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Appendix F

Transportation Systems Technical Report #1 and 2

BURNSIDE

Transportation System Technical Report

Warden Avenue and Kennedy Road Class Environmental Assessment

York Region

Transportation System Technical Report

Warden Avenue and Kennedy Road Class Environmental Assessment

York Region

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Project Director

Executive Summary

Introduction

The Regional Municipality of York ("York Region") retained R.J Burnside & Associates Ltd. ("Burnside") to complete a Municipal Class Environmental Assessment (MCEA) for two study corridors: Warden Avenue and Kennedy Road between Major Mackenzie Drive East and Elgin Mills Road East. York Region has completed the Region-wide Transportation Master Plan (TMP) in 2016. As part of the TMP, the road needs and justifications were established for the two study corridors meeting the requirements for Phase 1 and 2 of the MCEA process. This report documents the analysis methodology, results of the transportation assessment and proposed road network improvements to accommodate future demand along the study corridors. Burnside confirmed and built upon the findings of York Region's 2016 TMP.

Planning Context

A review of Provincial, York Region, and City of Markham guiding documents and policies were undertaken to establish the planning context. The 2016 TMP identified Warden Avenue and Kennedy Road as requiring roadway improvements. The 2016 TMP recommended Kennedy Road between Major Mackenzie Drive to Donald Cousens Parkway (Project ID 2003) to widen from two to four lanes and to be constructed to an urban arterial standard. The justification provided was that the transportation forecast meets threshold for a 4-lane widening. This recommendation provided an opportunity to improve walking and cycling facilities. The 2016 TMP recommended road improvements from Major Mackenzie Drive East to Elgin Mills Road East by 2031.

The 2016 TMP recommended Warden Avenue between Major Mackenzie Drive to Donald Cousens Parkway (Project ID 2073) to be widened from two to four lanes and to be constructed to an urban arterial standard. The justification provided was that the transportation forecast meets threshold for a 4-lane widening. This recommendation provided an opportunity to improve walking and cycling facilities. The 2016 TMP recommended the road improvements from Major Mackenzie Drive East to Elgin Mills Road East by 2031.

Around the two study corridors, the City of Markham's Official Plan has identified 1,300 hectares of lands, which includes 975 hectares of developable land, in North Markham to be the 'Future Urban Area'. Approximately 700 hectares of the developable land are designated 'Future Neighbourhood Area', which will accommodate approximately 45,000 persons by full build-out. Approximately 275 hectares of developable land north of Elgin Mills Road are designated as 'Future Employment Area', which will accommodate approximately 19,000 jobs at full build-out.

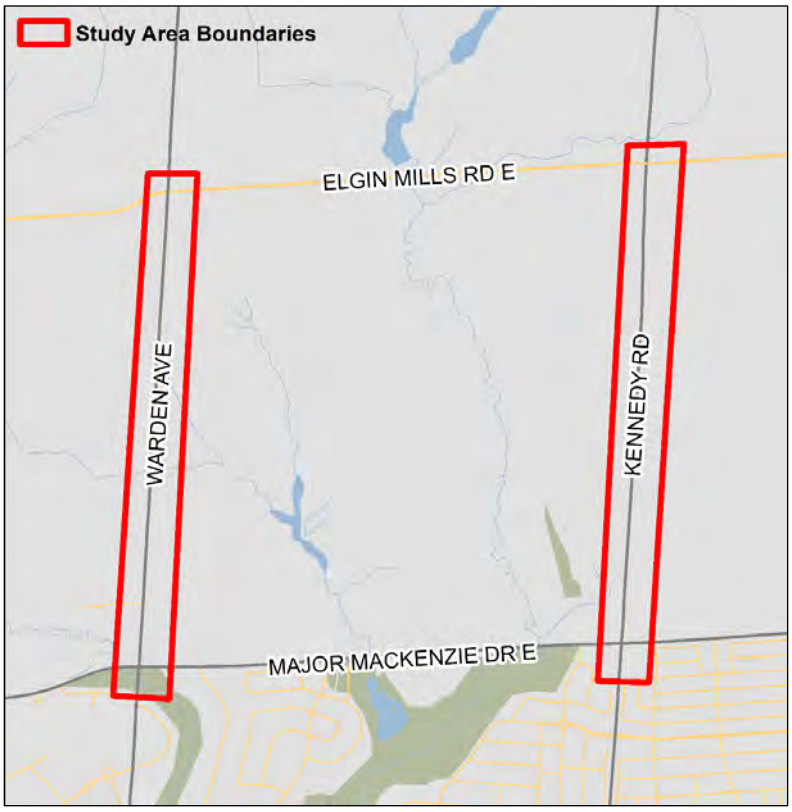
Study Areas

There are two study corridors, which include the following road segments:

- Warden Avenue, between Major Mackenzie Drive East and Elgin Mills Road Eas.
- Kennedy Road, between Major Mackenzie Drive East and Elgin Mills Road East.

The Study Areas are illustrated below.

The Study Area for Warden Avenue also includes a short segment approximately 65 m south of Major Mackenzie Drive East to include the large culvert that carries Berczy Creek under Warden Avenue. The Study Area for Kennedy Road also include a short segment approximately 120 m north of Elgin Mills Road East to include the bridge that carries Bruce Creek under Kennedy Road. While the Study Areas have been extended to include these 2 watercourse crossings, the Study Area limits referenced for the purposes of this report are the intersections at Major Mackenzie Drive East and Elgin Mills Road East.



Existing Transportation Conditions

A transportation system inventory was established, which documented the road network, transit network, active transportation network, goods movement-related characteristics, road right-of-way characteristics, and existing driveway accesses.

Travel Demand

Various transportation data sets provided insight on the travel patterns, mode share, and temporal distribution of traffic volumes. Analysis of 2016 Transportation Tomorrow Survey data showed that most travel to and from the area are done by driving or being a passenger of a private automobile. Historic traffic counts showed that for both Warden

Avenue and Kennedy Road, the southbound direction is the peak direction in the AM peak hour. The northbound direction is the peak direction in the PM peak hour.

The traffic volumes for the existing conditions during AM and PM peak hours were derived and normalized from various data sets including historical turning movement counts and Annual Average Daily Traffic (AADT).

Existing Conditions Multi-Modal Level-of-Service Evaluation

Using York Region's Transportation Mobility Plan Guidelines (November 2016), levels-of-service were evaluated for three transportation modes: automobile, cycling, and walking. There is currently no transit service along these two study corridors.

Future Transportation Conditions

The road and transit network were documented based on planned improvements from York Region's 2016 TMP, 5-Year York Region Transit Service Plan, Regional Official Plan (2010), and the City of Markham's Active Transportation Master Plan (2021).

Future Conditions Forecasted Traffic Volumes

Transportation model refinements were made to York Region's EMME model for the 2031 and 2041 horizon years. Traffic growth rates were calculated based on modelling outputs. The traffic growth rates were calculated using peak direction modelled volumes in the AM peak hour, which is the time period of the EMME model. These traffic growth rates were applied to both directions of the existing conditions AM and PM traffic volumes derived from the turning movement counts to forecast 2041 traffic volumes.

Future Conditions Automobile Level-of-Service Evaluation

Level-of-service evaluation for the "Do Nothing" scenario was undertaken using the future conditions traffic volumes and the existing network with no geometric improvements. The "Do Nothing" scenario was assessed to re-confirm the automobile needs and justification that was identified in the 2016 Transportation Master Plan. The 2016 TMP fulfills the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment process for roads. This TMP identified Warden Avenue and Kennedy Road as requiring roadway improvements which included a one to two-lane widening within the Study Areas.

Automobile Demand Needs and Justification:

In the 2021 existing conditions year:

- During the AM peak hour, the traffic operations analysis indicated three intersections operating with demand at or above capacity. Warden Avenue and Elgin Mills Road East operate at LOS E. Warden Avenue and Major Mackenzie Drive East operate at LOS F. Kennedy Road and Major Mackenzie Drive East operate at LOS E.

- During the PM peak hour, the traffic operations analysis indicated one intersection operating with demand at or above capacity. Warden Avenue and Major Mackenzie Drive East operate at LOS E.
- The link capacity analysis indicated that Warden Avenue is operating with volumes above typical auto link capacity during both AM and PM peak hours. The maximum auto link volume-to-capacity ratio was 1.24 in the southbound direction during the AM peak hour. The maximum auto link volume-to-capacity ratio was 1.15 in the northbound direction during the PM peak hour.
- This link capacity analysis indicated that Kennedy Road is operating below total link capacity in the existing conditions. The maximum link volume-to-capacity ratio is 0.78 in the southbound direction during the AM peak hour. The maximum link volume-to-capacity ratio is 0.58 in the northbound direction during the PM peak hour.

To re-confirm the findings of the Region's 2016 Transportation Master Plan, the 2041 "Do Nothing" scenario was assessed.

In the 2041 future conditions year for the "Do Nothing" scenario:

- During the AM and PM peak hours, the traffic operations analysis indicated that all four intersections are forecasted to operate with volumes above capacity at LOS F indicating a need for intersection improvements.
- In the AM peak hour, the southbound-through forecasted queue along Warden Avenue between Major Mackenzie Drive East and Elgin Mills Road East is significantly long. The recommended improvements of widening from two to four lanes to increase the link capacity will dramatically reduce the forecasted queues.
- The other movement that is forecasted to have 95th percentile through movement queues long enough to impact existing adjacent signalized intersection was westbound at Kennedy Road and Major Mackenzie Drive East. Signal timing optimization and coordination is recommended to mitigate spillback at the adjacent intersections.
- The 95th percentile queue is forecasted to be greater than the existing northbound left storage distance at Kennedy Road and Major Mackenzie Drive East. Infrastructure improvements (e.g., dual left turns), increasing left turn storage distances, signal timing optimization, or lane configuration alterations are recommended to be explored to mitigate the impacts.
- The link capacity analysis indicated that Warden Avenue is forecasted to operate above auto link capacity in the future "do nothing" scenario during the AM and PM peak hours. The maximum link volume-to-capacity ratio is 2.22 in the southbound direction during the AM peak hour. The maximum link volume-to-capacity ratio is 1.85 in the northbound direction during the PM peak hour.
- The link capacity analysis indicated that Kennedy Road is forecasted to operate above auto link capacity in the future "do nothing" scenario during the AM peak hour. The maximum link volume-to-capacity ratio is 1.26 in the southbound direction during

the AM peak hour. The maximum link volume-to-capacity ratio is 0.89 in the northbound direction during the PM peak hour.

- The 2041 future year link capacity analysis indicated the need for increased link capacity for Warden Avenue and Kennedy Road. Increased link capacity should be provided by increasing the number of lanes from one lane per direction to two lanes per direction as recommended by the Region's 2016 TMP.

Pedestrian and Cycling Needs and Justification

- There are no existing dedicated cycling facilities along Warden Avenue or Kennedy Road within the Study Areas.
- Pedestrian Levels-of-Service did not meet the target of LOS C for many legs of intersections and roadway segments within the study corridors under the existing condition.
- Improvements to the pedestrian and cycling environment should be implemented at the intersections of Elgin Mills Road East at Warden Avenue and Kennedy Road. Improvements to the pedestrian and cycling environment should be implemented on Warden Avenue and Kennedy Road between Elgin Mills Road East and Major Mackenzie Drive East.
- Because the area is being redeveloped and reconstructed, opportunities to improve the pedestrian and cycling environment should be explored at the Major Mackenzie Drive East intersections at Warden Avenue and Kennedy Road concurrently with the improvements to the rest of the study corridors to ensure consistency and connectivity.
- There is an existing multi-use path along Warden Avenue between 16th Avenue and Major Mackenzie Drive East on the east side. Given that the area is planned for redevelopment with an urban cross section for Warden Avenue, it would be appropriate to continue the multi-use path north of Major Mackenzie Drive East on the east side for connectivity of the active transportation network.

Transit Needs and Justification

- There is no transit service currently provided within the Study Areas. The Region supports transit as a robust transit network helps support growth to key centres and corridors and minimizes the need for travel and reduces dependence on single occupant vehicles. This sustainable mode of transportation also helps mitigate climate change, which is another important objective for York Region.
- Warden Avenue and Kennedy Road between Elgin Mills Road East and Major Mackenzie Drive East are planned to be Frequent Transit Network (FTN) routes.

Traffic Safety Needs and Justification

- A safety assessment was undertaken to identify and mitigate potential safety related concerns using historical collision records within the Study Areas.
- Warden Avenue between Major Mackenzie Drive East and Heritage Hill Drive has collision rate of 1.80 along this segment indicating a need for safety improvements.

- At the Kennedy Road and Elgin Mills Road East intersection, 47% of the collisions were categorized as non-fatal and 53% was categorized as property damage only. The severity of the collisions may represent an opportunity for improvement such as speed management.
- The alternative design concepts should consider the need to protect for vulnerable road users since active transportation activity is expected to increase along this corridor.

Roundabout Needs and Justification

- This study does not recommend including the implementation of roundabouts as an alternative to be considered for both study corridors at the Major Mackenzie Drive East and Elgin Mills Road East intersections based on the following reasons:
  - Given the forecasted 2041 traffic volumes, a 3-lane roundabout would have to be considered. A 3-lane roundabout is not recommended in York Region currently, and specifically in the Future Urban Area where in an urbanized environment, comfort for vulnerable road users and those that have mobility challenges should be prioritized.
  - Roundabouts should be considered if there are safety concerns at the intersections. However, these intersections are not shown to have safety problems as shown in the traffic safety assessment. Although single-lane roundabouts can improve safety, a multi-lane roundabout may not have the same level of safety benefits.
  - The four intersections within the study corridors are already signalized and generally roundabout implementation should be considered for new or unsignalized intersections.

Alternative Solutions

York Region's Transportation Master Plan (TMP) is the Region's long-term vision for York Region's transportation network, encompassing strategy, policy, and infrastructure. The plan looks ahead 30 years and considers the Region's transportation infrastructure needs to support growth and the changing needs of travellers. The plan supports healthy communities and economic growth by planning for safe, reliable travel, and efficient movement of goods.

The TMP was last conducted in 2016 and satisfies Phases 1 and 2 of the MCEA process. The TMP identified Warden Avenue and Kennedy Road as requiring roadway improvements. These recommendations were based on assessments of alternative scenarios. A preferred scenario was selected based on its alignment with the following TMP objectives:

- Support Transit.
- Support Road Network.
- Support Active Transportation.
- Support Goods Movement.
- Support Last Mile.

The preferred scenario for Warden Avenue included the widening of the corridor to 4 lanes and constructing to an urban arterial standard. The justification provided was that the traffic forecast met threshold for a 4-lane widening. This recommendation provided an opportunity to improve walking and cycling facilities. The TMP recommended the widening from Major Mackenzie Drive East to Elgin Mills Road East by 2031.

The preferred scenario for Kennedy Road included the widening of the corridor from two lanes to four lanes and constructing to an urban arterial standard. The justification provided was that the traffic forecast met threshold for a 4-lane widening. This recommendation provided an opportunity to improve walking and cycling facilities. The TMP recommended the widening from Major Mackenzie Drive East to Elgin Mills Road East by 2031.

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1.0 Introduction

1.1 Background

The Regional Municipality of York ("York Region") retained R.J Burnside & Associates Ltd. ("Burnside") to complete a Municipal Class Environmental Assessment (MCEA) for two study corridors: Warden Avenue and Kennedy Road between Major Mackenzie Drive East and Elgin Mills Road East. York Region conducted their Transportation Master Plan (TMP) in 2016. As part of the 2016 TMP, the road needs and justifications were established for the two study corridors meeting the requirements for Phase 1 and 2 of the MCEA process.

1.2 Report Structure

As part of this Environmental Assessment, a transportation assessment was completed to assess existing and future traffic operations and safety of the study corridors to identify any operational constraints and potential safety related concerns. This report documents the analysis methodology, results of the transportation assessment, alternative solutions, and proposed road network improvements to accommodate future demand along the study corridor. Burnside confirmed and built upon the findings of York Region's 2016 TMP.

This report will be updated in Phase 3 of the MCEA process which will inform the overall evaluation of alternative design concepts for the two study corridors.

1.3 Description of the Study Areas

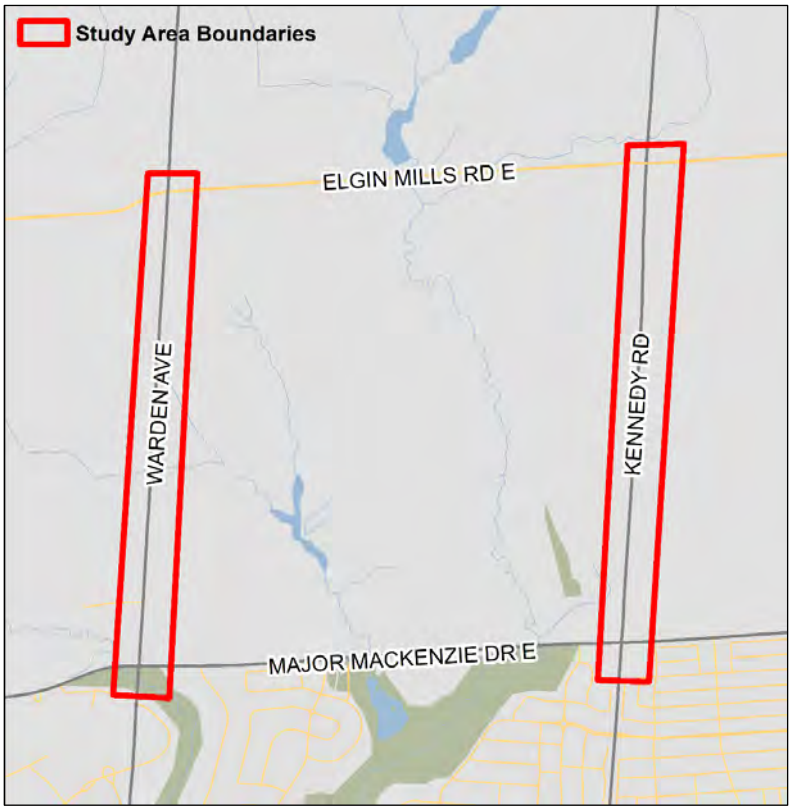
There are two study corridors, which include the following road segments:

- Warden Avenue, between Major Mackenzie Drive East and Elgin Mills Road East.
- Kennedy Road, between Major Mackenzie Drive East and Elgin Mills Road East.

The Study Area for Warden Avenue also includes a short segment approximately 65 m south of Major Mackenzie Drive East to include the large culvert that carries Berczy Creek under Warden Avenue. The Study Area for Kennedy Road also include a short segment approximately 120 m north of Elgin Mills Road East to include the bridge that carries Bruce Creek under Kennedy Road. While the Study Areas have been extended to include these two watercourse crossings, the Study Area limits referenced for the purposes of this report are the intersections at Major Mackenzie Drive East and Elgin Mills Road East.

The Study Areas are shown in Figure 1.

Figure 1: Study Areas



1.4 Transportation System Study Approach

This study provides a preliminary assessment of the key transportation related issues, including a review of all relevant background reports / studies and existing traffic data.

An evaluation of the existing traffic operations in the area help identify opportunities to improve traffic operations. This provides the Region an opportunity to:

- Review road and access options for improvements.
- Facilitate an improved active transportation network for pedestrians and cyclists.
- Provide a multi-modal facility that is safe and efficient and can be shared by all modes of travel.

Future operations are assessed to accommodate growth through 2041 along the Warden Avenue and Kennedy Road corridors to determine the transportation needs. This can include but is not limited to auxiliary lanes, widening of the road, transportation demand management, transit, and the accommodation of active transportation infrastructure.

The Region's November 2016 Transportation Mobility Plan Guidelines were taken into consideration.

2.0 Planning Context

2.1 Provincial Planning Context

2.1.1 Provincial Policy Statement, 2020

The Provincial Policy Statement provides direction on land use planning, efficient development patterns, and developing strong, liveable, and healthy communities. The policies related to transportation system planning include:

- Healthy, active communities should be promoted by planning public streets, spaces, and facilities to be safe, meet the needs of pedestrians, foster social interaction, and facilitate active transportation and community connectivity.
- Transportation systems should be provided, which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs.
- Efficient use should be made of existing and planned infrastructure, including through the use of transportation demand management strategies, where feasible.
- As part of a multimodal transportation system, connectivity within and among transportation systems and modes should be maintained and, where possible, improved including connections, which cross jurisdictional boundaries.
- A land use pattern, density and mix of uses should be promoted that minimize the length and number of vehicle trips and support current and future use of transit and active transportation.
- Planning authorities shall plan for and protect corridors and rights-of-way for infrastructure, including transportation, transit and electricity generation facilities and transmission systems to meet current and projected needs.
- Major goods movement facilities and corridors shall be protected for the long term.
- Planning authorities shall support energy conservation and efficiency, improved air quality, reduced greenhouse gas emissions, and preparing for the impacts of a changing climate through land use and development patterns, which promote the use of active transportation and transit in and between residential, employment (including commercial and industrial) and institutional uses and other areas.

2.1.2 Places to Grow

A Place to Grow (“Growth Plan”) contains policies and schedules to plan for growth and development in a way that supports economic prosperity, protects the environment, and helps communities achieve a high quality of life. This Growth Plan also sets out a long-term framework for managing growth by providing population and employment forecasts for upper- and single-tier municipalities within the Greater Golden Horseshoe.

On August 28, 2020, Amendment 1 to A Place to Grow and Proposed Lands Needs Assessment Methodology came into force and effect. The upper- and single-tier municipalities were then required to conduct a Municipal Comprehensive Review (MCR) to ensure that their Official Plans conformed with provincial plans and policies.

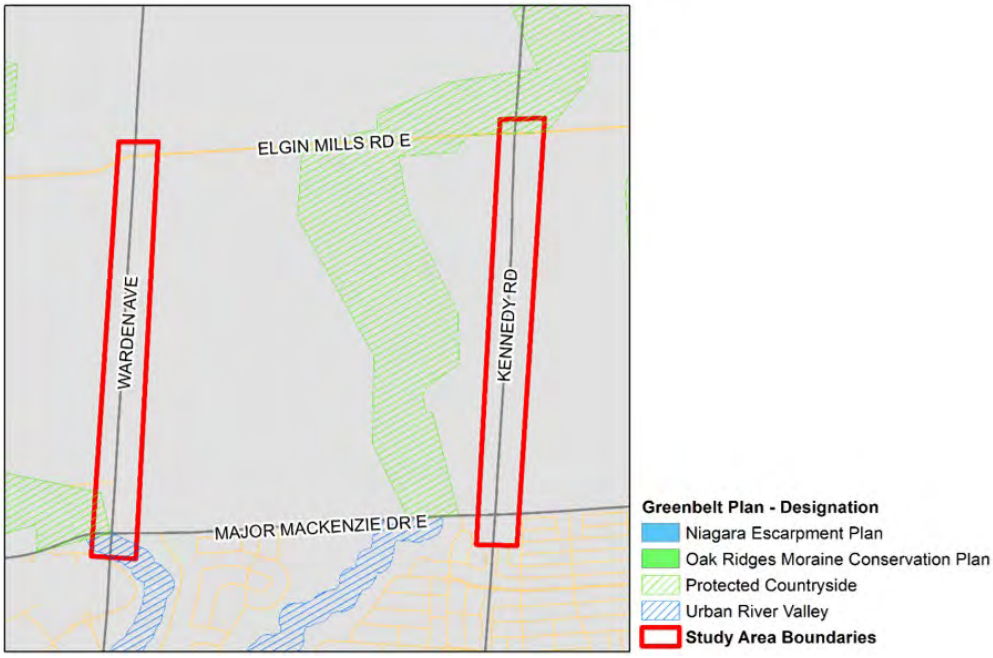
2.1.3 Greenbelt Plan

The Greenbelt Plan consists of policies and schedules aimed to permanently protect the agricultural land base and the ecological, hydrological features, areas, and functions within the Greenbelt, which is in Ontario's Greater Golden Horseshoe region. More specifically, the Greenbelt Area includes lands within the Niagara Escarpment Plan Area, the Oak Ridges Moraine Area, the Parkway Belt West Area, and lands designated as Protected Countryside and as Urban River Valley. The vision for these areas is a broad band of permanently protected land that:

- Protects against the loss and fragmentation of the agricultural land base and supports agriculture as the predominant land use.
- Gives permanent protection to the natural heritage and water resource systems that sustain ecological and human health and that form the environmental framework around, which major urbanization in south-central Ontario will be organized.
- Provides for a diverse range of economic and social activities associated with rural communities, agriculture, tourism, recreation, and resource uses.
- Builds resilience to and mitigates climate change.

The south section of the Warden Avenue Study Area is within the Urban River Valley and Protected Countryside designations of the Greenbelt Plan. The north section of the Kennedy Road Study Area is within the Protected Countryside designations of the Greenbelt Plan. The Study Areas and Greenbelt Plan areas are shown in Figure 2.

Figure 2: Greenbelt Plan Areas



2.1.4 Oak Ridges Moraine Conservation Plan

As part of the Greenbelt, the Oak Ridges Moraine is an environmentally sensitive, geological landform. The Oak Ridges Moraine Conservation Plan was established in 2002. It provides direction on land use and resource management for the land and water located within the moraine to protect ecological and hydrological features and functions. No section of the Warden Avenue and Kennedy Road Study Areas fall within the boundary of the Oak Ridges Moraine.

2.2 York Region Planning Context and Related Studies

2.2.1 York Region Official Plan

The Official Plan contains policies and schedules to accommodate future growth and development, while meeting the needs of existing residents and businesses in the Region. It provides directions and policies that guide economic, environmental, and community planning decisions. The 2019 consolidation of the 2010 Official Plan is currently being updated.

