6	77.6	77.6	51.4	51.4	51.4	24.4	24.4		24.4	24.4	
Actuated g/C Ratio	0.68	0.68	0.68	0.45	0.45	0.45	0.21	0.21		0.21	0.21	
Clearance Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4		6.4	6.4	
Vehicle Extension (s)	2.5	6.0	6.0	6.0	6.0	6.0	2.3	2.3		2.3	2.3	
Lane Grp Cap (vph)	455	2166	832	226	1449	601	76	312		203	284	
v/s Ratio Prot	c0.16	0.24			0.29			0.10			0.18	
v/s Ratio Perm	c0.38		0.02	0.05		0.03	c0.21			0.06		
v/c Ratio	0.81	0.35	0.03	0.10	0.64	0.06	0.97	0.48		0.29	0.84	
Uniform Delay, d1	17.9	7.8	6.1	18.2	24.4	17.9	44.7	39.5		37.8	43.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.3	0.4	0.1	0.9	2.2	0.2	93.5	0.7		0.5	18.6	
Delay (s)	28.2	8.2	6.2	19.1	26.6	18.1	138.3	40.1		38.3	61.7	
Level of Service	C	A	A	B	C	B	F	D		D	E	
Approach Delay (s)		14.5			25.7			71.7			58.2	
Approach LOS		B			C			E			E	

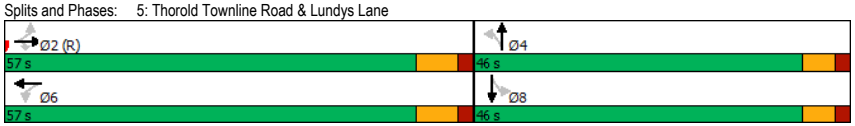
Intersection Summary					
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	114.5	Sum of lost time (s)		15.5	
Intersection Capacity Utilization	95.6%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	59	420	95	42	336	73	132	14	95
Future Volume (vph)	59	420	95	42	336	73	132	14	95
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		4		8
Permitted Phases	2		2	6		4		8	
Detector Phase	2	2	2	6	6	4	4	8	8
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0
Total Split (s)	57.0	57.0	57.0	57.0	57.0	46.0	46.0	46.0	46.0
Total Split (%)	55.3%	55.3%	55.3%	55.3%	55.3%	44.7%	44.7%	44.7%	44.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	Max	Max	None	None	None	None
Act Effct Green (s)	71.1	71.1	71.1	71.1	71.1	18.9	18.9	18.9	18.9
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.69	0.18	0.18	0.18	0.18
v/c Ratio	0.11	0.39	0.11	0.08	0.33	0.42	0.64	0.10	0.49
Control Delay	7.3	8.8	3.8	7.1	8.1	42.6	44.4	33.4	37.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	8.8	3.8	7.1	8.1	42.6	44.4	33.4	37.7
LOS	A	A	A	A	A	D	D	C	D
Approach Delay		7.8			8.0		43.9		37.3
Approach LOS		A			A		D		D

Intersection Summary		
Cycle Length: 103		
Actuated Cycle Length: 103		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 65		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.64		
Intersection Signal Delay: 17.5	Intersection LOS: B	
Intersection Capacity Utilization 80.9%	ICU Level of Service D	
Analysis Period (min) 15		

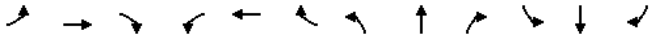
Splits and Phases: 5: Thorold Townline Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	420	95	42	336	9	73	132	41	14	95	29
Future Volume (vph)	59	420	95	42	336	9	73	132	41	14	95	29
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	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	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1444	1683	1377	1599	1646		1484	1502		1554	1404	
Flt Permitted	0.53	1.00	1.00	0.48	1.00		0.65	1.00		0.52	1.00	
Satd. Flow (perm)	807	1683	1377	801	1646		1010	1502		843	1404	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	63	452	102	45	361	10	78	142	44	15	102	31
RTOR Reduction (vph)	0	0	17	0	1	0	0	15	0	0	14	0
Lane Group Flow (vph)	63	452	85	45	370	0	78	171	0	15	119	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	15%	4%	8%	4%	6%	0%	12%	15%	4%	7%	17%	31%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	71.1	71.1	71.1	71.1	71.1		18.9	18.9		18.9	18.9	
Effective Green, g (s)	71.1	71.1	71.1	71.1	71.1		18.9	18.9		18.9	18.9	
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.69		0.18	0.18		0.18	0.18	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	557	1161	950	552	1136		185	275		154	257	
v/s Ratio Prot		c0.27			0.23			c0.11			0.08	
v/s Ratio Perm	0.08		0.06	0.06			0.08			0.02		
v/c Ratio	0.11	0.39	0.09	0.08	0.33		0.42	0.62		0.10	0.46	
Uniform Delay, d1	5.4	6.8	5.3	5.2	6.4		37.2	38.8		35.0	37.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.0	0.2	0.3	0.8		3.2	6.1		0.6	2.8	
Delay (s)	5.8	7.7	5.5	5.5	7.1		40.4	44.9		35.5	40.3	
Level of Service	A	A	A	A	A		D	D		D	D	
Approach Delay (s)		7.2			7.0			43.6			39.8	
Approach LOS		A			A			D			D	

Intersection Summary				
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.44			
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	80.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	15	127	18	9	184	24	21	171	6	12	115	19
Future Volume (vph)	15	127	18	9	184	24	21	171	6	12	115	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	138	20	10	200	26	23	186	7	13	125	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	174	236	216	159
Volume Left (vph)	16	10	23	13
Volume Right (vph)	20	26	7	21
Hadj (s)	-0.02	-0.04	0.27	0.25
Departure Headway (s)	5.3	5.2	5.6	5.6
Degree Utilization, x	0.26	0.34	0.33	0.25
Capacity (veh/h)	615	638	593	583
Control Delay (s)	10.2	10.9	11.3	10.5
Approach Delay (s)	10.2	10.9	11.3	10.5
Approach LOS	B	B	B	B

Intersection Summary				
Delay			10.8	
Level of Service			B	
Intersection Capacity Utilization			37.8%	ICU Level of Service
Analysis Period (min)			15	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	0	233	1	0	127
Future Volume (Veh/h)	1	0	233	1	0	127
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1	0	251	1	0	137
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	388	252			252	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	388	252			252	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	619	792			1325	

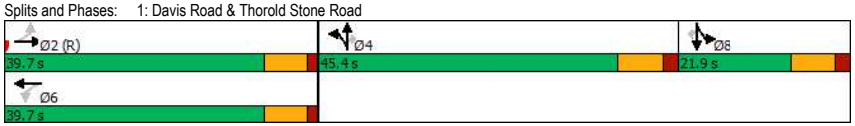
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	252	137
Volume Left	1	0	0
Volume Right	0	1	0
cSH	619	1700	1325
Volume to Capacity	0.00	0.15	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	10.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.8	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			23.4%	ICU Level of Service
Analysis Period (min)			15	A

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	26	1335	471	86	1223	455	6	95	4	7	31
Future Volume (vph)	26	1335	471	86	1223	455	6	95	4	7	31
Turn Type	Perm	NA	Free	Perm	NA	Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6	4	4		8	8	
Permitted Phases	2		Free	6				4			8
Detector Phase	2	2		6	6	4	4	4	8	8	8
Switch Phase											
Minimum Initial (s)	20.0	20.0		20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		28.9	28.9	29.7	29.7	29.7	21.7	21.7	21.7
Total Split (s)	39.7	39.7		39.7	39.7	45.4	45.4	45.4	21.9	21.9	21.9
Total Split (%)	37.1%	37.1%		37.1%	37.1%	42.4%	42.4%	42.4%	20.5%	20.5%	20.5%
Yellow Time (s)	5.4	5.4		5.4	5.4	5.7	5.7	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		6.9	6.9	7.7	7.7	7.7	7.7	7.7	7.7
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max		Max	Max	None	None	None	None	None	None
Act Effct Green (s)	57.5	57.5	107.0	57.5	57.5	24.3	24.3	24.3	10.0	10.0	10.0
Actuated g/C Ratio	0.54	0.54	1.00	0.54	0.54	0.23	0.23	0.23	0.09	0.09	0.09
v/c Ratio	0.31	0.80	0.34	1.23	0.74	0.69	0.68	0.25	0.03	0.05	0.14
Control Delay	34.9	28.1	0.6	211.8	26.0	47.1	46.9	5.2	44.8	45.1	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	28.1	0.6	211.8	26.0	47.1	46.9	5.2	44.8	45.1	1.2
LOS	C	C	A	F	C	D	D	A	D	D	A
Approach Delay		21.2			38.3		39.8			12.1	
Approach LOS		C			D		D			B	

Intersection Summary			
Cycle Length: 107			
Actuated Cycle Length: 107			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 125			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.23			
Intersection Signal Delay: 29.8		Intersection LOS: C	
Intersection Capacity Utilization 95.2%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Davis Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1335	471	86	1223	1	455	6	95	4	7	31
Future Volume (vph)	26	1335	471	86	1223	1	455	6	95	4	7	31
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1319	3292	1458	1525	3259		1564	1557	1352	1662	1535	1424
Flt Permitted	0.12	1.00	1.00	0.09	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	162	3292	1458	139	3259		1564	1557	1352	1662	1535	1424
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	27	1405	496	91	1287	1	479	6	100	4	7	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	77	0	0	31
Lane Group Flow (vph)	27	1405	496	91	1288	0	244	241	23	4	7	2
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	26%	1%	2%	9%	2%	0%	1%	33%	10%	0%	14%	3%
Turn Type	Perm	NA	Free	Perm	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6		4	4		8	8	
Permitted Phases	2		Free	6					4			8
Actuated Green, G (s)	54.4	54.4	107.0	54.4	54.4		24.3	24.3	24.3	6.0	6.0	6.0
Effective Green, g (s)	54.4	54.4	107.0	54.4	54.4		24.3	24.3	24.3	6.0	6.0	6.0
Actuated g/C Ratio	0.51	0.51	1.00	0.51	0.51		0.23	0.23	0.23	0.06	0.06	0.06
Clearance Time (s)	6.9	6.9		6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	82	1673	1458	70	1656		355	353	307	93	86	79
v/s Ratio Prot		0.43			0.40		c0.16	0.15		0.00	0.00	
v/s Ratio Perm	0.17		c0.34	c0.66					0.02			0.00
v/c Ratio	0.33	0.84	0.34	1.30	0.78		0.69	0.68	0.07	0.04	0.08	0.02
Uniform Delay, d1	15.5	22.6	0.0	26.3	21.4		37.9	37.8	32.5	47.8	47.9	47.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	5.3	0.6	207.5	3.7		6.4	6.3	0.2	0.3	0.7	0.2
Delay (s)	25.9	27.8	0.6	233.8	25.1		44.2	44.1	32.7	48.1	48.6	47.9
Level of Service	C	C	A	F	C		D	D	C	D	D	D
Approach Delay (s)		20.8			38.8			42.2			48.1	
Approach LOS		C			D			D			D	

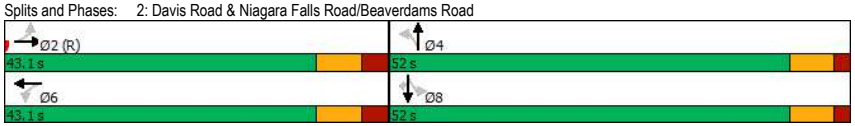
Intersection Summary					
HCM 2000 Control Delay	30.6	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	1.08				
Actuated Cycle Length (s)	107.0	Sum of lost time (s)	22.3		
Intersection Capacity Utilization	95.2%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	99	35	46	49	6	304	188	269	116
Future Volume (vph)	99	35	46	49	6	304	188	269	116
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	43.1	43.1	43.1	43.1	52.0	52.0	52.0	52.0	52.0
Total Split (%)	45.3%	45.3%	45.3%	45.3%	54.7%	54.7%	54.7%	54.7%	54.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		49.2		49.2	30.8	30.8	30.8	30.8	30.8
Actuated g/C Ratio		0.52		0.52	0.32	0.32	0.32	0.32	0.32
v/c Ratio		0.25		0.34	0.02	0.35	0.67	0.28	0.22
Control Delay		16.1		10.8	18.0	23.4	38.7	23.6	4.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		16.1		10.8	18.0	23.4	38.7	23.6	4.4
LOS		B		B	B	C	D	C	A
Approach Delay		16.1		10.8		23.3		24.7	
Approach LOS		B		B		C		C	

Intersection Summary			
Cycle Length: 95.1			
Actuated Cycle Length: 95.1			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 20.7		Intersection LOS: C	
Intersection Capacity Utilization 85.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	35	4	46	49	162	6	304	34	188	269	116
Future Volume (vph)	99	35	4	46	49	162	6	304	34	188	269	116
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		1.00			0.91		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1629			1565		1662	3066		1630	3107	1473
Flt Permitted		0.66			0.92		0.58	1.00		0.53	1.00	1.00
Satd. Flow (perm)		1106			1458		1012	3066		910	3107	1473
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	104	37	4	48	52	171	6	320	36	198	283	122
RTOR Reduction (vph)	0	1	0	0	49	0	0	11	0	0	0	82
Lane Group Flow (vph)	0	144	0	0	222	0	6	345	0	198	283	40
Heavy Vehicles (%)	2%	2%	50%	2%	2%	1%	0%	7%	5%	2%	7%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		49.2			49.2		30.8	30.8		30.8	30.8	30.8
Effective Green, g (s)		49.2			49.2		30.8	30.8		30.8	30.8	30.8
Actuated g/C Ratio		0.52			0.52		0.32	0.32		0.32	0.32	0.32
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		572			754		327	992		294	1006	477
v/s Ratio Prot								0.11			0.09	
v/s Ratio Perm		0.13			c0.15		0.01			c0.22		0.03
v/c Ratio		0.25			0.29		0.02	0.35		0.67	0.28	0.08
Uniform Delay, d1		12.7			13.1		21.9	24.5		27.8	23.9	22.3
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.1			1.0		0.0	0.4		7.7	0.3	0.2
Delay (s)		13.8			14.1		21.9	24.9		35.5	24.2	22.5
Level of Service		B			B		C	C		D	C	C
Approach Delay (s)		13.8			14.1			24.9			27.6	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.44				
Actuated Cycle Length (s)	95.1	Sum of lost time (s)	15.1		
Intersection Capacity Utilization	85.3%	ICU Level of Service	E		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	116	512	26	499	65	51	148	82	135	125
Future Volume (vph)	116	512	26	499	65	51	148	82	135	125
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases		2		6			4		8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	2	2	6	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	52.0	52.0	52.0	52.0	52.0	42.0	42.0	42.0	42.0	42.0
Total Split (%)	55.3%	55.3%	55.3%	55.3%	55.3%	44.7%	44.7%	44.7%	44.7%	44.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	45.0	45.0	45.0	45.0	45.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.37	0.37	0.37	0.37	0.37
v/c Ratio	0.47	0.70	0.12	0.64	0.10	0.13	0.34	0.22	0.26	0.21
Control Delay	23.8	24.9	15.4	22.8	3.8	20.5	21.9	22.1	22.0	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.8	24.9	15.4	22.8	3.8	20.5	21.9	22.1	22.0	4.6
LOS	C	C	B	C	A	C	C	C	C	A
Approach Delay		24.7		20.4			21.6		15.7	
Approach LOS		C		C			C		B	

Intersection Summary		
Cycle Length: 94		
Actuated Cycle Length: 94		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 70		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.70		
Intersection Signal Delay: 21.2	Intersection LOS: C	
Intersection Capacity Utilization 106.3%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 3: Davis Road & Lundys Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	512	31	26	499	65	51	148	33	82	135	125
Future Volume (vph)	116	512	31	26	499	65	51	148	33	82	135	125
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1644	1727		1613	1750	1397	1662	1496		1596	1522	1473
Flt Permitted	0.32	1.00		0.28	1.00	1.00	0.66	1.00		0.63	1.00	1.00
Satd. Flow (perm)	556	1727		477	1750	1397	1163	1496		1064	1522	1473
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	125	551	33	28	537	70	55	159	35	88	145	134
RTOR Reduction (vph)	0	2	0	0	0	36	0	8	0	0	0	84
Lane Group Flow (vph)	125	582	0	28	537	34	55	186	0	88	145	50
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	1%	0%	6%	3%	0%	4%	0%	15%	6%	4%	15%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	45.0	45.0		45.0	45.0	45.0	35.0	35.0		35.0	35.0	35.0
Effective Green, g (s)	45.0	45.0		45.0	45.0	45.0	35.0	35.0		35.0	35.0	35.0
Actuated g/C Ratio	0.48	0.48		0.48	0.48	0.48	0.37	0.37		0.37	0.37	0.37
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	266	826		228	837	668	433	557		396	566	548
v/s Ratio Prot		c0.34			0.31			c0.12			0.10	
v/s Ratio Perm	0.22			0.06		0.02	0.05			0.08		0.03
v/c Ratio	0.47	0.70		0.12	0.64	0.05	0.13	0.33		0.22	0.26	0.09
Uniform Delay, d1	16.5	19.3		13.6	18.4	13.1	19.4	21.1		20.2	20.5	19.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.9	5.0		1.1	3.8	0.1	0.6	1.6		1.3	1.1	0.3
Delay (s)	22.3	24.3		14.7	22.2	13.2	20.0	22.8		21.5	21.6	19.5
Level of Service	C	C		B	C	B	C	C		C	C	B
Approach Delay (s)		23.9			20.9			22.2			20.8	
Approach LOS		C			C			C			C	

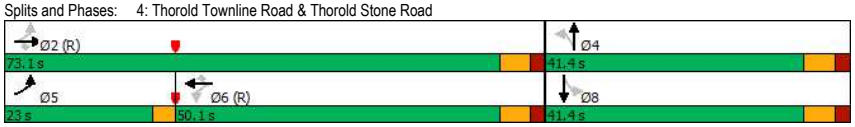
Intersection Summary					
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	94.0	Sum of lost time (s)		14.0	
Intersection Capacity Utilization	106.3%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	251	1126	34	33	906	39	76	92	53	152
Future Volume (vph)	251	1126	34	33	906	39	76	92	53	152
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	5	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	35.1	35.1	35.1	35.1	35.1	41.4	41.4	41.4	41.4
Total Split (s)	23.0	73.1	73.1	50.1	50.1	50.1	41.4	41.4	41.4	41.4
Total Split (%)	20.1%	63.8%	63.8%	43.8%	43.8%	43.8%	36.2%	36.2%	36.2%	36.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4	6.4	6.4
Lead/Lag	Lead			Lag	Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	72.2	69.1	69.1	51.4	51.4	51.4	32.9	32.9	32.9	32.9
Actuated g/C Ratio	0.63	0.60	0.60	0.45	0.45	0.45	0.29	0.29	0.29	0.29
v/c Ratio	0.74	0.59	0.04	0.20	0.65	0.06	1.04	0.27	0.17	0.95
Control Delay	25.5	15.9	3.9	26.4	28.5	2.9	157.1	29.1	31.1	62.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	15.9	3.9	26.4	28.5	2.9	157.1	29.1	31.1	62.4
LOS	C	B	A	C	C	A	F	C	C	E
Approach Delay		17.3			27.4			79.2		59.1
Approach LOS		B			C			E		E

Intersection Summary			
Cycle Length: 114.5			
Actuated Cycle Length: 114.5			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 31.2		Intersection LOS: C	
Intersection Capacity Utilization 100.0%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



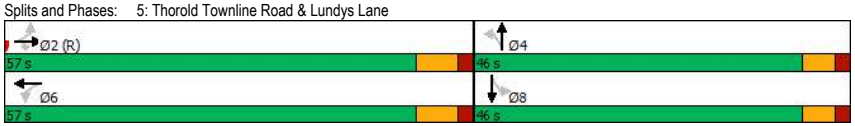
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	251	1126	34	33	906	39	76	92	26	53	152	300
Future Volume (vph)	251	1126	34	33	906	39	76	92	26	53	152	300
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4		6.4	6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	3292	1458	1525	3260	1417	1614	1534		1554	1505	
Flt Permitted	0.19	1.00	1.00	0.24	1.00	1.00	0.16	1.00		0.68	1.00	
Satd. Flow (perm)	305	3292	1458	387	3260	1417	264	1534		1109	1505	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	261	1173	35	34	944	41	79	96	27	55	158	312
RTOR Reduction (vph)	0	0	13	0	0	23	0	9	0	0	64	0
Lane Group Flow (vph)	261	1173	22	34	944	18	79	114	0	55	407	0
Heavy Vehicles (%)	7%	1%	2%	9%	2%	5%	3%	9%	15%	7%	4%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2		2	6		6	4			8		
Actuated Green, G (s)	69.1	69.1	69.1	51.4	51.4	51.4	32.9	32.9		32.9	32.9	
Effective Green, g (s)	69.1	69.1	69.1	51.4	51.4	51.4	32.9	32.9		32.9	32.9	
Actuated g/C Ratio	0.60	0.60	0.60	0.45	0.45	0.45	0.29	0.29		0.29	0.29	
Clearance Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.4	6.4		6.4	6.4	
Vehicle Extension (s)	2.5	6.0	6.0	6.0	6.0	6.0	2.3	2.3		2.3	2.3	
Lane Grp Cap (vph)	344	1986	879	173	1463	636	75	440		318	432	
v/s Ratio Prot	c0.10	0.36			0.29			0.07			0.27	
v/s Ratio Perm	c0.36		0.02	0.09		0.01	c0.30			0.05		
v/c Ratio	0.76	0.59	0.03	0.20	0.65	0.03	1.05	0.26		0.17	0.94	
Uniform Delay, d1	14.9	14.0	9.1	19.1	24.5	17.6	40.8	31.4		30.6	39.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.8	1.3	0.1	2.5	2.2	0.1	119.3	0.2		0.2	28.9	
Delay (s)	23.7	15.3	9.2	21.6	26.7	17.7	160.1	31.6		30.7	68.7	
Level of Service	C	B	A	C	C	B	F	C		C	E	
Approach Delay (s)		16.6			26.2			81.9			64.7	
Approach LOS		B			C			F			E	

Intersection Summary					
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	114.5	Sum of lost time (s)		15.5	
Intersection Capacity Utilization	100.0%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	36	479	106	49	443	110	129	28	130
Future Volume (vph)	36	479	106	49	443	110	129	28	130
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		4		8
Permitted Phases	2		2	6		4		8	
Detector Phase	2	2	2	6	6	4	4	8	8
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0
Total Split (s)	57.0	57.0	57.0	57.0	57.0	46.0	46.0	46.0	46.0
Total Split (%)	55.3%	55.3%	55.3%	55.3%	55.3%	44.7%	44.7%	44.7%	44.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	Max	Max	None	None	None	None
Act Effct Green (s)	70.1	70.1	70.1	70.1	70.1	19.9	19.9	19.9	19.9
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.19	0.19	0.19	0.19
v/c Ratio	0.09	0.46	0.12	0.11	0.44	0.74	0.61	0.19	0.59
Control Delay	7.9	10.3	4.6	8.1	10.1	63.8	40.4	34.8	40.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	10.3	4.6	8.1	10.1	63.8	40.4	34.8	40.3
LOS	A	B	A	A	B	E	D	C	D
Approach Delay		9.2			9.9		49.2		39.5
Approach LOS		A			A		D		D

Intersection Summary		
Cycle Length: 103		
Actuated Cycle Length: 103		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 65		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.74		
Intersection Signal Delay: 20.4	Intersection LOS: C	
Intersection Capacity Utilization 79.4%	ICU Level of Service D	
Analysis Period (min) 15		

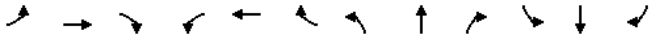
Splits and Phases: 5: Thorold Townline Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	479	106	49	443	20	110	129	55	28	130	42
Future Volume (vph)	36	479	106	49	443	20	110	129	55	28	130	42
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	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	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1496	1699	1444	1599	1694		1554	1604		1614	1598	
Flt Permitted	0.44	1.00	1.00	0.42	1.00		0.52	1.00		0.49	1.00	
Satd. Flow (perm)	686	1699	1444	715	1694		848	1604		829	1598	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	40	526	116	54	487	22	121	142	60	31	143	46
RTOR Reduction (vph)	0	0	17	0	1	0	0	19	0	0	15	0
Lane Group Flow (vph)	40	526	99	54	508	0	121	183	0	31	174	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	11%	3%	3%	4%	2%	15%	7%	6%	0%	3%	6%	4%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		
Actuated Green, G (s)	70.1	70.1	70.1	70.1	70.1		19.9	19.9		19.9	19.9	
Effective Green, g (s)	70.1	70.1	70.1	70.1	70.1		19.9	19.9		19.9	19.9	
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68		0.19	0.19		0.19	0.19	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	466	1156	982	486	1152		163	309		160	308	
v/s Ratio Prot		c0.31			0.30			0.11			0.11	
v/s Ratio Perm	0.06		0.07	0.08			c0.14			0.04		
v/c Ratio	0.09	0.46	0.10	0.11	0.44		0.74	0.59		0.19	0.57	
Uniform Delay, d1	5.6	7.6	5.6	5.7	7.5		39.1	37.8		34.8	37.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.3	0.2	0.5	1.2		19.6	4.5		1.2	3.9	
Delay (s)	5.9	8.9	5.8	6.1	8.7		58.7	42.4		36.1	41.5	
Level of Service	A	A	A	A	A		E	D		D	D	
Approach Delay (s)		8.2			8.5			48.5			40.8	
Approach LOS		A			A			D			D	

Intersection Summary					
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.52				
Actuated Cycle Length (s)	103.0	Sum of lost time (s)		13.0	
Intersection Capacity Utilization	79.4%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	218	18	12	183	23	29	163	8	22	166	39
Future Volume (vph)	26	218	18	12	183	23	29	163	8	22	166	39
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	28	234	19	13	197	25	31	175	9	24	178	42

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	281	235	215	244
Volume Left (vph)	28	13	31	24
Volume Right (vph)	19	25	9	42
Hadj (s)	0.00	-0.03	0.15	0.01
Departure Headway (s)	5.7	5.8	6.1	5.9
Degree Utilization, x	0.45	0.38	0.36	0.40
Capacity (veh/h)	576	562	532	556
Control Delay (s)	13.3	12.3	12.5	12.7
Approach Delay (s)	13.3	12.3	12.5	12.7
Approach LOS	B	B	B	B

Intersection Summary				
Delay			12.7	
Level of Service			B	
Intersection Capacity Utilization			47.4%	ICU Level of Service
Analysis Period (min)			15	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	1	209	1	1	179
Future Volume (Veh/h)	0	1	209	1	1	179
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	1	230	1	1	197
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	430	230			231	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	430	230			231	
tC, single (s)	6.4	7.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	4.2			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	586	616			1349	

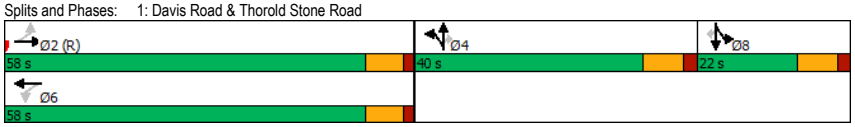
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	231	198
Volume Left	0	0	1
Volume Right	1	1	0
cSH	616	1700	1349
Volume to Capacity	0.00	0.14	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	10.8	0.0	0.0
Lane LOS	B		A
Approach Delay (s)	10.8	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			22.0%	ICU Level of Service
Analysis Period (min)			15	A

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	23	1038	303	95	1209	587	17	229	1	2	20
Future Volume (vph)	23	1038	303	95	1209	587	17	229	1	2	20
Turn Type	Perm	NA	Free	Perm	NA	Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6	4	4		8	8	
Permitted Phases	2		Free	6				4			8
Detector Phase	2	2		6	6	4	4	4	8	8	8
Switch Phase											
Minimum Initial (s)	20.0	20.0		20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		28.9	28.9	29.7	29.7	29.7	21.7	21.7	21.7
Total Split (s)	58.0	58.0		58.0	58.0	40.0	40.0	40.0	22.0	22.0	22.0
Total Split (%)	48.3%	48.3%		48.3%	48.3%	33.3%	33.3%	33.3%	18.3%	18.3%	18.3%
Yellow Time (s)	5.4	5.4		5.4	5.4	5.7	5.7	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		6.9	6.9	7.7	7.7	7.7	7.7	7.7	7.7
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max		Max	Max	None	None	None	None	None	None
Act Effct Green (s)	64.5	64.5	120.0	64.5	64.5	30.3	30.3	30.3	10.0	10.0	10.0
Actuated g/C Ratio	0.54	0.54	1.00	0.54	0.54	0.25	0.25	0.25	0.08	0.08	0.08
v/c Ratio	0.23	0.64	0.23	0.67	0.75	0.84	0.86	0.45	0.01	0.02	0.11
Control Delay	26.7	23.9	0.4	51.4	27.4	62.5	64.6	7.2	51.0	51.0	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	23.9	0.4	51.4	27.4	62.5	64.6	7.2	51.0	51.0	1.1
LOS	C	C	A	D	C	E	E	A	D	D	A
Approach Delay		18.7			29.1		48.0			7.3	
Approach LOS		B			C		D			A	

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 29.4		Intersection LOS: C	
Intersection Capacity Utilization 95.9%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Davis Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	1038	303	95	1209	7	587	17	229	1	2	20
Future Volume (vph)	23	1038	303	95	1209	7	587	17	229	1	2	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1539	3167	1352	1471	3157		1476	1471	1397	831	1167	1222
Flt Permitted	0.12	1.00	1.00	0.18	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	196	3167	1352	275	3157		1476	1471	1397	831	1167	1222
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	24	1081	316	99	1259	7	611	18	239	1	2	21
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	179	0	0	20
Lane Group Flow (vph)	24	1081	316	99	1266	0	312	317	60	1	2	1
Confl. Peds. (#/hr)	1					1	1		1	1		1
Heavy Vehicles (%)	8%	5%	10%	13%	5%	42%	7%	23%	5%	100%	50%	20%
Turn Type	Perm	NA	Free	Perm	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6		4	4		8	8	
Permitted Phases	2		Free	6					4			8
Actuated Green, G (s)	61.4	61.4	120.0	61.4	61.4		30.3	30.3	30.3	6.0	6.0	6.0
Effective Green, g (s)	61.4	61.4	120.0	61.4	61.4		30.3	30.3	30.3	6.0	6.0	6.0
Actuated g/C Ratio	0.51	0.51	1.00	0.51	0.51		0.25	0.25	0.25	0.05	0.05	0.05
Clearance Time (s)	6.9	6.9		6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	100	1620	1352	140	1615		372	371	352	41	58	61
v/s Ratio Prot		0.34			c0.40		0.21	c0.22		0.00	0.00	
v/s Ratio Perm	0.12		c0.23	0.36					0.04			0.00
v/c Ratio	0.24	0.67	0.23	0.71	0.78		0.84	0.85	0.17	0.02	0.03	0.02
Uniform Delay, d1	16.3	21.7	0.0	22.4	23.9		42.5	42.7	35.0	54.2	54.2	54.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.6	2.2	0.4	25.9	3.9		16.3	18.3	0.4	0.4	0.4	0.2
Delay (s)	21.9	23.9	0.4	48.4	27.8		58.9	61.0	35.4	54.6	54.7	54.4
Level of Service	C	C	A	D	C		E	E	D	D	D	D
Approach Delay (s)		18.7			29.3			53.2			54.4	
Approach LOS		B			C			D			D	

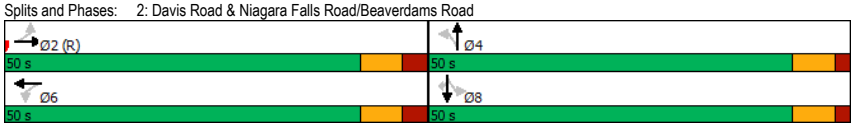
Intersection Summary					
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.79				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		22.3	
Intersection Capacity Utilization	95.9%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	123	35	37	19	16	504	92	260	49
Future Volume (vph)	123	35	37	19	16	504	92	260	49
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		56.1		56.1	28.8	28.8	28.8	28.8	28.8
Actuated g/C Ratio		0.56		0.56	0.29	0.29	0.29	0.29	0.29
v/c Ratio		0.31		0.29	0.07	0.67	0.63	0.33	0.13
Control Delay		14.1		4.4	24.4	34.2	49.7	28.5	6.6
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		14.1		4.4	24.4	34.2	49.7	28.5	6.6
LOS		B		A	C	C	D	C	A
Approach Delay		14.1		4.4		34.0		30.7	
Approach LOS		B		A		C		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 25.4		Intersection LOS: C	
Intersection Capacity Utilization 92.9%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	35	13	37	19	187	16	504	62	92	260	49
Future Volume (vph)	123	35	13	37	19	187	16	504	62	92	260	49
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		0.99			0.90		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1548			1521		1484	3044		1646	2891	1282
Flt Permitted		0.65			0.93		0.58	1.00		0.31	1.00	1.00
Satd. Flow (perm)		1046			1429		911	3044		533	2891	1282
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	129	37	14	39	20	197	17	531	65	97	274	52
RTOR Reduction (vph)	0	2	0	0	86	0	0	11	0	0	0	37
Lane Group Flow (vph)	0	178	0	0	170	0	17	585	0	97	274	15
Heavy Vehicles (%)	9%	5%	7%	5%	10%	1%	12%	8%	3%	1%	15%	16%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		56.1			56.1		28.8	28.8		28.8	28.8	28.8
Effective Green, g (s)		56.1			56.1		28.8	28.8		28.8	28.8	28.8
Actuated g/C Ratio		0.56			0.56		0.29	0.29		0.29	0.29	0.29
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		586			801		262	876		153	832	369
v/s Ratio Prot								c0.19			0.09	
v/s Ratio Perm		c0.17			0.12		0.02			0.18		0.01
v/c Ratio		0.30			0.21		0.06	0.67		0.63	0.33	0.04
Uniform Delay, d1		11.6			10.9		25.8	31.4		31.0	28.0	25.6
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.3			0.6		0.2	2.6		11.4	0.5	0.1
Delay (s)		12.9			11.5		26.0	33.9		42.4	28.5	25.7
Level of Service		B			B		C	C		D	C	C
Approach Delay (s)		12.9			11.5			33.7			31.3	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.43				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		15.1	
Intersection Capacity Utilization	92.9%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	155	568	40	434	239	24	155	185	104	152
Future Volume (vph)	155	568	40	434	239	24	155	185	104	152
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases		2		6			4		8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	2	2	6	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	52.0	52.0	52.0	52.0	52.0	38.0	38.0	38.0	38.0	38.0
Total Split (%)	57.8%	57.8%	57.8%	57.8%	57.8%	42.2%	42.2%	42.2%	42.2%	42.2%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	54.2	54.2	54.2	54.2	54.2	21.8	21.8	21.8	21.8	21.8
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.38	0.61	0.15	0.47	0.26	0.12	0.55	0.81	0.32	0.36
Control Delay	14.2	16.1	11.7	13.2	2.3	24.8	33.1	55.7	28.8	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.2	16.1	11.7	13.2	2.3	24.8	33.1	55.7	28.8	6.1
LOS	B	B	B	B	A	C	C	E	C	A
Approach Delay		15.7		9.5			32.1		32.3	
Approach LOS		B		A			C		C	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 90		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 70		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.81		
Intersection Signal Delay: 18.7	Intersection LOS: B	
Intersection Capacity Utilization 100.4%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 3: Davis Road & Lundys Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	568	20	40	434	239	24	155	25	185	104	152
Future Volume (vph)	155	568	20	40	434	239	24	155	25	185	104	152
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1554	1696		1385	1651	1458	1289	1411		1583	1423	1377
Flt Permitted	0.45	1.00		0.33	1.00	1.00	0.69	1.00		0.60	1.00	1.00
Satd. Flow (perm)	733	1696		485	1651	1458	930	1411		1006	1423	1377
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	165	604	21	43	462	254	26	165	27	197	111	162
RTOR Reduction (vph)	0	1	0	0	0	101	0	8	0	0	0	123
Lane Group Flow (vph)	165	624	0	43	462	153	26	184	0	197	111	39
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	7%	2%	20%	20%	6%	2%	29%	19%	36%	5%	23%	8%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	54.2	54.2		54.2	54.2	54.2	21.8	21.8		21.8	21.8	21.8
Effective Green, g (s)	54.2	54.2		54.2	54.2	54.2	21.8	21.8		21.8	21.8	21.8
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	441	1021		292	994	878	225	341		243	344	333
v/s Ratio Prot		c0.37			0.28			0.13			0.08	
v/s Ratio Perm	0.23			0.09		0.10	0.03			c0.20		0.03
v/c Ratio	0.37	0.61		0.15	0.46	0.17	0.12	0.54		0.81	0.32	0.12
Uniform Delay, d1	9.2	11.3		7.8	9.9	8.0	26.6	29.7		32.2	28.0	26.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.4	2.7		1.1	1.6	0.4	0.1	0.9		17.3	0.2	0.1
Delay (s)	11.6	14.0		8.9	11.5	8.4	26.7	30.7		49.5	28.2	26.7
Level of Service	B	B		A	B	A	C	C		D	C	C
Approach Delay (s)		13.5			10.3			30.2			36.6	
Approach LOS		B			B			C			D	