York Region is currently undertaking a Municipal Comprehensive Review process to update population and employment forecasts and allocations, land needs budget, and Regional Official Plan policies. The Region has until July 1, 2022, to complete their Municipal Comprehensive Review and Growth Plan conformity exercise, which includes allocating provincial growth forecasts of approximately 2,020,000 persons and 990,000 jobs to York Region by 2051. York Region is expecting to complete their Regional Official Plan adoption by Council in Q2 2022.

2.2.2 York Region Strategic Vision (Vision 2051), 2011

Vision 2051 is York Region's long-term strategy. This policy document describes the Region's ideal vision of the next 40 years and describes the action plan. One of the goals in Vision 2051 is for York Region to have a diverse urban form that provides a variety of interesting and exciting places to live, work, and play. This includes having communities that are people-first and designed for healthy, active living and social inclusion, and are the heart of business, arts and culture, community life and services. This goal is supported by the following actions relevant to the Warden Avenue and Kennedy Road corridors:

- Planning mixed-use pedestrian environments with attractive streets, high-quality urban design, and a distinct sense of place.
- Planning for safe, compact, complete, walkable, mixed-use communities, towns and villages that offer residents the opportunity to work and live active and healthy lives in the same community throughout their lives.
- Planning for an integrated urban network of communities, human services, jobs, transportation, and infrastructure systems that connect people to places, jobs, and services.
- Achieving a transit-oriented urban form.

- Achieving better connections between where people live, work, learn and play.

Another goal of Vision 2051 is to provide a seamless network for mobility that provides accessibility to all destinations using diverse transportation options for people in all communities, promotes active healthy living and safely and efficiently moves people and goods. This goal is supported by the following actions relevant to the Warden Avenue and Kennedy Road corridors:

- Ensuring a compact, mixed-use built form that minimizes the need for travel and reduces dependence on single occupant vehicles.
- Implementing and supporting transportation demand management initiatives that reduce automobile dependence by enhancing opportunities for residents and workers to walk, cycle, take transit and carpool.
- Providing convenient and reliable alternative modes of travel and prioritizing walking, cycling, public transit and carpooling.
- Implementing a comprehensive pedestrian system and programs that encourage walking, cycling and transit use.
- Facilitating an on and off-road cycling network that connects municipal cycling networks and trail systems and creates a Regional spine that will facilitate transportation by bicycle and support the use of public transit.

2.2.3 York Region's Sustainability Strategy

The Sustainability Strategy provides a long-term framework for making smart decisions about growth management and all municipal responsibilities that better integrate the economy, environment, and community. One of the goals of the strategy is to create self-sustaining and healthy communities that emphasize the human condition. This goal recognizes the importance of land-use and infrastructure planning, human services, and fiscal impacts. The relevant actions to the Warden Avenue and Kennedy Road corridors include:

- Ensure that all residents and employees, including new immigrants, the elderly, young people, and the disabled have barrier-free, accessible, and affordable transportation.
- Continue to provide rapid transit and public transit with connecting pedestrian-friendly access routes.
- Apply Transportation Demand Management to increase transit usage, carpooling and alternative transportation modes to improve access and mobility.

2.2.4 York Region Transportation Master Plan

York Region's Transportation Master Plan (TMP) is the Region's long-term vision for York Region's transportation network, encompassing strategy, policy, and infrastructure. The plan looks ahead 30 years and considers the Region's transportation infrastructure needs to support growth and the changing needs of travellers. The plan supports healthy communities and economic growth by planning for safe, reliable travel, and efficient movement of goods.

The TMP was last conducted in 2016 and satisfies Phases 1 and 2 of the MCEA process. At the time of writing this report, York Region's 2022 Transportation Master Plan was being conducted to support the planned growth of 2,020,000 people and 990,000 jobs by 2051.

The purpose of the 2022 Transportation Master Plan, currently underway, is to plan, build, operate, and maintain a connected transportation network for all travellers that is safe, reliable, future ready, sustainable and balances the needs of the unique communities.

The guiding principles include:

- Safety.
- Inclusive and equitable.
- Protect the environment.
- Affordable today and tomorrow.
- Balance the needs of communities and commuters.
- Future-ready.

The strategic objectives include:

- Make the best use of the roads, structures, and services we provide.
- Encourage all types of travel.
- Provide a resilient transportation network that is adaptable to the changing environment.
- Enhance partnerships.
- Collaborative sharing and learning through engagement and education.

2.2.5 York Region's Pedestrian and Cycling Master Plan (2007)

This master plan guides the development of a convenient and continuous regional-scale pedestrian and cycling network. This network consists of Regional and local roads to ensure that cycling and walking are safe and effective modes of transportation. This plan recognizes that walking and cycling are affordable and environmentally friendly modes of travel. A shift from motorized vehicles to active transportation can mitigate ozone depletion, ground-level air pollution, the greenhouse effect, traffic noise and urban sprawl. Economic benefits included reduced health care costs, higher productivity, and tourism.

Other goals of this plan include providing a safe environment for pedestrian and cyclists and enhancing the overall user experience through the implementation of policies and design standards. This plan provides a long-term pedestrian and cycling plan that was updated in York Region's 2016 Transportation Master Plan.

2.2.6 York Region Transit Business Plan (2021 – 2025)

The 2021 – 2025 Business Plan describes how York Region Transit (YRT) will address the impact of the COVID-19 pandemic and the Regin's transit needs over the next 5 years. This business plan outlines the Frequent Transit Network (FTN) plan, which identifies high-ridership corridors where additional service is warranted. Kennedy Road and Warden Avenue between Elgin Mills Road East and Major Mackenzie Drive East were identified as frequent transit network routes. Near to these Study Areas, Major Mackenzie Drive East was identified as a bus rapid transit route and Elgin Mills Road East was identified as a frequent transit network route.

Frequent transit network provides more direct service and improved transfers between routes by creating a connective grid network of Viva and base routes operating along key corridors in urban areas of the Region. The FTN supports travel between Regional Centres and along Regional Corridors and supports more direct inter-regional trips.

2.2.7 York Region's 2019 Designing Great Regional Streets

These guidelines aim to improve regional streets based on an examination of various needs and objectives within rights-of-way and road design standards. These guidelines also integrate road design and land use context by taking a context-sensitive approach that promotes the following outcomes:

- Flexibility to design for community context through the EA process.
- Consistency with facility applications in similar contexts.
- Best practices and sound, professional judgment.
- A 'made-in-York-Region' approach that considers full lifecycle costs.

These guidelines include six road typologies that reflects the Region's aspirations for the Regional road network:

- City Centre Street
- Avenue
- Main Street
- Connector
- Rural Road
- Rural Hamlet Road

Warden Avenue and Kennedy Road are planned to be "Connectors". Connectors prioritize goods and vehicle movement, while also supporting transit and active transportation. These roads are predominantly situated in residential or industrial areas, with small- to medium- scale built form that is typically set back from the street.

Design opportunities include generous green boulevards and multi-use paths.

2.3 City of Markham Planning Policies and Related Studies

2.3.1 City of Markham Official Plan

The City's Official Plan sets out land use policies that guide future development and manage growth. The 2014 Official Plan was approved on June 12, 2014 and amended through the LPAT Partial Approval Order Update issued on April 9, 2018.

The 2014 Official Plan contains policies on transportation, services, and utilities. These policies aim to build a transportation system within the City of Markham, which provides for the following:

- Selective road capacity enhancements.
- Increased and enhanced transit services.
- Transit-supportive development.
- Transportation demand management.
- Active transportation.

2.3.2 Future Urban Area Conceptual Master Plan

Markham's Official Plan has identified 1,300 hectares of lands, which includes 975 hectares of developable land, in North Markham to be the 'Future Urban Area'. Approximately 700 hectares of the developable lands are designated 'Future Neighbourhood Area', which will accommodate approximately 45,000 persons by full build-out. Approximately 275 hectares of developable lands north of Elgin Mills Road are designated as 'Future Employment Area', which will accommodate approximately 19,000 jobs at full build-out. The 4 residential blocks within the FUA are shown in Figure 3.

Figure 3: Residential Blocks within the FUA

Source: Public Open House #2 Display Boards, North Markham Future Urban Area Collector Roads Network Class Environmental Assessments (October 2019)

2.3.3 Markham Active Transportation Master Plan ('Ride & Stride') (2021)

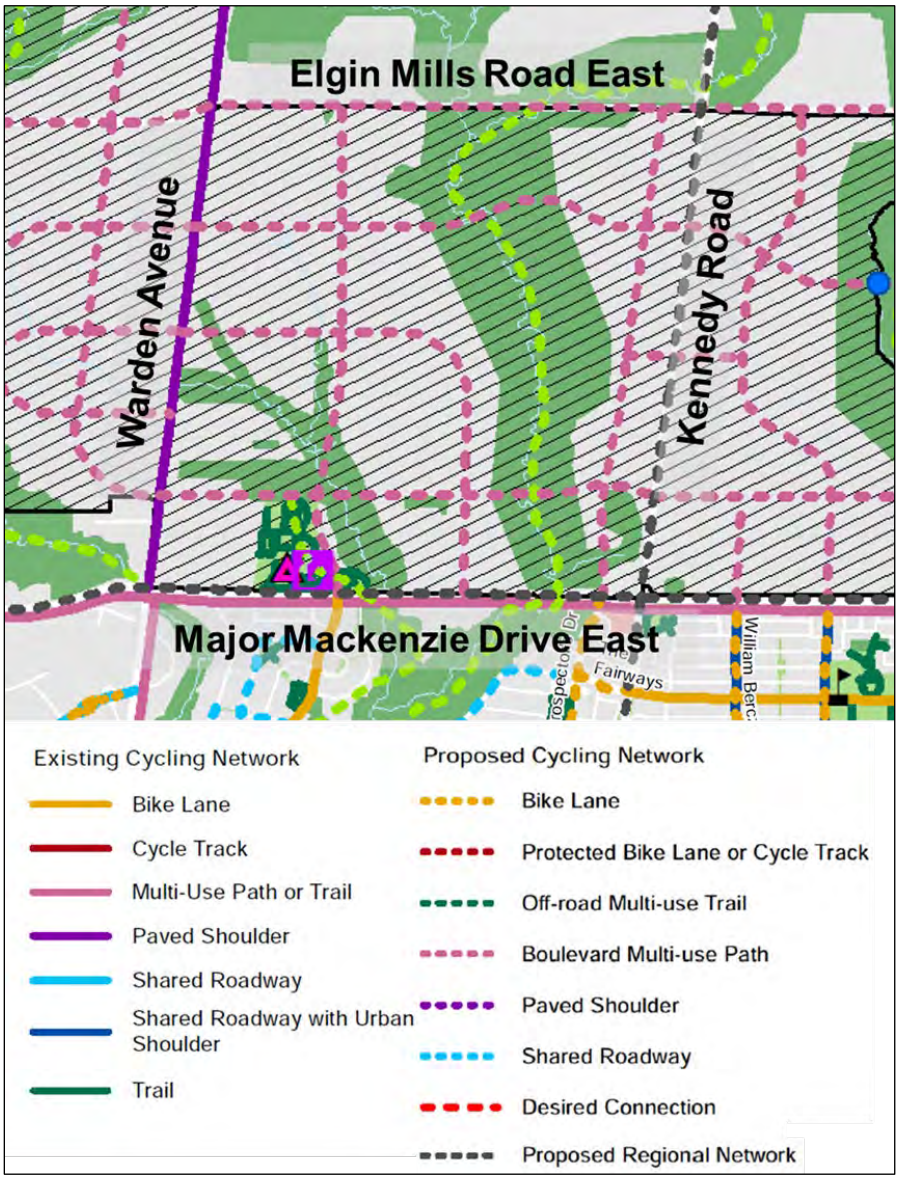
The 2021 Markham Active Transportation Master Plan (ATMP) outlines the policies, directions, steps, and projects that need to be undertaken to provide safe, comfortable, and well-connected active transportation network in Markham. The City identified strengthening the active transportation network as an important initiative to combat climate change and safety for road users. The City's "Getting to Zero: Markham's Municipal Energy Plan" assumes that as part of future scenarios 50% of trips with a length between 1 and 5 km shift to cycling by 2040, and 50% of the potential walking trips that were less than 2 km were not supporting the travel of another passenger were shifted to walking by 2050.

The ATMP proposed an ultimate cycling network that includes existing paved shoulders on Warden Avenue and a "Proposed Regional Network" facility on Kennedy Road between Major Mackenzie Drive East and Elgin Mills Road East. It also includes proposed boulevard MUPs on Elgin Mills Road between Warden Avenue and Kennedy Road, and on the proposed collector roads within the Future Urban Areas that will be connected to the study corridors.

The proposed active transportation network is shown in Figure 4.

Figure 4: Proposed Active Transportation Network (City of Markham Active Transportation Master Plan)

Adapted from: Ride & Stride: Markham Active Transportation Master Plan, Executive Summary (2021)



2.3.4 Future Urban Area Collector Road Network Class Environmental Assessments

The North Markham Future Urban Area Collector Road Network Class Environmental Assessments carry forward the Conceptual Master Planning (CMP) process for the proposed collector roads identified in the Community Structure Plan. To address Phases 3 and 4 of the MCEA process, an environmental study report (ESR) for each block was planned to be filed. At the time of writing this report, ESRs were filed for the Berczy Glen Block, Robinson Glen Block, and Victoria Glen Block. The Angus Glen

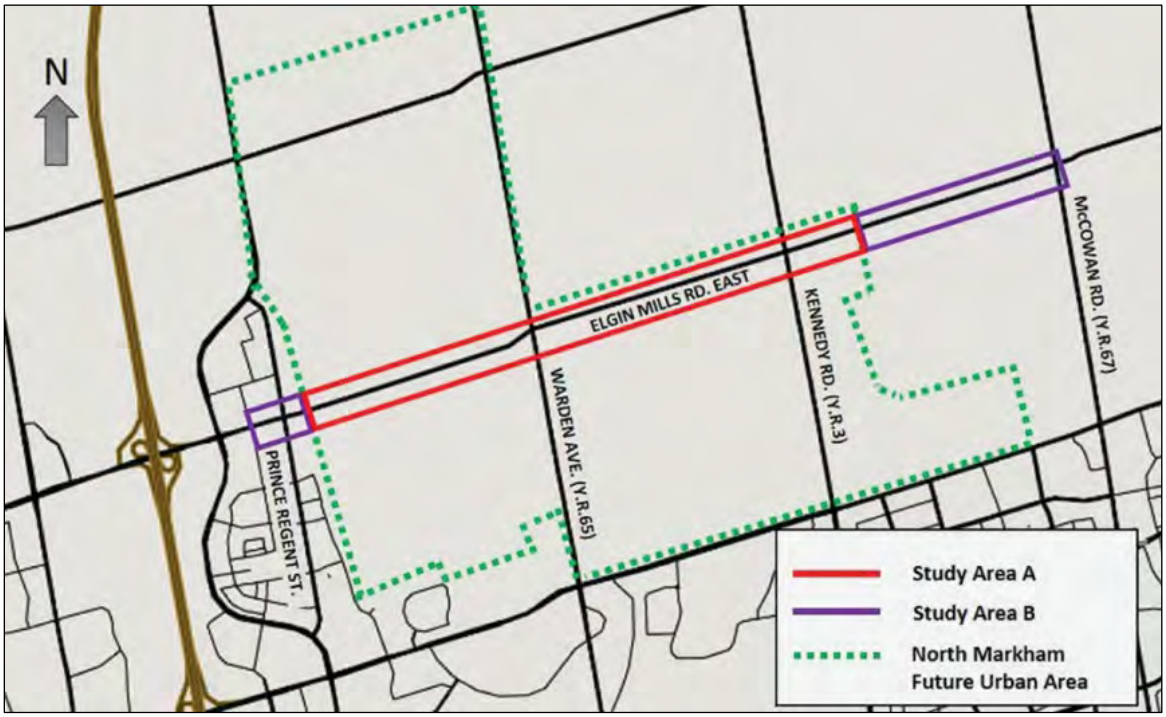
Block ESR has been appealed and currently on hold due to Ontario Land Tribunal (OLT) hearings.

2.3.5 Elgin Mills Road Municipal Class Environmental Assessment

The Elgin Mills Road Municipal Class Environmental Assessment from Woodbine Avenue to McCowan Road was commenced in May 2020. The study area intersects the Study Areas for the Warden Avenue and Kennedy Road MCEAs. This study includes two study areas, which include Study Area A and Study Area B as shown in Figure 5.

Figure 5: Elgin Mills Road East Class EA Study Area

Source: Notice of Public Online Engagement #2, Elgin Mills Road Municipal Class Environmental Assessment.



For Study Area A, the City completed Phase 1 and Phase 2 of the MCEA process and, at the time of writing this report, is carrying out the remaining Phase 3 and Phase 4. For Study Area B, the City relied on York Region's 2016 Transportation Master Plan that addressed Phases 1 and 2 of the MCEA process. The City is incorporating the findings related to this portion of Elgin Mills Road into this study and at the time of writing this report is proceeding to carry out the remaining Phases 3 and 4.

3.0 Data Collection

Data for conducting traffic analysis were obtained from York Region. The Region also provided historical collision data for the safety assessment.

3.1 Turning Movement Counts

The turning movements counts that were provided by the Region for the traffic analysis are shown in Table 1. Turning movement counts are provided in Appendix A.

Table 1: Turning Movement Counts Provided by York Region

Location	Date of Count
Kennedy Road and Elgin Mills Road East	January 21, 2009
Kennedy Road and Major Mackenzie Drive East	March 22, 2017
Warden Avenue and Elgin Mills Road East	November 11, 2009
Warden Avenue and Major Mackenzie Drive East	January 14, 2009

3.2 Supplemental Traffic Studies

Due to the dated regional turning movement count provided, traffic count data for the following studies were reviewed:

- The Master Environmental Servicing Plan (MESP) Transportation Study Update for Angus Glen Landowner Group and Berczy Glen Landowner Group, dated August 2, 2019, was prepared by Poulos & Chung.
- Robinson Glen Traffic Impact Study Update for Robinson Glen Landowners Group, dated January 2020, was prepared by WSP.
- Transportation Study Final Report – Environmental Assessment Study for Elgin Mills Road East between West of Woodbine Avenue to East of McCowan Road, dated November 22, 2021, was prepared by IBI Group.

Details regarding weekday turning movement counts for the WSP and Poulos & Chung studies are shown in Table 2. The IBI Group transportation study uses these 2 weekday TMCs for the existing conditions traffic analysis.

Table 2: Supplemental Traffic Data Details

Location	Date of Count
Kennedy Road and Elgin Mills Road East	June 14, 2018
Warden Avenue and Elgin Mills Road East	2018

The traffic count data is provided in Appendix A.

3.3 Annual Average Daily Traffic

York Region provided historical annual average daily traffic (AADT) volumes along Kennedy Road between Elgin Mills Road East and Major Mackenzie Drive East, Warden Avenue between Elgin Mills Road East and Heritage Hill Drive, and Warden Avenue between Elgin Mills Road East and Major Mackenzie Drive East. Historical AADT data is provided in Appendix A.

3.4 Existing Signal Timing Plans

Signal timing plans were provided by the Region for the 4 signalized intersections within the Study Areas. Detailed signal timing plans are provided in Appendix B.

3.5 Speed Studies

Speed studies were provided by the Region for Kennedy Road and Warden Avenue. The 15-min and 60-min speed data and traffic volumes were collected for Kennedy Road on June 12, 2019. The 60-min speed data and traffic volumes were collected for Warden Avenue on June 18, 2019. Speed studies are provided in Appendix C.

3.6 Collision Data

Historical collision data was provided by the Region for Kennedy Road and Major Mackenzie Drive East. The collision data was from January 1, 2010, to April 30, 2021. A copy of the collision data is provided in Appendix D.

3.7 York Region Transportation Forecasting Model

The Region provided EMME modelling files for the 2016 base year, and 2031 and 2041 horizon years based on an updated York Region model that was originally developed in 2005. The modelling period is the AM peak period. These EMME modelling files include:

- Model run inputs.
- Model run macros.
- Model user manual.
- Emmebank with a 2016 network
- Emmebank with a 2031 network that is based on the Region's 2021 10-Year Capital Program and a 2041 network based on the Region's 2016 TMP recommendations.

4.0 Existing Transportation Conditions

4.1 Transportation System Inventory

4.1.1 Road Network

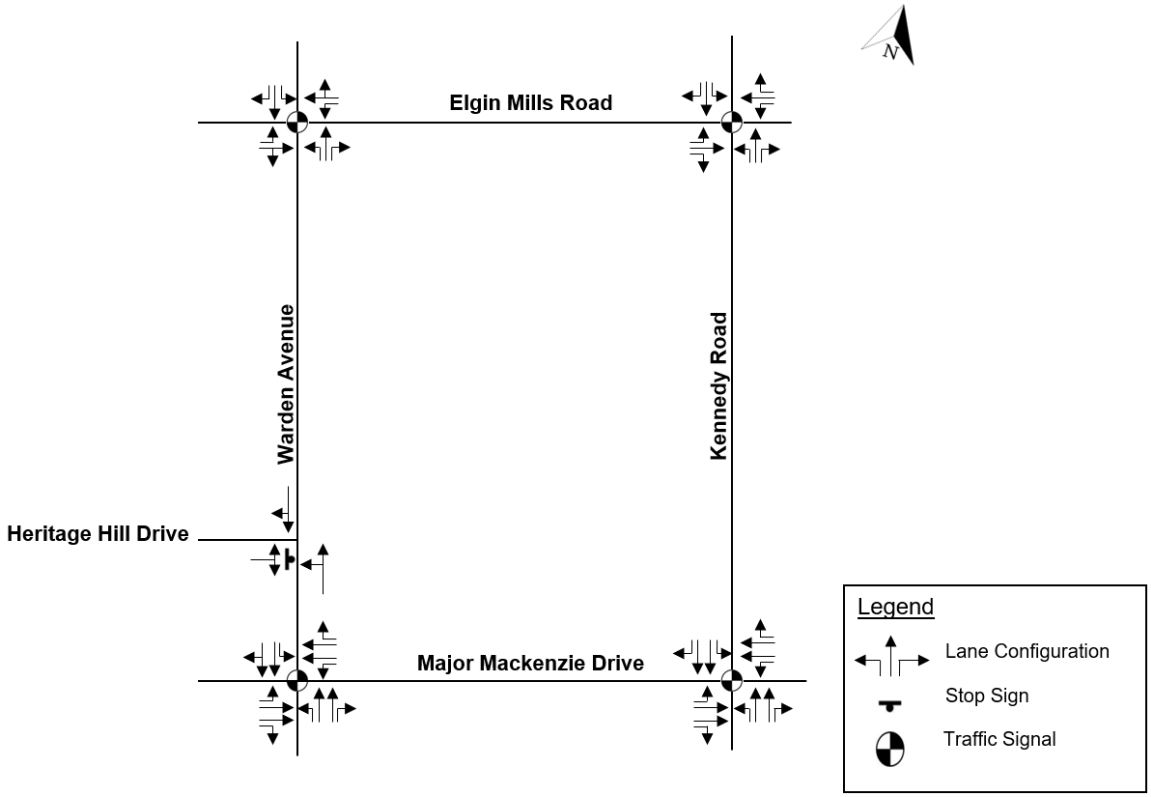
Kennedy Road and Warden Avenue are north-south rural arterial roads that run continuously throughout the City of Markham. They intersect Elgin Mills Road East to the north, which runs east-west and under the jurisdiction of the City of Markham, and Major Mackenzie Drive East, which also runs east-west and under the jurisdiction of York Region. The road characteristics of these roads within or near the Study Areas are shown in Table 3.

Table 3: Road Characteristics within or near the Study Area

Name (Approximate Length)	Jurisdiction	Classification	Number of Through Lanes	Posted Speed Limit
Kennedy Road (2.0 km)	York Region	Regional Arterial Road	2	80 km/hr
Warden Avenue (2.1 km)	York Region	Regional Arterial Road	2	80 km/hr
Major Mackenzie Drive East (2.1 km)	York Region	Regional Arterial Road	4	70 km/hr
Elgin Mills Road East (2.0 km)	City of Markham	Town Arterial Road	2	60 km/hr

The roadway configuration is shown in Figure 6.

Figure 6: Roadway Configuration



4.1.2 Transit Network

Within the Study Areas, York Region Transit (YRT) currently has no transit along Warden Avenue and Kennedy Road between Major Mackenzie Drive and Elgin Mills Road.