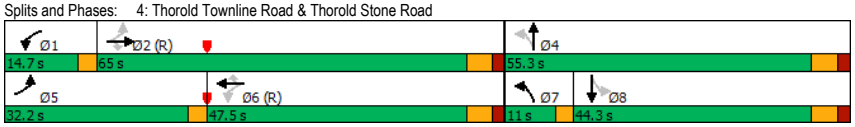
Intersection Summary					
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.67				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		14.0	
Intersection Capacity Utilization	100.4%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	361	801	102	112	929	83	95	151	58	154
Future Volume (vph)	361	801	102	112	929	83	95	151	58	154
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		7	4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	5	2	2	1	6	6	7	4	8	8
Switch Phase										
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0	10.0	8.0	10.0	10.0	10.0
Minimum Split (s)	11.0	35.1	35.1	12.5	35.1	35.1	11.0	41.4	41.4	41.4
Total Split (s)	32.2	65.0	65.0	14.7	47.5	47.5	11.0	55.3	44.3	44.3
Total Split (%)	23.9%	48.1%	48.1%	10.9%	35.2%	35.2%	8.1%	41.0%	32.8%	32.8%
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	78.1	62.3	62.3	55.3	42.4	42.4	50.9	47.5	36.5	36.5
Actuated g/C Ratio	0.58	0.46	0.46	0.41	0.31	0.31	0.38	0.35	0.27	0.27
v/c Ratio	0.98	0.56	0.15	0.38	0.95	0.18	0.55	0.39	0.22	0.96
Control Delay	80.1	28.8	7.4	19.6	64.8	5.3	40.1	32.6	40.1	76.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.1	28.8	7.4	19.6	64.8	5.3	40.1	32.6	40.1	76.7
LOS	F	C	A	B	E	A	D	C	D	E
Approach Delay		41.7			55.9			35.0		71.9
Approach LOS		D			E			C		E

Intersection Summary		
Cycle Length: 135		
Actuated Cycle Length: 135		
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 120		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.98		
Intersection Signal Delay: 50.5	Intersection LOS: D	
Intersection Capacity Utilization 97.5%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	361	801	102	112	929	83	95	151	54	58	154	231
Future Volume (vph)	361	801	102	112	929	83	95	151	54	58	154	231
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		6.4	6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	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	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1525	3228	1390	1583	3228	1337	1446	1511		1511	1397	
Flt Permitted	0.09	1.00	1.00	0.34	1.00	1.00	0.20	1.00		0.62	1.00	
Satd. Flow (perm)	141	3228	1390	563	3228	1337	297	1511		994	1397	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	376	834	106	117	968	86	99	157	56	60	160	241
RTOR Reduction (vph)	0	0	45	0	0	59	0	10	0	0	41	0
Lane Group Flow (vph)	376	834	61	117	968	27	99	203	0	60	360	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	9%	3%	7%	5%	3%	8%	15%	11%	12%	10%	11%	16%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2		2	6		6	4			8		
Actuated Green, G (s)	75.0	62.3	62.3	52.1	42.4	42.4	47.5	47.5		36.5	36.5	
Effective Green, g (s)	75.0	62.3	62.3	52.1	42.4	42.4	47.5	47.5		36.5	36.5	
Actuated g/C Ratio	0.56	0.46	0.46	0.39	0.31	0.31	0.35	0.35		0.27	0.27	
Clearance Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		6.4	6.4	
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0	6.0	2.5	2.3		2.3	2.3	
Lane Grp Cap (vph)	381	1489	641	290	1013	419	172	531		268	377	
v/s Ratio Prot	c0.22	0.26		0.03	0.30		c0.03	0.13			c0.26	
v/s Ratio Perm	c0.33		0.04	0.13		0.02	0.17			0.06		
v/c Ratio	0.99	0.56	0.10	0.40	0.96	0.06	0.58	0.38		0.22	0.96	
Uniform Delay, d1	42.3	26.4	20.5	27.5	45.4	32.4	33.0	32.8		38.2	48.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	42.2	1.5	0.3	0.7	19.4	0.3	3.8	0.3		0.2	34.4	
Delay (s)	84.5	27.9	20.8	28.2	64.8	32.7	36.8	33.0		38.5	82.9	
Level of Service	F	C	C	C	E	C	D	C		D	F	
Approach Delay (s)		43.5			58.8			34.2			77.1	
Approach LOS		D			E			C			E	

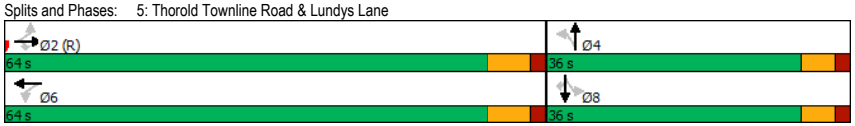
Intersection Summary					
HCM 2000 Control Delay	52.9	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.97				
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	18.5		
Intersection Capacity Utilization	97.5%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	155	569	109	43	387	79	134	23	96	60
Future Volume (vph)	155	569	109	43	387	79	134	23	96	60
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2			6		4		8	
Permitted Phases	2		2	6		4		8		8
Detector Phase	2	2	2	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	64.0	64.0	64.0	64.0	64.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	64.0%	64.0%	64.0%	64.0%	64.0%	36.0%	36.0%	36.0%	36.0%	36.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	68.3	68.3	68.3	68.3	68.3	18.7	18.7	18.7	18.7	18.7
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.19	0.19	0.19	0.19	0.19
v/c Ratio	0.31	0.53	0.12	0.11	0.41	0.42	0.65	0.15	0.37	0.22
Control Delay	9.4	10.9	4.1	7.6	9.0	40.7	43.8	33.7	37.8	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	10.9	4.1	7.6	9.0	40.7	43.8	33.7	37.8	9.7
LOS	A	B	A	A	A	D	D	C	D	A
Approach Delay		9.7			8.8		42.8		27.8	
Approach LOS		A			A		D		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 86.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 5: Thorold Townline Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	569	109	43	387	39	79	134	42	23	96	60
Future Volume (vph)	155	569	109	43	387	39	79	134	42	23	96	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1582	1699	1390	1599	1648		1498	1502		1599	1496	1293
Flt Permitted	0.47	1.00	1.00	0.37	1.00		0.69	1.00		0.52	1.00	1.00
Satd. Flow (perm)	785	1699	1390	629	1648		1089	1502		871	1496	1293
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	167	612	117	46	416	42	85	144	45	25	103	65
RTOR Reduction (vph)	0	0	18	0	3	0	0	13	0	0	0	53
Lane Group Flow (vph)	167	612	99	46	455	0	85	176	0	25	103	12
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	5%	3%	7%	4%	5%	0%	11%	15%	4%	4%	17%	15%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		8
Actuated Green, G (s)	68.3	68.3	68.3	68.3	68.3		18.7	18.7		18.7	18.7	18.7
Effective Green, g (s)	68.3	68.3	68.3	68.3	68.3		18.7	18.7		18.7	18.7	18.7
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68		0.19	0.19		0.19	0.19	0.19
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	536	1160	949	429	1125		203	280		162	279	241
v/s Ratio Prot		c0.36			0.28			c0.12			0.07	
v/s Ratio Perm	0.21		0.07	0.07			0.08			0.03		0.01
v/c Ratio	0.31	0.53	0.10	0.11	0.40		0.42	0.63		0.15	0.37	0.05
Uniform Delay, d1	6.4	7.9	5.4	5.4	6.9		35.9	37.5		34.0	35.5	33.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	1.7	0.2	0.5	1.1		2.9	6.1		0.9	1.7	0.2
Delay (s)	7.9	9.6	5.6	5.9	8.0		38.8	43.6		35.0	37.2	33.5
Level of Service	A	A	A	A	A		D	D		C	D	C
Approach Delay (s)		8.7			7.8			42.1			35.7	
Approach LOS		A			A			D			D	

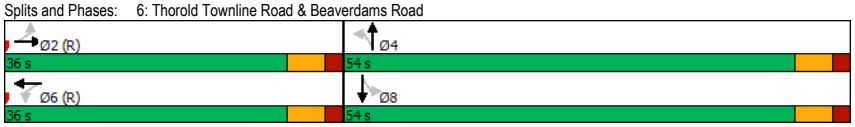
Intersection Summary					
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.55				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	86.6%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	20	154	18	196	21	244	12	331
Future Volume (vph)	20	154	18	196	21	244	12	331
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	36.0	36.0	36.0	36.0	54.0	54.0	54.0	54.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)		48.9		48.9		29.1		29.1
Actuated g/C Ratio		0.54		0.54		0.32		0.32
v/c Ratio		0.24		0.29		0.66		0.77
Control Delay		13.2		13.7		31.1		36.4
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		13.2		13.7		31.1		36.4
LOS		B		B		C		D
Approach Delay		13.2		13.7		31.1		36.4
Approach LOS		B		B		C		D

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 25.9		Intersection LOS: C	
Intersection Capacity Utilization 54.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: Thorold Townline Road & Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	154	18	18	196	24	21	244	34	12	331	21
Future Volume (vph)	20	154	18	18	196	24	21	244	34	12	331	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.98			0.99	
Flt Protected		0.99			1.00			1.00			1.00	
Satd. Flow (prot)		1683			1698			1552			1611	
Flt Permitted		0.96			0.97			0.96			0.98	
Satd. Flow (perm)		1617			1656			1491			1587	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	167	20	20	213	26	23	265	37	13	360	23
RTOR Reduction (vph)	0	3	0	0	3	0	0	7	0	0	3	0
Lane Group Flow (vph)	0	206	0	0	256	0	0	318	0	0	393	0
Confl. Peds. (#/hr)			5	5			6					6
Heavy Vehicles (%)	5%	1%	5%	0%	1%	4%	0%	13%	0%	16%	7%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		48.9			48.9			29.1			29.1	
Effective Green, g (s)		48.9			48.9			29.1			29.1	
Actuated g/C Ratio		0.54			0.54			0.32			0.32	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		878			899			482			513	
v/s Ratio Prot												
v/s Ratio Perm		0.13			c0.15			0.21			c0.25	
v/c Ratio		0.23			0.28			0.66			0.77	
Uniform Delay, d1		10.8			11.1			26.2			27.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.6			0.8			3.2			6.7	
Delay (s)		11.4			11.9			29.4			34.1	
Level of Service		B			B			C			C	
Approach Delay (s)		11.4			11.9			29.4			34.1	
Approach LOS		B			B			C			C	

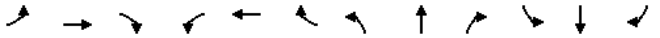
Intersection Summary					
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.46				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	54.5%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	350	0	0	262
Future Volume (Veh/h)	0	0	350	0	0	262
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	376	0	0	282
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	658	376			376	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	658	376			376	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	432	675			1194	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	376	282
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1194
Volume to Capacity	0.00	0.22	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		23.3%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	20	154	18	18	196	24	21	244	34	12	331	21
Future Volume (vph)	20	154	18	18	196	24	21	244	34	12	331	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	167	20	20	213	26	23	265	37	13	360	23

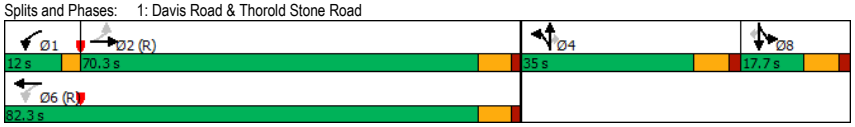
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	209	259	325	396
Volume Left (vph)	22	20	23	13
Volume Right (vph)	20	26	37	23
Hadj (s)	-0.01	-0.02	0.13	0.10
Departure Headway (s)	7.0	6.8	6.6	6.4
Degree Utilization, x	0.41	0.49	0.60	0.71
Capacity (veh/h)	440	466	503	525
Control Delay (s)	14.7	16.2	18.9	23.4
Approach Delay (s)	14.7	16.2	18.9	23.4
Approach LOS	B	C	C	C

Intersection Summary				
Delay		19.1		
Level of Service		C		
Intersection Capacity Utilization		49.8%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	27	1386	639	156	1304	554	6	136	4	7	31
Future Volume (vph)	27	1386	639	156	1304	554	6	136	4	7	31
Turn Type	Perm	NA	Free	pm+pt	NA	Split	NA	Perm	Split	NA	Perm
Protected Phases		2		1	6	4	4		8	8	
Permitted Phases	2		Free	6				4			8
Detector Phase	2	2		1	6	4	4	4	8	8	8
Switch Phase											
Minimum Initial (s)	20.0	20.0		5.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		8.0	28.9	29.7	29.7	29.7	17.7	17.7	17.7
Total Split (s)	70.3	70.3		12.0	82.3	35.0	35.0	35.0	17.7	17.7	17.7
Total Split (%)	52.1%	52.1%		8.9%	61.0%	25.9%	25.9%	25.9%	13.1%	13.1%	13.1%
Yellow Time (s)	5.4	5.4		3.0	5.4	5.7	5.7	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		0.0	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		3.0	6.9	7.7	7.7	7.7	7.7	7.7	7.7
Lead/Lag	Lag	Lag		Lead							
Lead-Lag Optimize?	Yes	Yes		Yes							
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None	None	None
Act Effct Green (s)	67.2	67.2	135.0	86.4	82.5	27.3	27.3	27.3	10.0	10.0	10.0
Actuated g/C Ratio	0.50	0.50	1.00	0.64	0.61	0.20	0.20	0.20	0.07	0.07	0.07
v/c Ratio	0.27	0.89	0.46	0.82	0.69	0.92	0.95	0.36	0.03	0.06	0.15
Control Delay	30.1	39.5	1.1	61.9	21.4	87.2	92.2	9.6	58.8	59.6	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	39.5	1.1	61.9	21.4	87.2	92.2	9.6	58.8	59.6	1.5
LOS	C	D	A	E	C	F	F	A	E	E	A
Approach Delay		27.4			25.7		74.1			16.0	
Approach LOS		C			C		E			B	

Intersection Summary		
Cycle Length: 135		
Actuated Cycle Length: 135		
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 125		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.95		
Intersection Signal Delay: 34.4	Intersection LOS: C	
Intersection Capacity Utilization 97.3%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 1: Davis Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	1386	639	156	1304	1	554	6	136	4	7	31
Future Volume (vph)	27	1386	639	156	1304	1	554	6	136	4	7	31
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	3.0	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1330	3292	1458	1583	3259		1564	1559	1390	1662	1535	1417
Flt Permitted	0.15	1.00	1.00	0.06	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	211	3292	1458	100	3259		1564	1559	1390	1662	1535	1417
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	1459	673	164	1373	1	583	6	143	4	7	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	114	0	0	32
Lane Group Flow (vph)	28	1459	673	164	1374	0	291	298	29	4	7	1
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	25%	1%	2%	5%	2%	0%	1%	33%	7%	0%	14%	3%
Turn Type	Perm	NA	Free	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		2		1	6		4	4		8	8	
Permitted Phases	2		Free	6					4			8
Actuated Green, G (s)	64.0	64.0	135.0	79.4	79.4		27.3	27.3	27.3	6.0	6.0	6.0
Effective Green, g (s)	64.0	64.0	135.0	79.4	79.4		27.3	27.3	27.3	6.0	6.0	6.0
Actuated g/C Ratio	0.47	0.47	1.00	0.59	0.59		0.20	0.20	0.20	0.04	0.04	0.04
Clearance Time (s)	6.9	6.9		3.0	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	100	1560	1458	195	1916		316	315	281	73	68	62
v/s Ratio Prot		c0.44		c0.08	0.42		0.19	c0.19		0.00	0.00	
v/s Ratio Perm	0.13		c0.46	0.42					0.02			0.00
v/c Ratio	0.28	0.94	0.46	0.84	0.72		0.92	0.95	0.10	0.05	0.10	0.02
Uniform Delay, d1	21.5	33.5	0.0	39.1	19.8		52.8	53.1	43.9	61.8	61.9	61.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.9	11.8	1.1	26.5	2.3		31.7	36.9	0.3	0.5	1.2	0.3
Delay (s)	28.4	45.4	1.1	65.6	22.1		84.5	90.0	44.2	62.3	63.1	62.0
Level of Service	C	D	A	E	C		F	F	D	E	E	E
Approach Delay (s)		31.4			26.8			78.9			62.2	
Approach LOS		C			C			E			E	

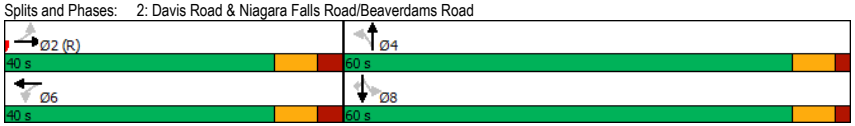
Intersection Summary					
HCM 2000 Control Delay	37.9	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.93				
Actuated Cycle Length (s)	135.0	Sum of lost time (s)		25.3	
Intersection Capacity Utilization	97.3%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	101	36	79	50	13	441	190	499	117
Future Volume (vph)	101	36	79	50	13	441	190	499	117
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	40.0	40.0	40.0	40.0	60.0	60.0	60.0	60.0	60.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		47.6		47.6	37.3	37.3	37.3	37.3	37.3
Actuated g/C Ratio		0.48		0.48	0.37	0.37	0.37	0.37	0.37
v/c Ratio		0.32		0.45	0.05	0.44	0.77	0.44	0.20
Control Delay		21.0		18.5	15.6	22.6	45.5	23.6	3.3
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		21.0		18.5	15.6	22.6	45.5	23.6	3.3
LOS		C		B	B	C	D	C	A
Approach Delay		21.0		18.5		22.4		25.8	
Approach LOS		C		B		C		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 80.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	36	17	79	50	165	13	441	53	190	499	117
Future Volume (vph)	101	36	17	79	50	165	13	441	53	190	499	117
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		0.98			0.92		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1631			1578		1662	3122		1630	3197	1473
Flt Permitted		0.64			0.86		0.40	1.00		0.41	1.00	1.00
Satd. Flow (perm)		1073			1382		707	3122		699	3197	1473
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	106	38	18	83	53	174	14	464	56	200	525	123
RTOR Reduction (vph)	0	4	0	0	36	0	0	13	0	0	0	77
Lane Group Flow (vph)	0	158	0	0	274	0	14	507	0	200	525	46
Heavy Vehicles (%)	1%	2%	11%	1%	2%	1%	0%	5%	3%	2%	4%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		47.6			47.6		37.3	37.3		37.3	37.3	37.3
Effective Green, g (s)		47.6			47.6		37.3	37.3		37.3	37.3	37.3
Actuated g/C Ratio		0.48			0.48		0.37	0.37		0.37	0.37	0.37
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		510			657		263	1164		260	1192	549
v/s Ratio Prot								0.16			0.16	
v/s Ratio Perm		0.15			c0.20		0.02			c0.29		0.03
v/c Ratio		0.31			0.42		0.05	0.44		0.77	0.44	0.08
Uniform Delay, d1		16.1			17.1		20.1	23.5		27.6	23.5	20.3
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.6			2.0		0.2	0.5		14.9	0.5	0.1
Delay (s)		17.7			19.1		20.2	24.0		42.5	24.1	20.4
Level of Service		B			B		C	C		D	C	C
Approach Delay (s)		17.7			19.1			23.9			27.9	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.57				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		15.1	
Intersection Capacity Utilization	80.0%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	192	623	31	610	248	52	156	309	139	170
Future Volume (vph)	192	623	31	610	248	52	156	309	139	170
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	5.0	22.0	22.0	22.0	22.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	8.0	36.0	36.0	36.0	36.0	32.0	32.0	8.0	32.0	32.0
Total Split (s)	12.0	70.0	58.0	58.0	58.0	32.0	32.0	18.0	50.0	50.0
Total Split (%)	10.0%	58.3%	48.3%	48.3%	48.3%	26.7%	26.7%	15.0%	41.7%	41.7%
Yellow Time (s)	3.0	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	7.0	7.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	Max	Max	Max	Max	Max	None	Max	Max
Act Effct Green (s)	67.0	63.0	51.0	51.0	51.0	25.0	25.0	47.0	43.0	43.0
Actuated g/C Ratio	0.56	0.52	0.42	0.42	0.42	0.21	0.21	0.39	0.36	0.36
v/c Ratio	0.85	0.77	0.18	0.88	0.36	0.23	0.66	0.82	0.27	0.28
Control Delay	46.2	29.9	25.6	47.9	9.0	42.6	52.4	46.9	29.1	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	29.9	25.6	47.9	9.0	42.6	52.4	46.9	29.1	5.0
LOS	D	C	C	D	A	D	D	D	C	A
Approach Delay		33.6		36.3			50.3		31.4	
Approach LOS		C		D			D		C	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 85		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.88		
Intersection Signal Delay: 35.6	Intersection LOS: D	
Intersection Capacity Utilization 116.3%	ICU Level of Service H	
Analysis Period (min) 15		

Splits and Phases: 3: Davis Road & Lundys Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	623	32	31	610	248	52	156	40	309	139	170
Future Volume (vph)	192	623	32	31	610	248	52	156	40	309	139	170
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1646	1730		1613	1750	1437	1662	1506		1645	1522	1473
Flt Permitted	0.14	1.00		0.26	1.00	1.00	0.66	1.00		0.43	1.00	1.00
Satd. Flow (perm)	246	1730		442	1750	1437	1159	1506		750	1522	1473
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	206	670	34	33	656	267	56	168	43	332	149	183
RTOR Reduction (vph)	0	1	0	0	0	135	0	8	0	0	0	117
Lane Group Flow (vph)	206	703	0	33	656	132	56	203	0	332	149	66
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	1%	0%	6%	3%	0%	1%	0%	14%	5%	1%	15%	1%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	63.0	63.0		51.0	51.0	51.0	25.0	25.0		43.0	43.0	43.0
Effective Green, g (s)	63.0	63.0		51.0	51.0	51.0	25.0	25.0		43.0	43.0	43.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	0.42	0.21	0.21		0.36	0.36	0.36
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	234	908		187	743	610	241	313		380	545	527
v/s Ratio Prot	c0.07	0.41			0.37			0.13		c0.11	0.10	
v/s Ratio Perm	c0.40			0.07		0.09	0.05			c0.20		0.04
v/c Ratio	0.88	0.77		0.18	0.88	0.22	0.23	0.65		0.87	0.27	0.12
Uniform Delay, d1	22.9	22.8		21.4	31.8	21.9	39.5	43.5		33.5	27.4	25.9
Progression Factor	1.00	1.00		1.05	1.08	1.84	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	29.5	6.4		1.8	12.7	0.7	2.2	10.0		19.4	1.2	0.5
Delay (s)	52.4	29.2		24.3	47.0	40.8	41.8	53.5		52.8	28.6	26.3
Level of Service	D	C		C	D	D	D	D		D	C	C
Approach Delay (s)		34.4			44.5			51.0			40.1	
Approach LOS		C			D			D			D	

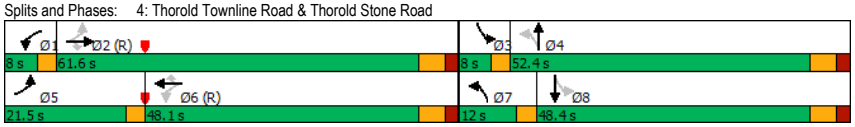
Intersection Summary				
HCM 2000 Control Delay	40.8	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	116.3%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	256	1189	59	67	992	40	134	149	54	183
Future Volume (vph)	256	1189	59	67	992	40	134	149	54	183
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	8.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	11.0	35.1	35.1	8.0	35.1	35.1	8.0	41.4	8.0	41.4
Total Split (s)	21.5	61.6	61.6	8.0	48.1	48.1	12.0	52.4	8.0	48.4
Total Split (%)	16.5%	47.4%	47.4%	6.2%	37.0%	37.0%	9.2%	40.3%	6.2%	37.2%
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1	3.0	4.1
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.3	0.0	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4	3.0	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	67.8	58.3	58.3	51.4	43.1	43.1	56.2	46.4	49.2	40.8
Actuated g/C Ratio	0.52	0.45	0.45	0.40	0.33	0.33	0.43	0.36	0.38	0.31
v/c Ratio	0.96	0.84	0.09	0.53	0.95	0.08	0.71	0.46	0.15	0.97
Control Delay	81.8	38.9	0.9	33.2	60.0	0.3	43.4	31.4	22.6	70.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.8	38.9	0.9	33.2	60.0	0.3	43.4	31.4	22.6	70.3
LOS	F	D	A	C	E	A	D	C	C	E
Approach Delay		44.7			56.2			35.5		65.6
Approach LOS		D			E			D		E

Intersection Summary			
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 50.5		Intersection LOS: D	
Intersection Capacity Utilization 101.2%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



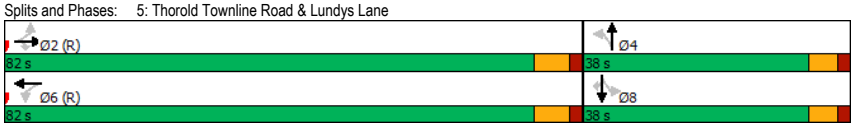
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	1189	59	67	992	40	134	149	109	54	183	306
Future Volume (vph)	256	1189	59	67	992	40	134	149	109	54	183	306
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		3.0	6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	3292	1473	1599	3292	1417	1630	1565		1554	1530	
Flt Permitted	0.09	1.00	1.00	0.12	1.00	1.00	0.14	1.00		0.55	1.00	
Satd. Flow (perm)	144	3292	1473	195	3292	1417	235	1565		894	1530	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	267	1239	61	70	1033	42	140	155	114	56	191	319
RTOR Reduction (vph)	0	0	34	0	0	28	0	21	0	0	46	0
Lane Group Flow (vph)	267	1239	27	70	1033	14	140	248	0	56	464	0
Heavy Vehicles (%)	7%	1%	1%	4%	1%	5%	2%	6%	3%	7%	3%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		
Actuated Green, G (s)	64.1	57.1	57.1	46.5	42.5	42.5	53.4	46.4		45.4	41.4	
Effective Green, g (s)	64.1	57.1	57.1	46.5	42.5	42.5	53.4	46.4		45.4	41.4	
Actuated g/C Ratio	0.49	0.44	0.44	0.36	0.33	0.33	0.41	0.36		0.35	0.32	
Clearance Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		3.0	6.4	
Vehicle Extension (s)	2.5	6.0	6.0	3.0	6.0	6.0	3.0	2.3		3.0	2.3	
Lane Grp Cap (vph)	272	1445	646	112	1076	463	193	558		332	487	
v/s Ratio Prot	c0.14	0.38		0.02	0.31		c0.05	0.16		0.01	c0.30	
v/s Ratio Perm	c0.34		0.02	0.20		0.01	0.25			0.05		
v/c Ratio	0.98	0.86	0.04	0.62	0.96	0.03	0.73	0.45		0.17	0.95	
Uniform Delay, d1	40.3	32.8	20.8	30.1	42.9	29.7	29.3	32.0		28.6	43.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	49.2	6.8	0.1	10.4	19.4	0.1	12.7	0.3		0.2	28.8	
Delay (s)	89.5	39.6	20.9	40.5	62.3	29.9	42.0	32.3		28.8	72.1	
Level of Service	F	D	C	D	E	C	D	C		C	E	
Approach Delay (s)		47.4			59.7			35.6			67.8	
Approach LOS		D			E			D			E	

Intersection Summary					
HCM 2000 Control Delay	53.0	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.97				
Actuated Cycle Length (s)	130.0	Sum of lost time (s)		18.5	
Intersection Capacity Utilization	101.2%	ICU Level of Service		G	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	81	582	115	50	606	125	131	56	133	135
Future Volume (vph)	81	582	115	50	606	125	131	56	133	135
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2			6		4		8	
Permitted Phases	2		2	6		4		8		8
Detector Phase	2	2	2	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	82.0	82.0	82.0	82.0	82.0	38.0	38.0	38.0	38.0	38.0
Total Split (%)	68.3%	68.3%	68.3%	68.3%	68.3%	31.7%	31.7%	31.7%	31.7%	31.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	84.1	84.1	84.1	84.1	84.1	22.9	22.9	22.9	22.9	22.9
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.19	0.19	0.19	0.19	0.19
v/c Ratio	0.23	0.54	0.12	0.13	0.58	0.74	0.64	0.42	0.46	0.37
Control Delay	9.0	12.3	4.1	8.5	12.7	67.7	49.1	49.2	46.4	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	12.3	4.1	8.5	12.7	67.7	49.1	49.2	46.4	8.3
LOS	A	B	A	A	B	E	D	D	D	A
Approach Delay		10.8			12.4		56.5		31.1	
Approach LOS		B			B		E		C	

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 21.2		Intersection LOS: C	
Intersection Capacity Utilization 94.5%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Thorold Townline Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	582	115	50	606	31	125	131	56	56	133	135
Future Volume (vph)	81	582	115	50	606	31	125	131	56	56	133	135
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1598	1699	1444	1599	1712		1568	1604		1646	1651	1473
Flt Permitted	0.32	1.00	1.00	0.36	1.00		0.59	1.00		0.45	1.00	1.00
Satd. Flow (perm)	544	1699	1444	602	1712		973	1604		778	1651	1473
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	89	640	126	55	666	34	137	144	62	62	146	148
RTOR Reduction (vph)	0	0	16	0	1	0	0	15	0	0	0	120
Lane Group Flow (vph)	89	640	110	55	699	0	137	191	0	62	146	28
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	3%	3%	4%	1%	9%	6%	6%	0%	1%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		8
Actuated Green, G (s)	84.1	84.1	84.1	84.1	84.1		22.9	22.9		22.9	22.9	22.9
Effective Green, g (s)	84.1	84.1	84.1	84.1	84.1		22.9	22.9		22.9	22.9	22.9
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70		0.19	0.19		0.19	0.19	0.19
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	381	1190	1012	421	1199		185	306		148	315	281
v/s Ratio Prot		0.38			c0.41			0.12			0.09	
v/s Ratio Perm	0.16		0.08	0.09			c0.14			0.08		0.02
v/c Ratio	0.23	0.54	0.11	0.13	0.58		0.74	0.63		0.42	0.46	0.10
Uniform Delay, d1	6.4	8.6	5.8	5.9	9.1		45.8	44.6		42.7	43.1	40.1
Progression Factor	0.97	1.11	0.93	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	1.0	0.1	0.6	2.1		17.4	5.6		4.0	2.2	0.3
Delay (s)	7.1	10.6	5.5	6.6	11.2		63.2	50.2		46.7	45.3	40.4
Level of Service	A	B	A	A	B		E	D		D	D	D
Approach Delay (s)		9.5			10.8			55.4			43.5	
Approach LOS		A			B			E			D	

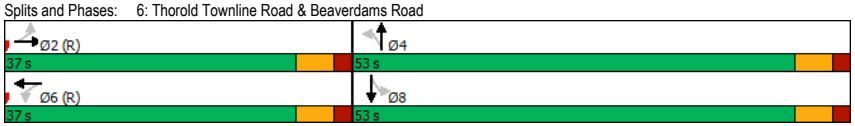
Intersection Summary					
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.62				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	94.5%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	30	238	44	213	30	356	22	248
Future Volume (vph)	30	238	44	213	30	356	22	248
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	37.0	37.0	37.0	37.0	53.0	53.0	53.0	53.0
Total Split (%)	41.1%	41.1%	41.1%	41.1%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Act Effct Green (s)		46.3		46.3		31.7		31.7
Actuated g/C Ratio		0.51		0.51		0.35		0.35
v/c Ratio		0.37		0.37		0.78		0.61
Control Delay		16.5		16.6		35.1		26.6
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		16.5		16.6		35.1		26.6
LOS		B		B		D		C
Approach Delay		16.5		16.6		35.1		26.6
Approach LOS		B		B		D		C

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 24.9		Intersection LOS: C	
Intersection Capacity Utilization 66.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Thorold Townline Road & Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	238	18	44	213	23	30	356	27	22	248	46
Future Volume (vph)	30	238	18	44	213	23	30	356	27	22	248	46
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.99			0.98	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1707			1707			1663			1635	
Flt Permitted		0.94			0.91			0.96			0.95	
Satd. Flow (perm)		1621			1563			1597			1567	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	32	256	19	47	229	25	32	383	29	24	267	49
RTOR Reduction (vph)	0	2	0	0	3	0	0	4	0	0	9	0
Lane Group Flow (vph)	0	305	0	0	298	0	0	440	0	0	331	0
Confl. Peds. (#/hr)	1		5	5		1	8		3	3		8
Heavy Vehicles (%)	6%	0%	5%	2%	0%	0%	3%	4%	0%	4%	4%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		46.3			46.3			31.7			31.7	
Effective Green, g (s)		46.3			46.3			31.7			31.7	
Actuated g/C Ratio		0.51			0.51			0.35			0.35	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		833			804			562			551	
v/s Ratio Prot												
v/s Ratio Perm		0.19			c0.19			c0.28			0.21	
v/c Ratio		0.37			0.37			0.78			0.60	
Uniform Delay, d1		13.1			13.1			26.1			23.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			1.3			7.0			1.8	
Delay (s)		14.3			14.4			33.1			25.8	
Level of Service		B			B			C			C	
Approach Delay (s)		14.3			14.4			33.1			25.8	
Approach LOS		B			B			C			C	

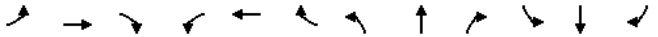
Intersection Summary					
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	66.2%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	347	0	0	301
Future Volume (Veh/h)	0	0	347	0	0	301
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	381	0	0	331
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	712	381			381	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	712	381			381	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	402	671			1189	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	381	331
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1189
Volume to Capacity	0.00	0.22	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		23.2%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	30	238	18	44	213	23	30	356	27	22	248	46
Future Volume (vph)	30	238	18	44	213	23	30	356	27	22	248	46
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	32	256	19	47	229	25	32	383	29	24	267	49

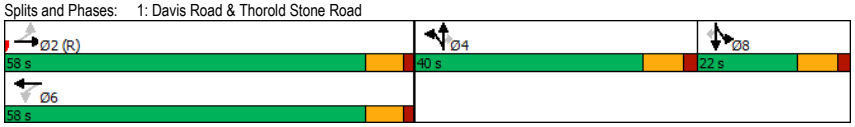
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	307	301	444	340
Volume Left (vph)	32	47	32	24
Volume Right (vph)	19	25	29	49
Hadj (s)	0.00	-0.01	0.04	0.00
Departure Headway (s)	8.3	8.4	7.8	8.1
Degree Utilization, x	0.71	0.70	0.96	0.77
Capacity (veh/h)	413	411	457	428
Control Delay (s)	29.5	28.6	61.1	33.3
Approach Delay (s)	29.5	28.6	61.1	33.3
Approach LOS	D	D	F	D

Intersection Summary				
Delay			40.3	
Level of Service			E	
Intersection Capacity Utilization			62.9%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	23	1056	303	95	1234	587	17	229	1	2	20
Future Volume (vph)	23	1056	303	95	1234	587	17	229	1	2	20
Turn Type	Perm	NA	Free	Perm	NA	Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6	4	4		8	8	
Permitted Phases	2		Free	6				4			8
Detector Phase	2	2		6	6	4	4	4	8	8	8
Switch Phase											
Minimum Initial (s)	20.0	20.0		20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		28.9	28.9	29.7	29.7	29.7	21.7	21.7	21.7
Total Split (s)	58.0	58.0		58.0	58.0	40.0	40.0	40.0	22.0	22.0	22.0
Total Split (%)	48.3%	48.3%		48.3%	48.3%	33.3%	33.3%	33.3%	18.3%	18.3%	18.3%
Yellow Time (s)	5.4	5.4		5.4	5.4	5.7	5.7	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		6.9	6.9	7.7	7.7	7.7	7.7	7.7	7.7
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max		Max	Max	None	None	None	None	None	None
Act Effct Green (s)	64.5	64.5	120.0	64.5	64.5	30.3	30.3	30.3	10.0	10.0	10.0
Actuated g/C Ratio	0.54	0.54	1.00	0.54	0.54	0.25	0.25	0.25	0.08	0.08	0.08
v/c Ratio	0.24	0.66	0.23	0.70	0.78	0.84	0.86	0.45	0.01	0.02	0.11
Control Delay	27.8	24.6	0.4	54.6	28.6	62.5	64.6	7.2	51.0	51.0	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.8	24.6	0.4	54.6	28.6	62.5	64.6	7.2	51.0	51.0	1.1
LOS	C	C	A	D	C	E	E	A	D	D	A
Approach Delay		19.3			30.5		48.0			7.3	
Approach LOS		B			C		D			A	