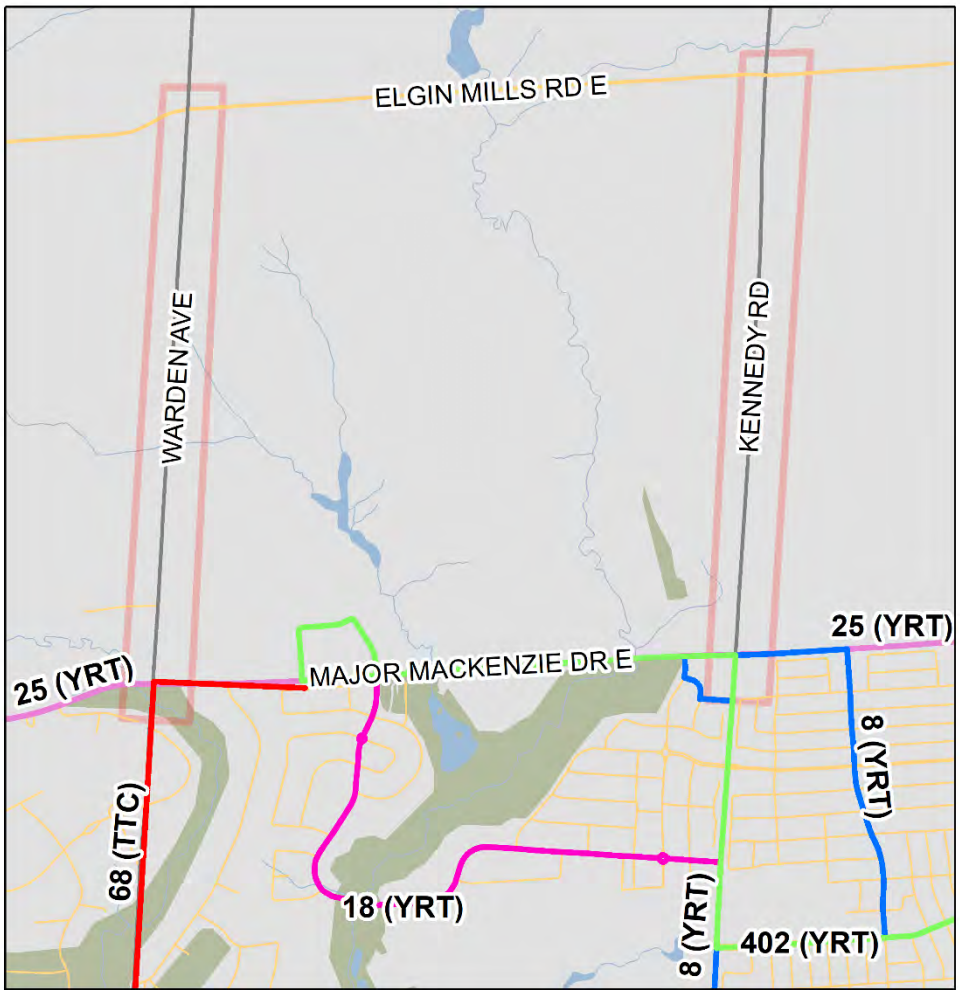
Along Warden Avenue, south of Major Mackenzie Drive East, Toronto Transit Commission (TTC) operates the 68B bus. This route has a terminal at the Angus Glen Community Centre at Major Mackenzie Drive East, between Warden Avenue and Kennedy Road.

Along Kennedy Road, south of Major Mackenzie Drive East, YRT operates Bus #8. This route terminates northbound at Prospector's Drive and Major Mackenzie Drive.

Along Major Mackenzie Drive, YRT operates Bus #25 that runs from Markham Stouffville Hospital at 9th Line to Mackenzie Richmond Hill Hospital near Yonge Street. This bus has stops along Major Mackenzie Drive including at Warden Avenue and Kennedy Road.

YRT also operates special routes including Bus #18 and Bus #402. The #18 and #402 buses run between Markham Stouffville Hospital and Angus Glen Community Centre. The #18 bus runs during rush hours only and the #402 bus runs on school days only. These bus routes are shown in Figure 7.

Figure 7: TTC and YRT Bus Routes Near the Study Area



4.1.3 Active Transportation Network

There are continuous 1.0 m to 3.0 m paved shoulders along Warden Avenue and Kennedy Road between Elgin Mills Road East and Major Mackenzie Drive East. The paved shoulders continue north of Elgin Mills Road East along Warden Avenue and Kennedy Road. Along Kennedy Road, south of Major Mackenzie Drive East, there are no bike-dedicated facilities. Along Warden Avenue, south of Major Mackenzie Drive East, a multi-use path is provided.

4.1.4 Goods Movement

There are no truck restrictions along Kennedy Road and Warden Avenue. In York Region's Strategic Goods Movement Network, these roads are identified as secondary goods movement corridors. York Region's 2016 Transportation Master Plan identified secondary arterial goods movement corridors as Regional arterial roads that have fewer than 2,500 trucks per 8-hour period and fewer than 10% medium and heavy trucks. Highway 404, which is in proximity of the Study Areas, is classified as a highway goods

movement corridor. This classification is given to 400-series freeways with more than 3,000 trucks per day and more than 5% medium and heavy trucks.

4.1.5 Road Right-of-Way Characteristics

The road right-of-way for Kennedy Road is 33.2 m to 47.4 m. The road right-of-way for Warden Avenue is 31.2 m to 50.2 m.

4.1.6 Existing Accesses

York Region manages new and re-development accesses onto regional roads using access management practices to preserve transportation capacity of regional roads for all modes of transportation. Access management establishes the recommendations for appropriate location and design elements of the proposed public roads and private entrances onto regional roads.

There is one intersecting road along Warden Avenue, between Major Mackenzie Drive East and Elgin Mills Road East, called Heritage Hill Drive. There are ten properties that require ten driveway accesses onto Warden Avenue. These properties are shown in Figure 8.

There are no intersecting roads along Kennedy Road, between Major Mackenzie Drive East and Elgin Mills Road East. There are 12 properties that require 13 driveway accesses onto Kennedy Road. These properties are shown in Figure 9.

Angus Glen Golf Club is located at 10080 Kennedy Road and is the largest development along Kennedy Road.

Figure 8: Properties with Driveway Accesses Along Warden Avenue

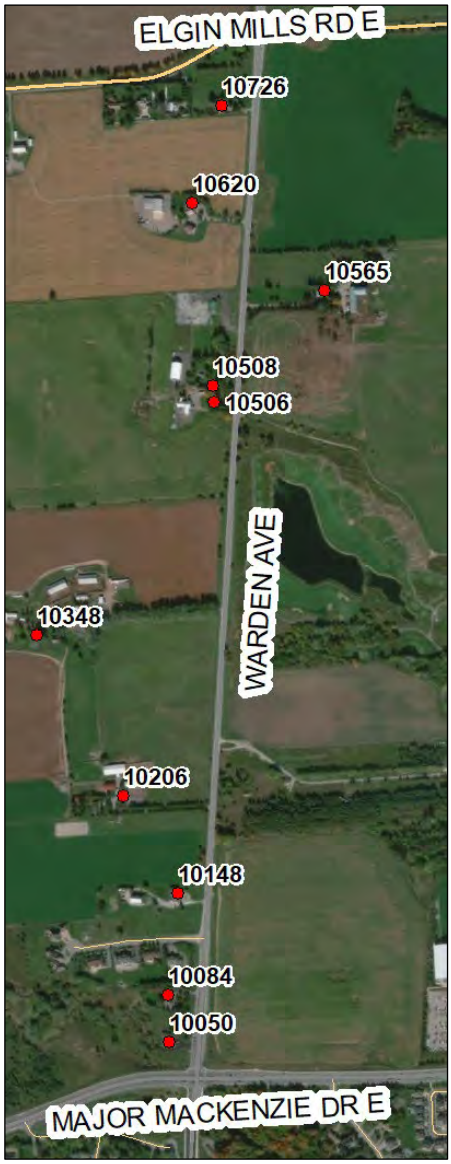


Figure 9: Properties with Driveway Accesses Along Kennedy Road

4.2 Travel Demand

4.2.1 Travel Patterns

Transportation Tomorrow Survey (TTS), a household survey conducted in the Greater Golden Horseshoe Area, provided 2016 travel patterns and mode shares for three Traffic Analysis Zones (TAZs) adjacent to the study corridors as shown in Figure 10. These 3 TAZs were 2381, 2413, and 2416.

Figure 10: Traffic Analysis Zones Adjacent to the Study Corridors

All-day trip productions to planning districts for the year 2016 for the 3 TAZs are shown in Table 4. Most trips are destined to within the City of Markham, City of Toronto, and the Town of Whitchurch-Stouffville.

Table 4: All-Day Trip Productions from Traffic Analysis Zones Adjacent to the Study Corridors*

	Trip Productions (# of trips)												
TAZ	Markham	Toronto	Aurora	Richmond Hill	Whitchurch-Stouffville	Mississauga	Halton Hills	Scugog	Whitby	Clarington	Newmarket	Bradford-West Gwillimbury	**Total**
2381	1263	114	23	0	164	17	7	0	70	77	15	25	**1,775**
2413	27	12	0	0	0	0	0	3	0	0	0	0	**42**
2416	109	0	0	38	0	0	0	0	0	0	0	0	**147**

* Burnside analysis of 2016 Transportation Tomorrow Survey data

All-day trip attractions for the year 2016 for the 3 TAZs are shown in Table 5. Most trips to the Study Areas originate from the City of Markham, City of Toronto, and Town of Whitchurch-Stouffville.

Table 5: All-Day Trip Attractions to Traffic Analysis Zones Adjacent to the Study Corridors*

	Trip Attractions (# of trips)		
	TAZ		
	2381	**2413**	**2416**
Markham	109	1266	27
Toronto	0	133	12
Newmarket	0	10	0
Aurora	0	23	0
Richmond Hill	38	0	0
Whitchurch-Stouffville	0	164	0
Halton Hills	0	7	0
Bradford-West Gwillimbury	0	25	0
Scugog	0	0	3
Whitby	0	70	0
Clarington	0	77	0
Total	**147**	**1,775**	**42**

* Burnside analysis of 2016 Transportation Tomorrow Survey data

4.2.2 Mode Share

The mode share for trip productions from the three TAZs adjacent to the study corridors are shown in Table 6. Most trips from the three TAZs are made by driving or as a passenger in a private vehicle.

Table 6: Mode Share for Trip Productions*

	Trip Productions (# of trips)			Mode Share (% of trips)		
	Driving	Passenger	Transit	Driving	Passenger	Transit
2381	66	81	0	45%	55%	0%
2413	1289	449	35	73%	25%	2%
2416	42	0	0	100%	0%	0%

* Burnside analysis of 2016 Transportation Tomorrow Survey data

The mode share for trip attractions to the three TAZs adjacent to the study corridors are shown in Table 7. Most trips to the three TAZs are made by driving or as a passenger in a private vehicle.

Table 7: Mode Share for Trip Attractions*

	Trip Attractions (# of trips)			Mode Share (% of trips)		
	Driving	Passenger	Transit	Driving	Passenger	Transit
Toronto	145	0	0	100%	0%	0%
Scugog	3	0	0	100%	0%	0%
Whitby	70	0	0	100%	0%	0%
Clarington	38	38	0	50%	50%	0%
Newmarket	10	0	0	100%	0%	0%
Aurora	11	11	0	50%	50%	0%

	Trip Attractions (# of trips)			Mode Share (% of trips)		
	Driving	Passenger	Transit	Driving	Passenger	Transit
Richmond Hill	38	0	0	100%	0%	0%
Whitchurch-Stouffville	146	18	0	89%	11%	0%
Markham	923	431	48	66%	31%	3%
Halton Hills	0	7	0	0%	100%	0%
Bradford-West Gwillimbury	13	13	0	50%	50%	0%

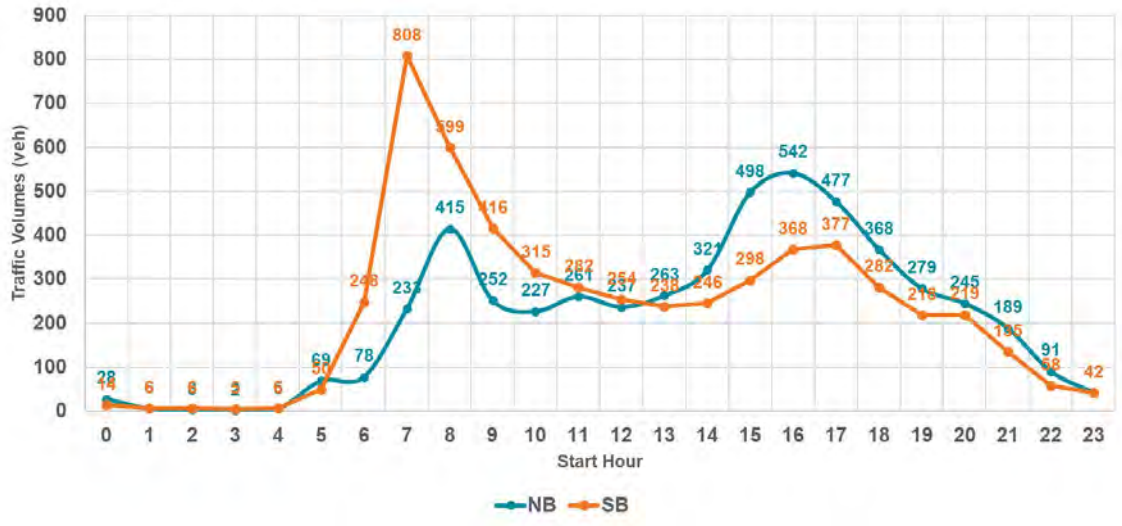
* Burnside analysis of 2016 Transportation Tomorrow Survey data

4.2.3 Temporal Distribution of Traffic Volumes

The speed studies provided temporal distribution of traffic volumes for Kennedy Road and Warden Avenue between Major Mackenzie Drive East and Elgin Mills Road East.

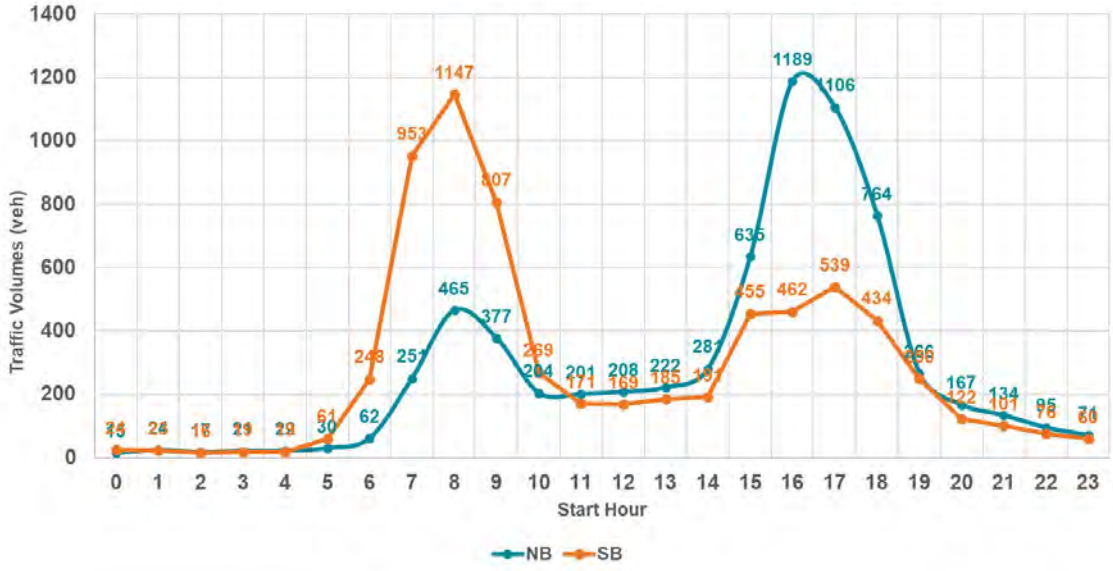
The temporal distribution for Kennedy Road for the northbound and southbound direction is illustrated in Figure 11. In the northbound direction, the AM peak hour is 8 AM with 415 vehicles. The PM peak hour is shown to be 4 PM with 542 vehicles. In the southbound direction, the AM peak hour is 7 AM with 808 vehicles. The PM peak hour is shown to be 5 PM with 377 vehicles. The southbound direction is the peak direction in the AM peak hour. The northbound direction is the peak direction in the PM peak hour.

Figure 11: Temporal Distribution of Traffic Volumes for Kennedy Road



The temporal distribution for Warden Avenue for the northbound and southbound direction is illustrated in Figure 12. In the northbound direction, the AM peak hour is 8 AM with 465 vehicles. The PM peak hour is shown to be 4 PM with 1,189 vehicles. In the southbound direction, the AM peak hour is 8 AM with 1,147 vehicles. The PM peak hour is shown to be 5 PM with 539 vehicles. The southbound direction is the peak direction in the AM peak hour. The northbound direction is the peak direction in the PM peak hour.

Figure 12: Temporal Distribution of Traffic Volumes for Warden Avenue



4.2.4 Traffic Speed Distribution

Traffic volumes by speed along Kennedy Road are illustrated in Figure 13 The posted speed along Kennedy Road is 80 km/hr. Speed attributes, shown in Table 8, along this roadway segment show that most vehicles are travelling above the posted speed in the southbound direction.

Figure 13: Traffic Volumes by Speed along Kennedy Road

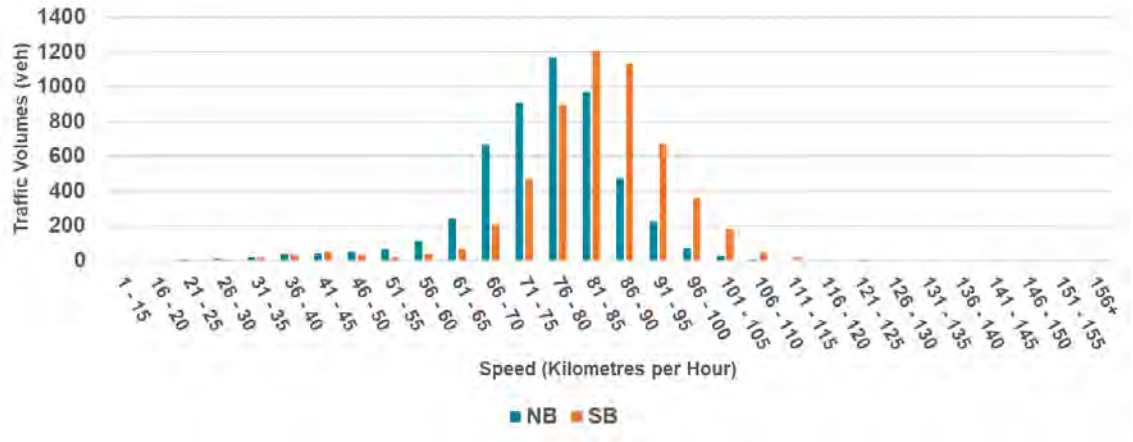


Table 8: Speed Attributes along Kennedy Road

Speed (km/hr)	NB	SB
Average	76 km/hr	83 km/hr
Median Speed	77 km/hr	84 km/hr
85th Percentile Speed	86 km/hr	94 km/hr

Traffic volumes by speed along Warden Avenue, between Major Mackenzie Drive East and Heritage Hill Drive are illustrated in Figure 14. The posted speed along this segment of Warden Avenue is 60 km/hr. Speed attributes, shown in Table 9, along this roadway segment show that most vehicles are travelling above the posted speed in the southbound segment. Estimates of the median and 85th percentile speeds suggest that most vehicles are travelling above the speed limit in the northbound direction.

Figure 14: Traffic Volumes by Speed along Warden Avenue

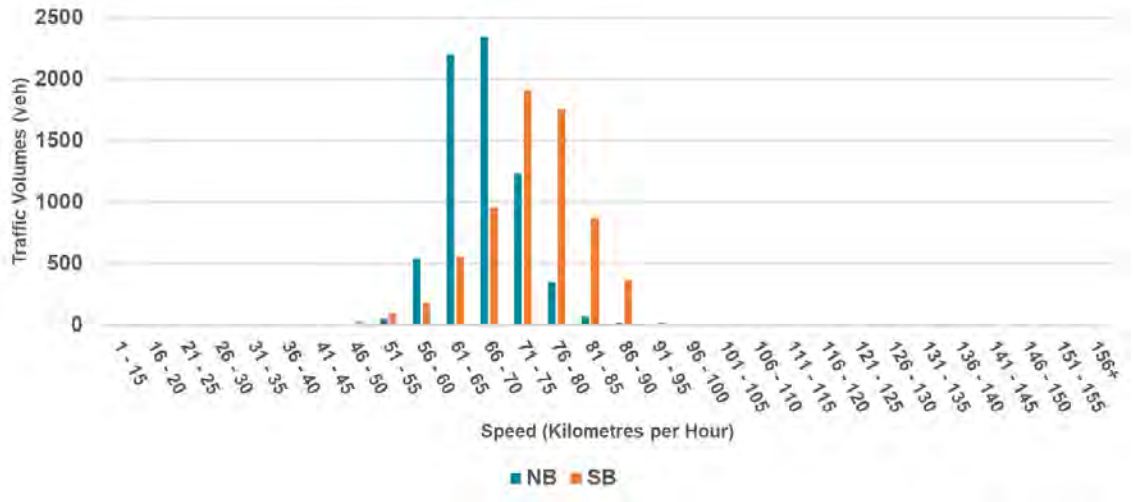


Table 9: Speed Attributes along Warden Avenue

Speed (km/hr)	NB*	SB
Average	Not available	74 km/hr
Median Speed	61 km/hr – 65 km/hr	75 km/hr

Speed (km/hr)	NB*	SB
85th Percentile Speed	66 km/hr – 70 km/hr	82 km/hr

*Speed attributes were not provided in the data for the northbound direction unlike for the southbound direction. The northbound speed attributes were estimated based on aggregated data provided.

4.2.5 Pedestrian Activity

There is limited data detailing the pedestrian activity along the Warden Avenue and Kennedy Road corridors. The turning movement counts indicated that in 2017, there were five pedestrians who crossed the Major Mackenzie Drive East and Kennedy Road intersection during the AM peak hour and four pedestrian crossings during the PM peak hour. The 2009 counts indicated that there were no pedestrian crossings at the other three intersections during the AM or PM peak hours.

Because there are also no sidewalks along Kennedy Road and Warden Avenue between Major Mackenzie Drive East and Elgin Mills Road East, limited pedestrian activity is expected under existing conditions.

4.2.6 Existing Conditions Traffic Volumes

4.2.7 Elgin Mills Road East Intersections

After review of the Elgin Mills Road East traffic counts at Warden Avenue and Kennedy Road, which were conducted in 2009, Burnside concluded that these traffic counts are not suitable for this study. These 2009 traffic counts were normalized to the 2021 existing conditions year using growth rates and data from adjacent intersections. However, Burnside confirmed that normalizing the counts does not adequately capture the volumes associated with developments, which occurred between the 2009 count year and year 2021.

Burnside reviewed the IBI transportation study (details provided in Section 3.2) and adopted the approach that was undertaken to derive 2021 existing conditions, which was based on 2018 traffic counts conducted for the WSP and Poulos & Chung traffic studies. This approach was adopted for the Elgin Mills Road East intersections at Warden Avenue and Kennedy Road.

4.2.8 Major Mackenzie Drive East Intersections

Historic AADTs, consideration of traffic volumes at adjacent intersections, and understanding of the land use context were used to normalize the 2009 historic turning movements counts at the Major Mackenzie Drive East intersections at Warden Avenue and Kennedy Road to represent 2021 existing conditions.

Compound annual growth rates were calculated for the Warden Avenue AADTs as shown in Table 10.

Table 10: Warden Avenue – Historic Average Annual Daily Traffic

Year	Average Annual Daily Traffic	
	Between Major Mackenzie Drive East and Heritage Hill Drive	Between Heritage Hill Drive and Elgin Mills Road East
2010	5,257	6,869
2014	-	-
2018	-	11,481
2019	6,014	-
Compound Annual Growth Rate	2%	7%

Based on the CAGRs calculated using AADTs along Warden Avenue, a 4% CAGR, which is an approximate average of the 2 growth rates, was applied to Warden Avenue turning movements to derive 2021 existing conditions turning movements.

Compound annual growth rates were calculated for the Kennedy Road AADTs as shown in Table 11.

Table 11: Kennedy Road – Historic Average Annual Daily Traffic

Year	Average Annual Daily Traffic
	Between Major Mackenzie Drive East and Elgin Mills Road East
2010	6,913
2014	7,318
2018	6,972

Based on the CAGRs calculated using AADTs along Kennedy Road, there was very limited traffic growth between 2010, which was the year of the traffic count, and the 2021 existing conditions year. Therefore, a 0.5% CAGR was applied to Kennedy Road turning movements to derive 2021 existing conditions turning movements.

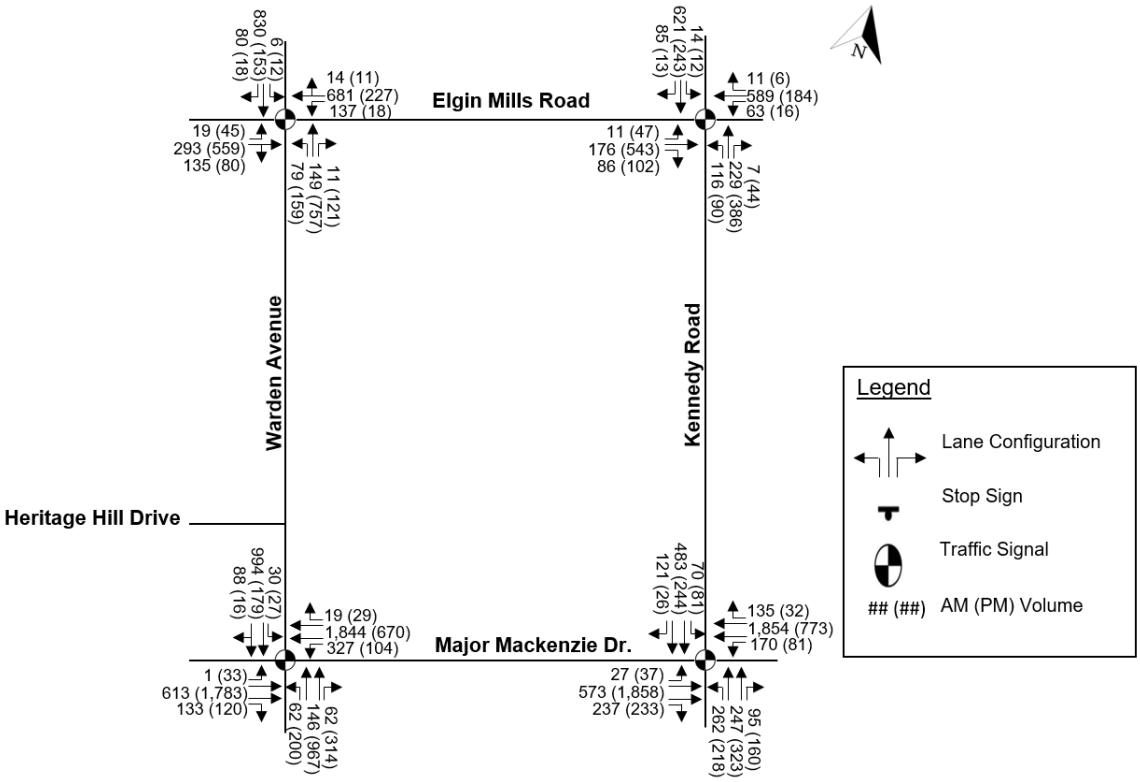
No data was provided for Major Mackenzie Drive East. A 2% CAGR was applied to Major Mackenzie Drive East turning movements, which is the typical traffic growth rate for a major arterial.

These traffic growth rate assumptions were validated by comparing the derived upstream and downstream traffic volumes between adjacent intersections. Burnside also compared the derived 2021 existing conditions traffic volumes to the 2014 balanced turning movement counts from the North Markham Future Urban Area Conceptual Master Plan (see Appendix A) to ensure the assumptions were reasonable. After the validation, Burnside believed that these growth rates were suitable for the traffic analysis.

4.2.9 Traffic Volumes

The resulting 2021 existing conditions traffic volumes after applying the traffic compound annual growth rates are shown in Figure 15.

Figure 15: Existing Balanced Traffic Volumes (2021)



4.3 Automobile Level of Service Evaluation

York Region's automobile level-of-service (LOS) and volume-to-capacity (v/c) target is LOS D or v/c of 0.85 or better for urban areas and LOS C or v/c of 0.70 for rural areas based on the Region's Mobility Plan Guidelines. The traffic analysis below analyzes the automobile performance within the Study Areas and evaluates the performance based on the targets.

4.3.1 Existing Link Capacity Analysis

To assess the transportation corridor requirements for number of lanes, auto link traffic volumes were reviewed. A link capacity analysis involves evaluating the directional traffic volumes within a midblock zone between intersections. Auto traffic volumes were used in this analysis, as shown in Figure 15 and trucks were not considered. An assessment is made only between auto traffic volumes and roadway capacity.

A link capacity analysis was conducted using normalized 2021 turning movement counts for Warden Avenue and Kennedy Road for the AM and PM peak hours as presented in Table 12to Table 15. Note that the Region's EMME model set the lane capacity for Warden Avenue at 900 vehicles/hour/lane (v/h/l) and Kennedy Road at 1,000 vehicles/hour/lane (v/h/l). This link capacity analysis used 900 v/h/l for Warden Avenue and Kennedy Road, which is typically used for an arterial roadway considering

only autos. Congested links are assumed to have an auto link volume-to-capacity ratios greater than 0.90 and are highlighted in the tables below in red.

Table 12: Link Capacity Analysis for Warden Avenue - AM Existing Conditions

Warden Avenue	# of Lanes	Total Capacity	Volume	v/c ratio	# of Lanes	Total Capacity	Volume	v/c ratio
	Southbound				Northbound			
South of Elgin Mills Road East	1	900	1102	1.22	1	900	239	0.27
North of Major Mackenzie Drive East	1	900	1112	1.24	1	900	166	0.18

Table 13: Link Capacity Analysis of Warden Avenue - PM Existing Conditions

Warden Avenue	# of Lanes	Total Capacity	Volume	v/c ratio	# of Lanes	Total Capacity	Volume	v/c ratio
	Southbound				Northbound			
South of Elgin Mills Road East	1	900	251	0.28	1	900	1037	1.15
North of Major Mackenzie Drive East	1	900	222	0.25	1	900	1029	1.14

Table 14: Link Capacity Analysis for Kennedy Road - AM Existing Conditions

Kennedy Road	# of Lanes	Total Capacity	Volume	v/c ratio	# of Lanes	Total Capacity	Volume	v/c ratio
	Southbound				Northbound			
South of Elgin Mills Road East	1	900	700	0.78	1	900	352	0.39
North of Major Mackenzie Drive East	1	900	674	0.75	1	900	409	0.45

Table 15: Link Capacity Analysis of Kennedy Road - PM Existing Conditions

Kennedy Road	# of Lanes	Total Capacity	Volume	v/c ratio	# of Lanes	Total Capacity	Volume	v/c ratio
	Southbound				Northbound			
South of Elgin Mills Road East	1	900	361	0.40	1	900	520	0.58
North of Major Mackenzie Drive East	1	900	351	0.39	1	900	392	0.44

The link capacity analysis indicated that Warden Avenue is operating above total link capacity during both AM and PM peak hours. The maximum link volume-to-capacity ratio is 1.24 in the southbound direction during the AM peak hour. The maximum link volume-to-capacity ratio is 1.15 in the northbound direction during the PM peak hour.

This link capacity analysis indicated that Kennedy Road is operating below total link capacity during both AM and PM peak hours The maximum link volume-to-capacity ratio is 0.78 in the southbound direction during the AM peak hour. The maximum link volume-to-capacity ratio is 0.58 in the northbound direction during the PM peak hour.

4.3.2 Existing Traffic Operations

Intersection operations were assessed for intersections in the Study Areas using the software program Synchro 11, which employs methodology from the Highway Capacity Manual (HCM 2000 and HCM 2010), published by the Transportation Research Board National Research Council. Synchro 11 can analyze both signalized and unsignalized intersections in a road corridor or network considering the spacing, interaction, queues and operations between intersections. The analysis contained within this report utilize the HCM2000 techniques / methodology within the Synchro software package.

Signalized Intersections

Signalized intersection analysis considers two separate measures of performance:

- The capacity of all intersection movements, which is based on a volume to capacity ratio that measure of the degree of capacity utilized.
- The level of service (LOS) for all intersection movements, which is based on the average control delay per vehicle for the various movements through the intersection and overall. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between A and F, with F being the longest delay. The link between LOS and delay (in seconds) for signalized intersections is summarized below.

Level of Service	Control Delay per Vehicle (seconds)
A	≤10
B	> 10 – 20
C	> 20 – 35
D	> 35 – 55
E	> 55 – 80
F	> 80

It is not possible to have a v/c ratio greater than 1.0 for existing conditions, since the existing demand is being served by the existing timing plan; therefore, the software is underestimating the capacity of these movements. This could be due to several reasons including higher saturation flows, more aggressive drivers, vehicles utilizing more of the yellow or all red phases, etc. Lost time adjustments were applied to six critical movements in the AM peak hour and two critical movements in the PM peak hour with v/c ratios greater than 1 to reflect drivers utilizing the yellow and all red phases. These critical movements in the AM peak hour include:

- 2.5 seconds for the southbound through movement at Warden Avenue and Elgin Mills Road East.
- 2.5 seconds for the northbound left movement at Kennedy Road and Elgin Mills Road East.
- 2.5 seconds for the westbound through movement at Kennedy Road and Major Mackenzie Drive East.
- 2.0 seconds for the northbound left movement at Kennedy Road and Major Mackenzie Drive East.
- 2.5 seconds for the westbound through movement at Warden Avenue and Major Mackenzie Drive East.
- 2.5 seconds for the southbound through movement at Warden Avenue and Major Mackenzie Drive East.

These critical movements in the PM peak hour include:

- 2.5 seconds for the northbound through movement at Warden Avenue and Elgin Mills Road East.
- 2.5 seconds for the eastbound through movement at Warden Avenue and Major Mackenzie Drive East.

Loss time adjustments were included in calibrated AM and PM peak hour Synchro scenarios. Baseline and calibrated Synchro results are provided in Appendix E. Calibrated results are reported in the subsequent sections.

The existing intersection operations were analyzed for the weekday AM and weekday PM peak hours based on the road network illustrated in Figure 6 and the existing balanced peak hour traffic volumes provided Figure 15. The signalized intersection operation results for Warden Avenue and Kennedy Road are provided in Table 16. A summary of all intersection operations is shown in Figure 16. Critical movements are highlighted in red in Table 18. These movements are categorized as critical when the

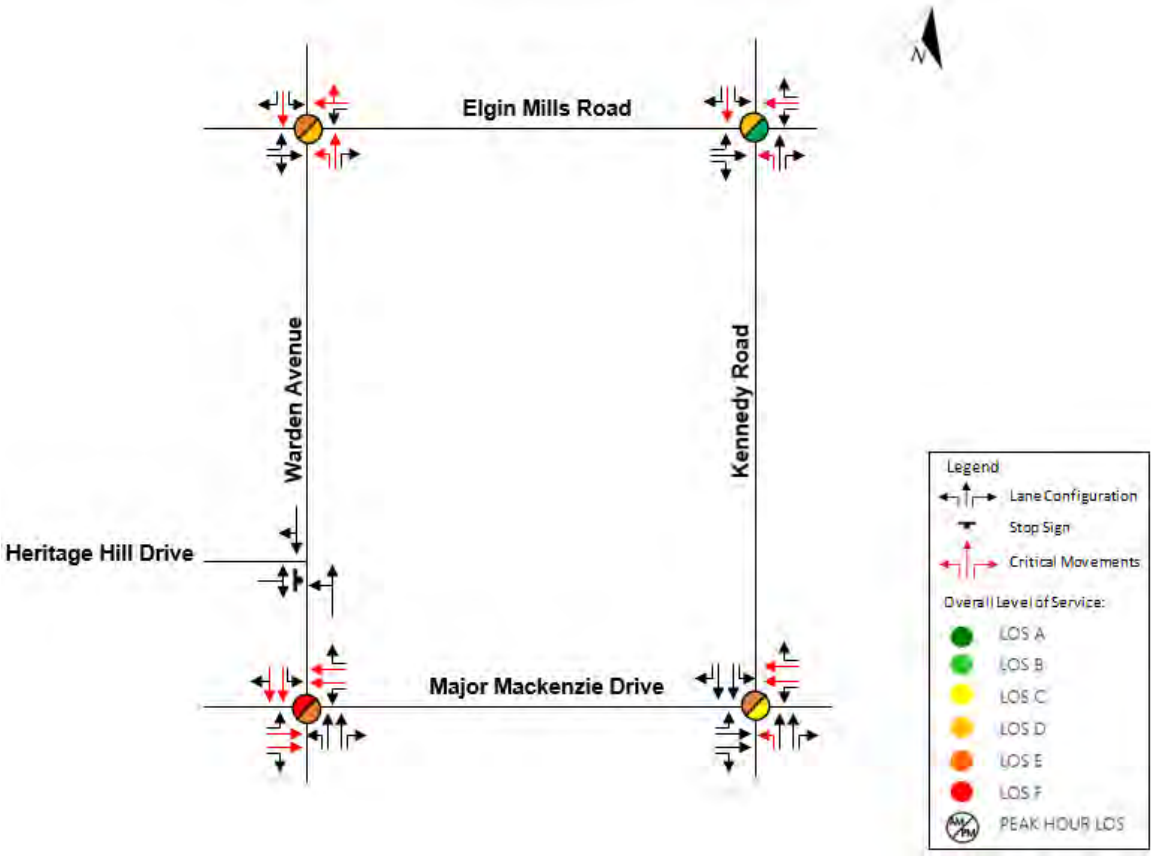
LOS is E or F or if the volume-to-capacity (v/c) ratio is 0.85 or higher as per York Region's Transportation Mobility Plan Guidelines.

Table 16: Existing Conditions Traffic Operations Analysis

Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	v/c	LOS	v/c	LOS
Warden Avenue and Elgin Mills Road East				
Overall	1.19	E	1.05	D
EBL	0.21	B	0.09	B
EBTR	0.66	B	0.94	D
WBL	0.60	B	0.17	B
WBT	1.03	E	0.35	B
NBL	0.82	E	0.37	B
NBT	0.25	B	1.07	E
NBR	0.01	B	0.15	B
SBL	0.02	B	0.11	B
SBT	1.25	F	0.24	B
SBR	0.09	B	0.01	B
Warden Avenue and Major Mackenzie Drive East				
Overall	1.38	F	1.03	E
EBL	0.02	C	0.11	C
EBT	0.66	D	1.15	F
EBR	0.09	C	0.10	C
WBL	0.87	D	0.66	D
WBT	1.12	F	0.37	B
WBR	0.01	B	0.02	B
NBL	0.48	C	0.57	C
NBT	0.11	C	0.83	D
NBR	0.05	C	0.45	C
SBL	0.08	C	0.48	D
SBT	1.69	F	0.41	D
SBR	0.06	C	0.01	D
Kennedy Road and Elgin Mills Road East				
Overall	1.08	D	0.65	B
EBL	0.11	B	0.11	B
EBT	0.28	B	0.82	C
EBR	0.06	B	0.07	B
WBL	0.18	B	0.10	B
WBT	0.94	D	0.28	B
WBR	0.01	B	0.00	B
NBL	1.11	F	0.19	B
NBT	0.35	B	0.51	B
NBR	0.00	B	0.03	B
SBL	0.04	B	0.03	B

Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	v/c	LOS	v/c	LOS
SBT	0.93	D	0.32	B
SBR	0.08	B	0.01	B
Kennedy Road and Major Mackenzie Drive East				
Overall	1.00	E	0.92	C
EBL	0.25	C	0.10	B
EBT	0.39	C	0.97	D
EBR	0.16	C	0.21	B
WBL	0.43	B	0.52	C
WBT	1.09	F	0.40	B
WBR	0.10	B	0.02	B
NBL	0.98	F	0.79	D
NBT	0.24	C	0.38	D
NBR	0.06	C	0.16	C
SBL	0.35	D	0.59	D
SBT	0.75	D	0.52	D
SBR	0.08	D	0.02	D

Figure 16: Summary of Existing Conditions Traffic Operations Analysis



4.3.3 Existing Intersection Queues

The 95th percentile queues for each movement at the study intersections were extracted from the Synchro 11 analysis and compared to the available storage length as shown in Table 17. This analysis showed that queues for all movements at all intersections during both the AM and PM peak hours can be accommodated within the available storage. The detailed queuing results are provided in Appendix E.

Table 17: Existing Conditions Queue Summary

Movement	Existing Storage/ Link Distance (m)	Weekday AM Peak Hour	Weekday PM Peak Hour
		95th % Queue (m)	95th % Queue (m)
Warden Avenue and Elgin Mills Road East			
EBL	70	7	9
EBTR	400+	70	145
WBL	80	33	7
WBTR	400+	161	37
NBL	125	33	31
NBT	500+	26	183
NBR	30	0	16
SBL	100	3	5
SBT	500+	204	27
SBR	30	10	1
Warden Avenue and Major Mackenzie Drive East			
EBL	55	2	13
EBT	500+	102	357
EBR	85	16	16
WBL	145	97	37
WBT	450+	352	72
WBR	100	0	1
NBL	60	19	58
NBT	500+	20	152
NBR	60	8	68
SBL	140	14	19
SBT	550+	483	63
SBR	80	10	0
Kennedy Road and Elgin Mills Road East			
EBL	120	5	10
EBT	350+	29	97
EBR	50	8	8
WBL	150	14	5
WBT	400+	133	29
WBR	60	0	0
NBL	125	48	17
NBT	300+	38	60
NBR	45	0	4
SBL	40	5	4
SBT	300+	140	37
SBR	35	9	0
Kennedy Road and Major Mackenzie Drive East			
EBL	55	8	8
EBT	500+	74	300

Movement	Existing Storage/ Link Distance (m)	Weekday AM Peak Hour	Weekday PM Peak Hour
		95th % Queue (m)	95th % Queue (m)
EBR	60	16	31
WBL	250	36	19
WBT	360	382	77
WBR	150	15	0
NBL	120	100	63
NBT	300+	36	45
NBR	60	12	21
SBL	195	31	34
SBT	550+	83	40
SBR	60	16	0

4.4 Pedestrian Level of Service Evaluation

York Region's pedestrian level-of-service (LOS) target is LOS C or better. The analysis shown in Table 18 analyzes the pedestrian performance based on criteria from York Region's Mobility Plan Guidelines within the Study Areas and evaluates the performance based on the target. LOS that does not meet the target is highlighted in red.

Table 18: Pedestrian Level-of-Service Evaluation

Intersection	Direction	Segment		Intersection LOS
		Description	LOS	
Elgin Mills Road East and Warden Avenue	Eastbound	Elgin Mills Road East	E	C
	Westbound	Elgin Mills Road East	E	C
	Northbound	Warden Avenue	E	E
	Southbound	Warden Avenue	E	C
Elgin Mills Road East and Kennedy Road	Eastbound	Elgin Mills Road East	E	C
	Westbound	Elgin Mills Road East	E	C
	Northbound	Kennedy Road	E	C
	Southbound	Kennedy Road	E	E
Major Mackenzie Drive East and Warden Avenue	Eastbound	Major Mackenzie Drive East	C	C
	Westbound	Major Mackenzie Drive East	B	B
	Northbound	Warden Avenue	E	C
	Southbound	Warden Avenue	C	C
Major Mackenzie Drive East and Kennedy Road	Eastbound	Major Mackenzie Drive East	B	B
	Westbound	Major Mackenzie Drive East	C	C
	Northbound	Kennedy Road	E	C

Intersection	Direction	Segment		Intersection LOS
		Description	LOS	
	Southbound	Kennedy Road	B	B

Improvements to the pedestrian environment should be implemented at the intersections of Elgin Mills Road East at Warden Avenue and Kennedy Road. Improvements to the pedestrian environment should be implemented on Kennedy Road and Warden Avenue between Elgin Mills Road East and Major Mackenzie Drive East.

Because the area is being redeveloped and reconstructed, opportunities to improve the pedestrian environment should be explored at the Major Mackenzie Drive East intersections at Warden Avenue and Kennedy Road concurrently with the improvements to the rest of the study corridor to ensure consistency and connectivity.

4.5 Cycling Level of Service Evaluation

York Region's cycling level-of-service (LOS) target is LOS C or better. The analysis shown in Table 19 analyzes the cycling performance based on criteria from York Region's Mobility Plan Guidelines. LOS that does not meet the target is highlighted in red.

Table 19: Cycling Level-of-Service Evaluation

Intersection	Direction	Segment		Intersection LOS
		Description	LOS	
Elgin Mills Road East and Warden Avenue	Eastbound	Elgin Mills Road East	E	E
	Westbound	Elgin Mills Road East	E	E
	Northbound	Warden Avenue	E	E
	Southbound	Warden Avenue	E	E
Elgin Mills Road East and Kennedy Road	Eastbound	Elgin Mills Road East	E	E
	Westbound	Elgin Mills Road East	E	E
	Northbound	Kennedy Road	E	E
	Southbound	Kennedy Road	E	E
Major Mackenzie Drive East and Warden Avenue	Eastbound	Major Mackenzie Drive East	C	C
	Westbound	Major Mackenzie Drive East	C	C
	Northbound	Warden Avenue	E	F
	Southbound	Warden Avenue	C	C
Major Mackenzie Drive East and Kennedy Road	Eastbound	Major Mackenzie Drive East	C	C
	Westbound	Major Mackenzie Drive East	C	C
	Northbound	Kennedy Road	D	E
	Southbound	Kennedy Road	C	C

Improvements to the cycling environment should be implemented at the intersections of Elgin Mills Road East at Warden Avenue and Kennedy Road. Improvements to the cycling environment should be implemented on Kennedy Road and Warden Avenue between Elgin Mills Road East and Major Mackenzie Drive East.

Because the area is being redeveloped and reconstructed, opportunities to improve the cycling improvement should be explored at the Major Mackenzie Drive East intersections at Warden Avenue and Kennedy Road concurrently with the improvements to the rest of the study corridor to ensure consistency and connectivity.

4.6 Transit Level of Service Evaluation

There is no transit service currently provided within the Study Areas. The Region supports transit as a robust transit network helps support growth to key centres and corridors and minimizes the need for travel and reduces dependence on single occupant vehicles. This sustainable mode of transportation also helps mitigate climate change, which is another important objective for York Region.

Future transit service should consider the following three criteria outlined in York Region's Mobility Plan Guidelines:

- Access to transit stops.
- Transit headways.
- Transit vehicle performance at the intersection approach.

York Region's transit level-of-service (LOS) target is LOS C or better for Access to Transit Stops and Transit Headways. The target is LOS D for Intersection Approach.

4.7 Traffic Safety

This section contains a safety assessment completed to identify and mitigate potential safety related concerns. The safety assessment consists of an in-office review of historical collision data. The in-office review helped identify any patterns with respect to collision type, direction, severity, and other contributing factors. These collision analysis findings provide an understanding of the overall safety performance of the study corridor, for intersections and midblock segments.

4.7.1 Review of Collision Data

York Region provided historical collision records from January 1, 2010, to April 30, 2021, along the two study corridors. Data for collisions during year 2020 and 2021 were removed to ensure that full years and years that were not affected by travel restrictions due to the COVID-19 pandemic were assessed. Five years of collision records between year 2015 to 2019 were analyzed to represent existing conditions. During this time period there were 88 collisions along and at the intersections of Warden Avenue and 72 collisions along and at the intersections of Kennedy Road.

4.7.2 Collision Rates

Collision rates were calculated for intersection and roadway segments using the following formulas:

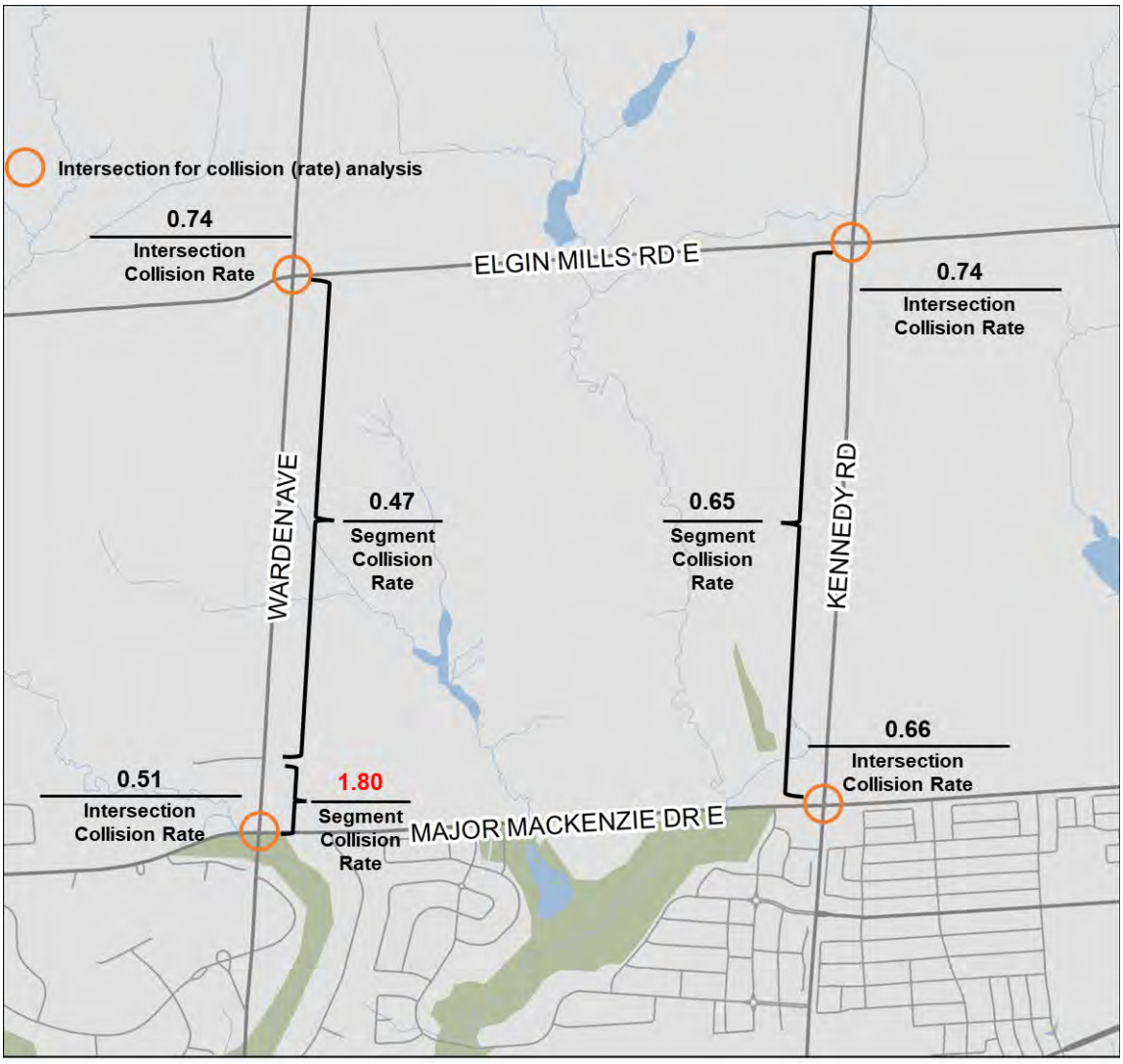
$$\text{Segment Collision Rate} = \frac{\text{Number of collisions x 1,000,000}}{\text{Average Annual Daily Traffic x 365 x Length of Segment x Years}}$$

$$\text{Intersection Collision Rate} = \frac{\text{Number of collisions x 1,000,000}}{\text{Average Annual Daily Traffic x 365 x Years}}$$

Annual Average Daily Traffic (AADT) was estimated by multiplying the sum of the AM and PM peak hour volumes by 5, and then adding together the total entering traffic volume. A hotspot, a location where safety countermeasures should be considered, is identified if the collision rate exceeds 1 or 1.5 crashes per million kilometres traveled.

A summary of the segment and intersection collision rates are illustrated in Figure 17. Warden Avenue, between Heritage Hill Drive and Major Mackenzie Drive East, is a possible hotspot. Its collision rate is highlighted in red.

Figure 17: Summary of Intersection and Segment Collision Rates



Details for the segment collision rates are shown in Table 20. Details for the intersection collision rates are shown in Table 21. Collision rates higher than 1.5 are highlighted in red.