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 105			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 30.1		Intersection LOS: C	
Intersection Capacity Utilization 96.7%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Davis Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	1056	303	95	1234	7	587	17	229	1	2	20
Future Volume (vph)	23	1056	303	95	1234	7	587	17	229	1	2	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1539	3107	1352	1471	3099		1476	1471	1397	831	1167	1222
Flt Permitted	0.11	1.00	1.00	0.17	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	185	3107	1352	265	3099		1476	1471	1397	831	1167	1222
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	24	1100	316	99	1285	7	611	18	239	1	2	21
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	179	0	0	20
Lane Group Flow (vph)	24	1100	316	99	1292	0	312	317	60	1	2	1
Confl. Peds. (#/hr)	1					1	1		1	1		1
Heavy Vehicles (%)	8%	7%	10%	13%	7%	42%	7%	23%	5%	100%	50%	20%
Turn Type	Perm	NA	Free	Perm	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		2			6		4	4		8	8	
Permitted Phases	2		Free	6					4			8
Actuated Green, G (s)	61.4	61.4	120.0	61.4	61.4		30.3	30.3	30.3	6.0	6.0	6.0
Effective Green, g (s)	61.4	61.4	120.0	61.4	61.4		30.3	30.3	30.3	6.0	6.0	6.0
Actuated g/C Ratio	0.51	0.51	1.00	0.51	0.51		0.25	0.25	0.25	0.05	0.05	0.05
Clearance Time (s)	6.9	6.9		6.9	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	94	1589	1352	135	1585		372	371	352	41	58	61
v/s Ratio Prot		0.35			c0.42		0.21	c0.22		0.00	0.00	
v/s Ratio Perm	0.13		c0.23	0.37					0.04			0.00
v/c Ratio	0.26	0.69	0.23	0.73	0.81		0.84	0.85	0.17	0.02	0.03	0.02
Uniform Delay, d1	16.5	22.2	0.0	22.9	24.5		42.5	42.7	35.0	54.2	54.2	54.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	2.5	0.4	29.4	4.7		16.3	18.3	0.4	0.4	0.4	0.2
Delay (s)	22.9	24.7	0.4	52.3	29.3		58.9	61.0	35.4	54.6	54.7	54.4
Level of Service	C	C	A	D	C		E	E	D	D	D	D
Approach Delay (s)		19.3			30.9			53.2			54.4	
Approach LOS		B			C			D			D	

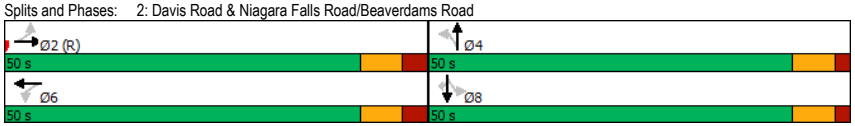
Intersection Summary					
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.81				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		22.3	
Intersection Capacity Utilization	96.7%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	123	35	37	19	16	504	92	260	49
Future Volume (vph)	123	35	37	19	16	504	92	260	49
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		56.1		56.1	28.8	28.8	28.8	28.8	28.8
Actuated g/C Ratio		0.56		0.56	0.29	0.29	0.29	0.29	0.29
v/c Ratio		0.31		0.29	0.07	0.67	0.63	0.33	0.13
Control Delay		14.1		4.4	24.4	34.2	49.7	28.5	6.6
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		14.1		4.4	24.4	34.2	49.7	28.5	6.6
LOS		B		A	C	C	D	C	A
Approach Delay		14.1		4.4		34.0		30.7	
Approach LOS		B		A		C		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 25.4		Intersection LOS: C	
Intersection Capacity Utilization 92.9%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	35	13	37	19	187	16	504	62	92	260	49
Future Volume (vph)	123	35	13	37	19	187	16	504	62	92	260	49
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		0.99			0.90		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1548			1521		1484	3044		1646	2891	1282
Flt Permitted		0.65			0.93		0.58	1.00		0.31	1.00	1.00
Satd. Flow (perm)		1046			1429		911	3044		533	2891	1282
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	129	37	14	39	20	197	17	531	65	97	274	52
RTOR Reduction (vph)	0	2	0	0	86	0	0	11	0	0	0	37
Lane Group Flow (vph)	0	178	0	0	170	0	17	585	0	97	274	15
Heavy Vehicles (%)	9%	5%	7%	5%	10%	1%	12%	8%	3%	1%	15%	16%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		56.1			56.1		28.8	28.8		28.8	28.8	28.8
Effective Green, g (s)		56.1			56.1		28.8	28.8		28.8	28.8	28.8
Actuated g/C Ratio		0.56			0.56		0.29	0.29		0.29	0.29	0.29
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		586			801		262	876		153	832	369
v/s Ratio Prot								c0.19			0.09	
v/s Ratio Perm		c0.17			0.12		0.02			0.18		0.01
v/c Ratio		0.30			0.21		0.06	0.67		0.63	0.33	0.04
Uniform Delay, d1		11.6			10.9		25.8	31.4		31.0	28.0	25.6
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.3			0.6		0.2	2.6		11.4	0.5	0.1
Delay (s)		12.9			11.5		26.0	33.9		42.4	28.5	25.7
Level of Service		B			B		C	C		D	C	C
Approach Delay (s)		12.9			11.5			33.7			31.3	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.43				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		15.1	
Intersection Capacity Utilization	92.9%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	155	570	40	436	239	24	155	185	104	152
Future Volume (vph)	155	570	40	436	239	24	155	185	104	152
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases		2		6			4		8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	2	2	6	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	52.0	52.0	52.0	52.0	52.0	38.0	38.0	38.0	38.0	38.0
Total Split (%)	57.8%	57.8%	57.8%	57.8%	57.8%	42.2%	42.2%	42.2%	42.2%	42.2%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	54.2	54.2	54.2	54.2	54.2	21.8	21.8	21.8	21.8	21.8
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.38	0.61	0.15	0.47	0.26	0.12	0.55	0.81	0.32	0.36
Control Delay	14.2	16.1	11.8	13.3	2.3	24.8	33.1	55.7	28.8	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.2	16.1	11.8	13.3	2.3	24.8	33.1	55.7	28.8	6.1
LOS	B	B	B	B	A	C	C	E	C	A
Approach Delay		15.7		9.5			32.1		32.3	
Approach LOS		B		A			C		C	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 90		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 70		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.81		
Intersection Signal Delay: 18.7	Intersection LOS: B	
Intersection Capacity Utilization 100.6%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 3: Davis Road & Lundys Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	570	20	40	436	239	24	155	25	185	104	152
Future Volume (vph)	155	570	20	40	436	239	24	155	25	185	104	152
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1554	1696		1385	1651	1458	1289	1411		1583	1423	1377
Flt Permitted	0.45	1.00		0.33	1.00	1.00	0.69	1.00		0.60	1.00	1.00
Satd. Flow (perm)	730	1696		483	1651	1458	930	1411		1006	1423	1377
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	165	606	21	43	464	254	26	165	27	197	111	162
RTOR Reduction (vph)	0	1	0	0	0	101	0	8	0	0	0	123
Lane Group Flow (vph)	165	626	0	43	464	153	26	184	0	197	111	39
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	7%	2%	20%	20%	6%	2%	29%	19%	36%	5%	23%	8%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	54.2	54.2		54.2	54.2	54.2	21.8	21.8		21.8	21.8	21.8
Effective Green, g (s)	54.2	54.2		54.2	54.2	54.2	21.8	21.8		21.8	21.8	21.8
Actuated g/C Ratio	0.60	0.60		0.60	0.60	0.60	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	439	1021		290	994	878	225	341		243	344	333
v/s Ratio Prot		c0.37			0.28			0.13			0.08	
v/s Ratio Perm	0.23			0.09		0.10	0.03			c0.20		0.03
v/c Ratio	0.38	0.61		0.15	0.47	0.17	0.12	0.54		0.81	0.32	0.12
Uniform Delay, d1	9.2	11.3		7.8	9.9	8.0	26.6	29.7		32.2	28.0	26.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.4	2.7		1.1	1.6	0.4	0.1	0.9		17.3	0.2	0.1
Delay (s)	11.7	14.0		8.9	11.5	8.4	26.7	30.7		49.5	28.2	26.7
Level of Service	B	B		A	B	A	C	C		D	C	C
Approach Delay (s)		13.5			10.3			30.2			36.6	
Approach LOS		B			B			C			D	

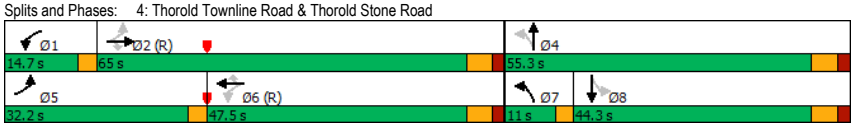
Intersection Summary					
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.67				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		14.0	
Intersection Capacity Utilization	100.6%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	361	801	120	126	929	83	120	170	58	166
Future Volume (vph)	361	801	120	126	929	83	120	170	58	166
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases	5	2		1	6		7	4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	5	2	2	1	6	6	7	4	8	8
Switch Phase										
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0	10.0	8.0	10.0	10.0	10.0
Minimum Split (s)	11.0	35.1	35.1	12.5	35.1	35.1	11.0	41.4	41.4	41.4
Total Split (s)	32.2	65.0	65.0	14.7	47.5	47.5	11.0	55.3	44.3	44.3
Total Split (%)	23.9%	48.1%	48.1%	10.9%	35.2%	35.2%	8.1%	41.0%	32.8%	32.8%
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	76.8	60.4	60.4	54.7	41.4	41.4	52.2	48.8	37.8	37.8
Actuated g/C Ratio	0.57	0.45	0.45	0.41	0.31	0.31	0.39	0.36	0.28	0.28
v/c Ratio	0.99	0.58	0.20	0.46	0.98	0.18	0.78	0.50	0.22	0.98
Control Delay	82.8	30.0	7.5	21.8	70.2	5.3	62.1	35.3	40.1	81.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.8	30.0	7.5	21.8	70.2	5.3	62.1	35.3	40.1	81.1
LOS	F	C	A	C	E	A	E	D	D	F
Approach Delay		42.8			60.2			44.2		75.9
Approach LOS		D			E			D		E

Intersection Summary		
Cycle Length: 135		
Actuated Cycle Length: 135		
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 120		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.99		
Intersection Signal Delay: 53.7	Intersection LOS: D	
Intersection Capacity Utilization 98.8%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	361	801	120	126	929	83	120	170	73	58	166	231
Future Volume (vph)	361	801	120	126	929	83	120	170	73	58	166	231
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		6.4	6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	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	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1525	3228	1250	1471	3228	1337	1279	1355		1511	1377	
Flt Permitted	0.09	1.00	1.00	0.34	1.00	1.00	0.19	1.00		0.60	1.00	
Satd. Flow (perm)	145	3228	1250	523	3228	1337	260	1355		958	1377	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	376	834	125	131	968	86	125	177	76	60	173	241
RTOR Reduction (vph)	0	0	54	0	0	60	0	11	0	0	37	0
Lane Group Flow (vph)	376	834	71	131	968	26	125	242	0	60	377	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	9%	3%	19%	13%	3%	8%	30%	20%	31%	10%	16%	16%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2		2	6		6	4			8		
Actuated Green, G (s)	73.7	60.5	60.5	51.6	41.4	41.4	48.8	48.8		37.8	37.8	
Effective Green, g (s)	73.7	60.5	60.5	51.6	41.4	41.4	48.8	48.8		37.8	37.8	
Actuated g/C Ratio	0.55	0.45	0.45	0.38	0.31	0.31	0.36	0.36		0.28	0.28	
Clearance Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		6.4	6.4	
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0	6.0	2.5	2.3		2.3	2.3	
Lane Grp Cap (vph)	378	1446	560	271	989	410	154	489		268	385	
v/s Ratio Prot	c0.22	0.26		0.04	0.30		c0.05	0.18			c0.27	
v/s Ratio Perm	c0.33		0.06	0.15		0.02	0.24			0.06		
v/c Ratio	0.99	0.58	0.13	0.48	0.98	0.06	0.81	0.49		0.22	0.98	
Uniform Delay, d1	42.5	27.7	21.8	28.3	46.4	33.1	36.4	33.5		37.3	48.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	44.6	1.7	0.5	1.0	23.9	0.3	26.1	0.5		0.2	39.5	
Delay (s)	87.1	29.4	22.3	29.3	70.3	33.4	62.5	34.0		37.6	87.7	
Level of Service	F	C	C	C	E	C	E	C		D	F	
Approach Delay (s)		45.0			63.1			43.4			81.4	
Approach LOS		D			E			D			F	

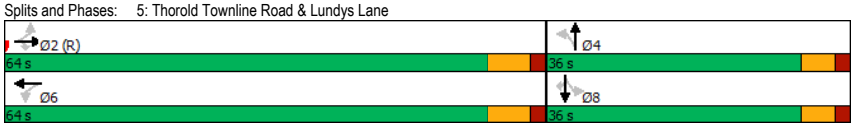
Intersection Summary				
HCM 2000 Control Delay	56.3	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.00			
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	18.5	
Intersection Capacity Utilization	98.8%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	157	569	109	43	387	79	134	24	96	62
Future Volume (vph)	157	569	109	43	387	79	134	24	96	62
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2			6		4		8	
Permitted Phases	2		2	6		4		8		8
Detector Phase	2	2	2	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	64.0	64.0	64.0	64.0	64.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	64.0%	64.0%	64.0%	64.0%	64.0%	36.0%	36.0%	36.0%	36.0%	36.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	68.3	68.3	68.3	68.3	68.3	18.7	18.7	18.7	18.7	18.7
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.19	0.19	0.19	0.19	0.19
v/c Ratio	0.32	0.53	0.12	0.11	0.41	0.42	0.65	0.16	0.37	0.22
Control Delay	9.5	10.9	4.1	7.6	9.0	40.7	43.8	33.9	37.8	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	10.9	4.1	7.6	9.0	40.7	43.8	33.9	37.8	9.7
LOS	A	B	A	A	A	D	D	C	D	A
Approach Delay		9.7			8.8		42.8		27.7	
Approach LOS		A			A		D		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 87.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 5: Thorold Townline Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	569	109	43	387	40	79	134	42	24	96	62
Future Volume (vph)	157	569	109	43	387	40	79	134	42	24	96	62
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1582	1699	1390	1599	1647		1498	1502		1599	1496	1305
Flt Permitted	0.47	1.00	1.00	0.37	1.00		0.69	1.00		0.52	1.00	1.00
Satd. Flow (perm)	783	1699	1390	629	1647		1089	1502		871	1496	1305
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	169	612	117	46	416	43	85	144	45	26	103	67
RTOR Reduction (vph)	0	0	18	0	3	0	0	13	0	0	0	54
Lane Group Flow (vph)	169	612	99	46	456	0	85	176	0	26	103	13
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	5%	3%	7%	4%	5%	0%	11%	15%	4%	4%	17%	14%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		8
Actuated Green, G (s)	68.3	68.3	68.3	68.3	68.3		18.7	18.7		18.7	18.7	18.7
Effective Green, g (s)	68.3	68.3	68.3	68.3	68.3		18.7	18.7		18.7	18.7	18.7
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68		0.19	0.19		0.19	0.19	0.19
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	534	1160	949	429	1124		203	280		162	279	244
v/s Ratio Prot		c0.36			0.28			c0.12			0.07	
v/s Ratio Perm	0.22		0.07	0.07			0.08			0.03		0.01
v/c Ratio	0.32	0.53	0.10	0.11	0.41		0.42	0.63		0.16	0.37	0.05
Uniform Delay, d1	6.4	7.9	5.4	5.4	7.0		35.9	37.5		34.1	35.5	33.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.6	1.7	0.2	0.5	1.1		2.9	6.1		1.0	1.7	0.2
Delay (s)	8.0	9.6	5.6	5.9	8.0		38.8	43.6		35.0	37.2	33.6
Level of Service	A	A	A	A	A		D	D		D	D	C
Approach Delay (s)		8.8			7.8			42.1			35.7	
Approach LOS		A			A			D			D	

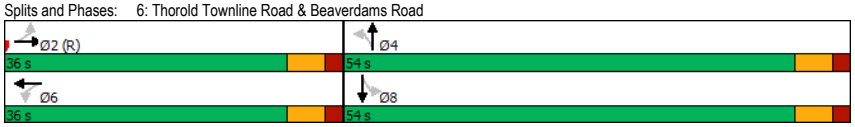
Intersection Summary					
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.55				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	87.5%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	20	154	18	196	21	307	12	375
Future Volume (vph)	20	154	18	196	21	307	12	375
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.5	30.5	30.5	30.5	34.0	34.0	30.5	30.5
Total Split (s)	36.0	36.0	36.0	36.0	54.0	54.0	54.0	54.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0		30.0		48.0		48.0
Actuated g/C Ratio		0.33		0.33		0.53		0.53
v/c Ratio		0.39		0.47		0.55		0.56
Control Delay		24.9		26.4		17.1		17.3
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		24.9		26.4		17.1		17.3
LOS		C		C		B		B
Approach Delay		24.9		26.4		17.1		17.3
Approach LOS		C		C		B		B

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 20.2		Intersection LOS: C	
Intersection Capacity Utilization 58.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: Thorold Townline Road & Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	154	18	18	196	24	21	307	34	12	375	21
Future Volume (vph)	20	154	18	18	196	24	21	307	34	12	375	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.99			0.99	
Flt Protected		0.99			1.00			1.00			1.00	
Satd. Flow (prot)		1683			1698			1392			1498	
Flt Permitted		0.95			0.97			0.96			0.99	
Satd. Flow (perm)		1607			1649			1344			1479	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	167	20	20	213	26	23	334	37	13	408	23
RTOR Reduction (vph)	0	4	0	0	5	0	0	4	0	0	2	0
Lane Group Flow (vph)	0	205	0	0	254	0	0	390	0	0	442	0
Confl. Peds. (#/hr)			5	5			6					6
Heavy Vehicles (%)	5%	1%	5%	0%	1%	4%	0%	28%	0%	16%	16%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		30.0			30.0			48.0			48.0	
Effective Green, g (s)		30.0			30.0			48.0			48.0	
Actuated g/C Ratio		0.33			0.33			0.53			0.53	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		535			549			716			788	
v/s Ratio Prot												
v/s Ratio Perm		0.13			c0.15			0.29			c0.30	
v/c Ratio		0.38			0.46			0.54			0.56	
Uniform Delay, d1		22.9			23.7			13.8			14.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.1			2.8			3.0			2.9	
Delay (s)		25.0			26.4			16.8			16.8	
Level of Service		C			C			B			B	
Approach Delay (s)		25.0			26.4			16.8			16.8	
Approach LOS		C			C			B			B	

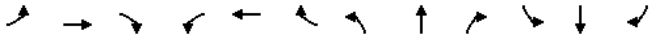
Intersection Summary					
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.52				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B		
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	63	350	3	44	262
Future Volume (Veh/h)	3	63	350	3	44	262
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	3	68	376	3	47	282
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	754	378			379	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	754	378			379	
tC, single (s)	6.4	7.1			4.9	
tC, 2 stage (s)						
tF (s)	3.5	4.1			2.9	
p0 queue free %	99	87			94	
cM capacity (veh/h)	359	516			852	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	71	379	47	282
Volume Left	3	0	47	0
Volume Right	68	3	0	0
cSH	507	1700	852	1700
Volume to Capacity	0.14	0.22	0.06	0.17
Queue Length 95th (m)	3.9	0.0	1.4	0.0
Control Delay (s)	13.3	0.0	9.5	0.0
Lane LOS	B		A	
Approach Delay (s)	13.3	0.0	1.4	
Approach LOS	B			

Intersection Summary				
Average Delay			1.8	
Intersection Capacity Utilization			37.9%	ICU Level of Service
Analysis Period (min)			15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	20	154	18	18	196	24	21	307	34	12	375	21
Future Volume (vph)	20	154	18	18	196	24	21	307	34	12	375	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	167	20	20	213	26	23	334	37	13	408	23

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	209	259	394	444
Volume Left (vph)	22	20	23	13
Volume Right (vph)	20	26	37	23
Hadj (s)	-0.01	-0.02	0.36	0.24
Departure Headway (s)	7.9	7.7	7.4	7.1
Degree Utilization, x	0.46	0.55	0.81	0.88
Capacity (veh/h)	408	430	465	489
Control Delay (s)	17.4	19.7	34.4	42.7
Approach Delay (s)	17.4	19.7	34.4	42.7
Approach LOS	C	C	D	E

Intersection Summary				
Delay			31.6	
Level of Service			D	
Intersection Capacity Utilization			53.8%	ICU Level of Service
Analysis Period (min)			15	

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	27	1404	639	156	1322	554	6	136	4	7	31
Future Volume (vph)	27	1404	639	156	1322	554	6	136	4	7	31
Turn Type	Perm	NA	Free	pm+pt	NA	Split	NA	Perm	Split	NA	Perm
Protected Phases		2		1	6	4	4		8	8	
Permitted Phases	2		Free	6				4			8
Detector Phase	2	2		1	6	4	4	4	8	8	8
Switch Phase											
Minimum Initial (s)	20.0	20.0		5.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		8.0	28.9	29.7	29.7	29.7	17.7	17.7	17.7
Total Split (s)	70.3	70.3		12.0	82.3	35.0	35.0	35.0	17.7	17.7	17.7
Total Split (%)	52.1%	52.1%		8.9%	61.0%	25.9%	25.9%	25.9%	13.1%	13.1%	13.1%
Yellow Time (s)	5.4	5.4		3.0	5.4	5.7	5.7	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		0.0	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		3.0	6.9	7.7	7.7	7.7	7.7	7.7	7.7
Lead/Lag	Lag	Lag		Lead							
Lead-Lag Optimize?	Yes	Yes		Yes							
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None	None	None
Act Effct Green (s)	67.2	67.2	135.0	86.4	82.5	27.3	27.3	27.3	10.0	10.0	10.0
Actuated g/C Ratio	0.50	0.50	1.00	0.64	0.61	0.20	0.20	0.20	0.07	0.07	0.07
v/c Ratio	0.28	0.91	0.46	0.82	0.71	0.92	0.95	0.36	0.03	0.06	0.15
Control Delay	31.0	41.5	1.1	61.9	22.0	87.2	92.2	9.6	58.8	59.6	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	41.5	1.1	61.9	22.0	87.2	92.2	9.6	58.8	59.6	1.5
LOS	C	D	A	E	C	F	F	A	E	E	A
Approach Delay		28.9			26.2		74.1			16.0	
Approach LOS		C			C		E			B	

Intersection Summary			
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 115			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 35.2		Intersection LOS: D	
Intersection Capacity Utilization 97.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Davis Road & Thorold Stone Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	1404	639	156	1322	1	554	6	136	4	7	31
Future Volume (vph)	27	1404	639	156	1322	1	554	6	136	4	7	31
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	3.0	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1330	3260	1458	1583	3228		1564	1559	1390	1662	1535	1417
Flt Permitted	0.15	1.00	1.00	0.06	1.00		0.95	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	203	3260	1458	100	3228		1564	1559	1390	1662	1535	1417
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	28	1478	673	164	1392	1	583	6	143	4	7	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	114	0	0	32
Lane Group Flow (vph)	28	1478	673	164	1393	0	291	298	29	4	7	1
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	25%	2%	2%	5%	3%	0%	1%	33%	7%	0%	14%	3%
Turn Type	Perm	NA	Free	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		2		1	6		4	4		8	8	
Permitted Phases	2		Free	6					4			8
Actuated Green, G (s)	64.0	64.0	135.0	79.4	79.4		27.3	27.3	27.3	6.0	6.0	6.0
Effective Green, g (s)	64.0	64.0	135.0	79.4	79.4		27.3	27.3	27.3	6.0	6.0	6.0
Actuated g/C Ratio	0.47	0.47	1.00	0.59	0.59		0.20	0.20	0.20	0.04	0.04	0.04
Clearance Time (s)	6.9	6.9		3.0	6.9		7.7	7.7	7.7	7.7	7.7	7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	96	1545	1458	195	1898		316	315	281	73	68	62
v/s Ratio Prot		c0.45		c0.08	0.43		0.19	c0.19		0.00	0.00	
v/s Ratio Perm	0.14		c0.46	0.42					0.02			0.00
v/c Ratio	0.29	0.96	0.46	0.84	0.73		0.92	0.95	0.10	0.05	0.10	0.02
Uniform Delay, d1	21.7	34.2	0.0	39.3	20.1		52.8	53.1	43.9	61.8	61.9	61.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.5	14.7	1.1	26.5	2.6		31.7	36.9	0.3	0.5	1.2	0.3
Delay (s)	29.2	48.8	1.1	65.8	22.7		84.5	90.0	44.2	62.3	63.1	62.0
Level of Service	C	D	A	E	C		F	F	D	E	E	E
Approach Delay (s)		33.8			27.2			78.9			62.2	
Approach LOS		C			C			E			E	

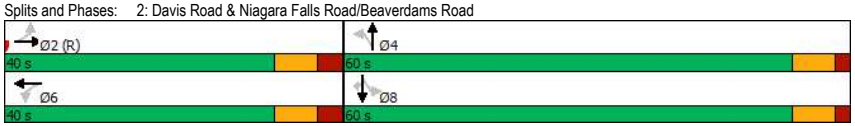
Intersection Summary					
HCM 2000 Control Delay	39.1	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.95				
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	25.3		
Intersection Capacity Utilization	97.8%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	101	36	79	50	13	441	190	499	117
Future Volume (vph)	101	36	79	50	13	441	190	499	117
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	40.0	40.0	40.0	40.0	60.0	60.0	60.0	60.0	60.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		47.6		47.6	37.3	37.3	37.3	37.3	37.3
Actuated g/C Ratio		0.48		0.48	0.37	0.37	0.37	0.37	0.37
v/c Ratio		0.32		0.45	0.05	0.44	0.77	0.44	0.20
Control Delay		21.0		18.5	15.6	22.6	45.5	23.6	3.3
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		21.0		18.5	15.6	22.6	45.5	23.6	3.3
LOS		C		B	B	C	D	C	A
Approach Delay		21.0		18.5		22.4		25.8	
Approach LOS		C		B		C		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 23.2		Intersection LOS: C	
Intersection Capacity Utilization 80.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



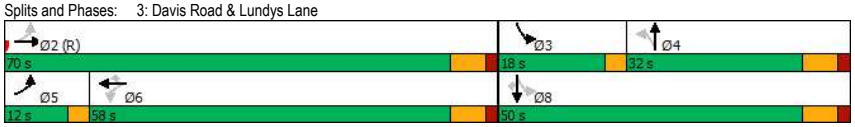
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	36	17	79	50	165	13	441	53	190	499	117
Future Volume (vph)	101	36	17	79	50	165	13	441	53	190	499	117
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		0.98			0.92		1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1631			1578		1662	3122		1630	3197	1473
Flt Permitted		0.64			0.86		0.40	1.00		0.41	1.00	1.00
Satd. Flow (perm)		1073			1382		707	3122		699	3197	1473
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	106	38	18	83	53	174	14	464	56	200	525	123
RTOR Reduction (vph)	0	4	0	0	36	0	0	13	0	0	0	77
Lane Group Flow (vph)	0	158	0	0	274	0	14	507	0	200	525	46
Heavy Vehicles (%)	1%	2%	11%	1%	2%	1%	0%	5%	3%	2%	4%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		47.6			47.6		37.3	37.3		37.3	37.3	37.3
Effective Green, g (s)		47.6			47.6		37.3	37.3		37.3	37.3	37.3
Actuated g/C Ratio		0.48			0.48		0.37	0.37		0.37	0.37	0.37
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		510			657		263	1164		260	1192	549
v/s Ratio Prot								0.16			0.16	
v/s Ratio Perm		0.15			c0.20		0.02			c0.29		0.03
v/c Ratio		0.31			0.42		0.05	0.44		0.77	0.44	0.08
Uniform Delay, d1		16.1			17.1		20.1	23.5		27.6	23.5	20.3
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.6			2.0		0.2	0.5		14.9	0.5	0.1
Delay (s)		17.7			19.1		20.2	24.0		42.5	24.1	20.4
Level of Service		B			B		C	C		D	C	C
Approach Delay (s)		17.7			19.1			23.9			27.9	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.57				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.1		
Intersection Capacity Utilization	80.0%	ICU Level of Service	D		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	192	625	31	612	248	52	156	309	139	170
Future Volume (vph)	192	625	31	612	248	52	156	309	139	170
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	5.0	22.0	22.0	22.0	22.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	8.0	36.0	36.0	36.0	36.0	32.0	32.0	8.0	32.0	32.0
Total Split (s)	12.0	70.0	58.0	58.0	58.0	32.0	32.0	18.0	50.0	50.0
Total Split (%)	10.0%	58.3%	48.3%	48.3%	48.3%	26.7%	26.7%	15.0%	41.7%	41.7%
Yellow Time (s)	3.0	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	7.0	7.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	Max	Max	Max	Max	Max	None	Max	Max
Act Effct Green (s)	67.0	63.0	51.0	51.0	51.0	25.0	25.0	47.0	43.0	43.0
Actuated g/C Ratio	0.56	0.52	0.42	0.42	0.42	0.21	0.21	0.39	0.36	0.36
v/c Ratio	0.86	0.78	0.18	0.89	0.36	0.23	0.66	0.82	0.27	0.28
Control Delay	47.4	30.0	25.7	48.1	9.0	42.6	52.4	46.9	29.1	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.4	30.0	25.7	48.1	9.0	42.6	52.4	46.9	29.1	5.0
LOS	D	C	C	D	A	D	D	D	C	A
Approach Delay		34.0		36.5			50.3		31.4	
Approach LOS		C		D			D		C	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 85		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.89		
Intersection Signal Delay: 35.8	Intersection LOS: D	
Intersection Capacity Utilization 116.4%	ICU Level of Service H	
Analysis Period (min) 15		

Splits and Phases: 3: Davis Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	625	32	31	612	248	52	156	40	309	139	170
Future Volume (vph)	192	625	32	31	612	248	52	156	40	309	139	170
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1646	1731		1613	1750	1437	1662	1506		1645	1522	1473
Flt Permitted	0.14	1.00		0.26	1.00	1.00	0.66	1.00		0.43	1.00	1.00
Satd. Flow (perm)	243	1731		439	1750	1437	1159	1506		750	1522	1473
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	206	672	34	33	658	267	56	168	43	332	149	183
RTOR Reduction (vph)	0	1	0	0	0	134	0	8	0	0	0	117
Lane Group Flow (vph)	206	705	0	33	658	133	56	203	0	332	149	66
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	1%	0%	6%	3%	0%	1%	0%	14%	5%	1%	15%	1%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	63.0	63.0		51.0	51.0	51.0	25.0	25.0		43.0	43.0	43.0
Effective Green, g (s)	63.0	63.0		51.0	51.0	51.0	25.0	25.0		43.0	43.0	43.0
Actuated g/C Ratio	0.52	0.52		0.42	0.42	0.42	0.21	0.21		0.36	0.36	0.36
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	232	908		186	743	610	241	313		380	545	527
v/s Ratio Prot	c0.07	0.41			0.38			0.13		c0.11	0.10	
v/s Ratio Perm	c0.40			0.08		0.09	0.05			c0.20		0.04
v/c Ratio	0.89	0.78		0.18	0.89	0.22	0.23	0.65		0.87	0.27	0.12
Uniform Delay, d1	22.9	22.8		21.5	31.8	21.9	39.5	43.5		33.5	27.4	25.9
Progression Factor	1.00	1.00		1.06	1.08	1.82	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	30.8	6.5		1.8	12.9	0.7	2.2	10.0		19.4	1.2	0.5
Delay (s)	53.8	29.3		24.4	47.3	40.5	41.8	53.5		52.8	28.6	26.3
Level of Service	D	C		C	D	D	D	D		D	C	C
Approach Delay (s)		34.8			44.6			51.0			40.1	
Approach LOS		C			D			D			D	

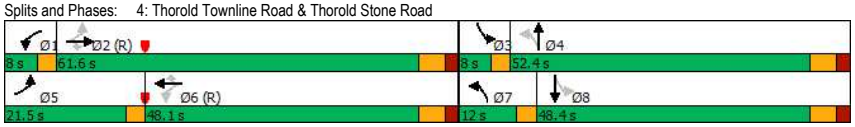
Intersection Summary				
HCM 2000 Control Delay	41.0	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	116.4%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	256	1189	77	81	992	40	152	162	54	195
Future Volume (vph)	256	1189	77	81	992	40	152	162	54	195
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	8.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	11.0	35.1	35.1	8.0	35.1	35.1	8.0	41.4	8.0	41.4
Total Split (s)	21.5	61.6	61.6	8.0	48.1	48.1	12.0	52.4	8.0	48.4
Total Split (%)	16.5%	47.4%	47.4%	6.2%	37.0%	37.0%	9.2%	40.3%	6.2%	37.2%
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1	3.0	4.1
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.3	0.0	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4	3.0	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	66.6	55.5	55.5	50.1	42.0	42.0	57.4	47.6	50.4	42.0
Actuated g/C Ratio	0.51	0.43	0.43	0.39	0.32	0.32	0.44	0.37	0.39	0.32
v/c Ratio	0.97	0.88	0.14	0.79	0.97	0.08	0.86	0.53	0.16	0.99
Control Delay	83.1	43.0	2.5	67.9	65.1	0.3	64.0	33.4	22.6	74.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.1	43.0	2.5	67.9	65.1	0.3	64.0	33.4	22.6	74.6
LOS	F	D	A	E	E	A	E	C	C	E
Approach Delay		47.7			63.0			44.1		69.6
Approach LOS		D			E			D		E

Intersection Summary			
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 55.3		Intersection LOS: E	
Intersection Capacity Utilization 102.9%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



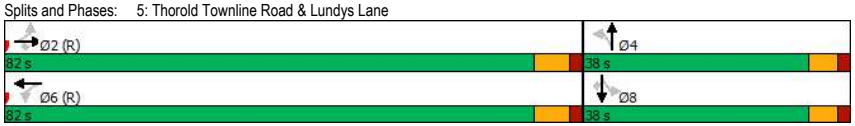
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	1189	77	81	992	40	152	162	122	54	195	306
Future Volume (vph)	256	1189	77	81	992	40	152	162	122	54	195	306
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		3.0	6.4	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	0.91	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	3292	1240	1421	3292	1417	1498	1468		1554	1506	
Flt Permitted	0.09	1.00	1.00	0.10	1.00	1.00	0.14	1.00		0.51	1.00	
Satd. Flow (perm)	147	3292	1240	150	3292	1417	216	1468		840	1506	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	267	1239	80	84	1033	42	158	169	127	56	203	319
RTOR Reduction (vph)	0	0	46	0	0	29	0	20	0	0	43	0
Lane Group Flow (vph)	267	1239	34	84	1033	13	158	276	0	56	479	0
Heavy Vehicles (%)	7%	1%	20%	17%	1%	5%	11%	12%	11%	7%	8%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		
Actuated Green, G (s)	62.9	54.9	54.9	46.4	41.4	41.4	54.6	47.6		46.6	42.6	
Effective Green, g (s)	62.9	54.9	54.9	46.4	41.4	41.4	54.6	47.6		46.6	42.6	
Actuated g/C Ratio	0.48	0.42	0.42	0.36	0.32	0.32	0.42	0.37		0.36	0.33	
Clearance Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		3.0	6.4	
Vehicle Extension (s)	2.5	6.0	6.0	3.0	6.0	6.0	3.0	2.3		3.0	2.3	
Lane Grp Cap (vph)	271	1390	523	102	1048	451	179	537		323	493	
v/s Ratio Prot	c0.14	0.38		0.03	0.31		c0.06	0.19		0.01	c0.32	
v/s Ratio Perm	c0.34		0.03	0.26		0.01	0.31			0.06		
v/c Ratio	0.99	0.89	0.06	0.82	0.99	0.03	0.88	0.51		0.17	0.97	
Uniform Delay, d1	40.3	34.8	22.3	32.3	44.0	30.5	29.5	32.2		27.8	43.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	50.2	9.0	0.2	39.2	24.6	0.1	36.2	0.5		0.3	33.1	
Delay (s)	90.5	43.8	22.5	71.5	68.6	30.6	65.8	32.7		28.1	76.2	
Level of Service	F	D	C	E	E	C	E	C		C	E	
Approach Delay (s)		50.6			67.4			44.2			71.5	
Approach LOS		D			E			D			E	