Table 20: Segment Collision Rates (2015 – 2019)

Location	AADT (year)	Number of Collisions (2015 to 2019)	Segment Length (km)	Segment Collision Rate
Warden Avenue between Major Mackenzie Drive East and Heritage Hill Drive	11,481 (2018)	8	0.265	1.80
Warden Avenue between Heritage Hill Drive and Elgin Mills Road East	6,014 (2019)	9	1.735	0.47
Kennedy Road between Major Mackenzie Drive East and Elgin Mills Road East	6,972 (2017)	10	2.000	0.65

Table 21: Intersection Collision Rates (2015 – 2019)

Intersection	AADT (estimated 2019)	Number of Collisions	Intersection Collision Rate
Warden Avenue and Elgin Mills Road East	14,847	20	0.74
Warden Avenue and Major Mackenzie Drive East	53,380	49	0.51
Kennedy Road and Elgin Mills Road East	11,046	15	0.74
Kennedy Road and Major Mackenzie Drive East	40,776	47	0.66

The collision rates for Warden Avenue and Kennedy Road suggest that no additional safety countermeasures are immediately required. Although the frequency of collisions between 2015 to 2019 at the Kennedy Road and Major Mackenzie intersection and the Warden Avenue and Major Mackenzie intersection are much higher than at the Elgin Mills Drive Road East intersections, the collision rates suggest that the Major Mackenzie Drive East intersections do not reflect collision trends requiring mitigation. The higher frequency of collisions at the Major Mackenzie Drive East intersections can be attributed to the higher traffic volumes entering the intersection.

The segment collision rate for Warden Avenue between Major Mackenzie Drive East and Heritage Hill Drive suggests that the segment may have potential for safety improvement. Detailed collision analysis can be found for this segment in Section 4.7.8.

4.7.3 Collisions by Severity

The collisions by severity are illustrated within the Study Areas in Figure 18. Details of the collisions by severity for Warden Avenue are shown in Table 22. Details of the collisions by severity for Warden Avenue are shown in Table 23.

Property damage is the dominant type of collision whether it is a roadway segment or at the intersections. Property damage accounted for most collisions along and at the intersections of Warden Avenue and Kennedy Road. There were no fatal collisions along Warden Avenue and Kennedy Road between 2015 to 2019.

There were 7 injury-type collisions at the Elgin Mills Road East and Kennedy Road intersection accounting for 47% of the collisions at the intersection. Although there were a small number of collisions, and the severity of collisions may represent an opportunity for improvement, such as speed management.

Figure 18: Warden Avenue and Kennedy Road – Collisions by Severity (2015 - 2019)

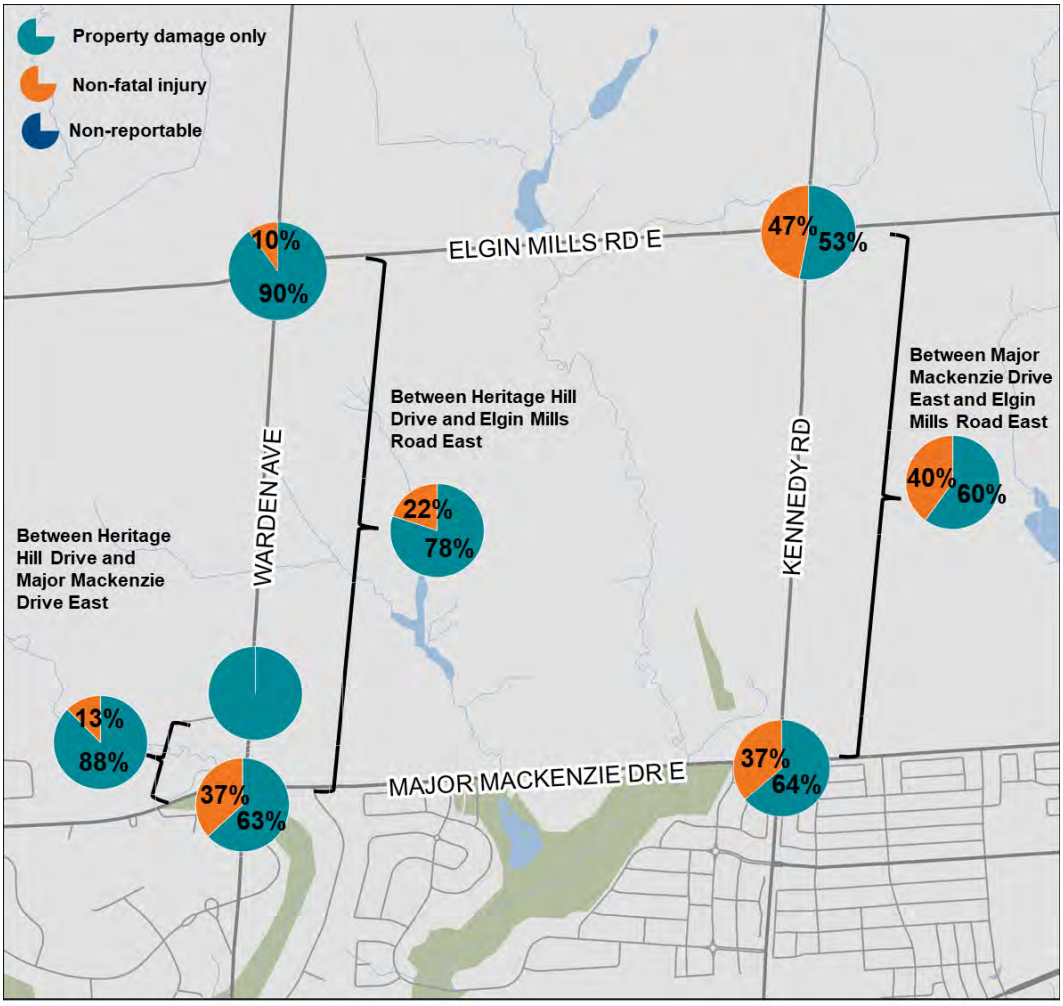


Table 22: Warden Avenue – Collisions by Severity (2015 – 2019)

	Property Damage Only % (# of collisions)	Non-Fatal Injury % (# of collisions)	Fatal Injury % (# of collisions)	Total % (# of collisions)
At Elgin Mills Road East	90% (18)	10% (2)	0% (0)	100% (20)
Between Heritage Hill Drive and Elgin Mills Road East	78% (7)	20% (2)	0% (0)	100% (9)
At Heritage Hill Drive	100% (2)	0% (0)	0% (0)	100% (2)
Between Heritage Hill Drive and Major Mackenzie Drive East	88% (7)	13% (1)	0% (0)	100% (8)
At Major Mackenzie Drive East	63% (31)	36% (18)	0% (0)	100% (49)

Table 23: Kennedy Road – Collisions by Severity (2015 – 2019)

	Property Damage Only % (# of collisions)	Non-Fatal Injury % (# of collisions)	Fatal Injury % (# of collisions)	Total % (# of collisions)
At Elgin Mills Road East	53% (8)	47% (7)	0% (0)	100% (15)
Between Elgin Mills Road East and Major Mackenzie Drive East	60% (6)	40% (4)	0% (0)	100% (10)
At Major Mackenzie Drive East	64% (30)	36% (17)	0% (0)	100% (47)

4.7.4 Collisions by Initial Impact Type

The collisions by initial impact type are illustrated for the Study Areas in Figure 19. The percentages for the top three impact types are shown at each location. Details of the collisions by initial impact type on Warden Avenue are shown in Table 24. Details of the collisions by initial impact type on Kennedy Road are shown in Table 25. At

intersections, rear end, angle, and single motor vehicle (SMV) collisions are the most predominant.

There were seven SMV collisions along Kennedy Road between Elgin Mills Road East and Major Mackenzie Drive East out of a total of ten, accounting for 70% of the collisions along that segment between year 2015 to 2019. Four of the seven SMV collisions involved an animal collision. Safety countermeasures to mitigate animal collisions may be needed along this roadway segment. These can include:

- Enhanced illumination as Kennedy Road currently does not have streetlighting.
- Wildlife crossings.
- Wildlife warning signs.

Figure 19: Warden Avenue and Kennedy Road – Collisions by Initial Impact Type (2015 – 2019)

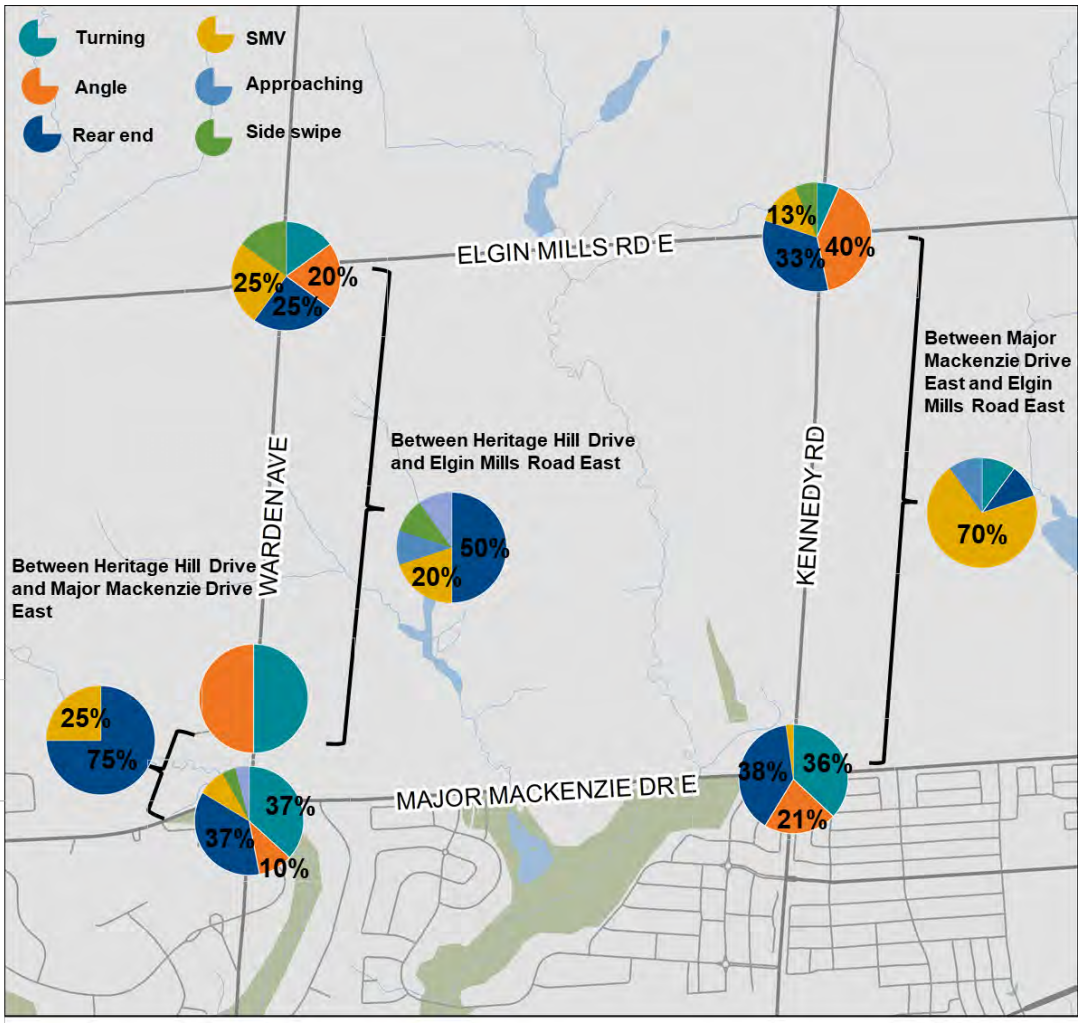


Table 24: Warden Avenue – Collisions by Initial Impact Type (2015 – 2019)

Initial Impact Type	Rear End % (# of collisions)	Turning Movement % (# of collisions)	SMV Other % (# of collisions)	Angle % (# of collisions)	Side swipe % (# of collisions)	Approaching % (# of collisions)	Other % (# of collisions)	Total % (# of collisions)
At Elgin Mills Road East	25% (5)	15% (3)	25% (5)	20% (4)	15% (3)	0% (0)	0% (0)	100% (20)
Between Heritage Hill Drive and Elgin Mills Road East	50% (5)	0% (0)	20% (2)	0% (0)	10% (1)	0% (0)	10% (1)	100% (9)
At Heritage Hill Drive	50% (1)	0% (0)	0% (0)	0% (0)	0% (0)	50% (1)	0% (0)	100% (2)
Between Heritage Hill Drive and Major Mackenzie Drive East	75% (6)	0% (0)	25% (2)	0% (0)	0% (0)	0% (0)	0% (0)	100% (8)
At Major Mackenzie Drive East	37% (18)	37% (18)	8% (4)	10% (5)	4% (2)	0% (0)	4% (2)	100% (49)

Table 25: Kennedy Road – Collisions by Initial Impact Type (2015 – 2019)

Initial Impact Type	Rear End % (# of collisions)	Turning Movement % (# of collisions)	SMV Other % (# of collisions)	Angle % (# of collisions)	Side swipe % (# of collisions)	Approaching % (# of collisions)	Other % (# of collisions)	Total % (# of collisions)
At Elgin Mills Road East	33% (5)	7% (1)	13% (2)	40% (6)	7% (1)	0% (0)	0% (0)	100% (15)
Between Elgin Mills Road East and Major Mackenzie Drive East	10% (1)	10% (1)	70% (7)	0% (0)	0% (0)	10% (1)	0% (0)	100% (10)
At Major Mackenzie Drive East*	38% (18)	36% (17)	2% (1)	21% (10)	0% (0)	0% (0)	0% (0)	100% (46)

*1 collision record recorded no initial impact type

4.7.5 Collisions by Vulnerable Road Users

York Region identifies pedestrians and cyclists as the most vulnerable travellers on the road network. The rates of injuries they sustain are higher compared to other modes of travel.

On Warden Avenue, 2 of the 88 collisions between year 2015 to 2019 involved cyclists. One cyclist collision involved a cyclist going too fast for the conditions and hitting an automobile in clear, dry conditions. In the second cyclist collision, the motor vehicle failed to yield right-of-way in clear, dry conditions.

On Kennedy Road, 2 of the 72 collisions between year 2015 to 2019 involved cyclists. One cyclist collision involved a cyclist who failed to yield for the right-of-way in clear, dry conditions. In the second cyclist collision, the cyclist lost control and hit a stopped motor vehicle.

There were no pedestrian collisions during this time period.

Although the number of cyclist and pedestrian collisions were low, the alternative design concepts should consider the need to protect for vulnerable road users since active transportation activity is expected to increase along this corridor. Cyclists and pedestrians are also vulnerable road users, and they are at more risk for serious injury or death involving a motor vehicle collision.

4.7.6 Collisions by Year, Month, and Day of the Week

The number of collisions by year and severity are shown in Table 26 for Warden Avenue. In this 5-year period, there was no relationship between year and number of collisions.

Table 26: Warden Avenue - Collisions by Severity and Year (2015 – 2019)

	2015	2016	2017	2018	2019	Total	%
P.D Only	12	17	11	11	14	65	74%
Non-Fatal Injury	6	3	4	6	4	23	26%
Fatal Injury	0	0	0	0	0	0	0%
Total	18	20	15	17	18	88	100%
%	20%	23%	17%	19%	20%	100%	

The number of collisions by month and severity are shown in Table 27 for Warden Avenue. The months with the highest number of collisions during this 5-year period were June, July, November, and December.

Table 27: Warden Avenue - Collisions by Severity and Month (2015 – 2019)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	%*
P.D Only	5	5	3	5	2	6	7	5	8	3	7	9	65	74
Non-Fatal Injury	3	0	0	2	2	5	0	3	1	1	3	3	23	26
Fatal Injury	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	8	5	3	7	4	11	7	8	9	4	10	12	88	100
%*	9	6	3	8	5	13	8	9	10	5	11	14	100	

*% unit not shown

The number of collisions by day and severity are shown in Table 28 for Warden Avenue. Wednesday had the highest number of collisions over this time period.

Table 28: Warden Avenue – Collisions by Severity and Day of the Week (2015 – 2019)

	Sun.	Mon.	Tues.	Wed.	Thu.	Fri.	Sat.	Total	%
P.D Only	8	10	8	16	9	8	6	65	74%
Non-Fatal Injury	1	4	4	4	6	2	2	23	26%
Fatal Injury	0	0	0	0	0	0	0	0	0%
Total	9	14	12	20	15	10	8	88	100%
%	10%	16%	14%	23%	17%	11%	9%	100%	

The number of collisions by year and severity are shown in Table 29 for Kennedy Road. In this 5-year period, there was no relationship between year and number of collisions.

Table 29: Kennedy Road – Collisions by Severity and Year (2015 – 2019)

	2015	2016	2017	2018	2019	Total	%
P.D Only	13	12	6	7	6	44	61%
Non-Fatal Injury	7	6	3	6	6	28	39%
Fatal Injury	0	0	0	0	0	0	0%
Total	20	18	9	13	12	72	100%
%	28%	25%	13%	18%	17%	100%	

The number of collisions by month and severity are shown in Table 30 for Kennedy Road. The months with the highest number of collisions during this 5-year period were April, September, January, and December.

Table 30: Kennedy Road - Collisions by Severity and Month (2015 – 2019)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	%
P.D Only	6	4	5	5	1	2	3	2	5	3	3	5	44	61%
Non-Fatal Injury	1	2	1	5	1	3	4	2	2	3	2	2	28	39%
Fatal Injury	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Total	7	6	6	10	2	5	7	4	7	6	5	7	72	100%
%*	10	8	8	14	3	7	10	6	10	8	7	10	100	

*% unit not shown

The number of collisions by day and severity are shown in Table 31 for Kennedy Road. Wednesday had the higher number of collisions over this time period.

Table 31: Kennedy Road - Collisions by Severity and Day of the Week (2015 – 2019)

	Sun.	Mon.	Tues.	Wed.	Thu.	Fri.	Sat.	Total	%
P.D Only	4	4	5	9	11	5	6	44	59%
Non-Fatal Injury	5	5	7	4	1	3	3	28	39%
Fatal Injury	0	0	0	0	0	0	0	0	3%
Total	9	9	12	13	12	8	9	72	100%
%	13%	13%	17%	18%	17%	11%	13%	100%	

4.7.7 Collisions by Environmental Conditions

The distribution of collisions by environmental conditions for Warden Avenue are shown in Table 32. No pattern was observed related to environmental patterns.

Table 32: Warden Avenue - Collisions by Environmental Conditions (2015 – 2019)

Environmental Conditions	Collisions	%
Clear	64	73%
Rain	15	17%
Snow or Drifting Snow	8	9%
Strong wind	1	1%
Total	88	100%

The distribution of collisions by environmental conditions for Kennedy Road are shown in Table 33. No pattern was observed related to environmental patterns.

Table 33: Kennedy Road - Collisions by Environmental Conditions (2015 – 2019)

Environmental Conditions	Collisions	%
Clear	53	75%
Snow or Drifting Snow	11	16%
Rain	7	10%
Total	72	100%

4.7.8 Collision Analysis for Warden Avenue between Major Mackenzie Drive East and Heritage Hill Drive

There were eight collisions between year 2015 to 2019 along Warden Avenue between Major Mackenzie Drive East and Heritage Hill Drive. The impact type and severity of those collisions are shown in Table 34.

Table 34: Warden Avenue between Major Mackenzie Drive East and Heritage Hill Drive by Impact and Severity (2015 – 2019)

Impact Type	Severity	# of collisions
Rear End	Property damage only	5
Rear End	Non-fatal	1
SMV – Animal	Property damage only	1
SMV – Speed too fast	Property damage only	1

Five or 63% of the total collisions that occurred along this segment within the 5-year period were rear end collisions that resulted in property damage. Speed was not explicitly recorded to be a factor in these five collisions suggesting that they were caused by careless driving. Because this segment is short (265 metres) and close to the Warden Avenue and Major Mackenzie Drive East intersection, safety countermeasures leading to the intersection could be implemented along this segment. These countermeasures can include:

- Electronic radar speed signs at the mid-block between Major Mackenzie Drive East and Heritage Hill Drive.
- Traffic calming: enhanced pavement markings, narrow width of road.
- Streetscape elements that can contribute to lower speeds.

5.0 Future Transportation Conditions

5.1 Future Land Use

The Study Areas are within the City of Markham's Future Urban Area, which is planned to accommodate approximately 38,000 persons and approximately 19,000 jobs by full build-out year which is assumed to be year 2031.

The Region's updated transportation model provided population and employment forecasts by TAZ to year 2041 near the Study Areas, which is represented by TAZ 2381, 2413, and 2416, as shown in Figure 20.

Figure 20: Traffic Analysis Zones near the Study Areas

The population forecasts to year 2041 are shown in Table 35.

Table 35: Population Forecasts near the Study Areas

TAZ	2016	2031	2041
2381	74	8,990	9,015
2413	37	14,102	14,141
2416	74	10,603	16,143
Total	**186**	**33,695**	**39,299**

The employment forecasts to year 2041 are shown in Table 36.

Table 36: Employment Forecasts near the Study Areas

TAZ	2016	2031	2041
2381	13	2,479	2,491
2413	606	3,134	3,649
2416	3	1,012	1,848
Total	**621**	**6,626**	**7,988**

5.2 Planned Road Network

The 2016 Transportation Master Plan recommended to widen the Warden Avenue and Kennedy Road corridors within the Study Areas from two to four lanes and construct to urban arterial standard. The TMP also recommended dedicated cycling facilities along both corridors. These facilities are defined as facilities that provide specific space for cyclists. In urban areas, dedicated facilities typically include bike lanes, buffered bike lanes, or multi-use paths while paved shoulders provide dedicated space on rural roads.

The 2016 TMP also recommended to widen Elgin Mills Road East between Woodbine Avenue to Kennedy Road from two to four lanes between year 2027 to 2031 and to widen between Kennedy Road to Donald Cousens Parkway between year 2032 to 2041.

The City of Markham's 2021 Active Transportation Master Plan maintains the existing paved shoulder along Warden Avenue between Major Mackenzie Drive East and Elgin Mills Road East in the City's proposed ultimate cycling network. A paved shoulder would not be consistent with the Region's plans to reconstruct Warden Avenue to an urban arterial standard with a dedicated cycling facility.

The City's ATMP was used as input for the Environmental Assessments of the two Study Areas. These Class EA studies will consider the recommendations and through the various assessments and investigations undertaken throughout the studies, the ATMP recommendations will be incorporated where appropriate.

There is an existing multi-use path along Warden Avenue between 16th Avenue and Major Mackenzie Drive East on the east side. Given that the area is planned for redevelopment with an urban cross section for Warden Avenue, it would be appropriate to continue the multi-use path north of Major Mackenzie Drive East on the east side for connectivity of the active transportation network. As mentioned earlier, the Region also plans to have dedicated cycling facilities along Kennedy Road.

The City of Markham's Future Urban Area Conceptual Master Plan recommended a comprehensive collector road network consisting of roads and active transportation infrastructure. This network is shown in Figure 21. The proposed signal and intersection configuration is shown Figure 22. These intersection configurations were assessed in the Collector Road Environmental Assessments.

Figure 21: Proposed Community Structure Plan (Conceptual Master Plan)
Adapted from: Future Urban Area Conceptual Master Plan Volume 2 (October 2018)

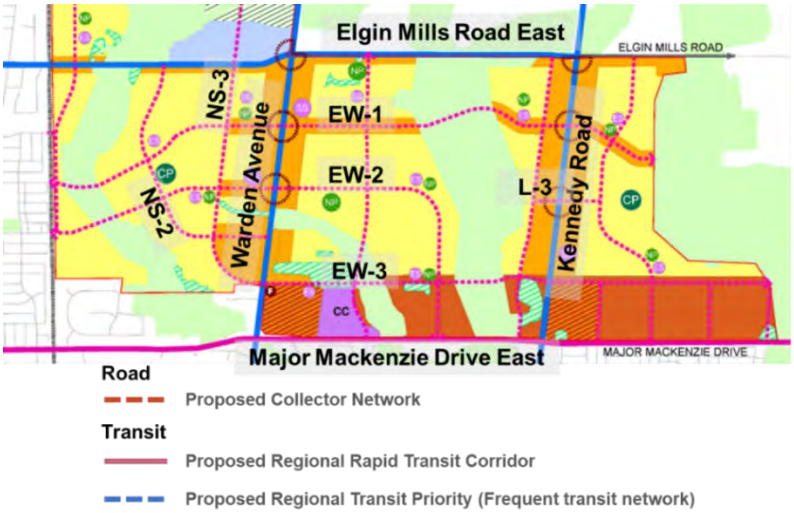
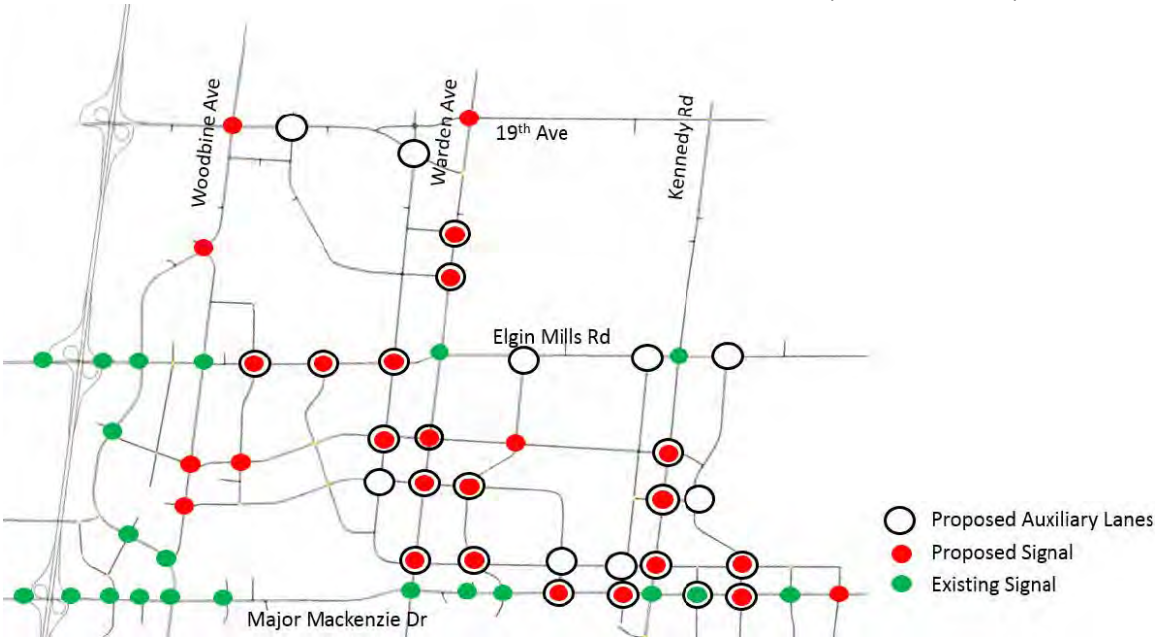


Figure 22: Proposed Signal and Intersection Configuration
Source: Future Urban Area Conceptual Master Plan Volume 2 (October 2018)



The 2019 consolidation of York Region's Official Plan 2010 identified the planned right-of-way for Kennedy Road and Warden Avenue to be up to 43 metres. At the time of writing this memorandum, a draft updated Region Official Plan indicates the planned right-of-way for Kennedy Road and Warden Avenue to be up to 41 metres and up to 43 metres at intersections.