Intersection Summary					
HCM 2000 Control Delay	58.2	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	0.99				
Actuated Cycle Length (s)	130.0	Sum of lost time (s)		18.5	
Intersection Capacity Utilization	102.9%	ICU Level of Service		G	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	83	582	115	50	606	125	131	57	133	137
Future Volume (vph)	83	582	115	50	606	125	131	57	133	137
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2			6		4		8	
Permitted Phases	2		2	6		4		8		8
Detector Phase	2	2	2	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	82.0	82.0	82.0	82.0	82.0	38.0	38.0	38.0	38.0	38.0
Total Split (%)	68.3%	68.3%	68.3%	68.3%	68.3%	31.7%	31.7%	31.7%	31.7%	31.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	84.1	84.1	84.1	84.1	84.1	22.9	22.9	22.9	22.9	22.9
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.19	0.19	0.19	0.19	0.19
v/c Ratio	0.24	0.54	0.12	0.13	0.58	0.74	0.64	0.43	0.46	0.37
Control Delay	9.1	12.3	4.1	8.5	12.7	67.7	49.1	49.5	46.4	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	12.3	4.1	8.5	12.7	67.7	49.1	49.5	46.4	8.3
LOS	A	B	A	A	B	E	D	D	D	A
Approach Delay		10.7			12.4		56.5		31.0	
Approach LOS		B			B		E		C	

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 21.2		Intersection LOS: C	
Intersection Capacity Utilization 94.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Thorold Townline Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	582	115	50	606	32	125	131	56	57	133	137
Future Volume (vph)	83	582	115	50	606	32	125	131	56	57	133	137
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1598	1699	1444	1599	1711		1568	1604		1646	1651	1473
Flt Permitted	0.32	1.00	1.00	0.36	1.00		0.59	1.00		0.45	1.00	1.00
Satd. Flow (perm)	544	1699	1444	602	1711		973	1604		778	1651	1473
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	91	640	126	55	666	35	137	144	62	63	146	151
RTOR Reduction (vph)	0	0	16	0	1	0	0	15	0	0	0	122
Lane Group Flow (vph)	91	640	110	55	700	0	137	191	0	63	146	29
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	3%	3%	4%	1%	9%	6%	6%	0%	1%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		8
Actuated Green, G (s)	84.1	84.1	84.1	84.1	84.1		22.9	22.9		22.9	22.9	22.9
Effective Green, g (s)	84.1	84.1	84.1	84.1	84.1		22.9	22.9		22.9	22.9	22.9
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70		0.19	0.19		0.19	0.19	0.19
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	381	1190	1012	421	1199		185	306		148	315	281
v/s Ratio Prot		0.38			c0.41			0.12			0.09	
v/s Ratio Perm	0.17		0.08	0.09			c0.14			0.08		0.02
v/c Ratio	0.24	0.54	0.11	0.13	0.58		0.74	0.63		0.43	0.46	0.10
Uniform Delay, d1	6.4	8.6	5.8	5.9	9.1		45.8	44.6		42.8	43.1	40.1
Progression Factor	0.98	1.11	0.92	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	1.0	0.1	0.6	2.1		17.4	5.6		4.1	2.2	0.3
Delay (s)	7.2	10.6	5.5	6.6	11.2		63.2	50.2		46.8	45.3	40.4
Level of Service	A	B	A	A	B		E	D		D	D	D
Approach Delay (s)		9.5			10.8			55.4			43.5	
Approach LOS		A			B			E			D	

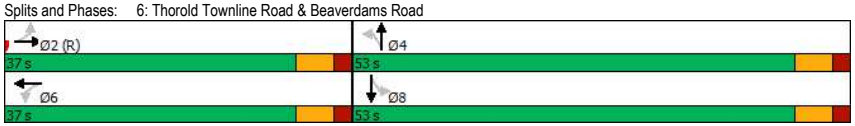
Intersection Summary					
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.62				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	94.6%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	30	238	44	213	30	400	22	292
Future Volume (vph)	30	238	44	213	30	400	22	292
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0
Total Split (s)	37.0	37.0	37.0	37.0	53.0	53.0	53.0	53.0
Total Split (%)	41.1%	41.1%	41.1%	41.1%	58.9%	58.9%	58.9%	58.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None
Act Effct Green (s)		40.4		40.4		37.6		37.6
Actuated g/C Ratio		0.45		0.45		0.42		0.42
v/c Ratio		0.42		0.43		0.79		0.63
Control Delay		21.1		21.2		31.4		24.0
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		21.1		21.2		31.4		24.0
LOS		C		C		C		C
Approach Delay		21.1		21.2		31.4		24.0
Approach LOS		C		C		C		C

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 25.3		Intersection LOS: C	
Intersection Capacity Utilization 69.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 6: Thorold Townline Road & Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	238	18	44	213	23	30	400	27	22	292	46
Future Volume (vph)	30	238	18	44	213	23	30	400	27	22	292	46
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.99			0.98	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1707			1707			1548			1511	
Flt Permitted		0.94			0.91			0.96			0.95	
Satd. Flow (perm)		1618			1559			1484			1447	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	32	256	19	47	229	25	32	430	29	24	314	49
RTOR Reduction (vph)	0	2	0	0	3	0	0	3	0	0	7	0
Lane Group Flow (vph)	0	305	0	0	298	0	0	488	0	0	380	0
Confl. Peds. (#/hr)	1		5	5		1	8		3	3		8
Heavy Vehicles (%)	6%	0%	5%	2%	0%	0%	3%	13%	0%	4%	15%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		40.4			40.4			37.6			37.6	
Effective Green, g (s)		40.4			40.4			37.6			37.6	
Actuated g/C Ratio		0.45			0.45			0.42			0.42	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		726			699			619			604	
v/s Ratio Prot												
v/s Ratio Perm		0.19			c0.19			c0.33			0.26	
v/c Ratio		0.42			0.43			0.79			0.63	
Uniform Delay, d1		16.8			16.9			22.7			20.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.8			1.9			7.6			2.9	
Delay (s)		18.6			18.8			30.4			23.6	
Level of Service		B			B			C			C	
Approach Delay (s)		18.6			18.8			30.4			23.6	
Approach LOS		B			B			C			C	

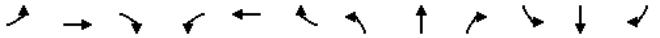
Intersection Summary					
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.60				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	69.4%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	44	347	3	44	301
Future Volume (Veh/h)	3	44	347	3	44	301
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	3	48	381	3	48	331
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	810	382			384	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	810	382			384	
tC, single (s)	6.4	7.0			4.9	
tC, 2 stage (s)						
tF (s)	3.5	4.0			2.9	
p0 queue free %	99	91			94	
cM capacity (veh/h)	332	522			848	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	51	384	48	331
Volume Left	3	0	48	0
Volume Right	48	3	0	0
cSH	505	1700	848	1700
Volume to Capacity	0.10	0.23	0.06	0.19
Queue Length 95th (m)	2.7	0.0	1.4	0.0
Control Delay (s)	12.9	0.0	9.5	0.0
Lane LOS	B		A	
Approach Delay (s)	12.9	0.0	1.2	
Approach LOS	B			

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	36.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	30	238	18	44	213	23	30	400	27	22	292	46
Future Volume (vph)	30	238	18	44	213	23	30	400	27	22	292	46
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	32	256	19	47	229	25	32	430	29	24	314	49

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	307	301	491	387
Volume Left (vph)	32	47	32	24
Volume Right (vph)	19	25	29	49
Hadj (s)	0.00	-0.01	0.17	0.16
Departure Headway (s)	8.6	8.6	8.3	8.4
Degree Utilization, x	0.74	0.72	1.14	0.90
Capacity (veh/h)	398	394	435	417
Control Delay (s)	32.1	31.1	114.4	51.1
Approach Delay (s)	32.1	31.1	114.4	51.1
Approach LOS	D	D	F	F

Intersection Summary				
Delay		64.1		
Level of Service		F		
Intersection Capacity Utilization		66.1%	ICU Level of Service	C
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBR
Lane Configurations									
Traffic Volume (vph)	26	1202	392	130	1353	717	18	283	24
Future Volume (vph)	26	1202	392	130	1353	717	18	283	24
Turn Type	Perm	NA	Free	pm+pt	NA	Split	NA	Perm	Perm
Protected Phases		2		1	6	4	4		
Permitted Phases	2		Free	6				4	4
Detector Phase	2	2		1	6	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0		3.5	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		8.0	28.9	29.7	29.7	29.7	29.7
Total Split (s)	63.0	63.0		11.0	74.0	46.0	46.0	46.0	46.0
Total Split (%)	52.5%	52.5%		9.2%	61.7%	38.3%	38.3%	38.3%	38.3%
Yellow Time (s)	5.4	5.4		3.0	5.4	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		0.0	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		3.0	6.9	7.7	7.7	7.7	7.7
Lead/Lag	Lag	Lag		Lead					
Lead-Lag Optimize?	Yes	Yes		Yes					
Recall Mode	C-Max	C-Max		None	Max	None	None	None	None
Act Effct Green (s)	58.3	58.3	120.0	73.4	69.5	35.9	35.9	35.9	35.9
Actuated g/C Ratio	0.49	0.49	1.00	0.61	0.58	0.30	0.30	0.30	0.30
v/c Ratio	0.26	0.81	0.30	0.70	0.77	0.86	0.87	0.55	0.06
Control Delay	27.7	32.3	0.5	32.7	23.6	58.5	59.8	19.0	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	32.3	0.5	32.7	23.6	58.5	59.8	19.0	0.3
LOS	C	C	A	C	C	E	E	B	A
Approach Delay		24.5			24.4		48.0		
Approach LOS		C			C		D		

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 30.1		Intersection LOS: C	
Intersection Capacity Utilization 104.2%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: Davis Road & Thorold Stone Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1202	392	130	1353	8	717	18	283	0	0	24
Future Volume (vph)	26	1202	392	130	1353	8	717	18	283	0	0	24
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	3.0	6.9		7.7	7.7	7.7			7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99			0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85			0.86
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00			1.00
Satd. Flow (prot)	1553	3167	1377	1498	3158		1490	1486	1411			1255
Flt Permitted	0.13	1.00	1.00	0.11	1.00		0.95	0.95	1.00			1.00
Satd. Flow (perm)	215	3167	1377	169	3158		1490	1486	1411			1255
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	1252	408	135	1409	8	747	19	295	0	0	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	114	0	0	18
Lane Group Flow (vph)	27	1252	408	135	1417	0	381	385	181	0	0	7
Confl. Peds. (#/hr)	1					1	1		1	1		1
Heavy Vehicles (%)	7%	5%	8%	11%	5%	37%	6%	22%	4%	100%	50%	19%
Turn Type	Perm	NA	Free	pm+pt	NA		Split	NA	Perm			Perm
Protected Phases		2		1	6		4	4				
Permitted Phases	2		Free	6					4			4
Actuated Green, G (s)	58.3	58.3	120.0	69.5	69.5		35.9	35.9	35.9			35.9
Effective Green, g (s)	58.3	58.3	120.0	69.5	69.5		35.9	35.9	35.9			35.9
Actuated g/C Ratio	0.49	0.49	1.00	0.58	0.58		0.30	0.30	0.30			0.30
Clearance Time (s)	6.9	6.9		3.0	6.9		7.7	7.7	7.7			7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5			4.5
Lane Grp Cap (vph)	104	1538	1377	188	1829		445	444	422			375
v/s Ratio Prot		c0.40		0.05	c0.45		0.26	c0.26				
v/s Ratio Perm	0.13		0.30	0.36					0.13			0.01
v/c Ratio	0.26	0.81	0.30	0.72	0.77		0.86	0.87	0.43			0.02
Uniform Delay, d1	18.2	26.2	0.0	18.5	19.3		39.6	39.8	33.8			29.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00
Incremental Delay, d2	6.0	4.8	0.5	12.3	3.3		15.9	17.1	1.2			0.0
Delay (s)	24.1	31.1	0.5	30.8	22.5		55.5	56.9	35.0			29.7
Level of Service	C	C	A	C	C		E	E	D			C
Approach Delay (s)		23.6			23.3			50.3			29.7	
Approach LOS		C			C			D			C	

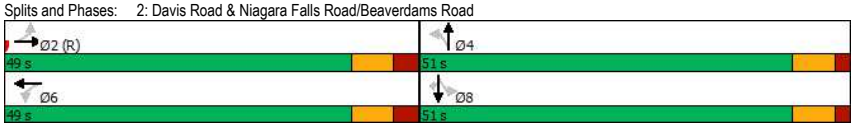
Intersection Summary					
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.83				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		17.6	
Intersection Capacity Utilization	104.2%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	136	38	34	21	25	672	97	359	52
Future Volume (vph)	136	38	34	21	25	672	97	359	52
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	49.0	49.0	49.0	49.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	49.0%	49.0%	49.0%	49.0%	51.0%	51.0%	51.0%	51.0%	51.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		50.9		50.9	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio		0.51		0.51	0.34	0.34	0.34	0.34	0.34
v/c Ratio		0.39		0.35	0.09	0.72	0.73	0.37	0.12
Control Delay		19.4		10.0	20.4	31.8	57.9	25.0	5.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		19.4		10.0	20.4	31.8	57.9	25.0	5.4
LOS		B		B	C	C	E	C	A
Approach Delay		19.4		10.0		31.4		29.3	
Approach LOS		B		B		C		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 26.1		Intersection LOS: C	
Intersection Capacity Utilization 96.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	38	20	34	21	206	25	672	51	97	359	52
Future Volume (vph)	136	38	20	34	21	206	25	672	51	97	359	52
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		0.99			0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1537			1521		1539	3110		1646	2969	1293
Flt Permitted		0.64			0.94		0.51	1.00		0.24	1.00	1.00
Satd. Flow (perm)		1018			1435		825	3110		409	2969	1293
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	143	40	21	36	22	217	26	707	54	102	378	55
RTOR Reduction (vph)	0	3	0	0	64	0	0	7	0	0	0	36
Lane Group Flow (vph)	0	201	0	0	211	0	26	754	0	102	378	19
Heavy Vehicles (%)	10%	5%	5%	5%	9%	1%	8%	6%	3%	1%	12%	15%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		50.9			50.9		34.0	34.0		34.0	34.0	34.0
Effective Green, g (s)		50.9			50.9		34.0	34.0		34.0	34.0	34.0
Actuated g/C Ratio		0.51			0.51		0.34	0.34		0.34	0.34	0.34
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		518			730		280	1057		139	1009	439
v/s Ratio Prot								0.24			0.13	
v/s Ratio Perm		c0.20			0.15		0.03			c0.25		0.01
v/c Ratio		0.39			0.29		0.09	0.71		0.73	0.37	0.04
Uniform Delay, d1		15.0			14.1		22.5	28.8		29.0	25.0	22.1
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		2.2			1.0		0.3	2.9		21.5	0.5	0.1
Delay (s)		17.2			15.1		22.8	31.6		50.5	25.4	22.2
Level of Service		B			B		C	C		D	C	C
Approach Delay (s)		17.2			15.1			31.3			29.9	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		15.1	
Intersection Capacity Utilization	96.6%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	181	733	52	575	144	25	162	143	109	172
Future Volume (vph)	181	733	52	575	144	25	162	143	109	172
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases		2		6			4		8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	2	2	6	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	58.0	58.0	58.0	58.0	58.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	64.4%	64.4%	64.4%	64.4%	64.4%	35.6%	35.6%	35.6%	35.6%	35.6%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	56.8	56.8	56.8	56.8	56.8	19.2	19.2	19.2	19.2	19.2
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.63	0.21	0.21	0.21	0.21	0.21
v/c Ratio	0.53	0.75	0.25	0.58	0.16	0.14	0.67	0.79	0.38	0.42
Control Delay	17.2	18.6	12.4	13.5	2.0	28.3	41.0	60.8	32.9	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	18.6	12.4	13.5	2.0	28.3	41.0	60.8	32.9	7.3
LOS	B	B	B	B	A	C	D	E	C	A
Approach Delay		18.3		11.2			39.5		31.9	
Approach LOS		B		B			D		C	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 90		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 80		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.79		
Intersection Signal Delay: 20.4	Intersection LOS: C	
Intersection Capacity Utilization 110.1%	ICU Level of Service H	
Analysis Period (min) 15		

Splits and Phases: 3: Davis Road & Lundys Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	733	23	52	575	144	25	162	32	143	109	172
Future Volume (vph)	181	733	23	52	575	144	25	162	32	143	109	172
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1554	1697		1420	1667	1417	1299	1411		1539	1434	1377
Flt Permitted	0.36	1.00		0.24	1.00	1.00	0.68	1.00		0.56	1.00	1.00
Satd. Flow (perm)	582	1697		353	1667	1417	933	1411		905	1434	1377
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	193	780	24	55	612	153	27	172	34	152	116	183
RTOR Reduction (vph)	0	1	0	0	0	56	0	9	0	0	0	144
Lane Group Flow (vph)	193	803	0	55	612	97	27	197	0	152	116	39
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	7%	2%	21%	17%	5%	5%	28%	19%	31%	8%	22%	8%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	56.8	56.8		56.8	56.8	56.8	19.2	19.2		19.2	19.2	19.2
Effective Green, g (s)	56.8	56.8		56.8	56.8	56.8	19.2	19.2		19.2	19.2	19.2
Actuated g/C Ratio	0.63	0.63		0.63	0.63	0.63	0.21	0.21		0.21	0.21	0.21
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	367	1070		222	1052	894	199	301		193	305	293
v/s Ratio Prot		c0.47			0.37			0.14			0.08	
v/s Ratio Perm	0.33			0.16		0.07	0.03			c0.17		0.03
v/c Ratio	0.53	0.75		0.25	0.58	0.11	0.14	0.66		0.79	0.38	0.13
Uniform Delay, d1	9.2	11.6		7.3	9.7	6.6	28.7	32.4		33.5	30.3	28.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.3	4.8		2.6	2.4	0.2	0.1	3.9		17.5	0.3	0.1
Delay (s)	14.5	16.5		9.9	12.0	6.8	28.8	36.3		51.0	30.6	28.7
Level of Service	B	B		A	B	A	C	D		D	C	C
Approach Delay (s)		16.1			10.9			35.4			36.7	
Approach LOS		B			B			D			D	

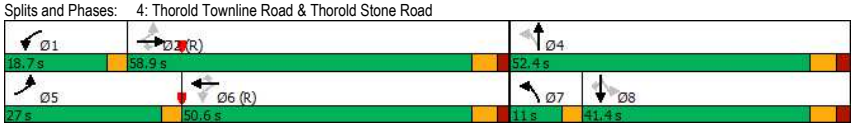
Intersection Summary					
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.76				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		14.0	
Intersection Capacity Utilization	110.1%	ICU Level of Service		H	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	399	924	168	208	1051	91	123	188	64	228	255
Future Volume (vph)	399	924	168	208	1051	91	123	188	64	228	255
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4		8	
Permitted Phases	2		2	6		6	4		8		8
Detector Phase	5	2	2	1	6	6	7	4	8	8	8
Switch Phase											
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0	10.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	35.1	35.1	12.5	35.1	35.1	11.0	41.4	41.4	41.4	41.4
Total Split (s)	27.0	58.9	58.9	18.7	50.6	50.6	11.0	52.4	41.4	41.4	41.4
Total Split (%)	20.8%	45.3%	45.3%	14.4%	38.9%	38.9%	8.5%	40.3%	31.8%	31.8%	31.8%
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4	6.4	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	85.8	66.7	66.7	60.6	44.5	44.5	38.2	34.8	23.8	23.8	23.8
Actuated g/C Ratio	0.66	0.51	0.51	0.47	0.34	0.34	0.29	0.27	0.18	0.18	0.18
v/c Ratio	0.89	0.58	0.22	0.63	0.99	0.18	0.62	0.68	0.40	0.80	0.59
Control Delay	58.4	25.7	8.5	21.8	67.8	5.4	48.8	47.4	52.3	70.1	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	25.7	8.5	21.8	67.8	5.4	48.8	47.4	52.3	70.1	10.4
LOS	E	C	A	C	E	A	D	D	D	E	B
Approach Delay		32.5			56.5			47.8		40.2	
Approach LOS		C			E			D		D	

Intersection Summary		
Cycle Length: 130		
Actuated Cycle Length: 130		
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 140		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.99		
Intersection Signal Delay: 43.8	Intersection LOS: D	
Intersection Capacity Utilization 99.3%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	399	924	168	208	1051	91	123	188	85	64	228	255
Future Volume (vph)	399	924	168	208	1051	91	123	188	85	64	228	255
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		6.4	6.4	6.4
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	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	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1525	3228	1417	1614	3228	1338	1471	1521		1511	1620	1282
Flt Permitted	0.08	1.00	1.00	0.30	1.00	1.00	0.32	1.00		0.57	1.00	1.00
Satd. Flow (perm)	135	3228	1417	505	3228	1338	495	1521		911	1620	1282
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	416	962	175	217	1095	95	128	196	89	67	238	266
RTOR Reduction (vph)	0	0	57	0	0	62	0	14	0	0	0	217
Lane Group Flow (vph)	416	963	118	217	1095	33	128	271	0	67	238	49
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	9%	3%	5%	3%	3%	8%	13%	10%	9%	10%	8%	16%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	82.7	66.7	66.7	57.5	44.5	44.5	34.8	34.8		23.8	23.8	23.8
Effective Green, g (s)	82.7	66.7	66.7	57.5	44.5	44.5	34.8	34.8		23.8	23.8	23.8
Actuated g/C Ratio	0.64	0.51	0.51	0.44	0.34	0.34	0.27	0.27		0.18	0.18	0.18
Clearance Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		6.4	6.4	6.4
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0	6.0	2.5	2.3		2.3	2.3	2.3
Lane Grp Cap (vph)	462	1656	727	334	1104	458	192	407		166	296	234
v/s Ratio Prot	c0.24	0.30		0.06	c0.34		0.04	c0.18			c0.15	
v/s Ratio Perm	0.33		0.08	0.22		0.02	0.14			0.07		0.04
v/c Ratio	0.90	0.58	0.16	0.65	0.99	0.07	0.67	0.67		0.40	0.80	0.21
Uniform Delay, d1	37.4	22.0	16.8	23.4	42.6	28.8	40.2	42.4		46.8	50.9	45.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	20.4	1.5	0.5	3.8	25.2	0.3	7.6	3.5		0.9	14.0	0.3
Delay (s)	57.8	23.5	17.3	27.2	67.8	29.1	47.9	45.9		47.8	64.9	45.4
Level of Service	E	C	B	C	E	C	D	D		D	E	D
Approach Delay (s)		32.0			58.9			46.5			53.8	
Approach LOS		C			E			D			D	

Intersection Summary				
HCM 2000 Control Delay	46.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.5	
Intersection Capacity Utilization	99.3%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	207	700	128	47	497	93	148	47	106	89
Future Volume (vph)	207	700	128	47	497	93	148	47	106	89
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2			6		4		8	
Permitted Phases	2		2	6		4		8		8
Detector Phase	2	2	2	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	65.0	65.0	65.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	65.0%	65.0%	65.0%	65.0%	65.0%	35.0%	35.0%	35.0%	35.0%	35.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	66.9	66.9	66.9	66.9	66.9	20.1	20.1	20.1	20.1	20.1
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.67	0.20	0.20	0.20	0.20	0.20
v/c Ratio	0.55	0.66	0.15	0.16	0.56	0.46	0.67	0.30	0.38	0.28
Control Delay	16.7	14.8	5.0	9.3	12.2	40.5	43.6	36.6	36.7	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	14.8	5.0	9.3	12.2	40.5	43.6	36.6	36.7	8.3
LOS	B	B	A	A	B	D	D	D	D	A
Approach Delay		13.9			12.0		42.6		26.2	
Approach LOS		B			B		D		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 18.5		Intersection LOS: B	
Intersection Capacity Utilization 98.2%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Thorold Townline Road & Lundys Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	700	128	47	497	79	93	148	46	47	106	89
Future Volume (vph)	207	700	128	47	497	79	93	148	46	47	106	89
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1597	1699	1390	1599	1638		1511	1492		1630	1496	1340
Flt Permitted	0.36	1.00	1.00	0.28	1.00		0.68	1.00		0.49	1.00	1.00
Satd. Flow (perm)	611	1699	1390	478	1638		1088	1492		839	1496	1340
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	223	753	138	51	534	85	100	159	49	51	114	96
RTOR Reduction (vph)	0	0	18	0	5	0	0	13	0	0	0	77
Lane Group Flow (vph)	223	753	120	51	614	0	100	195	0	51	114	19
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	3%	7%	4%	5%	0%	10%	16%	4%	2%	17%	11%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		8
Actuated Green, G (s)	66.9	66.9	66.9	66.9	66.9		20.1	20.1		20.1	20.1	20.1
Effective Green, g (s)	66.9	66.9	66.9	66.9	66.9		20.1	20.1		20.1	20.1	20.1
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.67		0.20	0.20		0.20	0.20	0.20
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	408	1136	929	319	1095		218	299		168	300	269
v/s Ratio Prot		c0.44			0.38			c0.13			0.08	
v/s Ratio Perm	0.36		0.09	0.11			0.09			0.06		0.01
v/c Ratio	0.55	0.66	0.13	0.16	0.56		0.46	0.65		0.30	0.38	0.07
Uniform Delay, d1	8.6	9.8	6.0	6.1	8.8		35.2	36.7		34.0	34.6	32.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.2	3.1	0.3	1.1	2.1		3.2	6.7		2.1	1.7	0.2
Delay (s)	13.8	12.9	6.3	7.2	10.8		38.3	43.5		36.1	36.2	32.6
Level of Service	B	B	A	A	B		D	D		D	D	C
Approach Delay (s)		12.3			10.6			41.8			34.9	
Approach LOS		B			B			D			C	

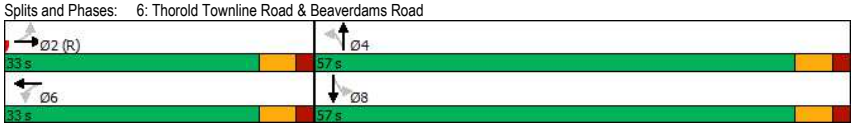
Intersection Summary					
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.66				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		13.0	
Intersection Capacity Utilization	98.2%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	22	154	54	210	24	335	14	564
Future Volume (vph)	22	154	54	210	24	335	14	564
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.5	30.5	30.5	30.5	34.0	34.0	30.5	30.5
Total Split (s)	33.0	33.0	33.0	33.0	57.0	57.0	57.0	57.0
Total Split (%)	36.7%	36.7%	36.7%	36.7%	63.3%	63.3%	63.3%	63.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		27.0		27.0		51.0		51.0
Actuated g/C Ratio		0.30		0.30		0.57		0.57
v/c Ratio		0.44		0.68		0.56		0.70
Control Delay		28.0		35.5		14.8		19.0
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		28.0		35.5		14.8		19.0
LOS		C		D		B		B
Approach Delay		28.0		35.5		14.8		19.0
Approach LOS		C		D		B		B

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 22.1		Intersection LOS: C	
Intersection Capacity Utilization 75.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Thorold Townline Road & Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	154	20	54	210	27	24	335	85	14	564	23
Future Volume (vph)	22	154	20	54	210	27	24	335	85	14	564	23
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1681			1706			1581			1664	
Flt Permitted		0.94			0.90			0.95			0.99	
Satd. Flow (perm)		1594			1546			1506			1643	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	167	22	59	228	29	26	364	92	15	613	25
RTOR Reduction (vph)	0	5	0	0	4	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	208	0	0	312	0	0	472	0	0	651	0
Confl. Peds. (#/hr)			5	5			6					6
Heavy Vehicles (%)	4%	1%	5%	0%	0%	3%	0%	10%	0%	14%	4%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		27.0			27.0			51.0			51.0	
Effective Green, g (s)		27.0			27.0			51.0			51.0	
Actuated g/C Ratio		0.30			0.30			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		478			463			853			931	
v/s Ratio Prot												
v/s Ratio Perm		0.13			c0.20			0.31			c0.40	
v/c Ratio		0.44			0.67			0.55			0.70	
Uniform Delay, d1		25.4			27.6			12.3			14.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.9			7.6			2.6			4.4	
Delay (s)		28.2			35.3			14.9			18.4	
Level of Service		C			D			B			B	
Approach Delay (s)		28.2			35.3			14.9			18.4	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	510	0	0	438
Future Volume (Veh/h)	0	0	510	0	0	438
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	548	0	0	471
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1019	548			548	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1019	548			548	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	265	540			1032	

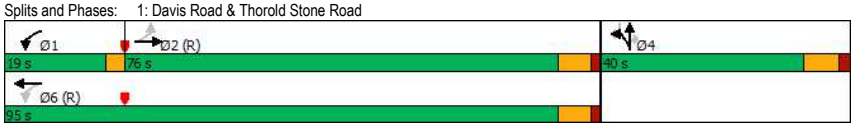
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	0	548	0	471
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.18	0.32	0.00	0.28
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	32.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBR
Lane Configurations									
Traffic Volume (vph)	29	1550	840	230	1493	698	6	193	44
Future Volume (vph)	29	1550	840	230	1493	698	6	193	44
Turn Type	Perm	NA	Free	pm+pt	NA	Split	NA	Perm	Perm
Protected Phases		2		1	6	4	4		
Permitted Phases	2		Free	6				4	4
Detector Phase	2	2		1	6	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0		5.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		8.0	28.9	29.7	29.7	29.7	29.7
Total Split (s)	76.0	76.0		19.0	95.0	40.0	40.0	40.0	40.0
Total Split (%)	56.3%	56.3%		14.1%	70.4%	29.6%	29.6%	29.6%	29.6%
Yellow Time (s)	5.4	5.4		3.0	5.4	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		0.0	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		3.0	6.9	7.7	7.7	7.7	7.7
Lead/Lag	Lag	Lag		Lead					
Lead-Lag Optimize?	Yes	Yes		Yes					
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None
Act Effct Green (s)	69.1	69.1	135.0	92.0	88.1	32.3	32.3	32.3	32.3
Actuated g/C Ratio	0.51	0.51	1.00	0.68	0.65	0.24	0.24	0.24	0.24
v/c Ratio	0.34	0.97	0.60	1.00	0.74	0.98	1.00	0.41	0.12
Control Delay	33.0	47.8	1.8	96.5	18.5	93.0	98.3	8.0	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	47.8	1.8	96.5	18.5	93.0	98.3	8.0	8.1
LOS	C	D	A	F	B	F	F	A	A
Approach Delay		31.6			28.9		76.8		
Approach LOS		C			C		E		

Intersection Summary		
Cycle Length: 135		
Actuated Cycle Length: 135		
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 110		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.00		
Intersection Signal Delay: 38.5	Intersection LOS: D	
Intersection Capacity Utilization 107.3%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 1: Davis Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	1550	840	230	1493	1	698	6	193	0	0	44
Future Volume (vph)	29	1550	840	230	1493	1	698	6	193	0	0	44
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	3.0	6.9		7.7	7.7	7.7			7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00			0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85			0.86
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00			1.00
Satd. Flow (prot)	1309	3292	1473	1614	3260		1564	1561	1417			1449
Flt Permitted	0.13	1.00	1.00	0.06	1.00		0.95	0.95	1.00			1.00
Satd. Flow (perm)	177	3292	1473	94	3260		1564	1561	1417			1449
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	1632	884	242	1572	1	735	6	203	0	0	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	154	0	0	35
Lane Group Flow (vph)	31	1632	884	242	1573	0	367	374	49	0	0	11
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	27%	1%	1%	3%	2%	0%	1%	33%	5%	0%	14%	3%
Turn Type	Perm	NA	Free	pm+pt	NA		Split	NA	Perm			Perm
Protected Phases		2		1	6		4	4				
Permitted Phases	2		Free	6					4			4
Actuated Green, G (s)	69.1	69.1	135.0	88.1	88.1		32.3	32.3	32.3			32.3
Effective Green, g (s)	69.1	69.1	135.0	88.1	88.1		32.3	32.3	32.3			32.3
Actuated g/C Ratio	0.51	0.51	1.00	0.65	0.65		0.24	0.24	0.24			0.24
Clearance Time (s)	6.9	6.9		3.0	6.9		7.7	7.7	7.7			7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5			4.5
Lane Grp Cap (vph)	90	1685	1473	241	2127		374	373	339			346
v/s Ratio Prot		0.50		c0.12	0.48		0.23	c0.24				
v/s Ratio Perm	0.18		0.60	c0.53					0.03			0.01
v/c Ratio	0.34	0.97	0.60	1.00	0.74		0.98	1.00	0.14			0.03
Uniform Delay, d1	19.5	31.9	0.0	46.4	15.7		51.0	51.4	40.5			39.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00
Incremental Delay, d2	10.2	15.6	1.8	59.0	2.4		41.5	47.3	0.3			0.1
Delay (s)	29.7	47.5	1.8	105.4	18.1		92.6	98.6	40.8			39.4
Level of Service	C	D	A	F	B		F	F	D			D
Approach Delay (s)		31.4			29.7			83.8			39.4	
Approach LOS		C			C			F			D	

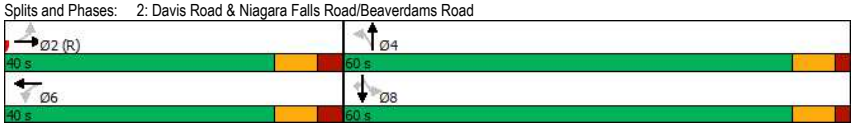
Intersection Summary				
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	17.6	
Intersection Capacity Utilization	107.3%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	112	39	70	55	27	630	200	728	123
Future Volume (vph)	112	39	70	55	27	630	200	728	123
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	40.0	40.0	40.0	40.0	60.0	60.0	60.0	60.0	60.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		40.9		40.9	44.0	44.0	44.0	44.0	44.0
Actuated g/C Ratio		0.41		0.41	0.44	0.44	0.44	0.44	0.44
v/c Ratio		0.45		0.53	0.13	0.50	0.89	0.54	0.18
Control Delay		27.9		35.7	14.5	20.3	61.0	21.2	2.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		27.9		35.7	14.5	20.3	61.0	21.2	2.8
LOS		C		D	B	C	E	C	A
Approach Delay		27.9		35.7		20.0		26.7	
Approach LOS		C		D		C		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 25.9		Intersection LOS: C	
Intersection Capacity Utilization 86.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



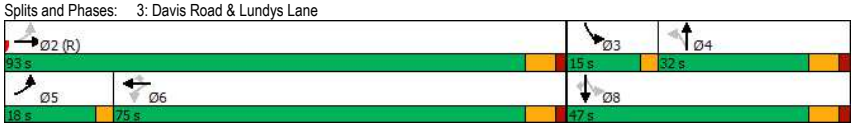
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	39	32	70	55	183	27	630	46	200	728	123
Future Volume (vph)	112	39	32	70	55	183	27	630	46	200	728	123
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		0.98			0.92		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1624			1576		1662	3193		1630	3228	1473
Flt Permitted		0.61			0.87		0.29	1.00		0.31	1.00	1.00
Satd. Flow (perm)		1028			1391		501	3193		540	3228	1473
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	118	41	34	74	58	193	28	663	48	211	766	129
RTOR Reduction (vph)	0	7	0	0	46	0	0	6	0	0	0	72
Lane Group Flow (vph)	0	186	0	0	279	0	28	705	0	211	766	57
Heavy Vehicles (%)	1%	2%	6%	1%	1%	1%	0%	3%	4%	2%	3%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		40.9			40.9		44.0	44.0		44.0	44.0	44.0
Effective Green, g (s)		40.9			40.9		44.0	44.0		44.0	44.0	44.0
Actuated g/C Ratio		0.41			0.41		0.44	0.44		0.44	0.44	0.44
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		420			568		220	1404		237	1420	648
v/s Ratio Prot								0.22			0.24	
v/s Ratio Perm		0.18			c0.20		0.06			c0.39		0.04
v/c Ratio		0.44			0.49		0.13	0.50		0.89	0.54	0.09
Uniform Delay, d1		21.3			21.9		16.6	20.1		25.8	20.6	16.3
Progression Factor		1.00			1.70		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		3.4			1.6		0.5	0.6		32.9	0.7	0.1
Delay (s)		24.7			38.9		17.2	20.7		58.6	21.3	16.4
Level of Service		C			D		B	C		E	C	B
Approach Delay (s)		24.7			38.9			20.6			27.8	
Approach LOS		C			D			C			C	

Intersection Summary					
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.70				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.1		
Intersection Capacity Utilization	86.6%	ICU Level of Service	E		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	234	830	47	828	230	54	164	252	146	204
Future Volume (vph)	234	830	47	828	230	54	164	252	146	204
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	5.0	22.0	22.0	22.0	22.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	8.0	36.0	36.0	36.0	36.0	32.0	32.0	8.0	32.0	32.0
Total Split (s)	18.0	93.0	75.0	75.0	75.0	32.0	32.0	15.0	47.0	47.0
Total Split (%)	12.9%	66.4%	53.6%	53.6%	53.6%	22.9%	22.9%	10.7%	33.6%	33.6%
Yellow Time (s)	3.0	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	7.0	7.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	Max	Max	Max	Max	Max	None	Max	Max
Act Effct Green (s)	90.0	86.0	68.0	68.0	68.0	25.0	25.0	44.0	40.0	40.0
Actuated g/C Ratio	0.64	0.61	0.49	0.49	0.49	0.18	0.18	0.31	0.29	0.29
v/c Ratio	1.10	0.87	0.37	1.05	0.32	0.28	0.85	1.01	0.36	0.38
Control Delay	125.5	33.2	32.1	79.3	9.2	54.1	80.1	101.5	42.8	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	125.5	33.2	32.1	79.3	9.2	54.1	80.1	101.5	42.8	6.6
LOS	F	C	C	E	A	D	F	F	D	A
Approach Delay		52.9		62.7			74.9		55.1	
Approach LOS		D		E			E		E	