5.3 Planned Transit Service

Kennedy Road and Warden Avenue between Elgin Mills Road East and Major Mackenzie Drive East are planned to be frequent transit network routes. Frequent Transit Network provides more direct service and improved transfers between routes by creating a connective grid network of Viva and base routes operating along key corridors in urban areas of the Region. The FTN supports travel between Regional Centres and along Regional Corridors and supports more direct inter-regional trips.

5.4 2041 Future Automobile Demand

The 2041 AM and PM future automobile demands were used to assess traffic operations along the Warden Avenue and Kennedy Road study corridors. The methodology to derive the 2041 future automobile demand is documented in the following section. The general methodology is outlined below:

1. Refine the Region's transportation models.
2. Derive appropriate compound annual growth rates based on refined models and available data.
3. Apply compound annual growth rates to the 2021 existing volumes as shown in Figure 15.

The traffic growth rates were calculated using peak direction modelled volumes in the AM peak hour, which is the time period of the EMME model. These traffic growth rates were applied to both directions of the existing conditions AM and PM traffic volumes derived from the turning movement counts to forecast 2041 traffic volumes

5.4.1 Transportation Model Refinements

The following transportation model refinements were made to the network in EMME:

- For the 2031 horizon year model, Warden Avenue was re-coded to two lanes per direction from Elgin Mills Road East to Donald Cousens Parkway. This network edit is consistent with the 2016 TMP. Warden Avenue between Major Mackenzie Drive to Donald Cousens Parkway (Project ID 2073) is planned to be widened from two to four lanes between 2027 to 2031. Originally, the network was coded to one lane per direction from Elgin Mills Road East to Donald Cousens Parkway.
- For the 2031 and 2041 horizon years, Warden Avenue and Kennedy Road between Major Mackenzie Drive East and Elgin Mills Road East were re-coded to 60 km/hr. to be consistent with the Region's vision for the corridors. The auto assignment was re-assigned to the network.

The peak direction (southbound) modelled volumes before and after the model refinements are shown in Figure 23 for the 2031 horizon year and in Figure 25 for the

2041 horizon year. Original and refined EMME modelled volume plots for the 2031 and 2041 horizon years can be found in Appendix F.

The EMME model was primarily used to derive appropriate compound annual growth rates along Warden Avenue and Kennedy Road. More detailed traffic operations analysis was conducted in the Synchro. Therefore, the EMME model network was reviewed and found to be sufficient in representing the collector road system in the Future Urban Area for this stage of the transportation analysis. Traffic operations assessment that includes future accesses and intersections as a result of the planned collector road system will be documented in Transportation Technical Report #2 which assesses the traffic operations of the preferred preliminary design concept.

Figure 23: 2031 Modelled Volumes Before and After Refinements

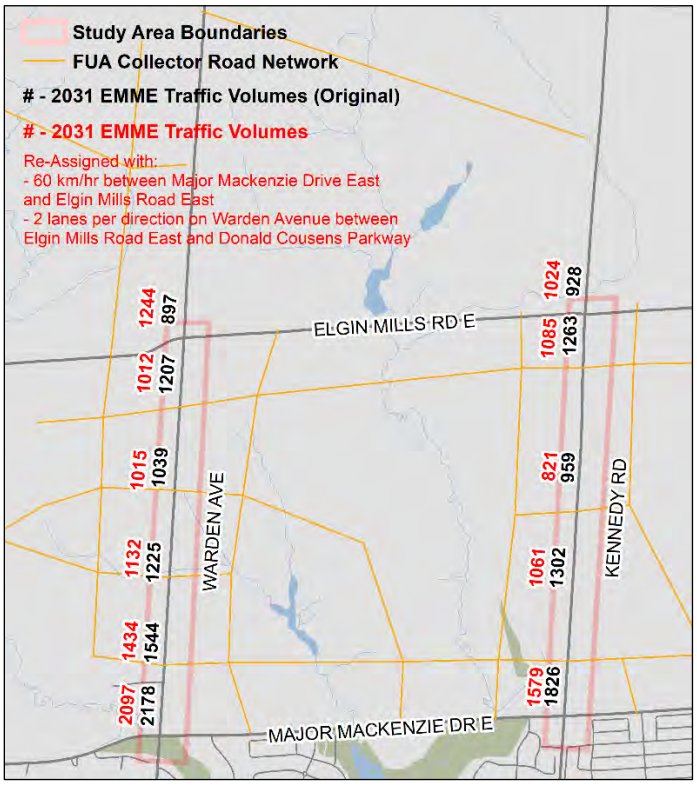
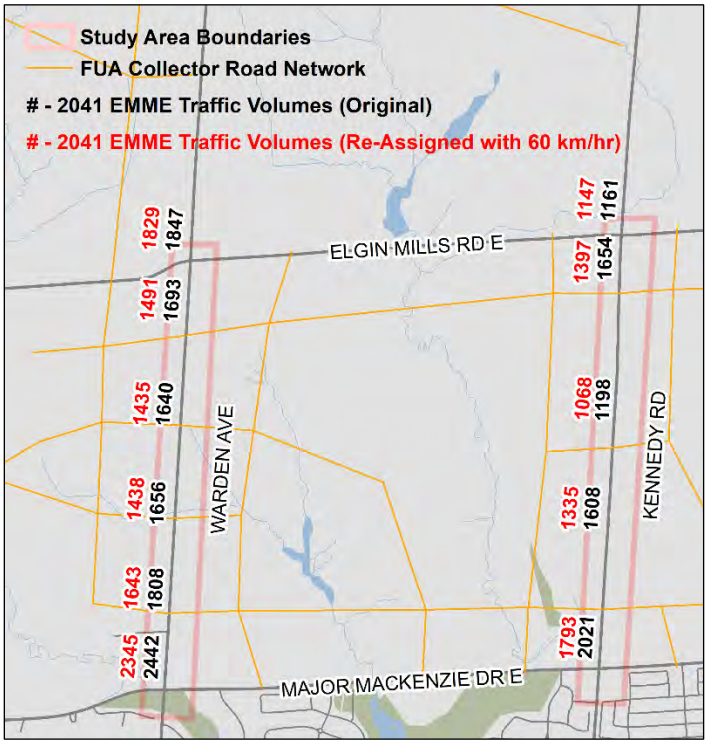


Figure 24: 2041 Modelled Volumes Before and After Refinements



5.4.2 Traffic Growth Rates

A traffic compound annual growth rate (CAGR) analysis was completed based on the models used for York Region's 2016 Transportation Master Plan (see Section 5.4.1).

Growth rates were calculated for the northbound/southbound directions and eastbound/westbound directions separately. This growth rate analysis assumed that the CAGR for the associated turning movements are half the through movements. Growth rates are also based on peak direction in the AM peak hour. The Region's model is an AM peak period models.

An 'unconstrained' growth rate approach was adopted which calculates growth rates with planned roadway improvements in the future horizon years. Unconstrained growth captures the full effects of latent demand so that all trips that desire to travel along the study corridors are not constrained by roadway capacity.

5.4.3 2016 to 2031 Compound Annual Growth Rate Analysis.

Northbound/Southbound Compound Annual Growth Rate Analysis

A screenline was identified mid-block on Warden Avenue and on Kennedy Road between Major Mackenzie Drive East and Elgin Mills Road.

A 2016 to 2031 traffic CAGR was calculated from the 2016 and 2031 York Region models. The 2031 model was refined to reflect the change in posted speed limits for the study corridors as outlined in Section 5.4.1. The results are shown in Table 37.

Table 37: Modelled Volumes for the 2016 to 2031 NB/SB Traffic Growth Rate

Year	Average Modelled Volume along Warden Avenue	Average Modelled Volume along Kennedy Road	Screenline Volumes
2016 Base Year	881	783	1,664
2031 Horizon Year with Posted Speed Limit Reduction	1,338	1,137	2,475
2016 – 2031 with Posted Speed Limit Reduction Auto Traffic CAGR	3%	3%	3%

As a result of this analysis, a 3.0% CAGR was applied to 2021 north/south through movements to forecast 2031 traffic volumes for this study. A 1.5% CAGR was applied to turning movements.

Eastbound/Westbound Compound Annual Growth Rate Analysis

Compound annual growth rates for through movements associated with Major Mackenzie Drive East and Elgin Mills Road East were derived based on modelled volumes from York Region's transportation models. Major Mackenzie Drive East and Elgin Mills Road East were analyzed separately due to their road functions. Major Mackenzie Drive East is a major arterial with high volumes and already approaching vehicular capacity in the existing conditions. There are no planned widenings associated with this roadway constraining the amount of traffic volume growth that can occur along this segment. Elgin Mills Road East is a City of Markham road that is performing below vehicular capacity in the existing conditions. There is also a 2-lane to 4-lane widening planned for this roadway.

Based on the Region's modelled traffic volumes between Warden Avenue and Kennedy Road, for through movements associated with Major Mackenzie Drive East, a 0.5% compound annual growth rate was applied to the 2021 existing conditions year to forecast 2031 traffic volumes as shown in Table 38. A 0.25% compound annual growth rate was applied to the turning movements.

Based on the Region's modelled traffic volumes between Warden Avenue and Kennedy Road, for through movements associated with Elgin Mills Road East, a 7% compound annual growth rate was applied between year 2021 to 2031. A 2.0% compound annual growth rate was applied to the turning movements.

Table 38: Modelled Volumes for the 2016 to 2031 EB/WB Traffic Growth Rate

Year	Average Modelled Volume along Major Mackenzie Drive East	Average Modelled Volume along Elgin Mills Road East
2016 Base Year	1,874	568
2031 Horizon Year	1,879	1,513
2011 – 2031 with Reduction Auto Traffic CAGR	0%	7%

5.4.4 2031 to 2041 Compound Annual Growth Rate Analysis

Northbound/Southbound Compound Annual Growth Rate Analysis

A 2031 to 2041 traffic CAGR was calculated from the 2031 and 2041 York Region transportation models. These models were refined to reflect the change in posted speed limits for the study corridors as outlined in Section 5.4.1. The results are shown in Table 39.

Table 39: Modelled Traffic Volumes for the 2031 to 2041 NB/SB Traffic Growth Rate

Year	Average Modelled Volume along Warden Avenue	Average Modelled Volume along Kennedy Road	Screenline Volumes
2031 Horizon Year with Posted Speed Limit Reduction (Derived from Region's TMP Model)	1,338	1,137	2,475
2041 Horizon Year Posted Speed Limit Reduction (Derived from Region's TMP Model)	1,670	1,398	3,068
2031 to 2041 Auto Traffic CAGR	2%	2%	2%

As a result of this analysis, a 2% CAGR was applied to through movements to 2031 traffic volumes to forecast 2041 traffic volumes for this study. A 1% CAGR was applied to turning movements.

A need to derive separate AM peak hour compound annual growth rates for the southbound approach at the Kennedy Road and Elgin Mills Road East intersection and southbound approach at the Warden Avenue and Elgin Mills Road East intersection was identified after review of the 2041 York Region transportation model. Due to travel

patterns associated within and near the Study Areas, these approaches experience very different levels of growth. These volumes are shown in Table 40.

Table 40: 2031 and 2041 AM Modelled Traffic Volumes approaching Southbound Elgin Mills Road East at Warden Avenue and Kennedy Road

Year	Warden Avenue: Southbound Approach at Elgin Mills Road East	Kennedy Road: Southbound Approach at Elgin Mills Road East
2031 Horizon Year with 2 lanes per direction north of Elgin Mills Road East adjustment (Derived from Region's TMP Model)	1,244	1,024
2041 Horizon Year (Derived from Region's TMP Model)	1,830	1,147
2031 to 2041 Auto Traffic CAGR	4%	1%

As a result of this analysis, a 4% CAGR was applied to the southbound through movement along Warden Avenue and a 1% CAGR was applied to the southbound through movement along Kennedy Road in the AM peak hour.

The northbound approach at these two intersections in the PM peak hour does not need to be adjusted since the 4% screenline CAGR (see Table 39) was applied and is more conservative.

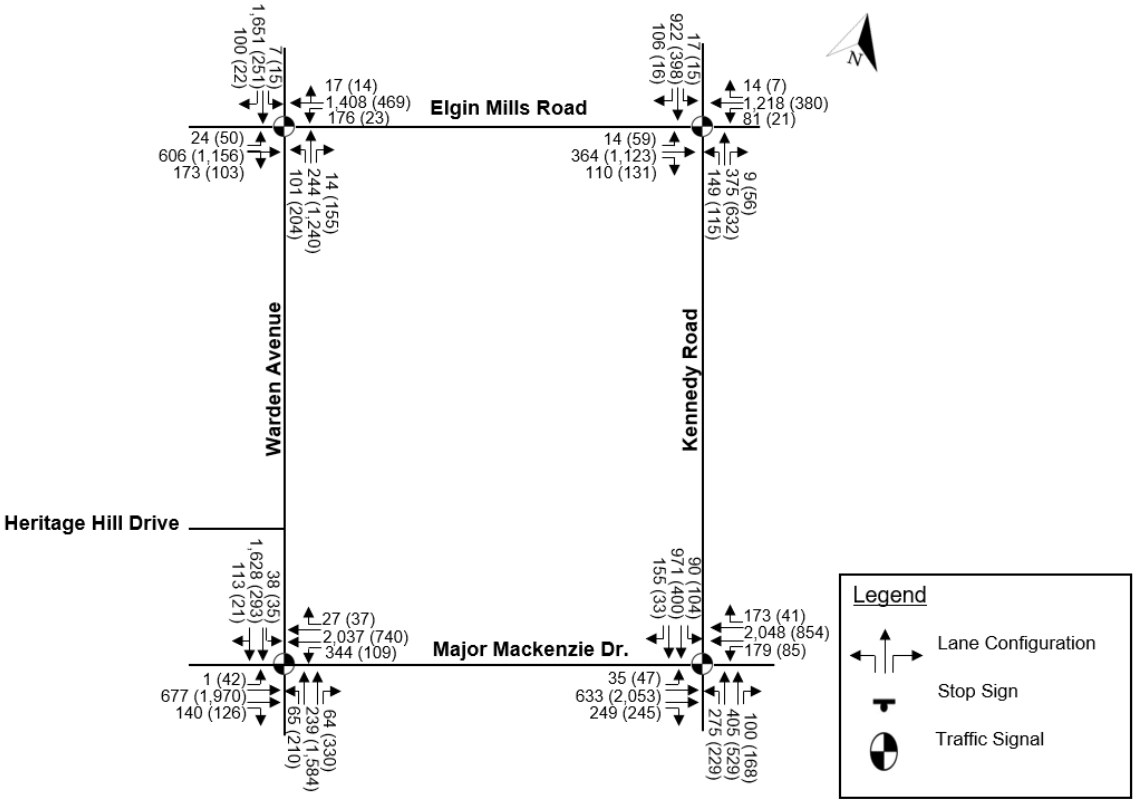
Eastbound/Westbound Compound Annual Growth Rate Analysis

Based on the traffic growth rate analysis, the compound annual growth rates that were applied to through movements associated with mid-block volumes along Major Mackenzie Drive East and Elgin Mills Drive East between Warden Avenue and Kennedy Road was 0.5% between 2031 to 2041. A 0.25% CAGR was applied to turning movements.

5.4.5 2041 Traffic Volumes

The resulting 2041 traffic volumes after applying the traffic compound annual growth rates are shown in Figure 25.

Figure 25: 2041 Forecasted Traffic Volumes



5.5 2041 "Do Nothing" Automobile Level of Service Evaluation

The future conditions assessment was conducted for the year 2041 using a "Do Nothing" scenario with no geometric improvements with the AM and PM peak hour demand as shown in Figure 25. The 2041 "Do Nothing" study corridors' intersection lane configuration and traffic control are shown in Figure 26.

The "Do Nothing" scenario was assessed to re-confirm the automobile needs and justification that was identified in the 2016 Transportation Master Plan. The 2016 TMP fulfills the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment process for roads. This TMP identified Kennedy Road and Warden Avenue as requiring roadway improvements which included a one to two-lane widening within the study areas. The alternative solutions and preferred solution are documented in Section 9.0 of this report.

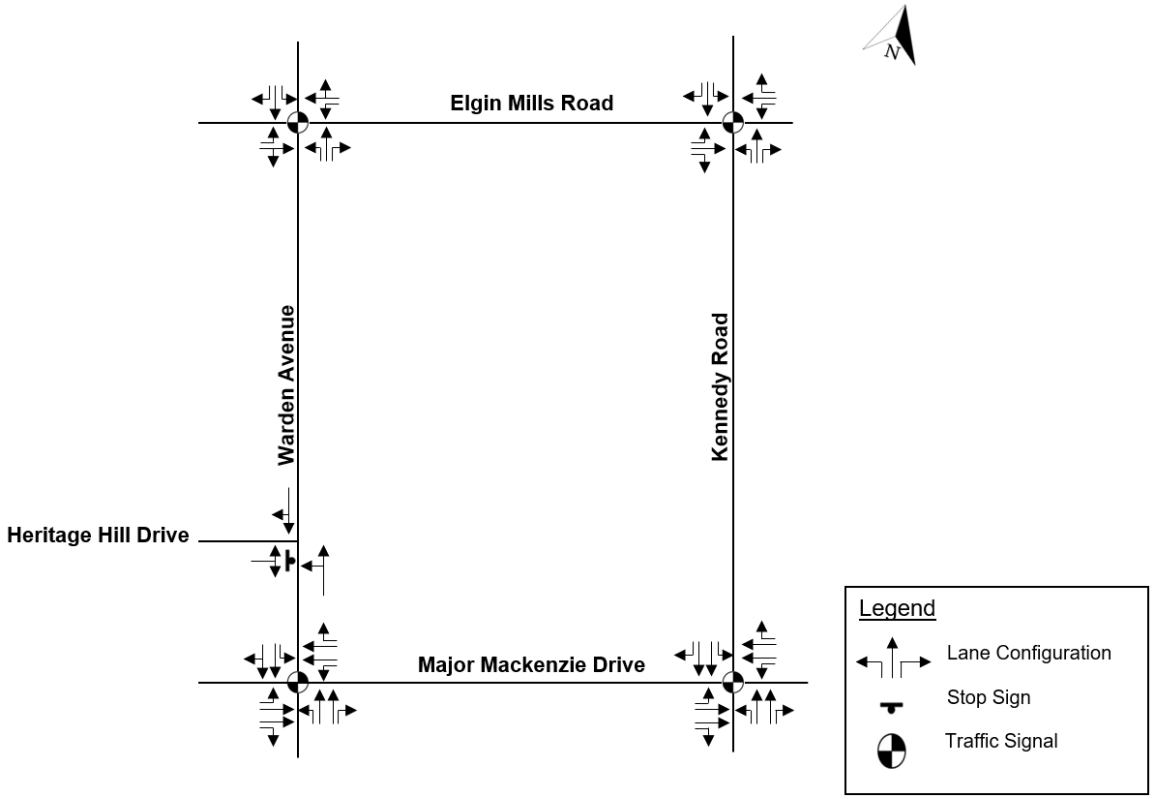
The collector road network is not shown as future traffic operations for the Collector Roads intersecting with the study corridors were assessed in the North Markham Future Urban Area Collector Roads Network Class Environmental Assessments (see Section 2.3.4). Traffic operations assessment that includes future accesses and intersections as a result of the planned collector road system will be documented in

Transportation Technical Report #2 which assesses the traffic operations of the preferred preliminary design concept.

Although there is a planned widening on Elgin Mills Road East between Woodbine Avenue to Kennedy Road from two to four lanes between year 2027 to 2031 and a planned widening between Kennedy Road to Donald Cousens Parkway between year 2032 to 2041, this “future conditions” assessment assumed no geometric improvements at the Elgin Mills Road East intersections.

At the time of writing this report, the City of Markham was conducting a Municipal Class Environmental Assessment Study on Elgin Mills Road East between Woodbine Avenue to McCowan Road. Recommendations from this study will re-confirm the preliminary designs of the Elgin Mills Road East intersections at Kennedy Road and Warden Avenue as proposed in the City’s Environmental Assessment and the needs for these York Region intersections. The compound annual traffic growth rates that were applied to traffic volumes along Elgin Mills Road East were not constraint by the existing 2-lane cross-section. This implies that traffic operations analysis incorporated the traffic demand based on a 4-lane cross-section of Elgin Mills Road East, but reports the results based on a 2-lane cross section. Unconstrained traffic growth rates are described in Section 5.4.2.

Figure 26: 2041 "Do Nothing" Lane Configuration and Traffic Control



5.5.1 2041 Link Capacity Analysis

The 2041 v/c ratios for the study corridors were calculated for the weekday AM and PM peak hours using the 2041 forecasted traffic volumes. Congested links are assumed to have a link volume-to-capacity ratios greater than 0.90 and are highlighted in the tables below in red. Similar to the existing condition link capacity analysis, only auto volumes and auto link capacities were considered in this analysis.

The results for Warden Avenue are presented in Table 41 for the AM peak and Table 42 for the PM peak.

Table 41: Link Capacity Analysis for Warden Avenue - AM Future Conditions

Warden Avenue	# of Lanes	Total Capacity	Volume	v/c ratio	# of Lanes	Total Capacity	Volume	v/c ratio
	Southbound				Northbound			
South of Elgin Mills Road East	1	900	2,000	2.22	1	900	359	0.40
North of Major Mackenzie Drive East	1	900	1,780	1.98	1	900	265	0.29

Table 42: Link Capacity Analysis of Warden Avenue - PM Future Conditions

Warden Avenue	# of Lanes	Total Capacity	Volume	v/c ratio	# of Lanes	Total Capacity	Volume	v/c ratio
	Southbound				Northbound			
South of Elgin Mills Road East	1	900	376	0.42	1	900	1,599	1.78
North of Major Mackenzie Drive East	1	900	348	0.39	1	900	1,664	1.85

The results for Kennedy Road are presented in Table 43 for the AM peak and Table 44 for the PM peak.

Table 43: Link Capacity Analysis for Kennedy Road - AM Future Conditions

Kennedy Road	# of Lanes	Total Capacity	Volume	v/c ratio	# of Lanes	Total Capacity	Volume	v/c ratio
	Southbound				Northbound			
South of Elgin Mills Road East	1	900	1,133	1.26	1	900	533	0.59
North of Major	1	900	1,036	1.15	1	900	612	0.68

Kennedy Road	# of Lanes	Total Capacity	Volume	v/c ratio	# of Lanes	Total Capacity	Volume	v/c ratio
	Southbound				Northbound			
Mackenzie Drive East								

Table 44: Link Capacity Analysis of Kennedy Road - PM Future Conditions

Kennedy Road	# of Lanes	Total Capacity	Volume	v/c ratio	# of Lanes	Total Capacity	Volume	v/c ratio
	Southbound				Northbound			
South of Elgin Mills Road East	1	900	549	0.61	1	900	804	0.89
North of Major Mackenzie Drive East	1	900	537	0.60	1	900	618	0.69

The link capacity analysis indicated that Warden Avenue will operate with demand above auto link capacity in the future “do nothing” conditions during the AM and PM peak hours. The maximum link volume-to-capacity ratio is 2.22 in the southbound direction during the AM peak hour. The maximum link volume-to-capacity ratio is 1.85 in the northbound direction during the PM peak hour.

The link capacity analysis indicated that Kennedy Road will operate with demand above auto link capacity in the future “do nothing” conditions during the AM peak hour. The maximum link volume-to-capacity ratio is 1.26 in the southbound direction during the AM peak hour. The maximum link volume-to-capacity ratio is 0.89 in the northbound direction during the PM peak hour.

The 2041 future year link capacity analysis showed the need for increased link capacity for Warden Avenue and Kennedy Road. Increased link capacity should be provided by increasing the number of lanes from 1 lane per direction to 2 lanes per direction as recommended by the Region’s 2016 TMP.

5.5.2 2041 Traffic Operations – “Do Nothing” Scenario

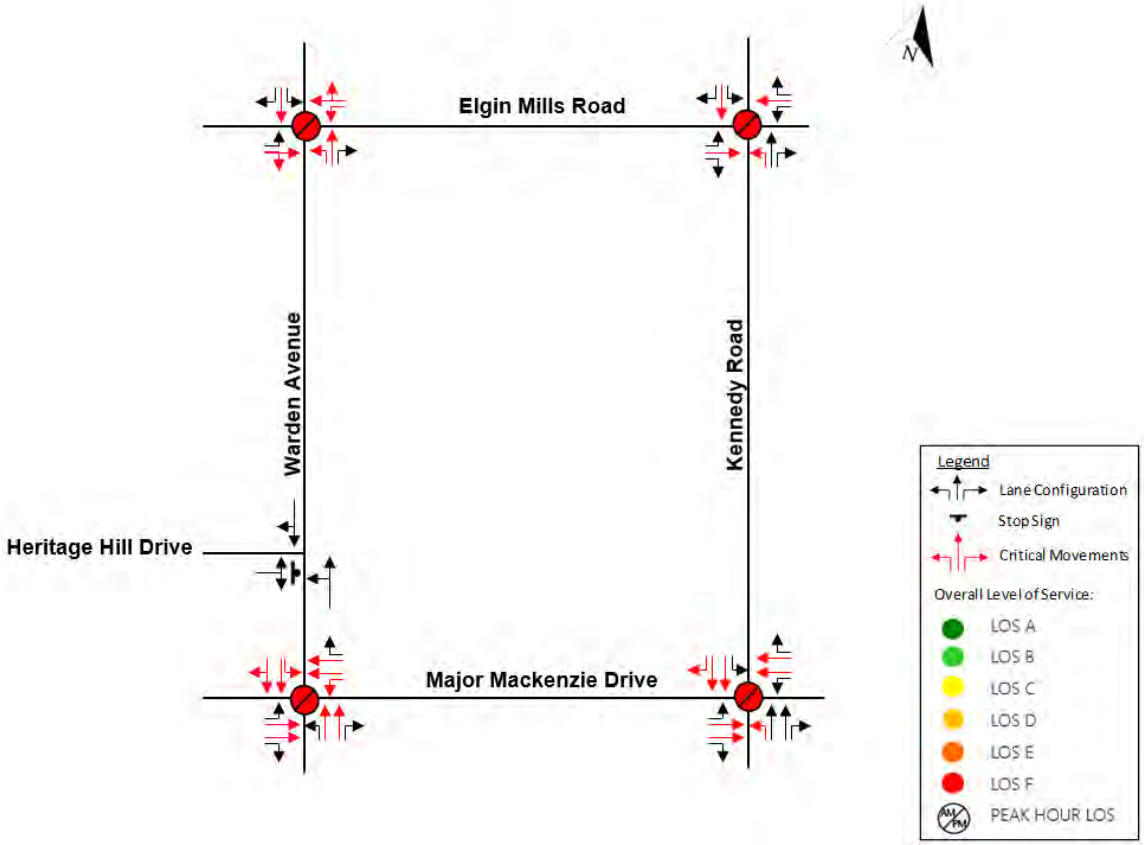
The 2041 “Do Nothing” scenario were analyzed for the weekday AM and PM peak hours. The signalized intersection operation results for Warden Avenue and Kennedy Road are shown in Table 45. A summary of the intersection operations is shown in Figure 27. Detailed results are provided in Appendix G. Critical movements are highlighted in red.

Table 45: Future Conditions Traffic Operations Analysis

Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	v/c	LOS	v/c	LOS
Warden Avenue and Elgin Mills Road East				
Overall	2.40	F	2.03	F
EBL	0.26	B	0.28	B
EBTR	1.25	F	1.99	F
WBL	1.88	F	0.25	B
WBTR	2.11	F	0.71	B
NBL	1.04	F	0.61	C
NBT	0.41	B	1.90	F
NBR	0.01	B	0.23	B
SBL	0.02	B	0.15	B
SBT	2.49	F	0.42	B
SBR	0.13	B	0.02	B
Warden Avenue and Major Mackenzie Drive East				
Overall	1.89	F	1.36	F
EBL	0.02	C	0.16	C
EBT	0.76	D	1.38	F
EBR	0.10	C	0.11	C
WBL	0.96	E	0.71	D
WBT	1.23	F	0.42	B
WBR	0.02	B	0.02	B
NBL	0.50	C	0.78	D
NBT	0.18	C	1.33	F
NBR	0.05	C	0.59	D
SBL	0.12	C	0.72	E
SBT	2.77	F	0.61	D
SBR	0.10	C	0.01	C
Kennedy Road and Elgin Mills Road East				
Overall	1.76	F	1.37	F
EBL	0.14	B	0.22	B
EBT	0.57	B	1.75	F
EBR	0.13	B	0.16	B
WBL	0.33	B	0.24	B
WBT	1.92	F	0.60	B
WBR	0.01	B	0.00	B
NBL	1.47	F	0.45	C
NBT	0.58	B	0.98	D
NBR	0.01	B	0.04	B
SBL	0.06	B	0.15	B
SBT	1.40	F	0.60	B
SBR	0.13	B	0.01	B
Kennedy Road and Major Mackenzie Drive East				
Overall	1.21	F	1.19	F
EBL	0.28	C	0.17	B

Movement	Weekday AM Peak Hour		Weekday PM Peak Hour	
	v/c	LOS	v/c	LOS
EBT	0.46	C	1.29	F
EBR	0.17	C	0.27	B
WBL	0.53	B	0.53	C
WBT	1.32	F	0.51	C
WBR	0.15	C	0.03	B
NBL	1.29	F	1.05	F
NBT	0.35	C	0.57	D
NBR	0.07	C	0.20	C
SBL	0.44	D	0.74	E
SBT	1.01	F	0.66	D
SBR	0.19	D	0.02	D

Figure 27: Summary of 2041 Future Conditions Traffic Operations Analysis



Many movements are identified as critical movements during the AM and PM peak hours under the 2041 future conditions. Similar to the existing conditions, all 4 intersections are operating well above capacity. A need for infrastructure improvements at the intersections to improve capacity and signal timing optimization is recommended to improve operations which will be addressed in the preliminary design concept.

5.5.3 2041 Future Intersection Queues - "Do Nothing" Scenario

The 95th percentile queues for each movement at the study intersections were extracted from the Synchro 11 analysis and compared to the available storage length as shown in Table 46. Future intersection queues were highlighted in red where 95th percentile queues were higher than existing storage link distances.

Table 46: Future Conditions Queue Summary

Movement	Existing Storage/ Link Distance (m)	Weekday AM Peak Hour	Weekday PM Peak Hour
		95th % Queue (m)	95th % Queue (m)
Warden Avenue and Elgin Mills Road East			
EBL	70	8	13
EBTR	400+	198	350
WBL	80	61	8
WBTR	400+	396	83
NBL	125	42	43
NBT	500+	42	335
NBR	30	0	21
SBL	100	3	6
SBT	500+	458	43
SBR	30	13	1
Warden Avenue and Major Mackenzie Drive East			
EBL	55	2	16
EBT	500+	114	419
EBR	85	16	17
WBL	145	124	40
WBT	450+	409	80
WBR	100	0	2
NBL	60	20	65
NBT	500+	31	340
NBR	60	9	90
SBL	140	17	30
SBT	550+	847	102
SBR	80	17	0
Kennedy Road and Elgin Mills Road East			
EBL	120	5	14
EBT	350+	62	301
EBR	50	13	15
WBL	150	18	8
WBT	400+	331	65
WBR	60	0	0
NBL	125	49	26
NBT	300+	64	146
NBR	45	0	6
SBL	40	5	6
SBT	300+	236	68
SBR	35	13	0
Kennedy Road and Major Mackenzie Drive East			
EBL	55	10	12

Movement	Existing Storage/ Link Distance (m)	Weekday AM Peak Hour	Weekday PM Peak Hour
		95th % Queue (m)	95th % Queue (m)
EBT	500+	83	449
EBR	60	16	45
WBL	250	38	25
WBT	360	443	113
WBR	150	19	0
NBL	120	136	93
NBT	300+	58	79
NBR	60	13	27
SBL	195	40	47
SBT	550+	162	68
SBR	60	28	0

In the AM peak hour, the southbound-through forecasted queue along Warden Avenue between Major Mackenzie Drive East and Elgin Mills Road East is significantly long. The recommended improvements of widening from two to four lanes to increase the link capacity will dramatically reduce the forecasted queues.

The other traffic through movement that contained 95th percentile through movement queues long enough to impact an existing adjacent signalized intersection was westbound at Kennedy Road and Major Mackenzie Drive East.

Major Mackenzie Drive East is planned for a widening from 4 lanes to 6 lanes between Leslie Street to Kennedy Road to accommodate transit and high-occupancy-vehicle lanes. Note that this widening has been identified in the Region's long-term plan through the 2016 TMP and has not been included in the 2022 10-Year Roads and Transit Capital Construction Program. Signal timing optimization and coordination is recommended to mitigate spillback at the adjacent intersections.

The forecasted 95th percentile northbound left queue is greater than the existing storage distance at Kennedy Road and Major Mackenzie Drive East. Infrastructure improvements (ex. Dual left turns), increasing left turn storage distances, signal timing optimization, or lane configuration alterations will be reviewed to mitigate the impacts. This will be addressed in the preferred preliminary design concept.

6.0 Signal Warrant Analysis

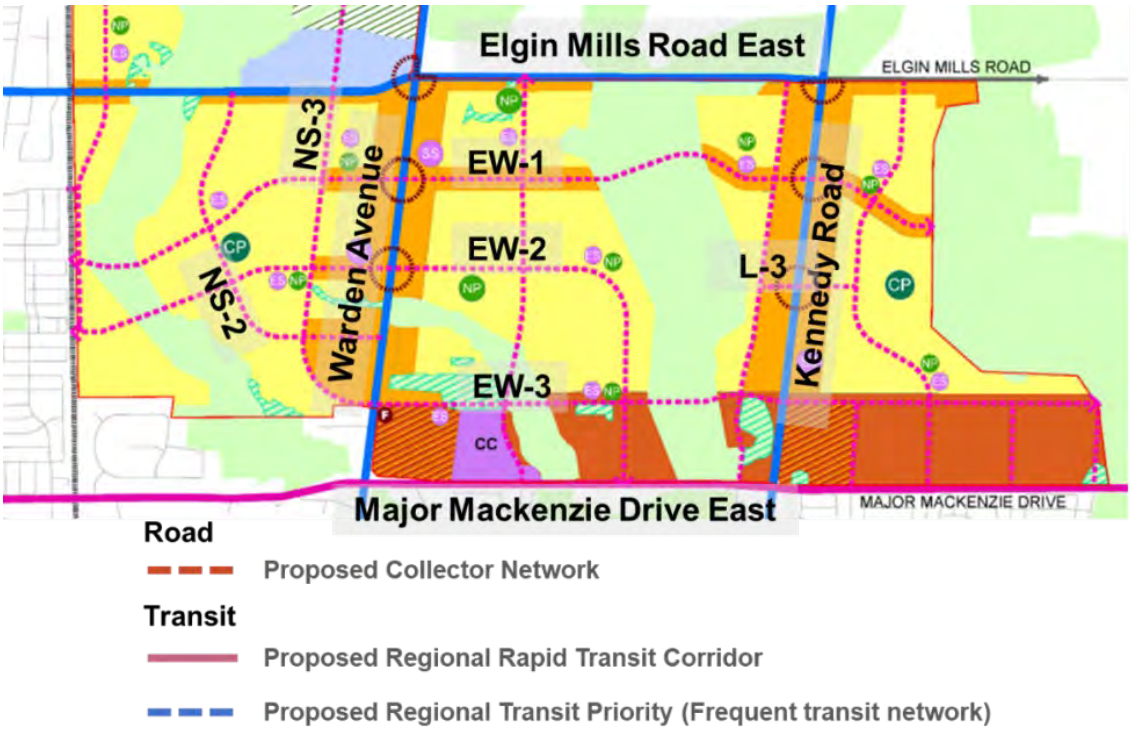
All 4 major intersections within the study corridors are already signalized.

The City of Markham's Future Urban Area Conceptual Master Plan recommended a comprehensive collector road network consisting of roads and active transportation infrastructure. This network is shown in Figure 28. The signal warrant analysis undertaken in WSP's Robinson Glen Traffic Impact Study Update (see Section 3.2) concluded the following:

- Kennedy Road at EW-1 and EW-3 are expected to approach being warranted by year 2031.
- Kennedy Road at L-3 was assumed unsignalized due to its short segment and less direct connectivity.

Figure 28: FUA Collector Road Network

Adapted from: Future Urban Area Conceptual Master Plan Volume 2 (October 2018)



The Angus Glen Block Collector Road Class Environmental Assessment is expected to confirm signalization of the FUA collector road network along Warden Avenue. This EA is currently on hold due to Ontario Land Tribunal hearings. The FUA Conceptual Master Plan Volume 2 proposed signals along Warden Avenue at EW-3, EW-2, and EW-1. The traffic analysis that will be undertaken for the preliminary design concept will confirm the

signalization of intersections of the Collector Roads and will be documented in Transportation Technical Report #2.

7.0 Roundabout Screening

There are a few general criteria that may merit consideration of roundabout implementation. These criteria include:

- Locations where there are capacity or safety problems at an existing intersection. Roundabouts may provide greater capacity than traffic signals or stop controlled intersections. Overall safety is also improved by slower intersection speeds and by reducing the number of conflict points.
- Where traffic signals or all-way stops are warranted or expected to be warranted in the near future at existing or proposed intersections.
- Where, as part of a larger capital project, suitable intersections are identified as potential sites. There is a potential significant cost savings associated with roundabouts as planned roadway re-construction usually requires removal of existing asphalt, granular material, curbing, sidewalks, etc.
- Where, through the development process, new intersections are introduced.

Although an alternative to signalization, roundabouts have an upper limit on the volume of traffic that can be accommodated through its intersection. Based on the U.S Federal Highway Administration's "Roundabout: An Informational Guide" (2000), single-lane roundabouts can generally be considered when circulating flow is less than 1,800 vehicles per hour or AADT flow less than 25,000 vehicles. A double-lane roundabout can generally be considered when circulating flow is less than 3,000 vehicles/hour pr AADT flow less than 34,000 vehicles. Multi-lane roundabouts with more than two lanes are not recommended in the context of York Region within the 2041 planning horizon. Given that they are more complicated for drivers, multi-lane roundabouts are rare in York Region and surrounding areas. There are no roundabouts with three or more lanes yet in Ontario.

Careful consideration should be made for vulnerable road users such as cyclists and pedestrians. Roundabouts are more difficult for cyclists and pedestrians to cross and may require pedestrian crossings. Careful consideration should also be made by those who are mobility challenged and require accessibility considerations. When the roundabout becomes busy, the approach entrances and exit lanes could become intimidating for this population, which typically require longer gaps in the traffic stream to safely cross.

Given these general considerations, this study does not recommend including the implementation of roundabouts as an alternative to be considered for the Major Mackenzie Drive East and Elgin Mills Road East intersections for the following reasons:

- Given the forecasted 2041 traffic volumes as shown in Figure 25 (see Section 5.4.5), a 3-lane roundabout would have to be considered. A 3-lane roundabout is not an appropriate solution in the context of York Region, and specifically in the Future Urban Area where in an urbanized environment, comfort for vulnerable road users and those that have mobility challenges should be prioritized.

- These intersections are not shown to have safety problems as shown in the traffic safety assessment (see Section 4.7). Although single-lane roundabouts can improve safety, a multi-lane roundabout may not have the same level of safety benefits.
- The four intersections within the study corridors are already signalized and generally roundabout implementation should be considered for new or unsignalized intersections.

8.0 Summary of Needs and Justifications

An existing and future transportation assessment and safety analysis was undertaken for the Warden Avenue and Kennedy Road corridors between Major Mackenzie Drive East and Elgin Mills Road East. Based on the analysis, a summary of the needs and justification are provided below:

Automobile Needs and Justification:

In the 2021 existing conditions year:

- During the AM peak hour, the traffic operations analysis indicated three intersections operating above capacity. Warden Avenue and Elgin Mills Road East operate at LOS E. Warden Avenue and Major Mackenzie Drive East operate at LOS F. Kennedy Road and Major Mackenzie Drive East operate at LOS E.
- During the PM peak hour, the traffic operations indicated one intersection operating above capacity. Warden Avenue and Major Mackenzie Drive East operate at LOS E.
- The link capacity analysis indicated that Warden Avenue is operating above auto link capacity during both AM and PM peak hours. The maximum auto link volume-to-capacity ratio was 1.24 in the southbound direction during the AM peak hour. The maximum auto link volume-to-capacity ratio was 1.15 in the northbound direction during the PM peak hour.
- This link capacity analysis indicated that Kennedy Road is operating below total link capacity during both AM and PM peak hours. The maximum link volume-to-capacity ratio is 0.78 in the southbound direction during the AM peak hour. The maximum link volume-to-capacity ratio is 0.58 in the northbound direction during the PM peak hour.

In the 2041 future conditions year for the “Do Nothing” assessment:

- During the AM and PM peak hours, the traffic operations analysis indicated that all 4 intersections was forecasted to operate above capacity at LOS F indicating a need for intersection improvements.
- In the AM peak hour, the southbound-through forecasted queue along Warden Avenue between Major Mackenzie Drive East and Elgin Mills Road East is significantly long. The recommended improvements of widening from two to four lanes to increase the link capacity will dramatically reduce the forecasted queues.
- The other movement that was forecasted to have 95th percentile through movement queues that was long enough to impact an existing adjacent signalized intersection was westbound at Kennedy Road and Major Mackenzie Drive East. Signal timing optimization and coordination is recommended to mitigate spillback at the adjacent intersections.
- The 95th percentile queue is forecasted to be greater than the existing northbound left storage distance at Kennedy Road and Major Mackenzie Drive East. Infrastructure improvements (e.g., Dual left turns), increasing left turn storage

distances, signal timing optimization, or lane configuration alterations are recommended to be explored to mitigate the impacts.

- The link capacity analysis indicated that Warden Avenue is forecasted to operate above auto link capacity in the future “do nothing” scenario during the AM and PM peak hours. The maximum link volume-to-capacity ratio is 2.22 in the southbound direction during the AM peak hour. The maximum link volume-to-capacity ratio is 1.85 in the northbound direction during the PM peak hour.
- The link capacity analysis indicated that Kennedy Road is forecasted to operate above auto link capacity in the future “do nothing” scenario during the AM peak hour. The maximum link volume-to-capacity ratio is 1.26 in the southbound direction during the AM peak hour. The maximum link volume-to-capacity ratio is 0.89 in the northbound direction during the PM peak hour.
- The 2041 future year link capacity analysis indicated the need for increased link capacity for Warden Avenue and Kennedy Road. Increased link capacity should be provided by increasing the number of lanes from one lane per direction to two lanes per direction as recommended by the Region’s 2016 TMP.

Pedestrian and Cycling Needs and Justification

- There are no existing dedicated cycling facilities along Warden Avenue or Kennedy Road within the Study Areas.
- Pedestrian Levels-of-Service did not meet the target of LOS C for many legs of intersections and roadway segments within the study corridors under the existing conditions.
- Improvements to the pedestrian and cycling environment should be implemented at the intersections of Elgin Mills Road East at Warden Avenue and Kennedy Road. Improvements to the pedestrian environment should be implemented on Warden Avenue and Kennedy Road between Elgin Mills Road East and Major Mackenzie Drive East.
- Because the area is being redeveloped and reconstructed, opportunities to improve the pedestrian and cycling environment improvement should be explored at the Major Mackenzie Drive East intersections at Warden Avenue and Kennedy Road concurrently with the improvements to the rest of the study corridors to ensure consistency and connectivity.
- There is an existing multi-use path along Warden Avenue between 16th Avenue and Major Mackenzie Drive East on the east side. Given that the area is planned for redevelopment with an urban cross section for Warden Avenue, it would be appropriate to continue the multi-use path north of Major Mackenzie Drive East on the east side for connectivity of the active transportation network.

Transit Needs and Justification

- There is no transit service currently provided within the Study Areas. The Region supports transit as a robust transit network helps support growth to key centres and corridors and minimizes the need for travel and reduces dependence on single

occupant vehicles. This sustainable mode of transportation also helps mitigate climate change, which is another important objective for York Region.

- Warden Avenue and Kennedy Road between Elgin Mills Road East and Major Mackenzie Drive East are planned to be frequent transit network routes.

Traffic Safety Needs and Justification

- A safety assessment was undertaken to identify and mitigate potential safety related concerns using historical collision records within the Study Areas.
- Warden Avenue between Major Mackenzie Drive East and Heritage Hill Drive has collision rate of 1.80 along this segment indicating a need for safety improvements.
- At the Kennedy Road and Elgin Mills Road East intersection, 47% of the collisions were categorized as non-fatal and 53% was categorized as property damage only. The severity of the collisions may represent an opportunity for improvement, such as speed management.
- There were 7 single motor vehicle (SMV) collisions out of 10 along Kennedy Road between Elgin Mills Road East and Major Mackenzie Drive East accounting for 70% of the collisions along that segment between year 2015 to 2019. Four of the seven were SMV collisions involved an animal collision
- The alternative design concepts should consider the need to protect for vulnerable road users since active transportation activity is expected to increase along this corridor.

Roundabout Needs and Justification

- This study does not recommend including the implementation of roundabouts as an alternative to be considered for both study corridors at the Major Mackenzie Drive East and Elgin Mills Road East intersections based on the following reasons:
  - Given the forecasted 2041 traffic volumes, a 3-lane roundabout would have to be considered. A 3-lane roundabout is not recommended in York Region currently, and specifically in the Future Urban Area where in an urbanized environment, comfort for vulnerable road users and those that have mobility challenges should be prioritized.
  - Roundabouts should be considered if there are safety concerns at the intersections. However, these intersections are not shown to have safety problems as shown in the traffic safety assessment. Although single-lane roundabouts can improve safety, a multi-lane roundabout may not have the same level of safety benefits.
  - The 4 intersections within the study corridors are already signalized and generally roundabout implementation should be considered for new or unsignalized intersections.

9.0 Alternative Solutions

9.1 Overview

York Region's Transportation Master Plan (TMP) is the Region's long-term vision for York Region's transportation network, encompassing strategy, policy, and infrastructure. The plan looks ahead 30 years and considers the Region's transportation infrastructure needs to support growth and the changing needs of travellers. The plan supports healthy communities and economic growth by planning for safe, reliable travel, and efficient movement of goods.

The TMP was last conducted in 2016 and satisfies Phases 1 and 2 of the MCEA process. The TMP identified Warden Avenue and Kennedy Road as requiring roadway improvements. These recommendations were based on assessments of alternative scenarios. A preferred scenario was selected based on its alignment with the following TMP objectives:

- Support Transit
- Support Road Network.
- Support Active Transportation.
- Support Goods Movement.
- Support Last Mile.

An overview of the problem and opportunity, alternative scenarios, and preferred scenario for each study corridor is outlined in the below sections.

9.2 Warden Avenue between Major Mackenzie Drive and Donald Cousens Parkway (Project ID 2073)

The TMP identified Warden Avenue between Major Mackenzie Drive to Donald Cousens Parkway (Project ID 2073) as requiring roadway improvement. The forecasted 2041 Do Nothing average modelled traffic volume was 2,000 vehicles per hour in the peak direction. This modelled traffic volume results in an average modelled volume-to-capacity (v/c) ratio of 1.81. This v/c ratio suggests a road widening is required to mitigate congestion.

The 2016 TMP proposed a 4-lane road throughout this section. This proposed lane configuration along Warden Avenue resulted in an average modelled traffic volume of 2,610 vehicles per hour in 2041. This modelled traffic volume resulted in an average v/c ratio of 1.36.

The problem and opportunity statement included the following:

- Transportation network improvements are needed to accommodate expansion of the Designated Urban Area.
- Capacity improvements needed to accommodate future travel demands.

- Corridor improvements needed to support walking and cycling.
- Corridor improvements need to support transit.

Alternatives that were considered and the results are shown in Table 47.

Table 47: Alternative Scenario Analysis for Warden Avenue (2016 York Region TMP)

Scenario #	Description	Result
1	Do Nothing	Did not address the problem or opportunity statement.
2	Optimize existing facility with intersection improvements only.	Provided minor improvements to traffic flow. Did not address overall traffic congestion.
3	Urbanize corridor but maintain 2-lane cross-section.	Did not address traffic congestion. Addressed opportunity to improve walking and cycling facilities.
4	Widen corridor to 4 lanes and maintain rural cross-section.	Addressed traffic capacity. Did not address. opportunity to improve walking and cycling facilities.
5	Widen corridor to 4 lanes and construct to urban cross-section.	Addressed traffic capacity. Addressed opportunity to improve walking and cycling facilities.
6	Widen parallel/adjacent corridor.	Potential to divert some traffic to other corridors. Did not address corridor congestion and provided no improvements to walking and cycling facilities.

The 2016 TMP recommended widening the corridor to 4 lanes and constructing to an urban arterial standard. The justification provided was that the traffic forecast met threshold for a 4-lane widening. This recommendation provided an opportunity to improve walking and cycling facilities. The TMP recommended the widening from Major Mackenzie Drive East to Elgin Mills Road East by 2031.

9.3 Kennedy Road between Major Mackenzie Drive and Donald Cousens Parkway (Project ID 2003)

The TMP identified Kennedy Road between Major Mackenzie Drive to Donald Cousens Parkway (Project ID 2003) as requiring roadway improvement. The forecasted 2041 Do Nothing average modelled traffic volume was 1,430 vehicles per hour in the peak direction. This modelled traffic volume results in an average modelled volume-to-capacity (v/c) ratio of 1.42. This v/c ratio suggests a road widening is required to mitigate congestion.

The 2016 TMP proposed a 4-lane road throughout this section. This proposed lane configuration along Kennedy Road resulted in an average modelled traffic volume of 1,760 vehicles per hour in 2041. This modelled traffic volume resulted in an average v/c ratio of 0.88.

The problem and opportunity statement included the following:

- Transportation network improvements are needed to accommodate expansion of the Designated Urban Area.
- Capacity improvements needed to accommodate future travel demands.
- Corridor improvements needed to support walking and cycling.

Alternatives that were considered and the results are shown in Table 48.