Intersection Summary		
Cycle Length: 140		
Actuated Cycle Length: 140		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 135		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.10		
Intersection Signal Delay: 58.8	Intersection LOS: E	
Intersection Capacity Utilization 124.9%	ICU Level of Service H	
Analysis Period (min) 15		

Splits and Phases: 3: Davis Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	234	830	35	47	828	230	54	164	56	252	146	204
Future Volume (vph)	234	830	35	47	828	230	54	164	56	252	146	204
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1662	1734		1630	1750	1436	1662	1505		1645	1522	1488
Flt Permitted	0.06	1.00		0.17	1.00	1.00	0.66	1.00		0.32	1.00	1.00
Satd. Flow (perm)	99	1734		286	1750	1436	1150	1505		554	1522	1488
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	252	892	38	51	890	247	58	176	60	271	157	219
RTOR Reduction (vph)	0	1	0	0	0	79	0	9	0	0	0	156
Lane Group Flow (vph)	252	929	0	51	890	168	58	227	0	271	157	63
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	0%	0%	5%	2%	0%	1%	0%	14%	3%	1%	15%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	86.0	86.0		68.0	68.0	68.0	25.0	25.0		40.0	40.0	40.0
Effective Green, g (s)	86.0	86.0		68.0	68.0	68.0	25.0	25.0		40.0	40.0	40.0
Actuated g/C Ratio	0.61	0.61		0.49	0.49	0.49	0.18	0.18		0.29	0.29	0.29
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	228	1065		138	850	697	205	268		251	434	425
v/s Ratio Prot	c0.12	0.54			0.51			0.15		c0.09	0.10	
v/s Ratio Perm	c0.56			0.18		0.12	0.05			c0.22		0.04
v/c Ratio	1.11	0.87		0.37	1.05	0.24	0.28	0.85		1.08	0.36	0.15
Uniform Delay, d1	48.5	22.4		22.6	36.0	21.0	49.7	55.6		47.7	39.8	37.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	90.7	9.8		7.5	43.9	0.8	3.4	26.8		79.6	2.3	0.7
Delay (s)	139.2	32.3		30.0	79.9	21.8	53.2	82.4		127.3	42.2	38.0
Level of Service	F	C		C	E	C	D	F		F	D	D
Approach Delay (s)		55.1			65.7			76.6			76.4	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	65.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	124.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	283	1361	84	104	1154	44	201	219	60	231	338
Future Volume (vph)	283	1361	84	104	1154	44	201	219	60	231	338
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4		8		8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	8.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	35.1	35.1	8.0	35.1	35.1	8.0	41.4	8.0	41.4	41.4
Total Split (s)	23.0	69.0	69.0	9.0	55.0	55.0	10.0	44.0	8.0	42.0	42.0
Total Split (%)	17.7%	53.1%	53.1%	6.9%	42.3%	42.3%	7.7%	33.8%	6.2%	32.3%	32.3%
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1	3.0	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.3	0.0	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4	3.0	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	78.8	65.9	65.9	61.0	51.1	51.1	44.4	35.4	40.2	31.8	31.8
Actuated g/C Ratio	0.61	0.51	0.51	0.47	0.39	0.39	0.34	0.27	0.31	0.24	0.24
v/c Ratio	0.95	0.85	0.11	0.71	0.93	0.07	0.72	0.94	0.44	0.58	0.62
Control Delay	78.3	34.8	5.0	45.5	51.6	0.2	47.9	72.7	37.5	48.4	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.3	34.8	5.0	45.5	51.6	0.2	47.9	72.7	37.5	48.4	13.6
LOS	E	C	A	D	D	A	D	E	D	D	B
Approach Delay		40.5			49.4			64.6		28.7	
Approach LOS		D			D			E		C	

Intersection Summary			
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 44.9		Intersection LOS: D	
Intersection Capacity Utilization 98.2%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road

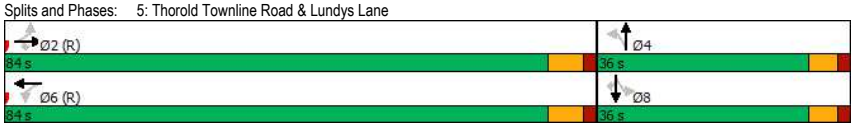
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	1361	84	104	1154	44	201	219	192	60	231	338
Future Volume (vph)	283	1361	84	104	1154	44	201	219	192	60	231	338
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		3.0	6.4	6.4
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1539	3292	1473	1630	3292	1430	1646	1579		1539	1699	1417
Flt Permitted	0.07	1.00	1.00	0.10	1.00	1.00	0.41	1.00		0.19	1.00	1.00
Satd. Flow (perm)	121	3292	1473	164	3292	1430	707	1579		315	1699	1417
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	295	1418	88	108	1202	46	209	228	200	62	241	352
RTOR Reduction (vph)	0	0	39	0	0	28	0	25	0	0	0	217
Lane Group Flow (vph)	295	1418	49	108	1202	18	209	403	0	63	241	135
Heavy Vehicles (%)	8%	1%	1%	2%	1%	4%	1%	4%	2%	8%	3%	5%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	75.1	65.3	65.3	57.3	50.5	50.5	42.4	35.4		36.4	32.4	32.4
Effective Green, g (s)	75.1	65.3	65.3	57.3	50.5	50.5	42.4	35.4		36.4	32.4	32.4
Actuated g/C Ratio	0.58	0.50	0.50	0.44	0.39	0.39	0.33	0.27		0.28	0.25	0.25
Clearance Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		3.0	6.4	6.4
Vehicle Extension (s)	2.5	6.0	6.0	3.0	6.0	6.0	3.0	2.3		3.0	2.3	2.3
Lane Grp Cap (vph)	305	1653	739	148	1278	555	281	429		125	423	353
v/s Ratio Prot	c0.16	0.43		0.04	0.37		c0.04	c0.26		0.02	0.14	
v/s Ratio Perm	c0.40		0.03	0.28		0.01	0.20			0.12		0.10
v/c Ratio	0.97	0.86	0.07	0.73	0.94	0.03	0.74	0.94		0.50	0.57	0.38
Uniform Delay, d1	41.6	28.3	16.7	25.4	38.3	24.6	39.5	46.3		36.8	42.7	40.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	42.2	6.0	0.2	16.4	14.5	0.1	10.2	28.3		3.2	1.3	0.4
Delay (s)	83.8	34.3	16.8	41.8	52.8	24.7	49.7	74.6		40.0	44.0	40.9
Level of Service	F	C	B	D	D	C	D	E		D	D	D
Approach Delay (s)		41.6			50.9			66.4			41.9	
Approach LOS		D			D			E			D	

Intersection Summary					
HCM 2000 Control Delay	48.0	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.99				
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.5		
Intersection Capacity Utilization	98.2%	ICU Level of Service	F		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	118	779	140	55	809	141	155	102	146	192
Future Volume (vph)	118	779	140	55	809	141	155	102	146	192
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2			6		4		8	
Permitted Phases	2		2	6		4		8		8
Detector Phase	2	2	2	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	84.0	84.0	84.0	84.0	84.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	70.0%	70.0%	70.0%	70.0%	70.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	82.4	82.4	82.4	82.4	82.4	24.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.69	0.20	0.20	0.20	0.20	0.20
v/c Ratio	0.64	0.73	0.15	0.22	0.82	0.81	0.70	0.78	0.47	0.48
Control Delay	30.7	17.7	5.4	11.0	22.2	74.2	51.5	78.7	45.6	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.7	17.7	5.4	11.0	22.2	74.2	51.5	78.7	45.6	12.4
LOS	C	B	A	B	C	E	D	E	D	B
Approach Delay		17.5			21.5		60.4		38.8	
Approach LOS		B			C		E		D	

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 27.8		Intersection LOS: C	
Intersection Capacity Utilization 110.1%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 5: Thorold Townline Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	779	140	55	809	65	141	155	62	102	146	192
Future Volume (vph)	118	779	140	55	809	65	141	155	62	102	146	192
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1599	1716	1444	1614	1707		1568	1606		1662	1651	1473
Flt Permitted	0.18	1.00	1.00	0.23	1.00		0.57	1.00		0.40	1.00	1.00
Satd. Flow (perm)	297	1716	1444	393	1707		937	1606		698	1651	1473
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	130	856	154	60	889	71	155	170	68	112	160	211
RTOR Reduction (vph)	0	0	17	0	2	0	0	13	0	0	0	140
Lane Group Flow (vph)	130	856	137	60	958	0	155	225	0	112	160	71
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	2%	3%	3%	1%	4%	6%	6%	0%	0%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		8
Actuated Green, G (s)	82.4	82.4	82.4	82.4	82.4		24.6	24.6		24.6	24.6	24.6
Effective Green, g (s)	82.4	82.4	82.4	82.4	82.4		24.6	24.6		24.6	24.6	24.6
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.69		0.21	0.21		0.21	0.21	0.21
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	203	1178	991	269	1172		192	329		143	338	301
v/s Ratio Prot		0.50			c0.56			0.14			0.10	
v/s Ratio Perm	0.44		0.10	0.15			c0.17			0.16		0.05
v/c Ratio	0.64	0.73	0.14	0.22	0.82		0.81	0.68		0.78	0.47	0.24
Uniform Delay, d1	10.5	11.8	6.5	7.0	13.4		45.4	44.1		45.2	42.0	39.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.5	3.9	0.3	1.9	6.4		24.0	7.4		27.1	2.2	0.8
Delay (s)	25.0	15.7	6.8	8.9	19.8		69.4	51.5		72.2	44.2	40.7
Level of Service	C	B	A	A	B		E	D		E	D	D
Approach Delay (s)		15.6			19.2			58.6			49.2	
Approach LOS		B			B			E			D	

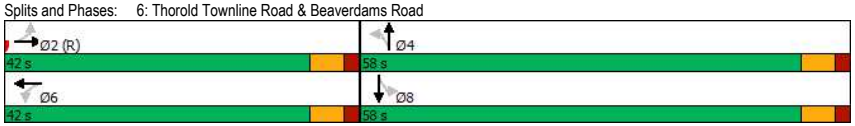
Intersection Summary					
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.81				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		13.0	
Intersection Capacity Utilization	110.1%	ICU Level of Service		H	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	32	254	127	218	33	574	25	354
Future Volume (vph)	32	254	127	218	33	574	25	354
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	32.0	32.0	32.0	32.0	35.0	35.0	35.0	35.0
Total Split (s)	42.0	42.0	42.0	42.0	58.0	58.0	58.0	58.0
Total Split (%)	42.0%	42.0%	42.0%	42.0%	58.0%	58.0%	58.0%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None
Act Effct Green (s)		37.6		37.6		50.4		50.4
Actuated g/C Ratio		0.38		0.38		0.50		0.50
v/c Ratio		0.55		0.89		0.93		0.59
Control Delay		20.7		54.8		41.4		20.4
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		20.7		54.8		41.4		20.4
LOS		C		D		D		C
Approach Delay		20.7		54.8		41.4		20.4
Approach LOS		C		D		D		C

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 35.7		Intersection LOS: D	
Intersection Capacity Utilization 105.5%		ICU Level of Service G	
Analysis Period (min) 15			

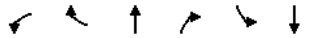
Splits and Phases: 6: Thorold Townline Road & Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	254	20	127	218	26	33	574	96	25	354	50
Future Volume (vph)	32	254	20	127	218	26	33	574	96	25	354	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.98			0.98	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1705			1698			1664			1657	
Flt Permitted		0.93			0.68			0.96			0.94	
Satd. Flow (perm)		1599			1179			1606			1555	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	34	273	22	137	234	28	35	617	103	27	381	54
RTOR Reduction (vph)	0	2	0	0	2	0	0	6	0	0	5	0
Lane Group Flow (vph)	0	327	0	0	397	0	0	749	0	0	457	0
Confl. Peds. (#/hr)	1		5	5		1	8		3	3		8
Heavy Vehicles (%)	6%	0%	5%	0%	0%	0%	3%	3%	0%	4%	3%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		37.6			37.6			50.4			50.4	
Effective Green, g (s)		37.6			37.6			50.4			50.4	
Actuated g/C Ratio		0.38			0.38			0.50			0.50	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		601			443			809			783	
v/s Ratio Prot												
v/s Ratio Perm		0.20			c0.34			c0.47			0.29	
v/c Ratio		0.54			0.90			0.93			0.58	
Uniform Delay, d1		24.5			29.3			23.1			17.4	
Progression Factor		0.70			1.00			1.00			1.00	
Incremental Delay, d2		2.8			23.2			17.0			1.7	
Delay (s)		20.0			52.6			40.0			19.2	
Level of Service		C			D			D			B	
Approach Delay (s)		20.0			52.6			40.0			19.2	
Approach LOS		C			D			D			B	

Intersection Summary			
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	560	0	0	491
Future Volume (Veh/h)	0	0	560	0	0	491
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	615	0	0	540
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1155	615			615	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1155	615			615	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	220	495			974	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	0	615	0	540
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.00	0.36	0.00	0.32
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	35.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBR
Lane Configurations									
Traffic Volume (vph)	26	1220	392	130	1378	717	18	283	24
Future Volume (vph)	26	1220	392	130	1378	717	18	283	24
Turn Type	Perm	NA	Free	pm+pt	NA	Split	NA	Perm	Perm
Protected Phases		2		1	6	4	4		
Permitted Phases	2		Free	6				4	4
Detector Phase	2	2		1	6	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0		3.5	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		8.0	28.9	29.7	29.7	29.7	29.7
Total Split (s)	63.0	63.0		11.0	74.0	46.0	46.0	46.0	46.0
Total Split (%)	52.5%	52.5%		9.2%	61.7%	38.3%	38.3%	38.3%	38.3%
Yellow Time (s)	5.4	5.4		3.0	5.4	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		0.0	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		3.0	6.9	7.7	7.7	7.7	7.7
Lead/Lag	Lag	Lag		Lead					
Lead-Lag Optimize?	Yes	Yes		Yes					
Recall Mode	C-Max	C-Max		None	Max	None	None	None	None
Act Effct Green (s)	58.2	58.2	120.0	73.4	69.5	35.9	35.9	35.9	35.9
Actuated g/C Ratio	0.48	0.48	1.00	0.61	0.58	0.30	0.30	0.30	0.30
v/c Ratio	0.27	0.84	0.30	0.71	0.80	0.86	0.87	0.55	0.06
Control Delay	28.9	33.5	0.5	35.0	24.9	58.5	59.8	19.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	33.5	0.5	35.0	24.9	58.5	59.8	19.2	0.3
LOS	C	C	A	C	C	E	E	B	A
Approach Delay		25.6			25.8		48.0		
Approach LOS		C			C		D		

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 31.0		Intersection LOS: C	
Intersection Capacity Utilization 105.0%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: Davis Road & Thorold Stone Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	1220	392	130	1378	8	717	18	283	0	0	24
Future Volume (vph)	26	1220	392	130	1378	8	717	18	283	0	0	24
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	3.0	6.9		7.7	7.7	7.7			7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99			0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85			0.86
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00			1.00
Satd. Flow (prot)	1553	3137	1377	1498	3100		1490	1486	1411			1255
Flt Permitted	0.12	1.00	1.00	0.10	1.00		0.95	0.95	1.00			1.00
Satd. Flow (perm)	204	3137	1377	161	3100		1490	1486	1411			1255
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	1271	408	135	1435	8	747	19	295	0	0	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	112	0	0	18
Lane Group Flow (vph)	27	1271	408	135	1443	0	381	385	183	0	0	7
Confl. Peds. (#/hr)	1					1	1		1	1		1
Heavy Vehicles (%)	7%	6%	8%	11%	7%	37%	6%	22%	4%	100%	50%	19%
Turn Type	Perm	NA	Free	pm+pt	NA		Split	NA	Perm			Perm
Protected Phases		2		1	6		4	4				
Permitted Phases	2		Free	6					4			4
Actuated Green, G (s)	58.2	58.2	120.0	69.5	69.5		35.9	35.9	35.9			35.9
Effective Green, g (s)	58.2	58.2	120.0	69.5	69.5		35.9	35.9	35.9			35.9
Actuated g/C Ratio	0.49	0.49	1.00	0.58	0.58		0.30	0.30	0.30			0.30
Clearance Time (s)	6.9	6.9		3.0	6.9		7.7	7.7	7.7			7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5			4.5
Lane Grp Cap (vph)	98	1521	1377	185	1795		445	444	422			375
v/s Ratio Prot		0.41		0.05	c0.47		0.26	c0.26				
v/s Ratio Perm	0.13		0.30	0.37					0.13			0.01
v/c Ratio	0.28	0.84	0.30	0.73	0.80		0.86	0.87	0.43			0.02
Uniform Delay, d1	18.4	26.8	0.0	19.0	19.9		39.6	39.8	33.9			29.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00
Incremental Delay, d2	6.8	5.6	0.5	13.4	3.9		15.9	17.1	1.2			0.0
Delay (s)	25.2	32.4	0.5	32.4	23.8		55.5	56.9	35.1			29.7
Level of Service	C	C	A	C	C		E	E	D			C
Approach Delay (s)		24.6			24.5			50.3			29.7	
Approach LOS		C			C			D			C	

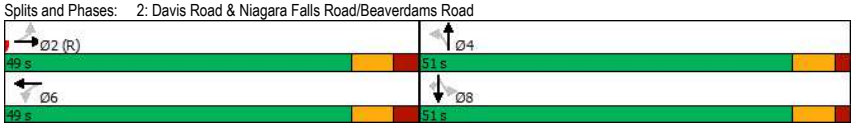
Intersection Summary					
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.85				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)		17.6	
Intersection Capacity Utilization	105.0%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	136	38	34	21	25	672	97	359	52
Future Volume (vph)	136	38	34	21	25	672	97	359	52
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	49.0	49.0	49.0	49.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	49.0%	49.0%	49.0%	49.0%	51.0%	51.0%	51.0%	51.0%	51.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		50.9		50.9	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio		0.51		0.51	0.34	0.34	0.34	0.34	0.34
v/c Ratio		0.39		0.35	0.09	0.72	0.73	0.37	0.12
Control Delay		19.4		10.0	20.4	31.8	57.9	25.0	5.4
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		19.4		10.0	20.4	31.8	57.9	25.0	5.4
LOS		B		B	C	C	E	C	A
Approach Delay		19.4		10.0		31.4		29.3	
Approach LOS		B		B		C		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 26.1		Intersection LOS: C	
Intersection Capacity Utilization 96.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	38	20	34	21	206	25	672	51	97	359	52
Future Volume (vph)	136	38	20	34	21	206	25	672	51	97	359	52
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		0.99			0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1537			1521		1539	3110		1646	2969	1293
Flt Permitted		0.64			0.94		0.51	1.00		0.24	1.00	1.00
Satd. Flow (perm)		1018			1435		825	3110		409	2969	1293
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	143	40	21	36	22	217	26	707	54	102	378	55
RTOR Reduction (vph)	0	3	0	0	64	0	0	7	0	0	0	36
Lane Group Flow (vph)	0	201	0	0	211	0	26	754	0	102	378	19
Heavy Vehicles (%)	10%	5%	5%	5%	9%	1%	8%	6%	3%	1%	12%	15%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		50.9			50.9		34.0	34.0		34.0	34.0	34.0
Effective Green, g (s)		50.9			50.9		34.0	34.0		34.0	34.0	34.0
Actuated g/C Ratio		0.51			0.51		0.34	0.34		0.34	0.34	0.34
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		518			730		280	1057		139	1009	439
v/s Ratio Prot								0.24			0.13	
v/s Ratio Perm		c0.20			0.15		0.03			c0.25		0.01
v/c Ratio		0.39			0.29		0.09	0.71		0.73	0.37	0.04
Uniform Delay, d1		15.0			14.1		22.5	28.8		29.0	25.0	22.1
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		2.2			1.0		0.3	2.9		21.5	0.5	0.1
Delay (s)		17.2			15.1		22.8	31.6		50.5	25.4	22.2
Level of Service		B			B		C	C		D	C	C
Approach Delay (s)		17.2			15.1			31.3			29.9	
Approach LOS		B			B			C			C	

Intersection Summary					
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		15.1	
Intersection Capacity Utilization	96.6%	ICU Level of Service		F	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	181	735	52	577	144	25	162	143	109	172
Future Volume (vph)	181	735	52	577	144	25	162	143	109	172
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases		2		6			4		8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	2	2	6	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	58.0	58.0	58.0	58.0	58.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	64.4%	64.4%	64.4%	64.4%	64.4%	35.6%	35.6%	35.6%	35.6%	35.6%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	56.8	56.8	56.8	56.8	56.8	19.2	19.2	19.2	19.2	19.2
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.63	0.21	0.21	0.21	0.21	0.21
v/c Ratio	0.53	0.75	0.25	0.58	0.16	0.14	0.67	0.79	0.38	0.42
Control Delay	17.2	18.7	12.5	13.5	2.0	28.3	41.0	60.8	32.9	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	18.7	12.5	13.5	2.0	28.3	41.0	60.8	32.9	7.3
LOS	B	B	B	B	A	C	D	E	C	A
Approach Delay		18.4		11.3			39.5		31.9	
Approach LOS		B		B			D		C	

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 20.5		Intersection LOS: C	
Intersection Capacity Utilization 110.2%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 3: Davis Road & Lundys Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	735	23	52	577	144	25	162	32	143	109	172
Future Volume (vph)	181	735	23	52	577	144	25	162	32	143	109	172
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1554	1698		1420	1667	1417	1299	1411		1539	1434	1377
Flt Permitted	0.35	1.00		0.23	1.00	1.00	0.68	1.00		0.56	1.00	1.00
Satd. Flow (perm)	580	1698		351	1667	1417	933	1411		905	1434	1377
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	193	782	24	55	614	153	27	172	34	152	116	183
RTOR Reduction (vph)	0	1	0	0	0	56	0	9	0	0	0	144
Lane Group Flow (vph)	193	805	0	55	614	97	27	197	0	152	116	39
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	7%	2%	21%	17%	5%	5%	28%	19%	31%	8%	22%	8%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	56.8	56.8		56.8	56.8	56.8	19.2	19.2		19.2	19.2	19.2
Effective Green, g (s)	56.8	56.8		56.8	56.8	56.8	19.2	19.2		19.2	19.2	19.2
Actuated g/C Ratio	0.63	0.63		0.63	0.63	0.63	0.21	0.21		0.21	0.21	0.21
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	366	1071		221	1052	894	199	301		193	305	293
v/s Ratio Prot		c0.47			0.37			0.14			0.08	
v/s Ratio Perm	0.33			0.16		0.07	0.03			c0.17		0.03
v/c Ratio	0.53	0.75		0.25	0.58	0.11	0.14	0.66		0.79	0.38	0.13
Uniform Delay, d1	9.2	11.6		7.3	9.7	6.6	28.7	32.4		33.5	30.3	28.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.4	4.9		2.7	2.4	0.2	0.1	3.9		17.5	0.3	0.1
Delay (s)	14.5	16.5		9.9	12.1	6.8	28.8	36.3		51.0	30.6	28.7
Level of Service	B	B		A	B	A	C	D		D	C	C
Approach Delay (s)		16.1			10.9			35.4			36.7	
Approach LOS		B			B			D			D	

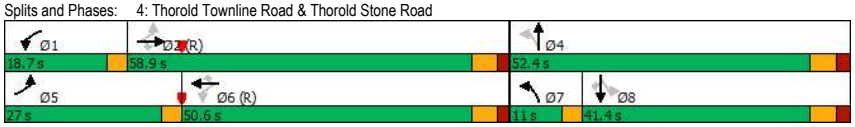
Intersection Summary					
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.76				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		14.0	
Intersection Capacity Utilization	110.2%	ICU Level of Service		H	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	399	924	186	222	1051	91	148	207	64	240	255
Future Volume (vph)	399	924	186	222	1051	91	148	207	64	240	255
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4		8	
Permitted Phases	2		2	6		6	4		8		8
Detector Phase	5	2	2	1	6	6	7	4	8	8	8
Switch Phase											
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0	10.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	35.1	35.1	12.5	35.1	35.1	11.0	41.4	41.4	41.4	41.4
Total Split (s)	27.0	58.9	58.9	18.7	50.6	50.6	11.0	52.4	41.4	41.4	41.4
Total Split (%)	20.8%	45.3%	45.3%	14.4%	38.9%	38.9%	8.5%	40.3%	31.8%	31.8%	31.8%
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.3	2.3	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4	6.4	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	84.1	63.7	63.7	61.9	44.5	44.5	39.9	36.5	25.5	25.5	25.5
Actuated g/C Ratio	0.65	0.49	0.49	0.48	0.34	0.34	0.31	0.28	0.20	0.20	0.20
v/c Ratio	0.93	0.61	0.27	0.67	0.99	0.18	0.81	0.80	0.44	0.82	0.57
Control Delay	66.0	28.0	9.4	24.1	67.8	5.4	67.8	54.7	53.1	70.3	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.0	28.0	9.4	24.1	67.8	5.4	67.8	54.7	53.1	70.3	9.7
LOS	E	C	A	C	E	A	E	D	D	E	A
Approach Delay		35.7			56.5			58.9		40.7	
Approach LOS		D			E			E		D	

Intersection Summary		
Cycle Length: 130		
Actuated Cycle Length: 130		
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 140		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.99		
Intersection Signal Delay: 46.5	Intersection LOS: D	
Intersection Capacity Utilization 101.7%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	399	924	186	222	1051	91	148	207	104	64	240	255
Future Volume (vph)	399	924	186	222	1051	91	148	207	104	64	240	255
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		6.4	6.4	6.4
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	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	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1525	3228	1328	1539	3228	1338	1319	1397		1511	1562	1282
Flt Permitted	0.08	1.00	1.00	0.29	1.00	1.00	0.32	1.00		0.50	1.00	1.00
Satd. Flow (perm)	135	3228	1328	474	3228	1338	443	1397		788	1562	1282
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	416	962	194	231	1095	95	154	216	108	67	250	266
RTOR Reduction (vph)	0	0	66	0	0	62	0	15	0	0	0	214
Lane Group Flow (vph)	416	963	128	231	1095	33	154	309	0	67	250	52
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	9%	3%	12%	8%	3%	8%	26%	17%	23%	10%	12%	16%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	81.0	63.7	63.7	58.8	44.5	44.5	36.5	36.5		25.5	25.5	25.5
Effective Green, g (s)	81.0	63.7	63.7	58.8	44.5	44.5	36.5	36.5		25.5	25.5	25.5
Actuated g/C Ratio	0.62	0.49	0.49	0.45	0.34	0.34	0.28	0.28		0.20	0.20	0.20
Clearance Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		6.4	6.4	6.4
Vehicle Extension (s)	2.5	6.0	6.0	2.5	6.0	6.0	2.5	2.3		2.3	2.3	2.3
Lane Grp Cap (vph)	442	1581	650	331	1104	458	178	392		154	306	251
v/s Ratio Prot	c0.24	0.30		0.08	0.34		c0.05	0.22			0.16	
v/s Ratio Perm	c0.34		0.10	0.24		0.02	c0.19			0.09		0.04
v/c Ratio	0.94	0.61	0.20	0.70	0.99	0.07	0.87	0.79		0.44	0.82	0.21
Uniform Delay, d1	38.9	24.1	18.7	22.9	42.6	28.8	43.5	43.2		45.9	50.0	43.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	28.4	1.8	0.7	5.8	25.2	0.3	32.5	9.6		1.1	14.9	0.2
Delay (s)	67.3	25.9	19.4	28.8	67.8	29.1	75.9	52.7		47.1	64.9	44.0
Level of Service	E	C	B	C	E	C	E	D		D	E	D
Approach Delay (s)		36.0			58.8			60.2			53.3	
Approach LOS		D			E			E			D	

Intersection Summary					
HCM 2000 Control Delay	49.4	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.96				
Actuated Cycle Length (s)	130.0	Sum of lost time (s)		18.5	
Intersection Capacity Utilization	101.7%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	209	700	128	47	497	93	148	48	106	91
Future Volume (vph)	209	700	128	47	497	93	148	48	106	91
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2			6		4		8	
Permitted Phases	2		2	6		4		8		8
Detector Phase	2	2	2	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	65.0	65.0	65.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	65.0%	65.0%	65.0%	65.0%	65.0%	35.0%	35.0%	35.0%	35.0%	35.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	66.9	66.9	66.9	66.9	66.9	20.1	20.1	20.1	20.1	20.1
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.67	0.20	0.20	0.20	0.20	0.20
v/c Ratio	0.55	0.66	0.15	0.16	0.56	0.46	0.67	0.31	0.38	0.28
Control Delay	16.9	14.8	5.0	9.3	12.2	40.5	43.6	36.8	36.7	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	14.8	5.0	9.3	12.2	40.5	43.6	36.8	36.7	8.2
LOS	B	B	A	A	B	D	D	D	D	A
Approach Delay		14.0			12.0		42.6		26.1	
Approach LOS		B			B		D		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 18.5		Intersection LOS: B	
Intersection Capacity Utilization 98.2%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: Thorold Townline Road & Lundys Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	209	700	128	47	497	80	93	148	46	48	106	91
Future Volume (vph)	209	700	128	47	497	80	93	148	46	48	106	91
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1597	1699	1390	1599	1638		1511	1492		1630	1496	1352
Flt Permitted	0.36	1.00	1.00	0.28	1.00		0.68	1.00		0.49	1.00	1.00
Satd. Flow (perm)	610	1699	1390	478	1638		1088	1492		839	1496	1352
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	225	753	138	51	534	86	100	159	49	52	114	98
RTOR Reduction (vph)	0	0	18	0	5	0	0	13	0	0	0	78
Lane Group Flow (vph)	225	753	120	51	615	0	100	195	0	52	114	20
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	3%	7%	4%	5%	0%	10%	16%	4%	2%	17%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		8
Actuated Green, G (s)	66.9	66.9	66.9	66.9	66.9		20.1	20.1		20.1	20.1	20.1
Effective Green, g (s)	66.9	66.9	66.9	66.9	66.9		20.1	20.1		20.1	20.1	20.1
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.67		0.20	0.20		0.20	0.20	0.20
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	408	1136	929	319	1095		218	299		168	300	271
v/s Ratio Prot		c0.44			0.38			c0.13			0.08	
v/s Ratio Perm	0.37		0.09	0.11			0.09			0.06		0.01
v/c Ratio	0.55	0.66	0.13	0.16	0.56		0.46	0.65		0.31	0.38	0.07
Uniform Delay, d1	8.7	9.8	6.0	6.1	8.8		35.2	36.7		34.0	34.6	32.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.3	3.1	0.3	1.1	2.1		3.2	6.7		2.2	1.7	0.2
Delay (s)	14.0	12.9	6.3	7.2	10.9		38.3	43.5		36.2	36.2	32.6
Level of Service	B	B	A	A	B		D	D		D	D	C
Approach Delay (s)		12.3			10.6			41.8			34.9	
Approach LOS		B			B			D			C	

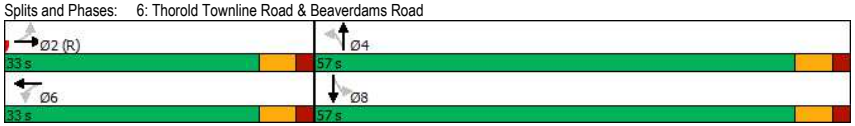
Intersection Summary					
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.66				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		13.0	
Intersection Capacity Utilization	98.2%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	22	154	54	210	24	398	14	608
Future Volume (vph)	22	154	54	210	24	398	14	608
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.5	30.5	30.5	30.5	34.0	34.0	30.5	30.5
Total Split (s)	33.0	33.0	33.0	33.0	57.0	57.0	57.0	57.0
Total Split (%)	36.7%	36.7%	36.7%	36.7%	63.3%	63.3%	63.3%	63.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		27.0		27.0		51.0		51.0
Actuated g/C Ratio		0.30		0.30		0.57		0.57
v/c Ratio		0.44		0.68		0.69		0.79
Control Delay		28.0		35.5		19.1		23.7
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		28.0		35.5		19.1		23.7
LOS		C		D		B		C
Approach Delay		28.0		35.5		19.1		23.7
Approach LOS		C		D		B		C

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 24.9		Intersection LOS: C	
Intersection Capacity Utilization 78.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 6: Thorold Townline Road & Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	154	20	54	210	27	24	398	85	14	608	23
Future Volume (vph)	22	154	20	54	210	27	24	398	85	14	608	23
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.98			1.00	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1681			1706			1455			1580	
Flt Permitted		0.94			0.90			0.95			0.99	
Satd. Flow (perm)		1594			1546			1390			1558	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	167	22	59	228	29	26	433	92	15	661	25
RTOR Reduction (vph)	0	5	0	0	4	0	0	8	0	0	1	0
Lane Group Flow (vph)	0	208	0	0	312	0	0	543	0	0	700	0
Confl. Peds. (#/hr)			5	5			6					6
Heavy Vehicles (%)	4%	1%	5%	0%	0%	3%	0%	22%	0%	14%	10%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		27.0			27.0			51.0			51.0	
Effective Green, g (s)		27.0			27.0			51.0			51.0	
Actuated g/C Ratio		0.30			0.30			0.57			0.57	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		478			463			787			882	
v/s Ratio Prot												
v/s Ratio Perm		0.13			c0.20			0.39			c0.45	
v/c Ratio		0.44			0.67			0.69			0.79	
Uniform Delay, d1		25.4			27.6			13.9			15.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.9			7.6			4.9			7.3	
Delay (s)		28.2			35.3			18.8			22.6	
Level of Service		C			D			B			C	
Approach Delay (s)		28.2			35.3			18.8			22.6	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	63	510	3	44	438
Future Volume (Veh/h)	3	63	510	3	44	438
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	3	68	548	3	47	471
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1114	550			551	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1114	550			551	
tC, single (s)	6.4	7.1			4.9	
tC, 2 stage (s)						
tF (s)	3.5	4.1			2.9	
p0 queue free %	99	83			93	
cM capacity (veh/h)	217	403			719	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	71	551	47	471
Volume Left	3	0	47	0
Volume Right	68	3	0	0
cSH	389	1700	719	1700
Volume to Capacity	0.18	0.32	0.07	0.28
Queue Length 95th (m)	5.3	0.0	1.7	0.0
Control Delay (s)	16.3	0.0	10.4	0.0
Lane LOS	C		B	
Approach Delay (s)	16.3	0.0	0.9	
Approach LOS	C			

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	47.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBR
Lane Configurations									
Traffic Volume (vph)	29	1568	840	230	1511	698	6	193	44
Future Volume (vph)	29	1568	840	230	1511	698	6	193	44
Turn Type	Perm	NA	Free	pm+pt	NA	Split	NA	Perm	Perm
Protected Phases		2		1	6	4	4		
Permitted Phases	2		Free	6				4	4
Detector Phase	2	2		1	6	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0		5.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	28.9	28.9		8.0	28.9	29.7	29.7	29.7	29.7
Total Split (s)	76.0	76.0		19.0	95.0	40.0	40.0	40.0	40.0
Total Split (%)	56.3%	56.3%		14.1%	70.4%	29.6%	29.6%	29.6%	29.6%
Yellow Time (s)	5.4	5.4		3.0	5.4	5.7	5.7	5.7	5.7
All-Red Time (s)	1.5	1.5		0.0	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.9	6.9		3.0	6.9	7.7	7.7	7.7	7.7
Lead/Lag	Lag	Lag		Lead					
Lead-Lag Optimize?	Yes	Yes		Yes					
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None
Act Effct Green (s)	69.1	69.1	135.0	92.0	88.1	32.3	32.3	32.3	32.3
Actuated g/C Ratio	0.51	0.51	1.00	0.68	0.65	0.24	0.24	0.24	0.24
v/c Ratio	0.36	0.99	0.60	1.00	0.76	0.98	1.00	0.41	0.12
Control Delay	34.1	52.4	1.8	96.5	19.1	93.0	98.3	8.0	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	52.4	1.8	96.5	19.1	93.0	98.3	8.0	8.1
LOS	C	D	A	F	B	F	F	A	A
Approach Delay		34.8			29.3		76.8		
Approach LOS		C			C		E		

Intersection Summary			
Cycle Length: 135			
Actuated Cycle Length: 135			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 40.0		Intersection LOS: D	
Intersection Capacity Utilization 107.8%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: Davis Road & Thorold Stone Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	1568	840	230	1511	1	698	6	193	0	0	44
Future Volume (vph)	29	1568	840	230	1511	1	698	6	193	0	0	44
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.9	6.9	4.0	3.0	6.9		7.7	7.7	7.7			7.7
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00			1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00			0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85			0.86
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00			1.00
Satd. Flow (prot)	1309	3260	1473	1614	3228		1564	1561	1417			1449
Flt Permitted	0.12	1.00	1.00	0.06	1.00		0.95	0.95	1.00			1.00
Satd. Flow (perm)	171	3260	1473	94	3228		1564	1561	1417			1449
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	1651	884	242	1591	1	735	6	203	0	0	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	154	0	0	35
Lane Group Flow (vph)	31	1651	884	242	1592	0	367	374	49	0	0	11
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	27%	2%	1%	3%	3%	0%	1%	33%	5%	0%	14%	3%
Turn Type	Perm	NA	Free	pm+pt	NA		Split	NA	Perm			Perm
Protected Phases		2		1	6		4	4				
Permitted Phases	2		Free	6					4			4
Actuated Green, G (s)	69.1	69.1	135.0	88.1	88.1		32.3	32.3	32.3			32.3
Effective Green, g (s)	69.1	69.1	135.0	88.1	88.1		32.3	32.3	32.3			32.3
Actuated g/C Ratio	0.51	0.51	1.00	0.65	0.65		0.24	0.24	0.24			0.24
Clearance Time (s)	6.9	6.9		3.0	6.9		7.7	7.7	7.7			7.7
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5			4.5
Lane Grp Cap (vph)	87	1668	1473	241	2106		374	373	339			346
v/s Ratio Prot		0.51		c0.12	0.49		0.23	c0.24				
v/s Ratio Perm	0.18		0.60	c0.53					0.03			0.01
v/c Ratio	0.36	0.99	0.60	1.00	0.76		0.98	1.00	0.14			0.03
Uniform Delay, d1	19.7	32.6	0.0	46.5	16.1		51.0	51.4	40.5			39.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00
Incremental Delay, d2	11.0	19.8	1.8	59.0	2.6		41.5	47.3	0.3			0.1
Delay (s)	30.7	52.4	1.8	105.5	18.7		92.6	98.6	40.8			39.4
Level of Service	C	D	A	F	B		F	F	D			D
Approach Delay (s)		34.7			30.1			83.8			39.4	
Approach LOS		C			C			F			D	

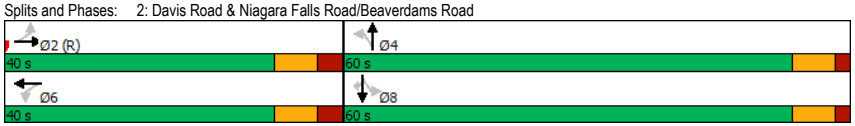
Intersection Summary					
HCM 2000 Control Delay	41.8	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	1.02				
Actuated Cycle Length (s)	135.0	Sum of lost time (s)		17.6	
Intersection Capacity Utilization	107.8%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	112	39	70	55	27	630	200	728	123
Future Volume (vph)	112	39	70	55	27	630	200	728	123
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		8
Detector Phase	2	2	6	6	4	4	8	8	8
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	25.0	25.0	25.0	25.0	25.0
Minimum Split (s)	38.1	38.1	38.1	38.1	32.0	32.0	32.0	32.0	32.0
Total Split (s)	40.0	40.0	40.0	40.0	60.0	60.0	60.0	60.0	60.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.1	3.1	3.1	3.1	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.1		8.1	7.0	7.0	7.0	7.0	7.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None	None
Act Effct Green (s)		40.9		40.9	44.0	44.0	44.0	44.0	44.0
Actuated g/C Ratio		0.41		0.41	0.44	0.44	0.44	0.44	0.44
v/c Ratio		0.45		0.53	0.13	0.50	0.89	0.54	0.18
Control Delay		27.9		35.0	14.5	20.3	61.0	21.2	2.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		27.9		35.0	14.5	20.3	61.0	21.2	2.8
LOS		C		C	B	C	E	C	A
Approach Delay		27.9		35.0		20.0		26.7	
Approach LOS		C		C		C		C	

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 25.8		Intersection LOS: C	
Intersection Capacity Utilization 86.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Davis Road & Niagara Falls Road/Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	39	32	70	55	183	27	630	46	200	728	123
Future Volume (vph)	112	39	32	70	55	183	27	630	46	200	728	123
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frt		0.98			0.92		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1624			1576		1662	3193		1630	3228	1473
Flt Permitted		0.61			0.87		0.29	1.00		0.31	1.00	1.00
Satd. Flow (perm)		1028			1391		501	3193		540	3228	1473
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	118	41	34	74	58	193	28	663	48	211	766	129
RTOR Reduction (vph)	0	7	0	0	46	0	0	6	0	0	0	72
Lane Group Flow (vph)	0	186	0	0	279	0	28	705	0	211	766	57
Heavy Vehicles (%)	1%	2%	6%	1%	1%	1%	0%	3%	4%	2%	3%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)		40.9			40.9		44.0	44.0		44.0	44.0	44.0
Effective Green, g (s)		40.9			40.9		44.0	44.0		44.0	44.0	44.0
Actuated g/C Ratio		0.41			0.41		0.44	0.44		0.44	0.44	0.44
Clearance Time (s)		8.1			8.1		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		420			568		220	1404		237	1420	648
v/s Ratio Prot								0.22			0.24	
v/s Ratio Perm		0.18			c0.20		0.06			c0.39		0.04
v/c Ratio		0.44			0.49		0.13	0.50		0.89	0.54	0.09
Uniform Delay, d1		21.3			21.9		16.6	20.1		25.8	20.6	16.3
Progression Factor		1.00			1.69		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		3.4			1.3		0.5	0.6		32.9	0.7	0.1
Delay (s)		24.7			38.2		17.2	20.7		58.6	21.3	16.4
Level of Service		C			D		B	C		E	C	B
Approach Delay (s)		24.7			38.2			20.6			27.8	
Approach LOS		C			D			C			C	

Intersection Summary					
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.70				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.1		
Intersection Capacity Utilization	86.6%	ICU Level of Service	E		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	234	832	47	830	230	54	164	252	146	204
Future Volume (vph)	234	832	47	830	230	54	164	252	146	204
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm
Protected Phases	5	2		6			4	3	8	
Permitted Phases	2		6		6	4		8		8
Detector Phase	5	2	6	6	6	4	4	3	8	8
Switch Phase										
Minimum Initial (s)	5.0	22.0	22.0	22.0	22.0	15.0	15.0	5.0	15.0	15.0
Minimum Split (s)	8.0	36.0	36.0	36.0	36.0	32.0	32.0	8.0	32.0	32.0
Total Split (s)	18.0	93.0	75.0	75.0	75.0	32.0	32.0	15.0	47.0	47.0
Total Split (%)	12.9%	66.4%	53.6%	53.6%	53.6%	22.9%	22.9%	10.7%	33.6%	33.6%
Yellow Time (s)	3.0	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	7.0	7.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	Max	Max	Max	Max	Max	None	Max	Max
Act Effct Green (s)	90.0	86.0	68.0	68.0	68.0	25.0	25.0	44.0	40.0	40.0
Actuated g/C Ratio	0.64	0.61	0.49	0.49	0.49	0.18	0.18	0.31	0.29	0.29
v/c Ratio	1.10	0.88	0.37	1.05	0.32	0.28	0.85	1.01	0.36	0.38
Control Delay	125.5	33.5	32.6	80.0	9.2	54.1	80.1	101.5	42.8	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	125.5	33.5	32.6	80.0	9.2	54.1	80.1	101.5	42.8	6.6
LOS	F	C	C	E	A	D	F	F	D	A
Approach Delay		53.1		63.2			74.9		55.1	
Approach LOS		D		E			E		E	

Intersection Summary		
Cycle Length: 140		
Actuated Cycle Length: 140		
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green		
Natural Cycle: 135		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.10		
Intersection Signal Delay: 59.1	Intersection LOS: E	
Intersection Capacity Utilization 125.0%	ICU Level of Service H	
Analysis Period (min) 15		

Splits and Phases: 3: Davis Road & Lundys Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	234	832	35	47	830	230	54	164	56	252	146	204
Future Volume (vph)	234	832	35	47	830	230	54	164	56	252	146	204
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1662	1734		1630	1750	1436	1662	1505		1645	1522	1488
Flt Permitted	0.06	1.00		0.16	1.00	1.00	0.66	1.00		0.32	1.00	1.00
Satd. Flow (perm)	99	1734		282	1750	1436	1150	1505		554	1522	1488
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	252	895	38	51	892	247	58	176	60	271	157	219
RTOR Reduction (vph)	0	1	0	0	0	78	0	9	0	0	0	156
Lane Group Flow (vph)	252	932	0	51	892	169	58	227	0	271	157	63
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	0%	0%	5%	2%	0%	1%	0%	14%	3%	1%	15%	0%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	86.0	86.0		68.0	68.0	68.0	25.0	25.0		40.0	40.0	40.0
Effective Green, g (s)	86.0	86.0		68.0	68.0	68.0	25.0	25.0		40.0	40.0	40.0
Actuated g/C Ratio	0.61	0.61		0.49	0.49	0.49	0.18	0.18		0.29	0.29	0.29
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	3.0	4.0		4.0	4.0	4.0	2.0	2.0		3.0	2.0	2.0
Lane Grp Cap (vph)	228	1065		136	850	697	205	268		251	434	425
v/s Ratio Prot	c0.12	0.54			0.51			0.15		c0.09	0.10	
v/s Ratio Perm	c0.56			0.18		0.12	0.05			c0.22		0.04
v/c Ratio	1.11	0.87		0.38	1.05	0.24	0.28	0.85		1.08	0.36	0.15
Uniform Delay, d1	48.5	22.5		22.6	36.0	21.0	49.7	55.6		47.7	39.8	37.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	90.7	10.0		7.7	44.6	0.8	3.4	26.8		79.6	2.3	0.7
Delay (s)	139.2	32.6		30.4	80.6	21.8	53.2	82.4		127.3	42.2	38.0
Level of Service	F	C		C	F	C	D	F		F	D	D
Approach Delay (s)		55.2			66.3			76.6			76.4	
Approach LOS		E			E			E			E	

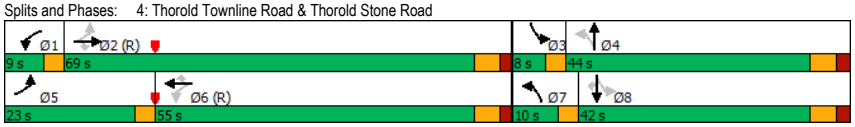
Intersection Summary				
HCM 2000 Control Delay	65.2	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.14			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	125.0%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	283	1361	102	118	1154	44	219	232	60	243	338
Future Volume (vph)	283	1361	102	118	1154	44	219	232	60	243	338
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4		8		8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	8.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.0	35.1	35.1	8.0	35.1	35.1	8.0	41.4	8.0	41.4	41.4
Total Split (s)	23.0	69.0	69.0	9.0	55.0	55.0	10.0	44.0	8.0	42.0	42.0
Total Split (%)	17.7%	53.1%	53.1%	6.9%	42.3%	42.3%	7.7%	33.8%	6.2%	32.3%	32.3%
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1	3.0	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.3	0.0	2.3	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4	3.0	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	76.0	62.9	62.9	59.0	48.9	48.9	47.2	38.2	43.0	34.6	34.6
Actuated g/C Ratio	0.58	0.48	0.48	0.45	0.38	0.38	0.36	0.29	0.33	0.27	0.27
v/c Ratio	0.98	0.89	0.16	0.92	0.97	0.08	0.79	0.98	0.42	0.58	0.60
Control Delay	84.0	38.9	6.7	89.4	59.5	0.2	54.2	79.5	36.3	47.4	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.0	38.9	6.7	89.4	59.5	0.2	54.2	79.5	36.3	47.4	13.1
LOS	F	D	A	F	E	A	D	E	D	D	B
Approach Delay		44.3			60.2			71.1		28.3	
Approach LOS		D			E			E		C	

Intersection Summary			
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 50.8		Intersection LOS: D	
Intersection Capacity Utilization 99.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Thorold Townline Road & Thorold Stone Road



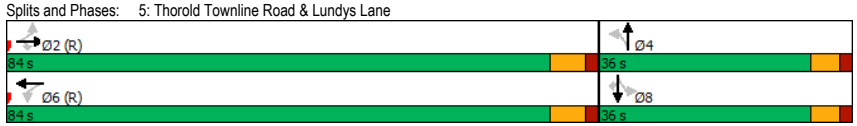
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	1361	102	118	1154	44	219	232	205	60	243	338
Future Volume (vph)	283	1361	102	118	1154	44	219	232	205	60	243	338
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		3.0	6.4	6.4
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1539	3292	1293	1498	3292	1430	1539	1505		1539	1636	1417
Flt Permitted	0.08	1.00	1.00	0.08	1.00	1.00	0.41	1.00		0.19	1.00	1.00
Satd. Flow (perm)	126	3292	1293	131	3292	1430	667	1505		310	1636	1417
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	295	1418	106	123	1202	46	228	242	214	62	253	352
RTOR Reduction (vph)	0	0	41	0	0	29	0	24	0	0	0	209
Lane Group Flow (vph)	295	1418	65	123	1202	17	228	432	0	63	253	143
Heavy Vehicles (%)	8%	1%	15%	11%	1%	4%	8%	9%	7%	8%	7%	5%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		8
Actuated Green, G (s)	72.3	62.3	62.3	55.3	48.3	48.3	45.2	38.2		39.2	35.2	35.2
Effective Green, g (s)	72.3	62.3	62.3	55.3	48.3	48.3	45.2	38.2		39.2	35.2	35.2
Actuated g/C Ratio	0.56	0.48	0.48	0.43	0.37	0.37	0.35	0.29		0.30	0.27	0.27
Clearance Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	6.4		3.0	6.4	6.4
Vehicle Extension (s)	2.5	6.0	6.0	3.0	6.0	6.0	3.0	2.3		3.0	2.3	2.3
Lane Grp Cap (vph)	298	1577	619	129	1223	531	278	442		131	442	383
v/s Ratio Prot	c0.16	0.43		0.05	0.37		c0.04	c0.29		0.01	0.15	
v/s Ratio Perm	c0.39		0.05	0.35		0.01	0.24			0.13		0.10
v/c Ratio	0.99	0.90	0.10	0.95	0.98	0.03	0.82	0.98		0.48	0.57	0.37
Uniform Delay, d1	42.0	31.0	18.6	28.3	40.4	26.0	39.6	45.5		35.0	40.9	38.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	48.8	8.6	0.3	64.5	21.9	0.1	17.3	36.5		2.8	1.3	0.4
Delay (s)	90.8	39.5	18.9	92.8	62.4	26.1	56.9	81.9		37.8	42.2	38.8
Level of Service	F	D	B	F	E	C	E	F		D	D	D
Approach Delay (s)		46.7			63.9			73.6			40.0	
Approach LOS		D			E			E			D	

Intersection Summary					
HCM 2000 Control Delay	54.9	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	1.02				
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.5		
Intersection Capacity Utilization	99.8%	ICU Level of Service	F		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	120	779	140	55	809	141	155	103	146	194
Future Volume (vph)	120	779	140	55	809	141	155	103	146	194
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		2			6		4		8	
Permitted Phases	2		2	6		4		8		8
Detector Phase	2	2	2	6	6	4	4	8	8	8
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0	35.0	35.0	35.0	35.0	35.0
Total Split (s)	84.0	84.0	84.0	84.0	84.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	70.0%	70.0%	70.0%	70.0%	70.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	82.4	82.4	82.4	82.4	82.4	24.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.69	0.20	0.20	0.20	0.20	0.20
v/c Ratio	0.66	0.73	0.15	0.22	0.82	0.81	0.70	0.79	0.47	0.48
Control Delay	32.0	17.7	5.4	11.0	22.3	74.2	51.5	79.7	45.6	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	17.7	5.4	11.0	22.3	74.2	51.5	79.7	45.6	12.7
LOS	C	B	A	B	C	E	D	E	D	B
Approach Delay		17.7			21.6		60.4		39.1	
Approach LOS		B			C		E		D	

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 27.9		Intersection LOS: C	
Intersection Capacity Utilization 110.2%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 5: Thorold Townline Road & Lundys Lane



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	779	140	55	809	66	141	155	62	103	146	194
Future Volume (vph)	120	779	140	55	809	66	141	155	62	103	146	194
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	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	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1599	1716	1444	1614	1706		1568	1606		1662	1651	1473
Flt Permitted	0.18	1.00	1.00	0.23	1.00		0.57	1.00		0.40	1.00	1.00
Satd. Flow (perm)	295	1716	1444	393	1706		937	1606		698	1651	1473
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	132	856	154	60	889	73	155	170	68	113	160	213
RTOR Reduction (vph)	0	0	17	0	2	0	0	13	0	0	0	140
Lane Group Flow (vph)	132	856	137	60	960	0	155	225	0	113	160	73
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	4%	2%	3%	3%	1%	4%	6%	6%	0%	0%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		2			6			4			8	
Permitted Phases	2		2	6			4			8		8
Actuated Green, G (s)	82.4	82.4	82.4	82.4	82.4		24.6	24.6		24.6	24.6	24.6
Effective Green, g (s)	82.4	82.4	82.4	82.4	82.4		24.6	24.6		24.6	24.6	24.6
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.69		0.21	0.21		0.21	0.21	0.21
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	202	1178	991	269	1171		192	329		143	338	301
v/s Ratio Prot		0.50			c0.56			0.14			0.10	
v/s Ratio Perm	0.45		0.10	0.15			c0.17			0.16		0.05
v/c Ratio	0.65	0.73	0.14	0.22	0.82		0.81	0.68		0.79	0.47	0.24
Uniform Delay, d1	10.7	11.8	6.5	7.0	13.5		45.4	44.1		45.3	42.0	39.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.3	3.9	0.3	1.9	6.5		24.0	7.4		28.1	2.2	0.9
Delay (s)	26.0	15.7	6.8	8.9	19.9		69.4	51.5		73.4	44.2	40.8
Level of Service	C	B	A	A	B		E	D		E	D	D
Approach Delay (s)		15.7			19.3			58.6			49.5	
Approach LOS		B			B			E			D	

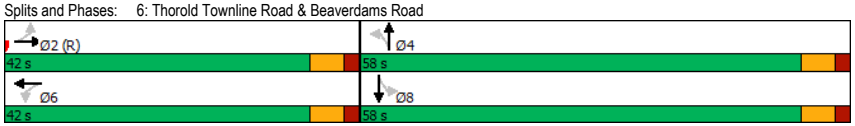
Intersection Summary					
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.82				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0		
Intersection Capacity Utilization	110.2%	ICU Level of Service	H		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	32	254	127	218	33	618	25	398
Future Volume (vph)	32	254	127	218	33	618	25	398
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		4		8
Permitted Phases	2		6		4		8	
Detector Phase	2	2	6	6	4	4	8	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	32.0	32.0	32.0	32.0	35.0	35.0	35.0	35.0
Total Split (s)	42.0	42.0	42.0	42.0	58.0	58.0	58.0	58.0
Total Split (%)	42.0%	42.0%	42.0%	42.0%	58.0%	58.0%	58.0%	58.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	Max	Max	None	None	None	None
Act Effct Green (s)		36.0		36.0		52.0		52.0
Actuated g/C Ratio		0.36		0.36		0.52		0.52
v/c Ratio		0.57		0.95		0.99		0.66
Control Delay		22.0		65.1		54.9		22.5
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		22.0		65.1		54.9		22.5
LOS		C		E		D		C
Approach Delay		22.0		65.1		54.9		22.5
Approach LOS		C		E		D		C

Intersection Summary			
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 43.5		Intersection LOS: D	
Intersection Capacity Utilization 108.6%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 6: Thorold Townline Road & Beaverdams Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	254	20	127	218	26	33	618	96	25	398	50
Future Volume (vph)	32	254	20	127	218	26	33	618	96	25	398	50
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.98			0.99	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1705			1698			1601			1559	
Flt Permitted		0.93			0.67			0.96			0.94	
Satd. Flow (perm)		1597			1162			1545			1465	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	34	273	22	137	234	28	35	665	103	27	428	54
RTOR Reduction (vph)	0	3	0	0	3	0	0	5	0	0	4	0
Lane Group Flow (vph)	0	326	0	0	396	0	0	798	0	0	505	0
Confl. Peds. (#/hr)	1		5	5		1	8		3	3		8
Heavy Vehicles (%)	6%	0%	5%	0%	0%	0%	3%	8%	0%	4%	11%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		36.0			36.0			52.0			52.0	
Effective Green, g (s)		36.0			36.0			52.0			52.0	
Actuated g/C Ratio		0.36			0.36			0.52			0.52	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		574			418			803			761	
v/s Ratio Prot												
v/s Ratio Perm		0.20			c0.34			c0.52			0.34	
v/c Ratio		0.57			0.95			0.99			0.66	
Uniform Delay, d1		25.8			31.1			23.8			17.6	
Progression Factor		0.72			1.00			1.00			1.00	
Incremental Delay, d2		3.3			32.8			30.1			2.9	
Delay (s)		21.8			63.9			53.9			20.5	
Level of Service		C			E			D			C	
Approach Delay (s)		21.8			63.9			53.9			20.5	
Approach LOS		C			E			D			C	

Intersection Summary					
HCM 2000 Control Delay	42.3	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.97				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0		
Intersection Capacity Utilization	108.6%	ICU Level of Service	G		
Analysis Period (min)	15				

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	44	560	3	44	491
Future Volume (Veh/h)	3	44	560	3	44	491
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	3	48	615	3	48	540
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1252	616			618	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1252	616			618	
tC, single (s)	6.4	7.0			4.9	
tC, 2 stage (s)						
tF (s)	3.5	4.0			2.9	
p0 queue free %	98	87			93	
cM capacity (veh/h)	178	372			673	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	51	618	48	540
Volume Left	3	0	48	0
Volume Right	48	3	0	0
cSH	350	1700	673	1700
Volume to Capacity	0.15	0.36	0.07	0.32
Queue Length 95th (m)	4.0	0.0	1.8	0.0
Control Delay (s)	17.0	0.0	10.8	0.0
Lane LOS	C		B	
Approach Delay (s)	17.0	0.0	0.9	
Approach LOS	C			

Intersection Summary				
Average Delay			1.1	
Intersection Capacity Utilization			48.9%	ICU Level of Service
Analysis Period (min)			15	

APPENDIX F

SimTraffic Queueing Reports

Table F-1 2018 Existing and 2023 Baseline Queuing Analysis

Intersection	Movement	Available Storage (m)	95th Percentile Queue Length (m)			
			2018 Existing		2023 Baseline	
			AM	PM	AM	PM
Davis Road at Thorold Stone Road	EBL	105	11	17	12	20
	EBR	50	-	18	-	16
	WBL	70	27	47	37	**117**
	NBL	275	60	54	63	58
	NBR	80	-	-	-	6
	SBL	30	4	4	3	5
Davis Road at Niagara Falls Road / Beaverdams Road	NBL	80	8	6	6	5
	SBL	140	26	51	27	50
	SBR	180	-	2	-	2
Davis Road at Lundy's Lane	EBL	85	29	35	34	36
	WBL	65	17	12	18	17
	WBR	80	11	14	12	15
	NBL	55	19	21	18	18
	SBL	90	32	24	33	26
	SBR	100	19	17	18	20
Thorold Townline Road at Thorold Stone Road	EBL	100	83	66	**108**	72
	EBR	50	12	8	12	9
	WBL	85	16	18	20	22
	WBR	90	18	12	22	14
	NBL	80	35	30	31	31
	SBL	75	26	44	26	75
Thorold Townline Road at Lundy's Lane	EBL	90	19	18	23	17
	EBR	20	20	**25**	**27**	**27**
	WBL	55	14	18	16	19
	NBL	25	**27**	**35**	**35**	**41**
	SBL	25	11	15	12	20
	SBTR	-	42	49	49	52
Thorold Townline Road at Beaverdams Road	EBLTR	-	19	34	21	34
	WBLTR	-	19	21	19	20
	NBLTR	-	28	31	34	34
	SBLTR	-	26	26	25	29
Thorold Townline Road at Upper's Lane	WBLR	-	2	5	3	5
	SBLT	-	-	2	-	-

Table F-2 2025 Future Background and 2025 Future Total Queuing Analysis

Intersection	Movement	Available Storage (m)	95th Percentile Queue Length (m)			
			2025 Background		2025 Total	
			AM	PM	AM	PM
Davis Road at Thorold Stone Road	EBL	105	11	19	12	20
	EBR	50	-	**58**	**-**	**109**
	WBL	70	52	52	55	51
	NBL	275	85	102	81	96
	NBR	80	12	18	10	17
	SBL	30	3	3	2	5
Davis Road at Niagara Falls Road / Beaverdams Road	NBL	80	14	9	10	10
	SBL	140	32	51	36	53
	SBR	180	-	3	-	4
Davis Road at Lundy's Lane	EBL	85	45	85	53	**129**
	WBL	65	24	22	25	48
	WBR	80	29	49	27	80
	NBL	55	18	24	19	24
	SBL	90	58	**155**	66	**130**
	SBR	100	31	37	27	40
Thorold Townline Road at Thorold Stone Road	EBL	100	**138**	**128**	**147**	**130**
	EBR	50	20	14	26	**66**
	WBL	85	34	36	**89**	41
	WBR	90	18	14	76	14
	NBL	80	41	44	64	55
	SBL	75	57	**101**	**201**	**205**
Thorold Townline Road at Lundy's Lane	EBL	90	38	27	39	30
	EBR	20	**23**	**21**	**27**	18
	WBL	55	15	18	17	21
	NBL	25	**38**	**50**	**34**	**46**
	SBL	25	14	**29**	**17**	**27**
	SBR	30	20	30	20	**36**
Thorold Townline Road at Beaverdams Road	EBLTR	-	39	56	53	62
	WBLTR	-	34	55	46	52
	NBLTR	-	85	95	78	113
	SBLTR	-	96	76	78	93
Thorold Townline Road at Upper's Lane	WBLR	-	-	-	28	25
	SBL	15	-	-	**20**	**19**

Table F-3 2035 Future Background and 2035 Future Total Queuing Analysis

Intersection	Movement	Available Storage (m)	95th Percentile Queue Length (m)			
			2035 Background		2035 Total	
			AM	PM	AM	PM
Davis Road at Thorold Stone Road	EBL	105	17	82	16	77
	EBR	50	11	**167**	35	**167**
	WBL	70	47	**94**	50	**83**
	NBL	275	93	123	104	107
	NBR	80	48	69	69	44
Davis Road at Niagara Falls Road / Beaverdams Road	NBL	80	17	14	18	15
	SBL	140	33	52	33	62
	SBR	180	-	5	-	6
Davis Road at Lundy's Lane	EBL	85	80	**197**	68	**198**
	WBL	65	33	**145**	29	**132**
	WBR	80	23	**221**	21	**224**
	NBL	55	24	24	19	26
	SBL	90	68	**200**	59	**220**
	SBR	100	37	83	38	75
Thorold Townline Road at Thorold Stone Road	EBL	100	**192**	**131**	**232**	**139**
	EBR	50	32	37	38	**51**
	WBL	85	61	85	**143**	**122**
	WBR	90	35	47	**107**	39
	NBL	80	62	73	**117**	**214**
	SBL	75	33	26	39	58
	SBR	75	60	73	63	**104**
Thorold Townline Road at Lundy's Lane	EBL	90	**93**	**129**	83	**202**
	EBR	20	**43**	**51**	**41**	**57**
	WBL	55	18	34	22	41
	NBL	25	**37**	**80**	**33**	**68**
	SBL	25	22	**56**	24	**54**
	SBR	30	25	**59**	23	**60**
Thorold Townline Road at Beaverdams Road	EBLTR	-	49	62	53	59
	WBLTR	-	64	152	67	177
	NBLTR	-	104	491	241	941
	SBLTR	-	97	253	189	868
Thorold Townline Road at Upper's Lane	WBLR	-	-	-	29	27
	SBL	15	-	-	**24**	**25**

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:15	7:15	7:15	7:15	7:15	7:15
End Time	8:45	8:45	8:45	8:45	8:45	8:45
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	4124	4148	4132	4287	4213	4182
Vehs Exited	4140	4179	4130	4327	4181	4192
Starting Vehs	211	218	201	243	191	215
Ending Vehs	195	187	203	203	223	198
Travel Distance (km)	10406	10480	10474	10934	10522	10563
Travel Time (hr)	197.2	199.4	200.3	210.7	199.6	201.4
Total Delay (hr)	57.3	58.2	59.4	63.4	57.7	59.2
Total Stops	4633	4637	4803	5071	4690	4772
Fuel Used (l)	870.4	874.0	881.4	921.8	870.8	883.7

Interval #0 Information Seeding

Start Time	7:15
End Time	7:45
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:45
End Time	8:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	4124	4148	4132	4287	4213	4182
Vehs Exited	4140	4179	4130	4327	4181	4192
Starting Vehs	211	218	201	243	191	215
Ending Vehs	195	187	203	203	223	198
Travel Distance (km)	10406	10480	10474	10934	10522	10563
Travel Time (hr)	197.2	199.4	200.3	210.7	199.6	201.4
Total Delay (hr)	57.3	58.2	59.4	63.4	57.7	59.2
Total Stops	4633	4637	4803	5071	4690	4772
Fuel Used (l)	870.4	874.0	881.4	921.8	870.8	883.7

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	L	T	TR	L	LT	L	T
Maximum Queue (m)	18.8	72.9	57.6	33.5	101.7	102.0	68.4	73.0	5.4	10.0
Average Queue (m)	3.4	34.6	18.6	12.6	38.7	42.0	36.6	41.5	0.3	0.6
95th Queue (m)	11.2	60.6	44.3	26.7	81.7	88.7	59.8	65.0	3.7	4.6
Link Distance (m)		367.0	367.0		315.3	315.3	1000.6	1000.6		265.6
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	105.0			70.0					30.0	
Storage Blk Time (%)			0		2			0		
Queuing Penalty (veh)			0		1			0		

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T
Maximum Queue (m)	43.1	32.9	14.8	43.8	49.8	32.2	47.7	35.2
Average Queue (m)	15.4	12.4	1.2	21.8	26.3	13.0	22.1	8.5
95th Queue (m)	34.2	25.1	7.6	39.9	46.7	25.7	39.9	25.5
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)			80.0			140.0		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	35.0	56.0	22.3	51.3	15.1	27.8	64.6	39.5	48.2	26.5
Average Queue (m)	13.2	23.5	5.6	19.0	3.1	6.4	29.1	14.0	16.9	7.4
95th Queue (m)	29.0	45.9	16.9	42.4	11.2	18.6	54.4	31.7	38.3	19.0
Link Distance (m)		266.3		1923.8			458.7		610.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0
Storage Blk Time (%)				0			1			
Queuing Penalty (veh)				0			0			

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (m)	97.6	55.2	56.9	18.6	24.1	84.9	79.7	24.5	46.3	59.5	32.3	104.1
Average Queue (m)	48.0	19.6	23.4	3.1	5.2	54.7	44.5	7.4	15.9	21.3	11.5	48.7
95th Queue (m)	83.2	45.2	48.9	12.1	16.3	82.5	74.4	18.0	35.2	43.0	26.1	86.6
Link Distance (m)		279.0	279.0			338.6	338.6			1028.0		311.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	100.0			50.0	85.0			90.0	80.0		75.0	
Storage Blk Time (%)	1		1			0	0			0		2
Queuing Penalty (veh)	2		0			0	0			0		1

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	TR
Maximum Queue (m)	24.4	59.8	38.8	21.3	47.2	30.7	63.3	14.2	56.8
Average Queue (m)	7.7	23.9	5.1	4.5	17.8	12.9	24.4	3.5	20.5
95th Queue (m)	19.3	50.6	20.3	14.0	37.5	26.7	49.0	11.0	41.9
Link Distance (m)		1923.8			479.5		741.7		1500.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0	
Storage Blk Time (%)		8	0		0	4	12		8
Queuing Penalty (veh)		11	0		0	6	8		1

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	24.7	23.6	33.1	34.1
Average Queue (m)	11.5	10.5	16.8	15.8
95th Queue (m)	19.5	18.7	27.8	26.5
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

Movement	WB
Directions Served	LR
Maximum Queue (m)	4.0
Average Queue (m)	0.2
95th Queue (m)	1.9
Link Distance (m)	1027.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 32

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:45	3:45	3:45	3:45	3:45	3:45
End Time	5:15	5:15	5:15	5:15	5:15	5:15
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	4981	5188	5088	5136	4990	5075
Vehs Exited	5003	5245	5119	5166	5013	5111
Starting Vehs	290	294	257	251	258	264
Ending Vehs	268	237	226	221	235	236
Travel Distance (km)	12740	13012	12799	12764	12504	12764
Travel Time (hr)	254.6	263.5	251.5	251.6	246.4	253.5
Total Delay (hr)	83.3	88.5	80.2	79.6	78.3	82.0
Total Stops	6165	6330	6024	5936	5896	6068
Fuel Used (l)	1070.8	1088.1	1070.5	1069.7	1037.8	1067.4

Interval #0 Information Seeding

Start Time	3:45
End Time	4:15
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	4:15
End Time	5:15
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	4981	5188	5088	5136	4990	5075
Vehs Exited	5003	5245	5119	5166	5013	5111
Starting Vehs	290	294	257	251	258	264
Ending Vehs	268	237	226	221	235	236
Travel Distance (km)	12740	13012	12799	12764	12504	12764
Travel Time (hr)	254.6	263.5	251.5	251.6	246.4	253.5
Total Delay (hr)	83.3	88.5	80.2	79.6	78.3	82.0
Total Stops	6165	6330	6024	5936	5896	6068
Fuel Used (l)	1070.8	1088.1	1070.5	1069.7	1037.8	1067.4

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LT	L	T
Maximum Queue (m)	23.8	106.8	98.6	33.1	53.2	99.0	105.0	62.7	66.4	6.9	15.0
Average Queue (m)	5.7	54.6	43.3	1.1	22.5	41.7	44.0	34.5	37.7	0.8	2.6
95th Queue (m)	17.3	94.1	85.8	18.3	46.8	81.2	84.6	54.1	57.6	4.0	9.7
Link Distance (m)		367.0	367.0			315.3	315.3	1000.6	1000.6		265.6
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	105.0			50.0	70.0					30.0	
Storage Blk Time (%)		0	4	0	0	2			0		0
Queuing Penalty (veh)		0	18	0	0	1			0		0

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T	R
Maximum Queue (m)	36.0	51.2	8.9	39.8	47.1	58.0	45.5	38.9	3.1
Average Queue (m)	13.4	18.0	1.2	21.2	24.4	28.7	24.9	11.0	0.1
95th Queue (m)	28.0	36.8	5.7	36.6	43.3	51.0	41.4	29.9	2.2
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)			80.0			140.0			180.0
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	41.2	71.2	17.0	84.2	19.9	25.6	51.3	34.3	49.4	22.6
Average Queue (m)	17.7	38.6	4.0	43.7	5.8	9.7	22.6	9.8	13.0	6.8
95th Queue (m)	34.9	65.1	12.4	73.3	14.4	21.3	45.4	23.8	33.3	16.7
Link Distance (m)		266.3		1923.8			458.7		610.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0
Storage Blk Time (%)		0		2			0			
Queuing Penalty (veh)		0		2			0			

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (m)	76.6	83.0	87.5	12.4	25.2	82.2	80.9	15.0	37.6	48.1	86.1	141.3
Average Queue (m)	36.6	34.7	39.3	2.0	6.7	52.7	41.5	3.7	14.2	17.8	10.7	75.0
95th Queue (m)	65.9	74.4	80.5	8.3	18.0	78.3	70.8	11.6	29.8	37.2	44.5	130.9
Link Distance (m)		279.0	279.0			338.6	338.6			1028.0		311.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	100.0			50.0	85.0			90.0	80.0		75.0	
Storage Blk Time (%)	0	0	5			0	0					14
Queuing Penalty (veh)	1	0	2			0	0					7

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	TR
Maximum Queue (m)	24.3	72.8	43.7	25.7	66.6	41.6	47.8	19.5	56.4
Average Queue (m)	6.7	30.7	8.3	6.6	27.6	19.5	20.5	5.3	26.4
95th Queue (m)	18.2	62.5	24.6	18.1	51.7	35.3	41.6	15.0	49.4
Link Distance (m)		1923.8			479.5		741.7		1500.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0	
Storage Blk Time (%)		11	0		1	8	10	0	14
Queuing Penalty (veh)		15	2		0	13	10	0	4

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	40.9	30.3	40.3	32.6
Average Queue (m)	20.2	10.9	18.0	15.9
95th Queue (m)	34.3	21.5	30.7	26.3
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	10.8	3.1
Average Queue (m)	0.6	0.1
95th Queue (m)	5.1	1.6
Link Distance (m)	1027.2	1091.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 75

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:15	7:15	7:15	7:15	7:15	7:15
End Time	8:45	8:45	8:45	8:45	8:45	8:45
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	4581	4634	4643	4626	4553	4609
Vehs Exited	4622	4684	4630	4608	4575	4624
Starting Vehs	263	242	213	231	216	233
Ending Vehs	222	192	226	249	194	216
Travel Distance (km)	11433	11859	11704	11536	11498	11606
Travel Time (hr)	226.7	233.1	227.1	226.0	227.4	228.1
Total Delay (hr)	72.6	73.5	69.3	70.2	72.0	71.5
Total Stops	5491	5572	5344	5412	5488	5462
Fuel Used (l)	968.5	997.0	978.6	969.9	965.8	975.9

Interval #0 Information Seeding

Start Time	7:15
End Time	7:45
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:45
End Time	8:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	4581	4634	4643	4626	4553	4609
Vehs Exited	4622	4684	4630	4608	4575	4624
Starting Vehs	263	242	213	231	216	233
Ending Vehs	222	192	226	249	194	216
Travel Distance (km)	11433	11859	11704	11536	11498	11606
Travel Time (hr)	226.7	233.1	227.1	226.0	227.4	228.1
Total Delay (hr)	72.6	73.5	69.3	70.2	72.0	71.5
Total Stops	5491	5572	5344	5412	5488	5462
Fuel Used (l)	968.5	997.0	978.6	969.9	965.8	975.9

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	L	T	TR	L	LT	L	T
Maximum Queue (m)	17.6	91.5	83.6	40.2	96.4	100.4	66.2	73.0	5.7	10.9
Average Queue (m)	4.4	43.6	29.0	18.2	43.2	46.2	38.9	42.2	0.2	1.0
95th Queue (m)	12.3	73.8	63.4	37.0	86.4	91.3	62.6	65.9	2.9	6.5
Link Distance (m)		367.0	367.0		315.3	315.3	1000.6	1000.6		265.6
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	105.0			70.0					30.0	
Storage Blk Time (%)		0	1		2			0		
Queuing Penalty (veh)		0	2		1			0		

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T
Maximum Queue (m)	36.1	44.4	9.3	48.4	55.7	32.6	57.9	37.8
Average Queue (m)	15.8	15.1	1.0	22.5	27.0	14.6	21.4	6.3
95th Queue (m)	30.9	31.1	6.1	42.1	48.7	27.5	41.9	23.8
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)			80.0			140.0		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	45.8	83.9	22.6	59.3	15.1	25.1	68.4	44.7	50.5	24.2
Average Queue (m)	16.5	30.9	7.2	22.9	3.7	6.4	34.4	15.1	18.7	7.6
95th Queue (m)	33.8	63.1	18.4	49.6	11.6	18.1	60.9	32.9	39.3	18.2
Link Distance (m)		266.3		1923.8			458.7		610.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0
Storage Blk Time (%)		0		0			2			
Queuing Penalty (veh)		0		0			1			

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (m)	115.5	74.1	62.9	20.5	25.6	101.4	93.9	31.6	37.4	76.2	37.5	115.8
Average Queue (m)	65.4	23.2	28.5	3.0	6.8	60.8	51.8	9.7	14.0	25.9	11.3	51.2
95th Queue (m)	108.3	55.4	56.1	12.1	19.6	91.0	82.2	22.2	30.6	53.8	26.3	98.9
Link Distance (m)		279.0	279.0			338.6	338.6			1028.0		311.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	100.0			50.0	85.0			90.0	80.0		75.0	
Storage Blk Time (%)	3		1			1	0			0		6
Queuing Penalty (veh)	10		0			0	0			0		3

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	TR
Maximum Queue (m)	31.9	72.8	64.0	21.8	49.3	55.6	74.6	15.3	65.7
Average Queue (m)	9.2	29.0	6.9	6.0	19.7	16.4	27.2	4.1	23.5
95th Queue (m)	22.8	60.5	27.4	15.8	40.4	35.5	54.5	11.6	48.9
Link Distance (m)		1923.8			479.5		741.7		1500.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0	
Storage Blk Time (%)		11	0		0	6	15	0	10
Queuing Penalty (veh)		17	1		0	10	11	0	1

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	27.5	26.4	47.4	27.2
Average Queue (m)	12.5	10.6	19.2	15.2
95th Queue (m)	21.2	19.5	34.3	24.9
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

Movement	WB
Directions Served	LR
Maximum Queue (m)	5.4
Average Queue (m)	0.3
95th Queue (m)	2.6
Link Distance (m)	1027.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 60

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:45	3:45	3:45	3:45	3:45	3:45
End Time	5:15	5:15	5:15	5:15	5:15	5:15
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	5531	5664	5626	5574	5593	5594
Vehs Exited	5524	5656	5603	5605	5602	5597
Starting Vehs	298	319	257	311	308	298
Ending Vehs	305	327	280	280	299	293
Travel Distance (km)	13793	14127	13790	14092	13842	13929
Travel Time (hr)	284.7	304.8	289.4	288.8	287.0	290.9
Total Delay (hr)	99.1	115.0	104.2	99.5	100.9	103.8
Total Stops	6710	7082	7026	6722	6781	6868
Fuel Used (l)	1168.6	1208.5	1168.1	1188.9	1170.3	1180.9

Interval #0 Information Seeding

Start Time	3:45
End Time	4:15
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	4:15
End Time	5:15
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	5531	5664	5626	5574	5593	5594
Vehs Exited	5524	5656	5603	5605	5602	5597
Starting Vehs	298	319	257	311	308	298
Ending Vehs	305	327	280	280	299	293
Travel Distance (km)	13793	14127	13790	14092	13842	13929
Travel Time (hr)	284.7	304.8	289.4	288.8	287.0	290.9
Total Delay (hr)	99.1	115.0	104.2	99.5	100.9	103.8
Total Stops	6710	7082	7026	6722	6781	6868
Fuel Used (l)	1168.6	1208.5	1168.1	1188.9	1170.3	1180.9

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LT	R	L	T
Maximum Queue (m)	27.8	121.8	117.5	23.4	87.3	123.9	126.5	68.9	76.3	8.6	5.5	10.6
Average Queue (m)	6.9	60.2	48.9	0.8	47.4	54.7	52.6	35.7	39.0	0.3	0.9	1.9
95th Queue (m)	19.8	99.5	91.6	16.5	117.5	111.1	101.1	58.1	62.2	6.1	4.7	7.7
Link Distance (m)		367.0	367.0			315.3	315.3	1000.6	1000.6			265.6
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	105.0			50.0	70.0					80.0	30.0	
Storage Blk Time (%)		1	6		19	3			0			
Queuing Penalty (veh)		0	28		118	3			0			

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T	R
Maximum Queue (m)	36.6	39.9	7.4	46.7	49.2	63.6	48.9	37.2	3.0
Average Queue (m)	15.1	18.6	1.1	21.9	26.9	29.5	26.2	10.1	0.1
95th Queue (m)	29.4	35.2	5.0	41.5	47.3	50.1	42.3	27.4	2.1
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)			80.0			140.0			180.0
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	42.6	86.0	23.0	92.4	19.7	24.4	56.4	32.9	37.9	25.1
Average Queue (m)	19.1	46.5	7.0	48.2	5.7	7.8	24.1	12.5	11.9	8.1
95th Queue (m)	36.0	79.6	17.2	81.2	14.6	18.5	43.9	25.9	28.5	19.6
Link Distance (m)		266.3		1923.8			458.7		610.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0
Storage Blk Time (%)		0		3			0			
Queuing Penalty (veh)		1		3			0			

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	B24	B24	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	R	T	T	L	T	T	R	L	TR
Maximum Queue (m)	87.4	87.6	93.6	13.6	125.7	126.2	27.3	102.0	97.3	20.6	37.5	45.3
Average Queue (m)	41.1	40.8	46.0	2.6	4.2	6.3	9.1	62.9	52.0	5.0	15.9	19.1
95th Queue (m)	71.7	82.2	87.0	9.5	63.7	78.7	21.7	92.5	85.4	13.6	30.7	40.7
Link Distance (m)		279.0	279.0		315.3	315.3		338.6	338.6			1028.0
Upstream Blk Time (%)					0	0						
Queuing Penalty (veh)					0	0						
Storage Bay Dist (m)	100.0			50.0			85.0			90.0	80.0	
Storage Blk Time (%)	0		8					1	0			
Queuing Penalty (veh)	1		3					0	0			

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (m)	114.1	199.0
Average Queue (m)	16.6	111.7
95th Queue (m)	75.4	190.7
Link Distance (m)		311.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	75.0	
Storage Blk Time (%)		40
Queuing Penalty (veh)		21

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	TR
Maximum Queue (m)	21.4	92.6	41.4	27.7	78.3	49.4	60.2	31.0	62.2
Average Queue (m)	6.9	35.8	8.5	8.2	32.2	21.9	26.0	6.0	26.2
95th Queue (m)	17.3	72.4	27.1	19.4	60.1	40.7	48.6	19.6	51.7
Link Distance (m)		1923.8			479.5		741.7		1500.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0	
Storage Blk Time (%)		16	0		1	10	12	0	13
Queuing Penalty (veh)		22	1		1	19	13	0	4

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	40.0	25.2	40.6	35.9
Average Queue (m)	20.3	11.4	19.3	17.6
95th Queue (m)	34.0	19.6	33.8	29.4
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

Movement	WB
Directions Served	LR
Maximum Queue (m)	10.8
Average Queue (m)	0.7
95th Queue (m)	5.5
Link Distance (m)	1027.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 238

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:15	7:15	7:15	7:15	7:15	7:15
End Time	8:45	8:45	8:45	8:45	8:45	8:45
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	5517	5464	5462	5613	5506	5513
Vehs Exited	5570	5492	5444	5630	5449	5519
Starting Vehs	351	355	337	341	292	331
Ending Vehs	298	327	355	324	349	329
Travel Distance (km)	15710	15187	15295	15580	15095	15374
Travel Time (hr)	334.3	322.8	322.9	331.5	311.6	324.6
Total Delay (hr)	122.0	118.2	116.5	121.2	108.0	117.2
Total Stops	7447	7248	7206	7537	6943	7274
Fuel Used (l)	1318.4	1276.4	1284.9	1311.7	1259.0	1290.1

Interval #0 Information Seeding

Start Time	7:15
End Time	7:45
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:45
End Time	8:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	5517	5464	5462	5613	5506	5513
Vehs Exited	5570	5492	5444	5630	5449	5519
Starting Vehs	351	355	337	341	292	331
Ending Vehs	298	327	355	324	349	329
Travel Distance (km)	15710	15187	15295	15580	15095	15374
Travel Time (hr)	334.3	322.8	322.9	331.5	311.6	324.6
Total Delay (hr)	122.0	118.2	116.5	121.2	108.0	117.2
Total Stops	7447	7248	7206	7537	6943	7274
Fuel Used (l)	1318.4	1276.4	1284.9	1311.7	1259.0	1290.1

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	L	T	TR	L	LT	R	L	T
Maximum Queue (m)	14.4	84.9	78.6	60.8	99.2	103.4	94.1	96.3	27.5	2.4	11.2
Average Queue (m)	3.5	46.6	35.0	24.5	44.7	48.2	61.0	64.3	0.9	0.3	0.9
95th Queue (m)	10.8	77.2	66.7	51.8	91.3	97.1	84.8	87.7	11.7	3.0	6.3
Link Distance (m)		367.0	367.0		315.3	315.3	1000.6	1000.6			265.6
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	105.0			70.0					80.0	30.0	
Storage Blk Time (%)			1	0	3			2			
Queuing Penalty (veh)			3	2	3			5			

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T
Maximum Queue (m)	48.0	52.8	17.9	71.2	78.3	36.7	57.8	53.3
Average Queue (m)	19.3	20.4	4.7	33.6	41.6	17.1	28.5	13.4
95th Queue (m)	38.8	41.8	13.8	56.5	67.1	32.4	48.5	36.1
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)			80.0			140.0		
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	50.0	102.1	31.8	71.2	42.8	25.7	73.3	67.3	49.6	41.1
Average Queue (m)	25.2	45.0	10.2	37.2	14.9	5.7	32.5	35.9	18.6	14.3
95th Queue (m)	45.0	84.9	24.2	64.1	29.4	18.0	60.6	57.6	41.7	30.6
Link Distance (m)		266.3		1920.7			458.7		610.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0
Storage Blk Time (%)		1		1			2	0		
Queuing Penalty (veh)		1		1			0	0		

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	B24	B24	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	R	T	T	L	T	T	R	L	TR
Maximum Queue (m)	153.1	130.7	136.0	23.8	187.7	126.0	42.0	143.8	136.4	21.4	52.1	77.0
Average Queue (m)	80.7	53.9	57.4	9.7	6.3	4.2	19.2	90.0	80.3	9.2	20.1	32.1
95th Queue (m)	138.1	103.2	98.9	20.2	78.5	63.8	34.5	132.0	122.4	18.5	41.1	62.4
Link Distance (m)		279.0	279.0		315.3	315.3		338.6	338.6			1028.0
Upstream Blk Time (%)					0	0						
Queuing Penalty (veh)					0	0						
Storage Bay Dist (m)	100.0			50.0			85.0			90.0	80.0	
Storage Blk Time (%)	9	0	14					13	5			0
Queuing Penalty (veh)	36	1	14					15	4			0

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (m)	94.5	181.7
Average Queue (m)	16.1	105.4
95th Queue (m)	57.2	173.0
Link Distance (m)		311.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	75.0	
Storage Blk Time (%)		32
Queuing Penalty (veh)		18

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	T	R
Maximum Queue (m)	46.2	75.8	43.0	17.1	59.9	53.9	59.7	17.9	57.1	28.4
Average Queue (m)	20.4	34.6	7.1	5.9	26.0	18.0	26.3	4.9	18.1	8.3
95th Queue (m)	37.9	66.7	22.8	15.2	49.8	38.2	51.3	13.7	41.5	20.0
Link Distance (m)		1920.7			479.5		741.7		1500.2	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0		30.0
Storage Blk Time (%)		13	0		0	7	14	0	7	0
Queuing Penalty (veh)		35	1		0	12	11	0	6	0

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	47.3	39.2	106.6	109.2
Average Queue (m)	17.8	16.1	46.8	55.8
95th Queue (m)	38.7	34.0	84.8	95.8
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

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)

Network Summary

Network wide Queuing Penalty: 171

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:45	3:45	3:45	3:45	3:45	3:45
End Time	5:15	5:15	5:15	5:15	5:15	5:15
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	6446	6522	6630	6514	6551	6532
Vehs Exited	6512	6565	6715	6550	6572	6583
Starting Vehs	443	441	485	473	421	455
Ending Vehs	377	398	400	437	400	400
Travel Distance (km)	18609	19050	19009	18846	18525	18808
Travel Time (hr)	421.0	437.2	446.7	435.0	420.8	432.2
Total Delay (hr)	170.4	180.5	191.4	181.3	171.2	178.9
Total Stops	9302	9798	9917	9746	9520	9651
Fuel Used (l)	1566.1	1606.2	1613.5	1598.2	1555.7	1587.9

Interval #0 Information Seeding

Start Time	3:45
End Time	4:15
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	4:15
End Time	5:15
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6446	6522	6630	6514	6551	6532
Vehs Exited	6512	6565	6715	6550	6572	6583
Starting Vehs	443	441	485	473	421	455
Ending Vehs	377	398	400	437	400	400
Travel Distance (km)	18609	19050	19009	18846	18525	18808
Travel Time (hr)	421.0	437.2	446.7	435.0	420.8	432.2
Total Delay (hr)	170.4	180.5	191.4	181.3	171.2	178.9
Total Stops	9302	9798	9917	9746	9520	9651
Fuel Used (l)	1566.1	1606.2	1613.5	1598.2	1555.7	1587.9

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LT	R	L	T
Maximum Queue (m)	22.9	158.9	163.2	95.9	65.1	105.9	108.3	110.4	103.9	45.7	5.2	9.3
Average Queue (m)	6.6	91.6	82.2	9.4	29.8	46.6	49.0	68.7	71.5	2.2	0.6	1.7
95th Queue (m)	18.8	137.6	134.8	58.4	51.9	87.9	90.2	102.0	103.3	18.0	3.0	6.7
Link Distance (m)		367.0	367.0			315.3	315.3	1000.6	1000.6			265.6
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	105.0			50.0	70.0					80.0	30.0	
Storage Blk Time (%)		4	17	0	0	3			10			
Queuing Penalty (veh)		1	111	1	0	4			13			

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T	R
Maximum Queue (m)	46.6	77.7	13.4	49.8	61.4	60.8	72.7	251.8	6.2
Average Queue (m)	19.4	33.8	2.8	26.4	32.9	31.1	39.7	39.4	0.2
95th Queue (m)	36.8	64.0	9.4	46.9	57.0	51.3	64.1	232.2	3.2
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6	
Upstream Blk Time (%)								0	
Queuing Penalty (veh)								0	
Storage Bay Dist (m)			80.0			140.0			180.0
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	94.8	134.4	29.5	138.4	84.9	28.9	83.2	163.1	156.4	46.4
Average Queue (m)	40.2	68.7	8.1	83.1	19.2	12.2	44.0	89.8	41.9	18.8
95th Queue (m)	84.8	116.6	21.6	124.7	48.6	24.2	70.5	155.2	125.4	37.3
Link Distance (m)		266.3		1920.7			458.7		610.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0
Storage Blk Time (%)	5	5		17			5	22		
Queuing Penalty (veh)	32	10		47			3	67		

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	B24	B24	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	R	T	T	L	T	T	R	L	TR
Maximum Queue (m)	143.0	152.1	156.4	17.5	124.8	125.7	58.9	158.5	146.3	18.5	60.5	85.6
Average Queue (m)	70.2	84.1	86.8	5.7	4.2	4.2	14.9	106.1	95.6	5.7	21.8	40.0
95th Queue (m)	128.4	145.0	148.6	14.2	63.2	63.7	36.1	149.7	138.6	13.6	44.1	72.3
Link Distance (m)		279.0	279.0		315.3	315.3		338.6	338.6			1028.0
Upstream Blk Time (%)					0	0						
Queuing Penalty (veh)					0	0						
Storage Bay Dist (m)	100.0			50.0			85.0			90.0	80.0	
Storage Blk Time (%)	7	6	24					24	12		0	1
Queuing Penalty (veh)	41	16	14					16	5		0	1

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (m)	117.0	216.6
Average Queue (m)	23.2	132.4
95th Queue (m)	101.3	219.1
Link Distance (m)		311.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	75.0	
Storage Blk Time (%)		46
Queuing Penalty (veh)		25

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	T	R
Maximum Queue (m)	35.8	68.3	27.2	21.9	96.8	58.5	79.6	35.2	59.8	39.4
Average Queue (m)	12.5	33.2	6.0	7.4	44.3	28.4	31.1	14.3	27.6	15.0
95th Queue (m)	27.1	58.8	21.0	17.8	78.8	50.5	59.9	29.5	49.4	29.9
Link Distance (m)		1920.7			479.5		741.7		1500.2	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0		30.0
Storage Blk Time (%)		13	0		4	24	17	5	15	1
Queuing Penalty (veh)		26	0		2	45	21	13	28	2

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	66.2	71.6	112.6	84.6
Average Queue (m)	28.7	27.5	56.3	44.4
95th Queue (m)	56.4	55.0	95.0	76.2
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

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)

Network Summary

Network wide Queuing Penalty: 546

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:15	7:15	7:15	7:15	7:15	7:15
End Time	8:45	8:45	8:45	8:45	8:45	8:45
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	5707	5844	5679	5691	5674	5715
Vehs Exited	5749	5845	5645	5699	5659	5719
Starting Vehs	373	332	346	385	334	351
Ending Vehs	331	331	380	377	349	353
Travel Distance (km)	16192	16157	15741	15962	16047	16020
Travel Time (hr)	347.0	374.4	352.7	373.1	344.0	358.2
Total Delay (hr)	127.7	156.0	139.9	156.9	127.1	141.5
Total Stops	7786	8643	7724	7672	7746	7912
Fuel Used (l)	1378.3	1393.3	1356.9	1379.0	1356.1	1372.7

Interval #0 Information Seeding

Start Time	7:15
End Time	7:45
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:45
End Time	8:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	5707	5844	5679	5691	5674	5715
Vehs Exited	5749	5845	5645	5699	5659	5719
Starting Vehs	373	332	346	385	334	351
Ending Vehs	331	331	380	377	349	353
Travel Distance (km)	16192	16157	15741	15962	16047	16020
Travel Time (hr)	347.0	374.4	352.7	373.1	344.0	358.2
Total Delay (hr)	127.7	156.0	139.9	156.9	127.1	141.5
Total Stops	7786	8643	7724	7672	7746	7912
Fuel Used (l)	1378.3	1393.3	1356.9	1379.0	1356.1	1372.7

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	L	T	TR	L	LT	R	L	T
Maximum Queue (m)	17.7	99.7	86.3	64.7	120.4	122.8	85.2	91.4	16.9	2.2	14.4
Average Queue (m)	4.0	50.4	37.0	26.2	52.1	53.5	59.7	63.9	0.8	0.1	1.3
95th Queue (m)	12.5	82.0	70.6	55.4	104.0	109.0	80.7	85.0	9.9	2.0	7.7
Link Distance (m)		367.0	367.0		315.3	315.3	1000.6	1000.6			265.6
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	105.0			70.0					80.0	30.0	
Storage Blk Time (%)		0	2	1	5			2			
Queuing Penalty (veh)		0	6	8	4			4			

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T
Maximum Queue (m)	44.2	60.3	13.8	61.1	74.5	43.6	51.3	43.4
Average Queue (m)	20.2	22.0	3.2	35.2	43.2	18.5	27.6	12.3
95th Queue (m)	37.9	45.3	10.5	55.3	67.1	36.0	46.5	32.7
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)			80.0			140.0		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	61.1	79.1	31.9	80.0	30.0	27.0	70.5	74.0	57.7	37.2
Average Queue (m)	28.1	42.2	10.8	36.1	14.6	5.4	29.9	38.0	18.8	12.8
95th Queue (m)	52.7	75.0	25.4	65.9	26.6	18.7	55.5	66.1	44.6	27.6
Link Distance (m)		266.3		1920.7			458.7		610.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0
Storage Blk Time (%)		0		1			1	0		
Queuing Penalty (veh)		0		2			0	0		

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	B24	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	T	L	T	T	R	L	TR	L
Maximum Queue (m)	151.4	105.5	107.7	29.7	66.3	98.1	185.5	180.1	79.9	76.7	105.4	146.4
Average Queue (m)	92.7	54.5	57.8	13.0	4.3	30.5	113.4	104.8	17.5	31.0	47.4	71.3
95th Queue (m)	147.2	93.0	94.9	26.4	65.6	89.2	176.4	168.2	76.0	63.9	88.9	201.5
Link Distance (m)		279.0	279.0		315.3		338.6	338.6			1028.0	
Upstream Blk Time (%)					0							
Queuing Penalty (veh)					1							
Storage Bay Dist (m)	100.0			50.0		85.0			90.0	80.0		75.0
Storage Blk Time (%)	12	0	14				28	17		1	2	
Queuing Penalty (veh)	50	2	17				35	14		2	2	

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	SB
Directions Served	TR
Maximum Queue (m)	267.7
Average Queue (m)	208.9
95th Queue (m)	365.7
Link Distance (m)	311.8
Upstream Blk Time (%)	19
Queuing Penalty (veh)	0
Storage Bay Dist (m)	
Storage Blk Time (%)	60
Queuing Penalty (veh)	35

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	T	R
Maximum Queue (m)	47.7	77.1	51.4	22.9	68.0	40.1	63.2	23.8	47.0	25.5
Average Queue (m)	20.2	34.4	7.1	6.9	29.1	15.9	27.6	6.3	17.8	8.6
95th Queue (m)	38.9	66.7	26.6	16.7	56.4	33.6	53.0	17.2	38.7	20.3
Link Distance (m)		1920.7			479.5		741.7		1500.2	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0		30.0
Storage Blk Time (%)		14	0		1	7	14	0	7	0
Queuing Penalty (veh)		37	1		0	12	11	1	6	0

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	67.1	54.5	95.8	98.1
Average Queue (m)	27.7	26.0	41.1	40.0
95th Queue (m)	53.2	46.1	77.8	78.5
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (m)	38.0	27.9
Average Queue (m)	14.8	6.3
95th Queue (m)	28.3	19.8
Link Distance (m)	1027.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		15.0
Storage Blk Time (%)		1
Queuing Penalty (veh)		4

Network Summary

Network wide Queuing Penalty: 253

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:45	3:45	3:45	3:45	3:45	3:45
End Time	5:15	5:15	5:15	5:15	5:15	5:15
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	6742	6679	6726	6658	6659	6691
Vehs Exited	6739	6667	6713	6676	6633	6685
Starting Vehs	485	457	426	464	427	453
Ending Vehs	488	469	439	446	453	455
Travel Distance (km)	19082	19236	19527	19302	19169	19263
Travel Time (hr)	517.0	506.8	468.2	440.2	471.1	480.6
Total Delay (hr)	259.3	247.3	205.0	179.6	212.0	220.6
Total Stops	10561	9921	10274	10007	9653	10085
Fuel Used (l)	1687.8	1677.9	1664.6	1627.7	1639.8	1659.6

Interval #0 Information Seeding

Start Time	3:45
End Time	4:15
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	4:15
End Time	5:15
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6742	6679	6726	6658	6659	6691
Vehs Exited	6739	6667	6713	6676	6633	6685
Starting Vehs	485	457	426	464	427	453
Ending Vehs	488	469	439	446	453	455
Travel Distance (km)	19082	19236	19527	19302	19169	19263
Travel Time (hr)	517.0	506.8	468.2	440.2	471.1	480.6
Total Delay (hr)	259.3	247.3	205.0	179.6	212.0	220.6
Total Stops	10561	9921	10274	10007	9653	10085
Fuel Used (l)	1687.8	1677.9	1664.6	1627.7	1639.8	1659.6

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	LT	R	L	T
Maximum Queue (m)	29.4	181.1	195.6	120.0	61.0	110.5	118.7	100.9	105.4	27.3	6.2	9.3
Average Queue (m)	6.7	107.2	99.5	28.7	29.8	51.2	53.6	67.2	70.6	2.0	0.9	2.0
95th Queue (m)	19.8	163.0	164.3	109.4	51.1	95.4	100.3	95.8	99.5	17.1	4.9	7.1
Link Distance (m)		367.0	367.0			315.3	315.3	1000.6	1000.6			265.6
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	105.0			50.0	70.0					80.0	30.0	
Storage Blk Time (%)		9	22	0	0	3			7			
Queuing Penalty (veh)		2	139	3	0	5			10			

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T	R
Maximum Queue (m)	40.9	74.7	15.9	53.3	63.6	62.0	67.7	55.4	6.7
Average Queue (m)	18.3	29.9	2.8	24.9	32.2	31.7	38.2	22.2	0.3
95th Queue (m)	34.6	55.8	9.9	45.4	55.4	53.4	61.1	46.9	4.1
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)			80.0			140.0			180.0
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	144.1	187.4	50.7	178.9	89.6	30.8	90.5	132.1	105.7	41.6
Average Queue (m)	59.4	81.2	10.1	93.9	25.3	12.4	44.6	78.4	31.4	21.4
95th Queue (m)	129.4	150.7	47.9	154.7	79.9	24.1	75.5	129.9	77.9	40.2
Link Distance (m)		266.3		1920.7			458.7		610.8	
Upstream Blk Time (%)		0								
Queuing Penalty (veh)		0								
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0
Storage Blk Time (%)	13	7		21			7	17	0	
Queuing Penalty (veh)	84	13		58			4	51	0	

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	B24	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	T	L	T	T	R	L	TR	L
Maximum Queue (m)	128.0	157.1	162.6	149.2	63.3	43.7	145.0	131.6	16.7	66.0	97.4	147.2
Average Queue (m)	71.4	85.7	90.0	15.4	2.1	21.5	98.6	90.0	4.9	29.8	46.7	73.4
95th Queue (m)	130.3	150.1	155.1	65.9	44.6	41.4	137.5	129.0	13.8	54.9	84.0	204.9
Link Distance (m)		279.0	279.0		315.3		338.6	338.6			1028.0	
Upstream Blk Time (%)					0							
Queuing Penalty (veh)					0							
Storage Bay Dist (m)	100.0			50.0		85.0			90.0	80.0		75.0
Storage Blk Time (%)	9	8	26				19	8		0	2	
Queuing Penalty (veh)	51	20	20				16	3		0	3	

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	SB
Directions Served	TR
Maximum Queue (m)	297.2
Average Queue (m)	262.8
95th Queue (m)	417.8
Link Distance (m)	311.8
Upstream Blk Time (%)	55
Queuing Penalty (veh)	0
Storage Bay Dist (m)	
Storage Blk Time (%)	66
Queuing Penalty (veh)	36

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	T	R
Maximum Queue (m)	35.8	66.3	30.0	29.6	94.0	57.6	64.8	32.8	50.0	47.5
Average Queue (m)	14.3	33.2	5.7	8.5	46.2	27.5	30.4	13.7	25.2	17.0
95th Queue (m)	29.8	61.0	18.0	21.1	78.3	46.2	53.8	27.0	44.5	36.0
Link Distance (m)		1920.7			479.5		741.7		1500.2	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0		30.0
Storage Blk Time (%)		13	0		4	21	17	3	12	2
Queuing Penalty (veh)		26	1		2	39	21	7	22	5

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	69.4	58.7	144.7	119.3
Average Queue (m)	32.8	28.4	62.6	51.1
95th Queue (m)	61.8	52.4	113.0	93.0
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	34.6	3.4	21.9
Average Queue (m)	11.3	0.1	6.5
95th Queue (m)	25.1	2.4	19.2
Link Distance (m)	1027.2	1500.2	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			15.0
Storage Blk Time (%)			1
Queuing Penalty (veh)			4

Network Summary

Network wide Queuing Penalty: 646

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:15	7:15	7:15	7:15	7:15	7:15
End Time	8:45	8:45	8:45	8:45	8:45	8:45
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	6770	6790	6671	6715	6657	6723
Vehs Exited	6803	6760	6659	6783	6689	6739
Starting Vehs	426	419	417	452	444	431
Ending Vehs	393	449	429	384	412	415
Travel Distance (km)	18773	18707	18518	18543	18466	18601
Travel Time (hr)	422.7	428.6	411.0	404.4	412.1	415.7
Total Delay (hr)	169.2	176.0	161.0	154.2	162.9	164.6
Total Stops	9696	9894	9414	9245	9396	9526
Fuel Used (l)	1600.6	1601.1	1572.0	1567.3	1571.3	1582.5

Interval #0 Information Seeding

Start Time	7:15
End Time	7:45
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:45
End Time	8:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6770	6790	6671	6715	6657	6723
Vehs Exited	6803	6760	6659	6783	6689	6739
Starting Vehs	426	419	417	452	444	431
Ending Vehs	393	449	429	384	412	415
Travel Distance (km)	18773	18707	18518	18543	18466	18601
Travel Time (hr)	422.7	428.6	411.0	404.4	412.1	415.7
Total Delay (hr)	169.2	176.0	161.0	154.2	162.9	164.6
Total Stops	9696	9894	9414	9245	9396	9526
Fuel Used (l)	1600.6	1601.1	1572.0	1567.3	1571.3	1582.5

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	T	TR	L	LT	R
Maximum Queue (m)	22.3	129.9	128.1	16.9	55.8	133.6	133.2	106.1	106.8	60.4
Average Queue (m)	6.7	80.1	69.9	1.0	25.0	66.9	69.3	68.3	73.9	12.1
95th Queue (m)	17.2	115.0	110.7	11.3	47.2	126.7	131.1	93.4	98.0	48.1
Link Distance (m)		371.3	371.3			315.3	315.3	1000.6	1000.6	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	105.0			50.0	70.0					80.0
Storage Blk Time (%)		2	13	0	0	9			5	0
Queuing Penalty (veh)		0	52	0	0	12			14	0

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T
Maximum Queue (m)	65.0	57.7	21.3	75.4	87.9	40.0	59.6	46.8
Average Queue (m)	24.0	22.9	6.1	40.6	47.1	18.9	32.3	16.9
95th Queue (m)	47.9	45.8	17.3	64.9	76.0	33.7	51.3	40.0
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)			80.0			140.0		
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	91.0	118.0	43.9	98.5	34.2	32.9	67.4	85.4	46.1	51.4
Average Queue (m)	40.0	56.8	14.8	45.3	11.0	8.1	35.9	35.3	18.2	17.6
95th Queue (m)	79.7	102.1	33.4	81.7	23.1	23.6	61.2	68.5	38.8	37.2
Link Distance (m)		266.3		1920.7			458.7		610.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0
Storage Blk Time (%)	3	2	0	2			1	2		
Queuing Penalty (veh)	23	4	0	4			0	5		

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	B24	B24	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	R	T	T	L	T	T	R	L	TR
Maximum Queue (m)	186.0	202.1	189.2	45.7	188.5	197.0	81.6	163.1	158.4	54.7	70.3	106.2
Average Queue (m)	110.6	72.7	63.4	14.6	6.3	8.7	31.4	109.6	103.6	11.8	32.4	49.4
95th Queue (m)	192.3	176.7	130.8	32.3	78.9	95.2	60.7	153.7	147.6	35.2	62.2	87.3
Link Distance (m)		275.6	275.6		315.3	315.3		338.6	338.6			1028.0
Upstream Blk Time (%)		0			0	0						
Queuing Penalty (veh)		3			0	2						
Storage Bay Dist (m)	100.0			50.0			85.0			90.0	80.0	
Storage Blk Time (%)	23	0	16	0				26	17		1	2
Queuing Penalty (veh)	107	1	27	1				54	15		2	3

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (m)	41.7	89.2	69.0
Average Queue (m)	15.7	47.5	32.8
95th Queue (m)	32.9	79.0	59.7
Link Distance (m)		312.0	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		75.0
Storage Blk Time (%)		2	0
Queuing Penalty (veh)		5	0

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	T	R
Maximum Queue (m)	116.9	128.6	74.9	23.9	88.7	45.1	63.3	25.1	53.7	33.6
Average Queue (m)	45.5	50.2	11.4	8.4	41.6	18.5	29.8	10.0	19.6	11.5
95th Queue (m)	92.6	94.3	43.1	18.5	76.0	37.3	55.5	22.1	42.2	24.8
Link Distance (m)		1920.7			479.5		741.7		1500.2	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0		30.0
Storage Blk Time (%)	4	19	0		4	8	16	1	9	1
Queuing Penalty (veh)	29	65	2		2	16	15	2	12	1

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	58.5	77.5	131.4	110.0
Average Queue (m)	26.8	36.9	52.3	51.8
95th Queue (m)	48.7	64.4	104.4	97.4
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

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)

Network Summary

Network wide Queuing Penalty: 478

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:45	3:45	3:45	3:45	3:45	3:45
End Time	5:15	5:15	5:15	5:15	5:15	5:15
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8167	8097	8209	8306	8100	8175
Vehs Exited	7864	7800	7975	8039	7907	7919
Starting Vehs	664	658	593	611	620	630
Ending Vehs	967	955	827	878	813	887
Travel Distance (km)	23195	23157	23356	23805	23089	23320
Travel Time (hr)	811.0	820.9	728.1	736.1	746.3	768.5
Total Delay (hr)	498.7	509.8	414.0	415.4	435.7	454.7
Total Stops	16660	17104	16495	16456	15616	16466
Fuel Used (l)	2175.6	2173.5	2111.2	2143.4	2119.2	2144.6

Interval #0 Information Seeding

Start Time	3:45
End Time	4:15
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	4:15
End Time	5:15
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8167	8097	8209	8306	8100	8175
Vehs Exited	7864	7800	7975	8039	7907	7919
Starting Vehs	664	658	593	611	620	630
Ending Vehs	967	955	827	878	813	887
Travel Distance (km)	23195	23157	23356	23805	23089	23320
Travel Time (hr)	811.0	820.9	728.1	736.1	746.3	768.5
Total Delay (hr)	498.7	509.8	414.0	415.4	435.7	454.7
Total Stops	16660	17104	16495	16456	15616	16466
Fuel Used (l)	2175.6	2173.5	2111.2	2143.4	2119.2	2144.6

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	T	TR	L	LT	R
Maximum Queue (m)	136.5	307.2	312.5	120.0	106.5	115.6	114.9	128.5	132.5	95.1
Average Queue (m)	18.1	164.3	168.8	91.8	54.0	57.9	59.5	84.9	87.7	14.6
95th Queue (m)	82.5	264.2	286.6	166.8	94.3	103.9	106.8	123.2	127.6	68.9
Link Distance (m)		371.3	371.3			315.3	315.3	1000.6	1000.6	
Upstream Blk Time (%)		0	1							
Queuing Penalty (veh)		0	0							
Storage Bay Dist (m)	105.0			50.0	70.0					80.0
Storage Blk Time (%)		23	33	5	12	4			20	0
Queuing Penalty (veh)		7	275	36	88	10			38	0

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T	R
Maximum Queue (m)	53.7	94.2	20.1	76.4	83.2	62.0	84.0	266.5	9.1
Average Queue (m)	23.8	46.2	5.5	32.2	39.6	31.2	50.9	39.8	0.4
95th Queue (m)	43.7	81.1	14.5	57.9	71.1	52.0	75.1	177.6	5.4
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6	
Upstream Blk Time (%)								0	
Queuing Penalty (veh)								0	
Storage Bay Dist (m)			80.0			140.0			180.0
Storage Blk Time (%)				0					
Queuing Penalty (veh)				0					

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	B9	B27
Directions Served	L	TR	L	T	R	L	TR	L	T	R	T	T
Maximum Queue (m)	166.6	223.2	164.9	820.8	160.0	29.3	119.8	190.0	635.1	109.9	122.0	361.8
Average Queue (m)	110.8	141.5	43.2	517.6	113.4	12.3	64.5	187.6	492.5	34.1	75.6	147.8
95th Queue (m)	196.8	257.1	144.7	923.1	220.8	24.1	108.4	199.9	814.9	83.4	191.0	473.4
Link Distance (m)		266.3		1920.7			458.7		610.8		119.0	466.3
Upstream Blk Time (%)		6							43		40	18
Queuing Penalty (veh)		0							355		334	146
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0		
Storage Blk Time (%)	50	14	0	50	0		25	99	0	0		
Queuing Penalty (veh)	432	34	0	139	1		14	348	1	1		

Intersection: 3: Davis Road & Lundys Lane

Movement	B28	B26	B21
Directions Served	T	T	T
Maximum Queue (m)	148.2	195.0	50.0
Average Queue (m)	37.1	26.3	3.3
95th Queue (m)	172.1	203.1	50.2
Link Distance (m)	221.0	936.9	296.6
Upstream Blk Time (%)	9		
Queuing Penalty (veh)	71		
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	B24	B24	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	R	T	T	L	T	T	R	L	TR
Maximum Queue (m)	138.9	157.4	161.6	72.9	126.9	193.3	131.1	188.0	179.5	49.2	80.6	145.5
Average Queue (m)	76.4	82.0	82.8	8.2	6.3	12.8	29.1	118.6	109.2	8.9	43.0	80.6
95th Queue (m)	131.1	145.7	147.2	36.7	79.2	116.2	84.8	177.2	166.8	46.9	73.0	135.3
Link Distance (m)		275.6	275.6		315.3	315.3		338.6	338.6			1028.0
Upstream Blk Time (%)					0	0						
Queuing Penalty (veh)					0	1						
Storage Bay Dist (m)	100.0			50.0			85.0			90.0	80.0	
Storage Blk Time (%)	10	5	20					28	19		1	15
Queuing Penalty (veh)	69	15	17					29	8		3	31

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (m)	29.6	77.7	84.6
Average Queue (m)	12.1	41.9	41.8
95th Queue (m)	25.6	69.8	73.5
Link Distance (m)		312.0	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		75.0
Storage Blk Time (%)		0	1
Queuing Penalty (veh)		2	4

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	T	R
Maximum Queue (m)	117.9	152.3	74.9	54.3	186.7	64.9	368.2	71.5	79.2	74.8
Average Queue (m)	65.2	71.6	14.2	11.4	90.4	55.0	151.6	30.9	35.0	31.0
95th Queue (m)	129.1	132.3	50.9	33.9	158.8	79.9	357.9	56.3	67.3	59.4
Link Distance (m)		1920.7			479.5		741.7		1500.2	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0		30.0
Storage Blk Time (%)	19	22	1	0	19	76	34	30	15	11
Queuing Penalty (veh)	172	58	5	0	11	165	49	102	45	26

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	85.8	161.5	424.1	292.8
Average Queue (m)	30.1	81.9	233.1	124.3
95th Queue (m)	61.7	152.3	491.1	253.0
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

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)

Network Summary

Network wide Queuing Penalty: 3139

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	7:15	7:15	7:15	7:15	7:15	7:15
End Time	8:45	8:45	8:45	8:45	8:45	8:45
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	6812	6882	6929	6880	6762	6852
Vehs Exited	6805	6894	6875	6866	6774	6843
Starting Vehs	476	445	421	480	470	454
Ending Vehs	483	433	475	494	458	469
Travel Distance (km)	18691	19124	19268	19221	18750	19011
Travel Time (hr)	439.2	439.1	462.1	492.9	438.7	454.4
Total Delay (hr)	186.1	180.1	202.1	233.1	185.0	197.3
Total Stops	10035	10257	10943	11373	10227	10564
Fuel Used (l)	1610.5	1639.1	1671.7	1686.0	1616.6	1644.8

Interval #0 Information Seeding

Start Time	7:15
End Time	7:45
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:45
End Time	8:45
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	6812	6882	6929	6880	6762	6852
Vehs Exited	6805	6894	6875	6866	6774	6843
Starting Vehs	476	445	421	480	470	454
Ending Vehs	483	433	475	494	458	469
Travel Distance (km)	18691	19124	19268	19221	18750	19011
Travel Time (hr)	439.2	439.1	462.1	492.9	438.7	454.4
Total Delay (hr)	186.1	180.1	202.1	233.1	185.0	197.3
Total Stops	10035	10257	10943	11373	10227	10564
Fuel Used (l)	1610.5	1639.1	1671.7	1686.0	1616.6	1644.8

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	T	TR	L	LT	R
Maximum Queue (m)	21.7	131.7	130.2	47.8	64.3	133.3	138.7	123.8	121.3	92.6
Average Queue (m)	6.0	84.1	73.9	3.2	26.7	67.3	70.0	71.7	75.5	22.3
95th Queue (m)	16.4	126.0	117.6	35.0	50.3	124.2	130.1	103.8	105.8	69.0
Link Distance (m)		371.3	371.3			315.3	315.3	1000.6	1000.6	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	105.0			50.0	70.0					80.0
Storage Blk Time (%)		3	16			8			6	0
Queuing Penalty (veh)		1	61			11			17	0

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T
Maximum Queue (m)	51.1	68.1	24.0	77.0	86.9	40.3	60.1	50.5
Average Queue (m)	23.4	26.0	6.2	43.0	50.6	17.8	34.1	18.0
95th Queue (m)	43.5	53.9	17.9	67.9	78.2	33.1	54.5	41.5
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)			80.0			140.0		
Storage Blk Time (%)				0				
Queuing Penalty (veh)				0				

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	87.8	111.9	33.5	86.9	25.8	22.8	73.1	71.5	68.5	44.8
Average Queue (m)	35.9	55.0	14.1	43.7	10.2	7.7	36.8	33.4	22.1	18.5
95th Queue (m)	68.2	93.6	29.5	74.8	21.0	19.3	61.8	59.1	49.8	37.6
Link Distance (m)		266.3		1920.7			458.7		610.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0
Storage Blk Time (%)	1	2		1			2		0	
Queuing Penalty (veh)	10	3		3			0		0	

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	B19	B19	B24	B24	WB	WB	WB	WB
Directions Served	L	T	T	R	T	T	T	T	L	T	T	R
Maximum Queue (m)	199.8	284.6	249.3	49.6	62.3	55.2	127.1	132.6	142.6	204.1	197.0	137.4
Average Queue (m)	160.8	156.2	117.7	18.1	12.3	7.6	6.3	8.7	58.6	137.3	129.4	28.6
95th Queue (m)	232.2	341.4	274.9	38.5	58.5	44.7	79.4	95.0	143.1	216.5	206.3	106.9
Link Distance (m)		275.6	275.6		169.7	169.7	315.3	315.3		338.6	338.6	
Upstream Blk Time (%)		16	1				0	1				
Queuing Penalty (veh)		123	4				0	4				
Storage Bay Dist (m)	100.0			50.0					85.0			90.0
Storage Blk Time (%)	60	1	18	1					1	39	31	
Queuing Penalty (veh)	279	5	34	2					7	87	28	

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R
Maximum Queue (m)	121.2	161.0	45.8	93.3	84.1
Average Queue (m)	56.9	73.2	17.4	51.7	33.2
95th Queue (m)	116.8	145.3	39.1	86.0	63.5
Link Distance (m)		1028.0		312.0	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	80.0		75.0		75.0
Storage Blk Time (%)	13	9	0	2	1
Queuing Penalty (veh)	42	14	1	8	2

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	T	R
Maximum Queue (m)	92.8	101.1	64.7	28.8	84.8	40.2	62.2	30.4	44.8	29.7
Average Queue (m)	42.4	49.3	11.2	9.9	42.0	16.1	31.9	11.6	19.8	10.7
95th Queue (m)	83.3	91.4	40.6	22.1	71.7	33.4	57.9	24.3	39.3	23.4
Link Distance (m)		1920.7			479.5		741.7		1500.2	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0		30.0
Storage Blk Time (%)	4	20	0		3	5	19	2	9	0
Queuing Penalty (veh)	30	66	2		1	9	18	5	12	0

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	63.7	77.2	246.7	205.6
Average Queue (m)	28.6	39.5	98.1	91.1
95th Queue (m)	53.2	67.0	240.7	188.9
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	36.5	3.1	28.4
Average Queue (m)	14.7	0.1	9.1
95th Queue (m)	29.2	2.2	24.2
Link Distance (m)	1027.2	1500.2	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			15.0
Storage Blk Time (%)			3
Queuing Penalty (veh)			12

Network Summary

Network wide Queuing Penalty: 902

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	3:45	3:45	3:45	3:45	3:45	3:45
End Time	5:15	5:15	5:15	5:15	5:15	5:15
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8159	8245	8123	8206	8093	8164
Vehs Exited	7764	8163	7870	7953	7811	7913
Starting Vehs	607	655	654	606	639	635
Ending Vehs	1002	737	907	859	921	885
Travel Distance (km)	22778	23641	23098	23484	23243	23249
Travel Time (hr)	884.9	733.5	826.6	744.9	877.7	813.5
Total Delay (hr)	579.2	414.7	515.7	428.5	564.4	500.5
Total Stops	16773	16665	17216	15207	17418	16656
Fuel Used (l)	2210.5	2149.8	2181.3	2138.0	2226.5	2181.2

Interval #0 Information Seeding

Start Time	3:45
End Time	4:15
Total Time (min)	30

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:15
End Time	5:15
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8159	8245	8123	8206	8093	8164
Vehs Exited	7764	8163	7870	7953	7811	7913
Starting Vehs	607	655	654	606	639	635
Ending Vehs	1002	737	907	859	921	885
Travel Distance (km)	22778	23641	23098	23484	23243	23249
Travel Time (hr)	884.9	733.5	826.6	744.9	877.7	813.5
Total Delay (hr)	579.2	414.7	515.7	428.5	564.4	500.5
Total Stops	16773	16665	17216	15207	17418	16656
Fuel Used (l)	2210.5	2149.8	2181.3	2138.0	2226.5	2181.2

Intersection: 1: Davis Road & Thorold Stone Road

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	T	TR	L	LT	R
Maximum Queue (m)	204.6	325.6	338.4	120.0	89.3	118.5	123.6	111.9	117.4	66.9
Average Queue (m)	17.0	170.9	177.4	83.1	46.3	57.7	59.1	74.6	78.5	10.3
95th Queue (m)	76.7	290.9	316.6	167.2	83.5	101.9	107.5	107.5	111.2	44.3
Link Distance (m)		371.3	371.3			315.3	315.3	1000.6	1000.6	
Upstream Blk Time (%)		0	1							
Queuing Penalty (veh)		0	0							
Storage Bay Dist (m)	105.0			50.0	70.0					80.0
Storage Blk Time (%)		22	31	4	5	5			13	
Queuing Penalty (veh)		6	264	29	40	10			26	

Intersection: 2: Davis Road & Niagara Falls Road/Beaverdams Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	T	R
Maximum Queue (m)	47.7	79.9	18.6	63.1	68.4	71.1	82.0	261.6	15.1
Average Queue (m)	23.8	42.4	6.0	32.0	38.3	33.1	49.2	38.2	0.6
95th Queue (m)	42.5	73.6	15.0	56.2	64.3	61.7	71.4	174.5	6.2
Link Distance (m)	244.6	305.1		296.6	296.6		1000.6	1000.6	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)			80.0			140.0			180.0
Storage Blk Time (%)				0					
Queuing Penalty (veh)				0					

Intersection: 3: Davis Road & Lundys Lane

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	B9	B27
Directions Served	L	TR	L	T	R	L	TR	L	T	R	T	T
Maximum Queue (m)	163.9	226.5	164.8	705.2	160.0	33.2	102.0	189.9	539.8	99.7	79.0	80.4
Average Queue (m)	117.8	145.5	37.2	472.2	122.3	13.1	51.5	173.5	317.3	34.1	21.8	8.9
95th Queue (m)	198.3	250.6	132.1	909.6	223.6	26.3	86.7	220.1	694.5	74.7	101.1	63.2
Link Distance (m)		266.3		1920.7			458.7		610.8		119.0	466.3
Upstream Blk Time (%)		5							13		7	
Queuing Penalty (veh)		0							111		59	
Storage Bay Dist (m)	85.0		65.0		80.0	55.0		90.0		100.0		
Storage Blk Time (%)	55	16		51			12	94	0	0		
Queuing Penalty (veh)	476	37		140			6	331	2	1		

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	EB	EB	EB	EB	B24	B24	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	R	T	T	L	T	T	R	L	TR
Maximum Queue (m)	140.5	174.8	176.1	97.7	62.4	126.0	117.6	229.8	221.4	75.0	179.7	358.5
Average Queue (m)	75.7	89.2	89.2	11.7	2.1	4.2	46.3	121.3	112.7	7.7	127.4	175.1
95th Queue (m)	138.6	163.4	160.9	50.8	44.0	63.8	121.7	206.5	196.7	38.8	214.5	379.8
Link Distance (m)		275.6	275.6		315.3	315.3		338.6	338.6			1028.0
Upstream Blk Time (%)					0	0		1	1			
Queuing Penalty (veh)					0	0		0	0			
Storage Bay Dist (m)	100.0			50.0			85.0			90.0	80.0	
Storage Blk Time (%)	8	6	22	2			10	25	16		62	32
Queuing Penalty (veh)	55	17	23	12			58	29	7		269	71

Intersection: 4: Thorold Townline Road & Thorold Stone Road

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (m)	66.9	136.7	103.0
Average Queue (m)	17.2	64.8	49.3
95th Queue (m)	57.7	164.0	104.1
Link Distance (m)		312.0	
Upstream Blk Time (%)		2	
Queuing Penalty (veh)		0	
Storage Bay Dist (m)	75.0		75.0
Storage Blk Time (%)		10	2
Queuing Penalty (veh)		40	6

Intersection: 5: Thorold Townline Road & Lundys Lane

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	TR	L	T	R
Maximum Queue (m)	142.4	655.1	74.9	54.7	158.0	64.8	145.7	61.3	83.6	70.9
Average Queue (m)	101.5	284.5	16.3	13.4	87.3	38.9	55.2	27.0	32.9	29.8
95th Queue (m)	201.8	990.4	57.4	41.3	146.1	68.3	118.7	54.6	68.8	60.3
Link Distance (m)		1920.7			479.5		741.7		1500.2	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	90.0		20.0	55.0		25.0		25.0		30.0
Storage Blk Time (%)	44	19	1		18	47	28	25	14	11
Queuing Penalty (veh)	400	50	8		10	102	39	84	43	27

Intersection: 6: Thorold Townline Road & Beaverdams Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	72.1	168.8	768.9	583.8
Average Queue (m)	31.1	88.8	481.1	343.7
95th Queue (m)	59.1	177.0	941.4	867.6
Link Distance (m)	192.4	256.5	1091.4	1028.0
Upstream Blk Time (%)			1	6
Queuing Penalty (veh)			5	27
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Thorold Townline Road & Uppers Lane

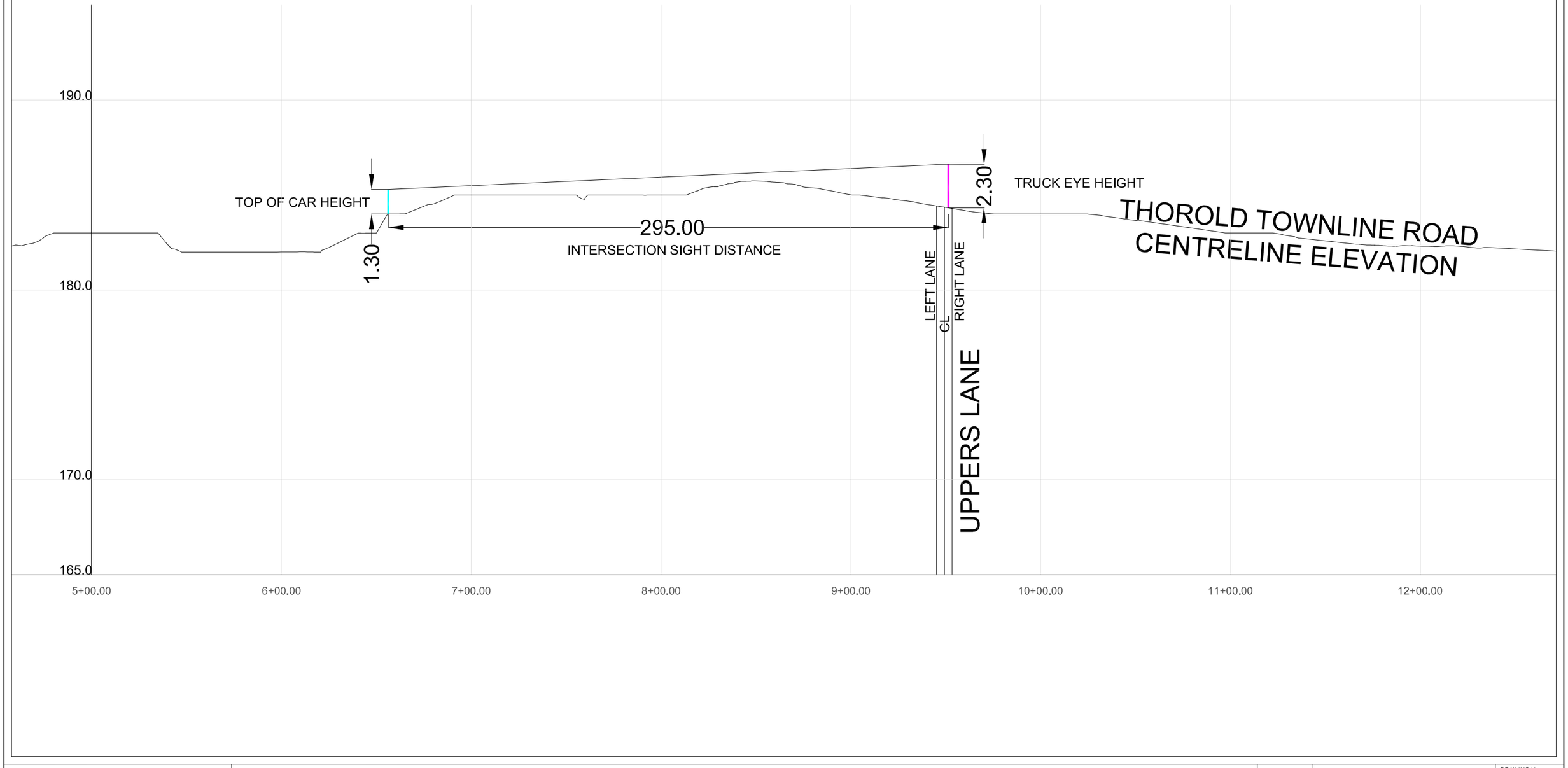
Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	31.4	19.3	35.5
Average Queue (m)	14.3	1.9	8.2
95th Queue (m)	27.2	19.1	24.8
Link Distance (m)	1027.2	1500.2	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			15.0
Storage Blk Time (%)			3
Queuing Penalty (veh)			16

Network Summary

Network wide Queuing Penalty: 2937

APPENDIX G

Site Access Sightline Analysis



G:\Projects\2016\16137 – Uppers Quarry\01 20230104 TIS Update\03 Analysis\03 Site Review & Circulation\Sightline

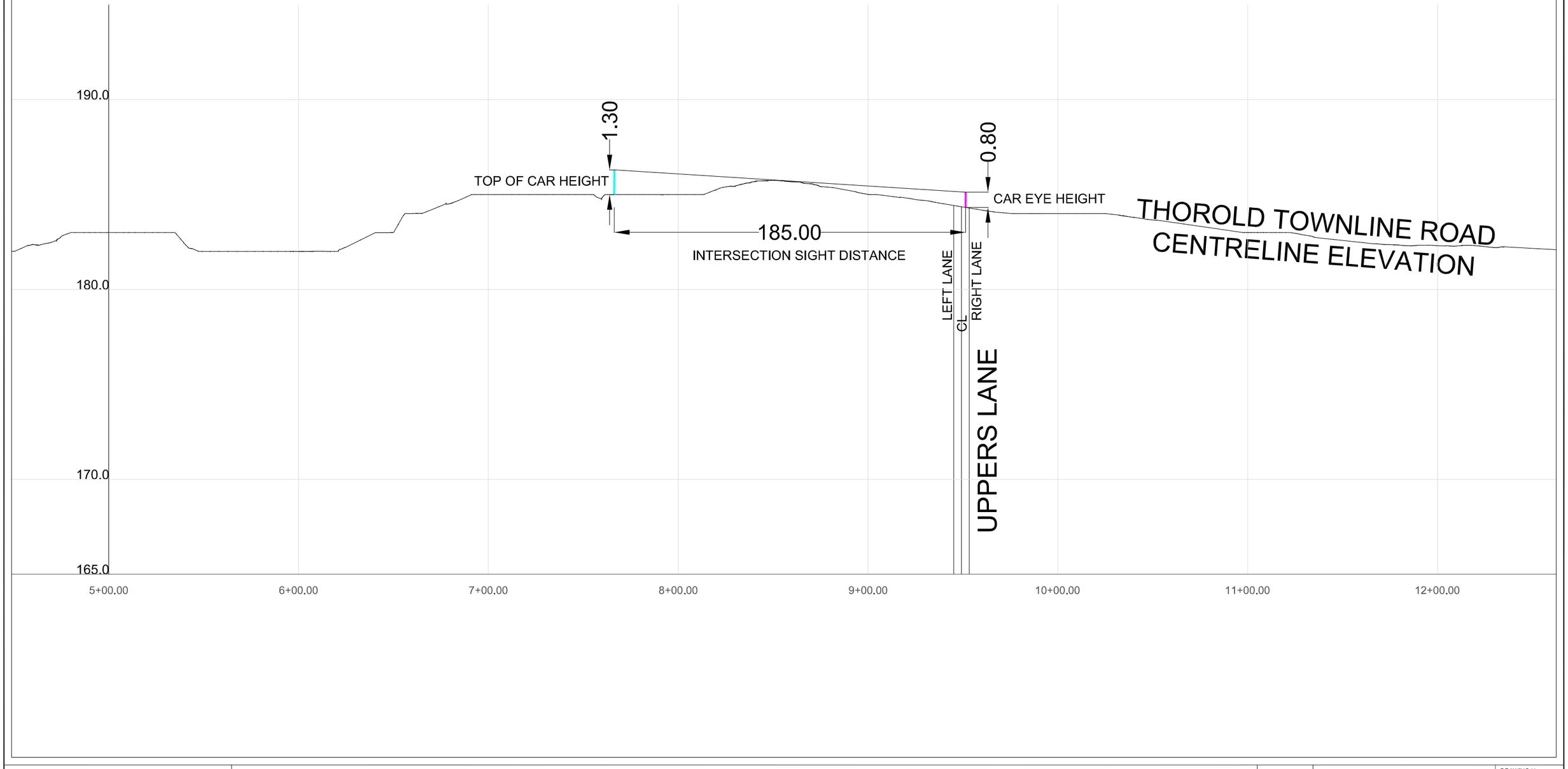
TYLin
8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700

UPPERS QUARRY
INTERSECTION SIGHT DISTANCE
COMBINATION TRUCK RIGHT TURN

V SCALE 1:50
H SCALE 1:500

DRAWING No.
01

DATE
JAN 2023



G:\Projects\2016\16137 – Uppers Quarry\01 20230104 TIS Update\03 Analysis\03 Site Review & Circulation\Sightline

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

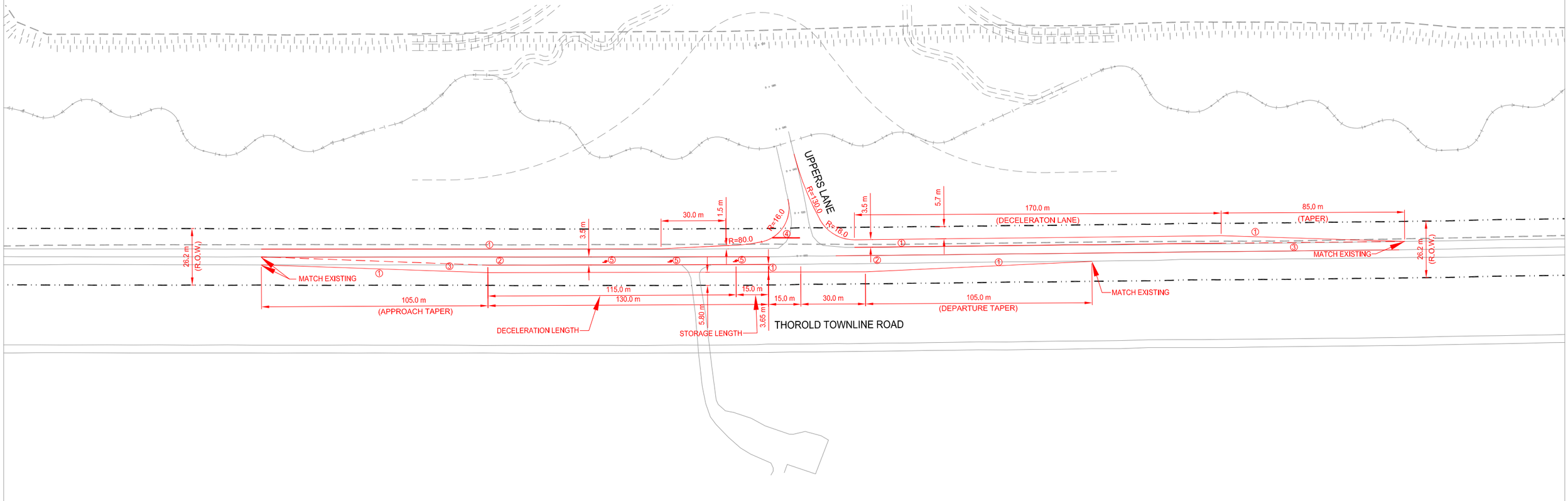
UPPERS QUARRY
INTERSECTION SIGHT DISTANCE
PASSENGER VEHICLE RIGHT TURN

V SCALE 1:50
H SCALE 1:500

DRAWING No. 02
DATE JAN 2023

APPENDIX H

Proposed Site Access Conceptual Design Alternatives



PAVEMENT MARKING LEGEND			
IDENTIFICATION	TYPE	COLOUR	WIDTH (cm)
1	SOLID	WHITE	10
2	SOLID	YELLOW	10
3	3-3-3 BROKEN	WHITE	10
4	SOLID	WHITE	60
5	SYMBOL - LEFT ARROW	WHITE	-

PAVEMENT MARKING DENOTATION:

ⓍPERMANENT

NOTES:

1) MEASUREMENTS IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.

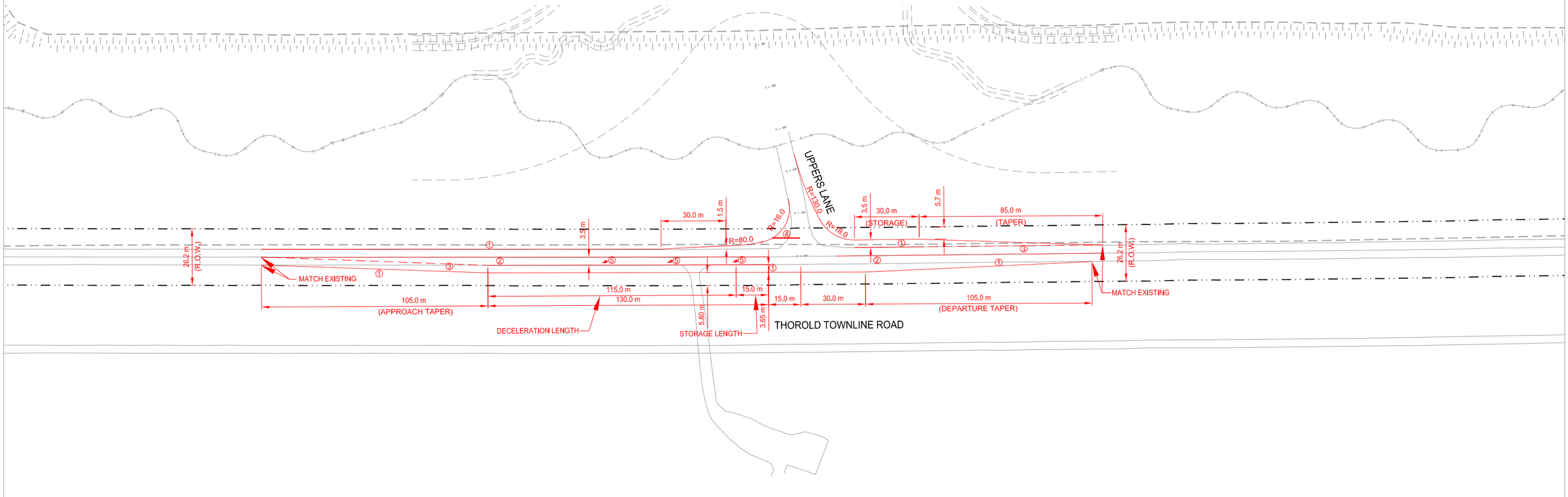
2) THIS DRAWING REPRESENTS A CONCEPTUAL DESIGN ONLY AND DOES NOT CONSIDER DETAILED TOPOGRAPHIC INFORMATION INCLUDING GRADING AND UTILITY LOCATIONS.

3) LANE DIMENSIONS AS SHOWN REPRESENT THE MINIMUM CRITERIA AS PER THE 2017 TRANSPORTATION OF CANADA (TAC) GEOMETRIC DESIGN GUIDELING FOR CANADIAN ROADS. FINAL DIMENSIONS AND LAYOUT / LOCATION OF AUXILIARY LANES TO BE DETERMINED THROUGH DETAILED DESIGN AND CONSULTATION WITH MUNICIPAL STAFF.

TMIG
The Municipal Infrastructure Group Ltd

UPPERS QUARRY - THOROLD TOWNLINE ROAD
CONCEPTUAL ROAD DESIGN
OPTION 1: SOUTHBOUND SLIP AROUND LANE & EXTENDED NORTHBOUND RIGHT TURN LANE

PROJECT No: 16137
DATE: 06/FEB/23
SCALE: N.T.S.
FIGURE CD1



PAVEMENT MARKING LEGEND			
IDENTIFICATION	TYPE	COLOUR	WIDTH (cm)
1	SOLID	WHITE	10
2	SOLID	YELLOW	10
3	3-3-3 BROKEN	WHITE	10
4	SOLID	WHITE	60
5	SYMBOL - LEFT ARROW	WHITE	-

PAVEMENT MARKING DENOTATION:

ⓍPERMANENT

NOTES:

1) MEASUREMENTS IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.

2) THIS DRAWING REPRESENTS A CONCEPTUAL DESIGN ONLY AND DOES NOT CONSIDER DETAILED TOPOGRAPHIC INFORMATION INCLUDING GRADING AND UTILITY LOCATIONS.

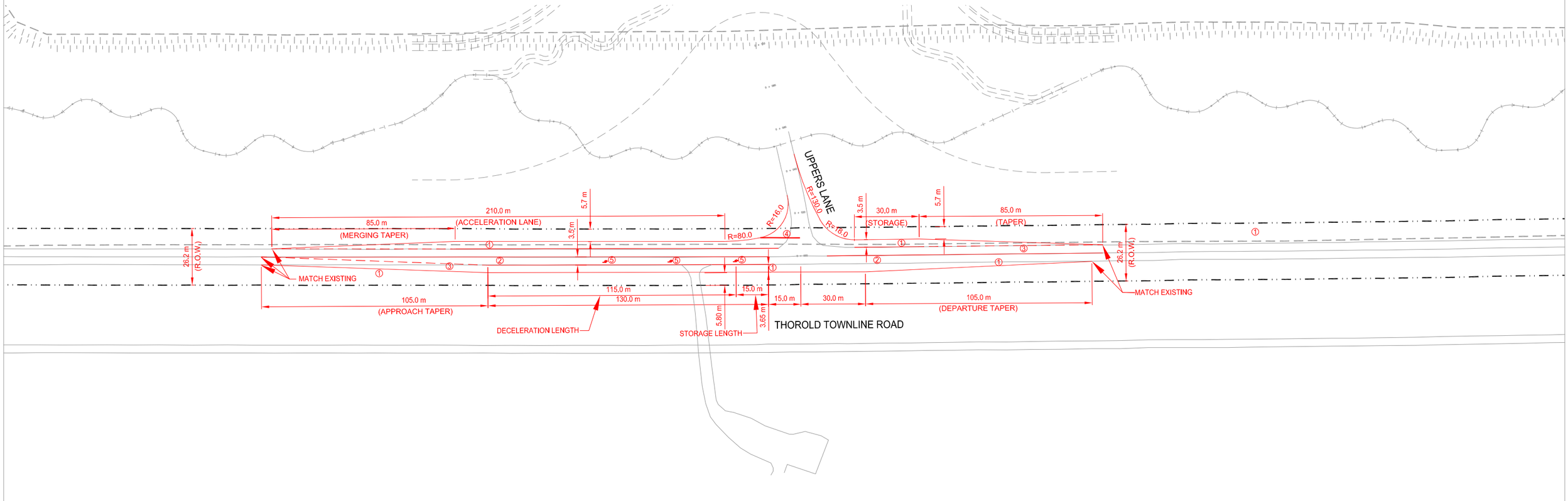
3) LANE DIMENSIONS AS SHOWN REPRESENT THE MINIMUM CRITERIA AS PER THE 2017 TRANSPORTATION OF CANADA (TAC) GEOMETRIC DESIGN GUIDELING FOR CANADIAN ROADS. FINAL DIMENSIONS AND LAYOUT / LOCATION OF AUXILIARY LANES TO BE DETERMINED THROUGH DETAILED DESIGN AND CONSULTATION WITH MUNICIPAL STAFF.

TMIG
The Municipal Infrastructure Group Ltd

UPPERS QUARRY - THOROLD TOWNLINE ROAD
CONCEPTUAL ROAD DESIGN
OPTION 2: SOUTHBOUND SLIP AROUND LANE & NORTHBOUND RIGHT TURN LANE

PROJECT No: 16137
DATE: 06/FEB/23
SCALE: N.T.S.

FIGURE CD2



PAVEMENT MARKING LEGEND			
IDENTIFICATION	TYPE	COLOUR	WIDTH (cm)
1	SOLID	WHITE	10
2	SOLID	YELLOW	10
3	3-3-3 BROKEN	WHITE	10
4	SOLID	WHITE	60
5	SYMBOL - LEFT ARROW	WHITE	-

PAVEMENT MARKING DENOTATION:

ⓍPERMANENT

NOTES:

1) MEASUREMENTS IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN.

2) THIS DRAWING REPRESENTS A CONCEPTUAL DESIGN ONLY AND DOES NOT CONSIDER DETAILED TOPOGRAPHIC INFORMATION INCLUDING GRADING AND UTILITY LOCATIONS.

3) LANE DIMENSIONS AS SHOWN REPRESENT THE MINIMUM CRITERIA AS PER THE 2017 TRANSPORTATION OF CANADA (TAC) GEOMETRIC DESIGN GUIDELING FOR CANADIAN ROADS. FINAL DIMENSIONS AND LAYOUT / LOCATION OF AUXILIARY LANES TO BE DETERMINED THROUGH DETAILED DESIGN AND CONSULTATION WITH MUNICIPAL STAFF.

TMIG
The Municipal Infrastructure Group Ltd

UPPERS QUARRY - THOROLD TOWNLINE ROAD
CONCEPTUAL ROAD DESIGN
OPTION 3: SOUTHBOUND SLIP AROUND LANE & NORTHBOUND ACCELERATION LANE

PROJECT No: 16137

DATE: 06/FEB/23

SCALE: N.T.S.

FIGURE CD3