Table 48: Alternative Scenario Analysis for Kennedy Road (2016 York Region TMP)

Scenario #	Description	Result
1	Do Nothing	Did not address the problem or opportunity statement.
2	Optimize existing facility with intersection improvements only.	Provided minor improvements to traffic flow. Did not address overall traffic congestion.
3	Urbanize corridor but maintain 2-lane cross-section.	Did not address traffic congestion. Addressed opportunity to improve walking and cycling facilities.
4	Widen corridor to 4 lanes and construct to urban arterial standard.	Addressed traffic capacity. Addressed opportunity to improve walking and cycling facilities.
5	Widen parallel/adjacent corridor.	Potential to divert some traffic to other corridors. Did not address corridor congestion and provided no improvements to walking and cycling facilities.

The 2016 TMP recommended widening of the corridor from two lanes to four lanes and constructing to an urban arterial standard. The justification provided was that the traffic forecast met threshold for a 4-lane widening. This recommendation provided an opportunity to improve walking and cycling facilities. The TMP recommended the widening from Major Mackenzie Drive East to Elgin Mills Road East by 2031.

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Appendix A

Turning Movement Counts and Supplemental Traffic Data

AADT Midblocks Report

Description	2010	2012	2014	2015	2017	2019
Kennedy Road btwn Major Mackenzie Drive East & Elgin Mills Road East	6913	6907	7318	7283	7910	6972

AADT Midblocks Report

Description	2010	2012	2014	2016	2018
Warden Avenue btwn Major Mackenzie Drive East & Heritage Hill Drive	6869	6928	7339	11811	11481

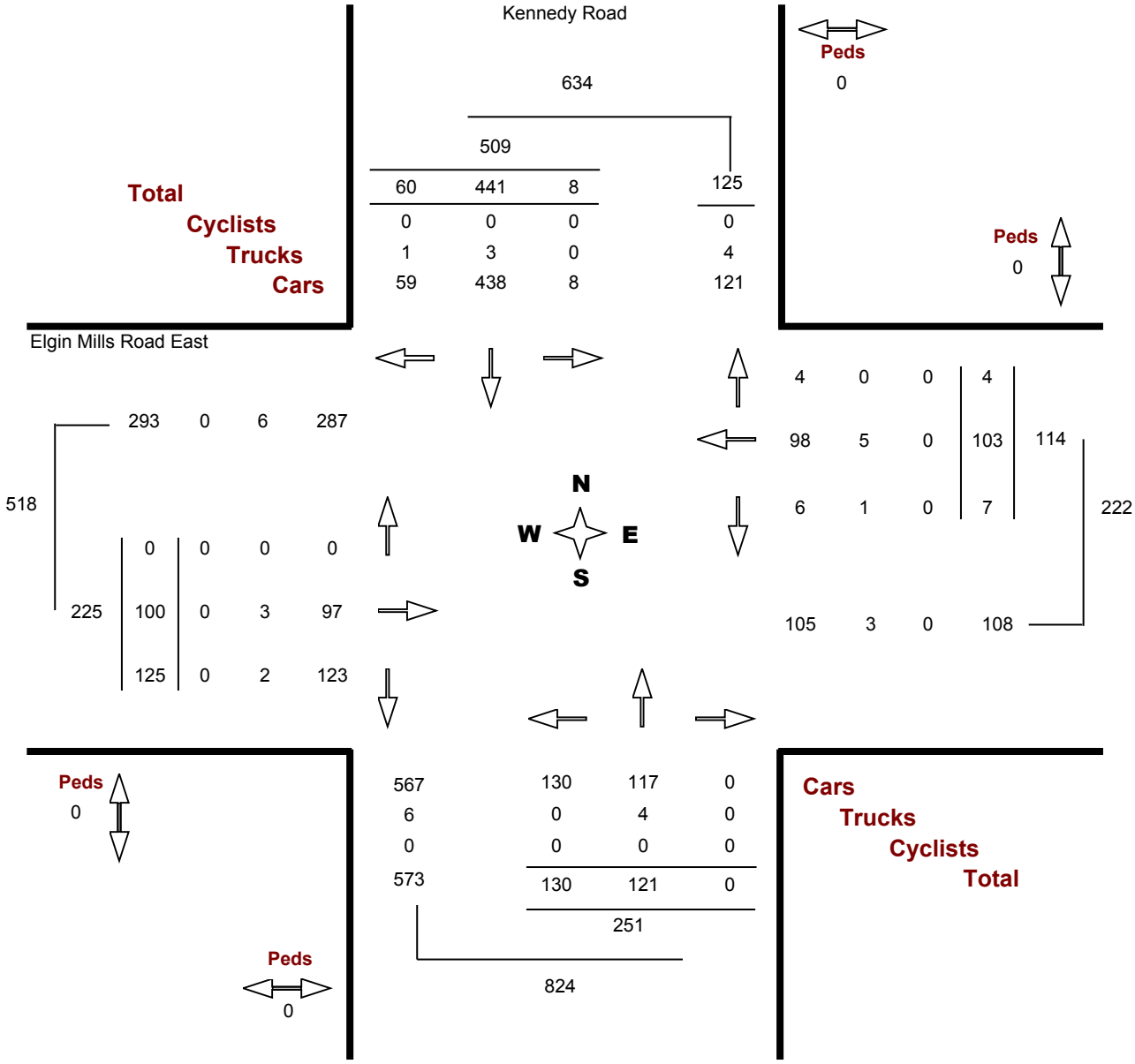
AADT Midblocks Report

Description	2010	2012	2014	2015	2017	2019
Warden Avenue btwn Heritage Hill Drive & Elgin Mills Road East	5257	5347	5656	5754	6234	6014

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Kennedy Road & Elgin Mills Road East
Municipality. Markham
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 576E7D63
Count Date. Wednesday, 21 January, 2009
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:30 AM — 08:30 AM

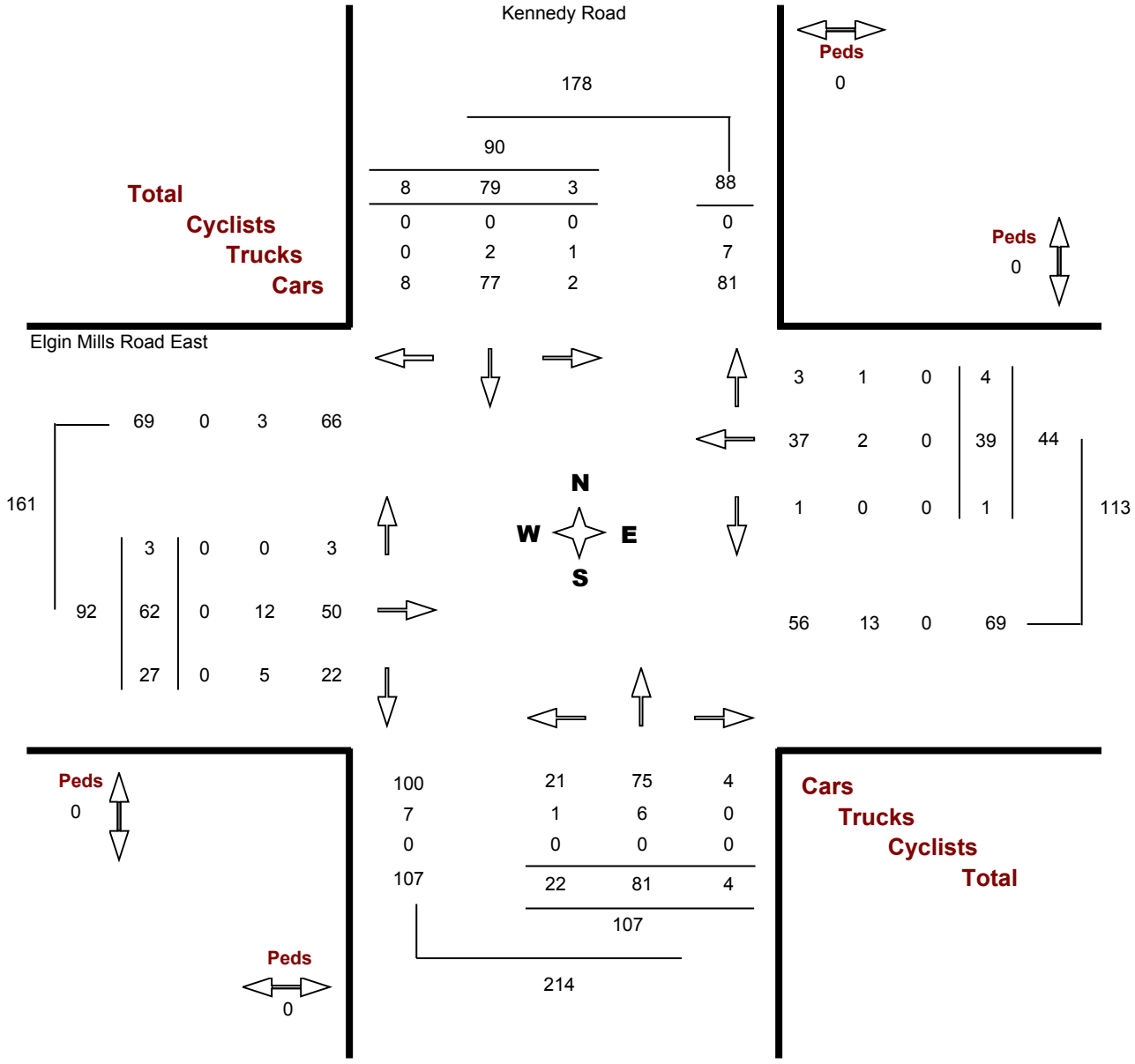


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Kennedy Road & Elgin Mills Road East
Municipality. Markham
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 576E7D63
Count Date. Wednesday, 21 January, 2009
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 11:15 AM — 12:15 PM

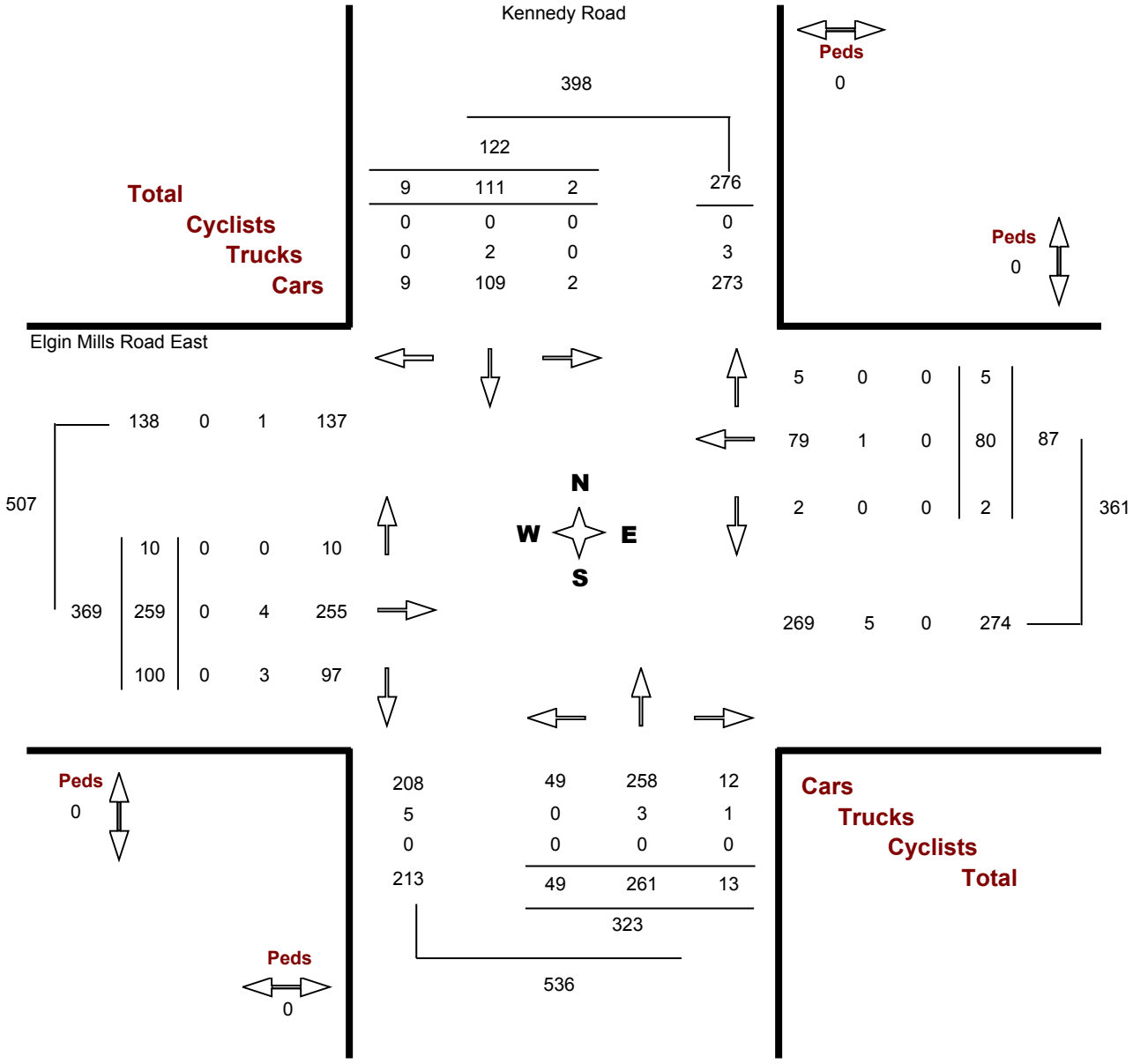


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Kennedy Road & Elgin Mills Road East
Municipality. Markham
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 576E7D63
Count Date. Wednesday, 21 January, 2009
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 05:00 PM — 06:00 PM

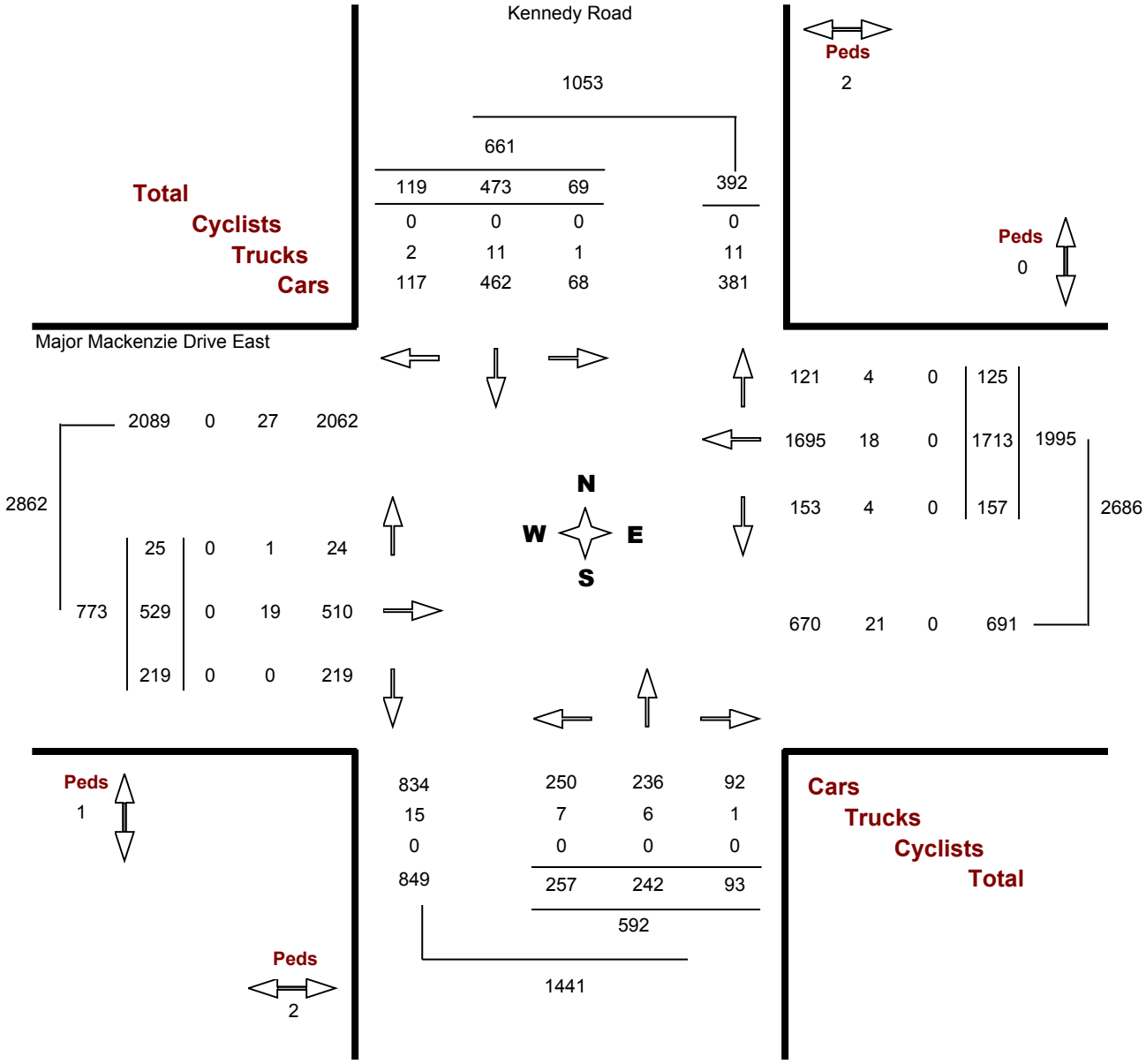


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Kennedy Road & Major Mackenzie Drive East
Municipality. Markham
Traffic Cont. Traffic signal
Major Dir..... None

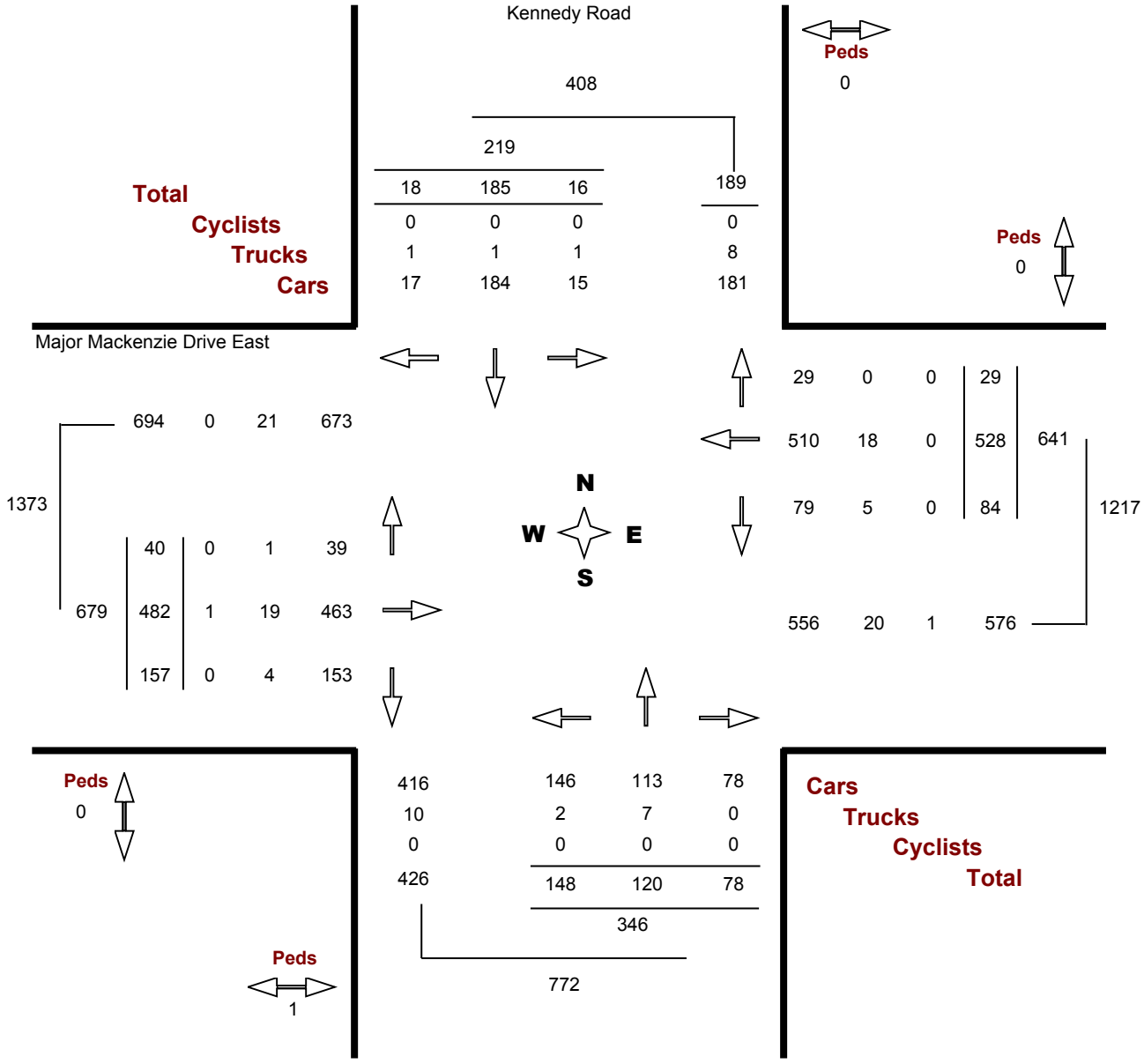
GeoID..... DEA43F1B
Count Date. Wednesday, 22 March, 2017
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:45 AM — 08:45 AM



Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location.....	Kennedy Road & Major Mackenzie Drive East	**GeoID.....**	DEA43F1B
Municipality.	Markham	**Count Date.**	Wednesday, 22 March, 2017
Traffic Cont.	Traffic signal	**Count Period.**	11:00 AM — 02:00 PM
Major Dir.....	None	**Peak Hour....**	11:45 AM — 12:45 PM

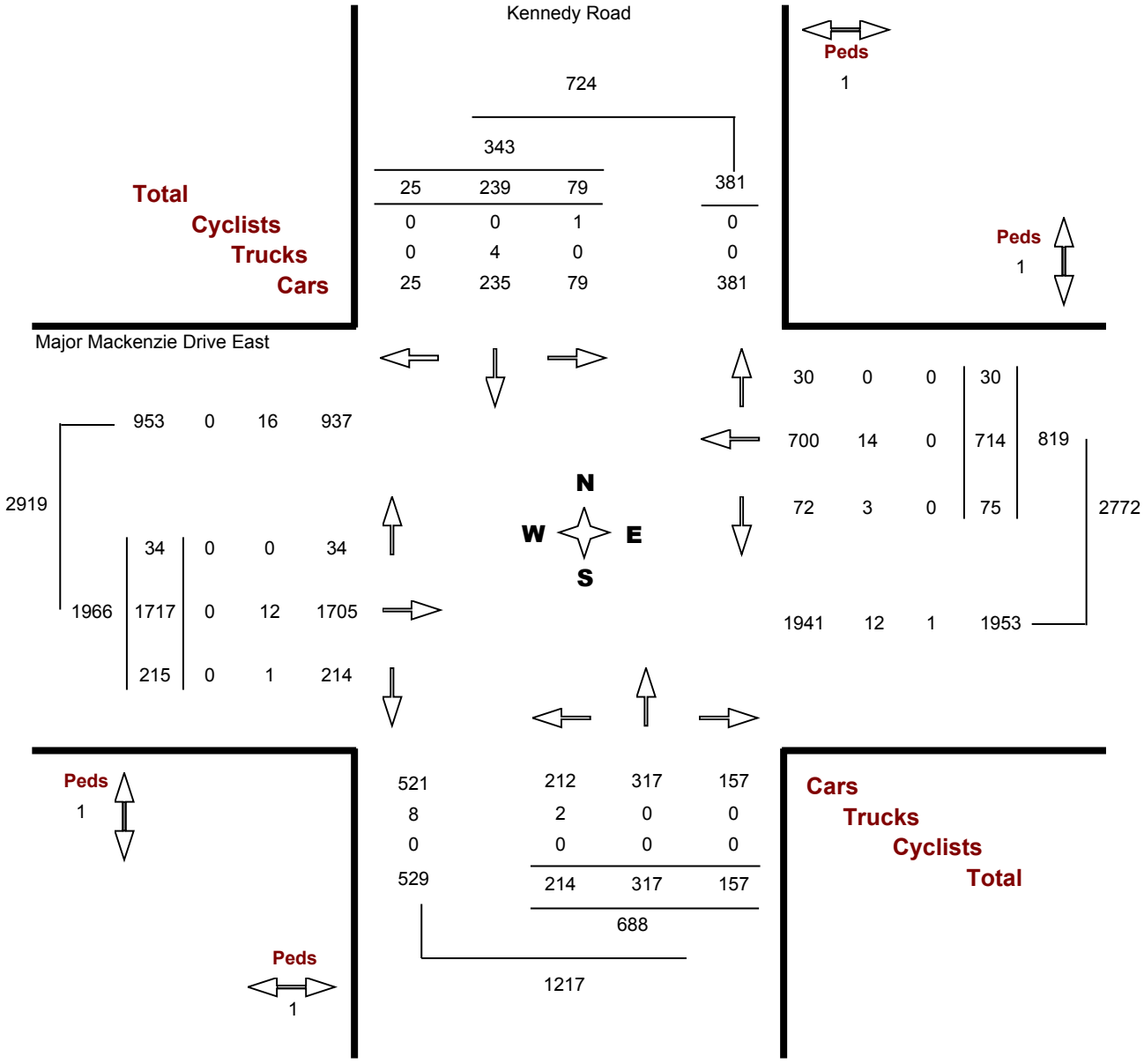


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Kennedy Road & Major Mackenzie Drive East
Municipality. Markham
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... DEA43F1B
Count Date. Wednesday, 22 March, 2017
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 05:00 PM — 06:00 PM

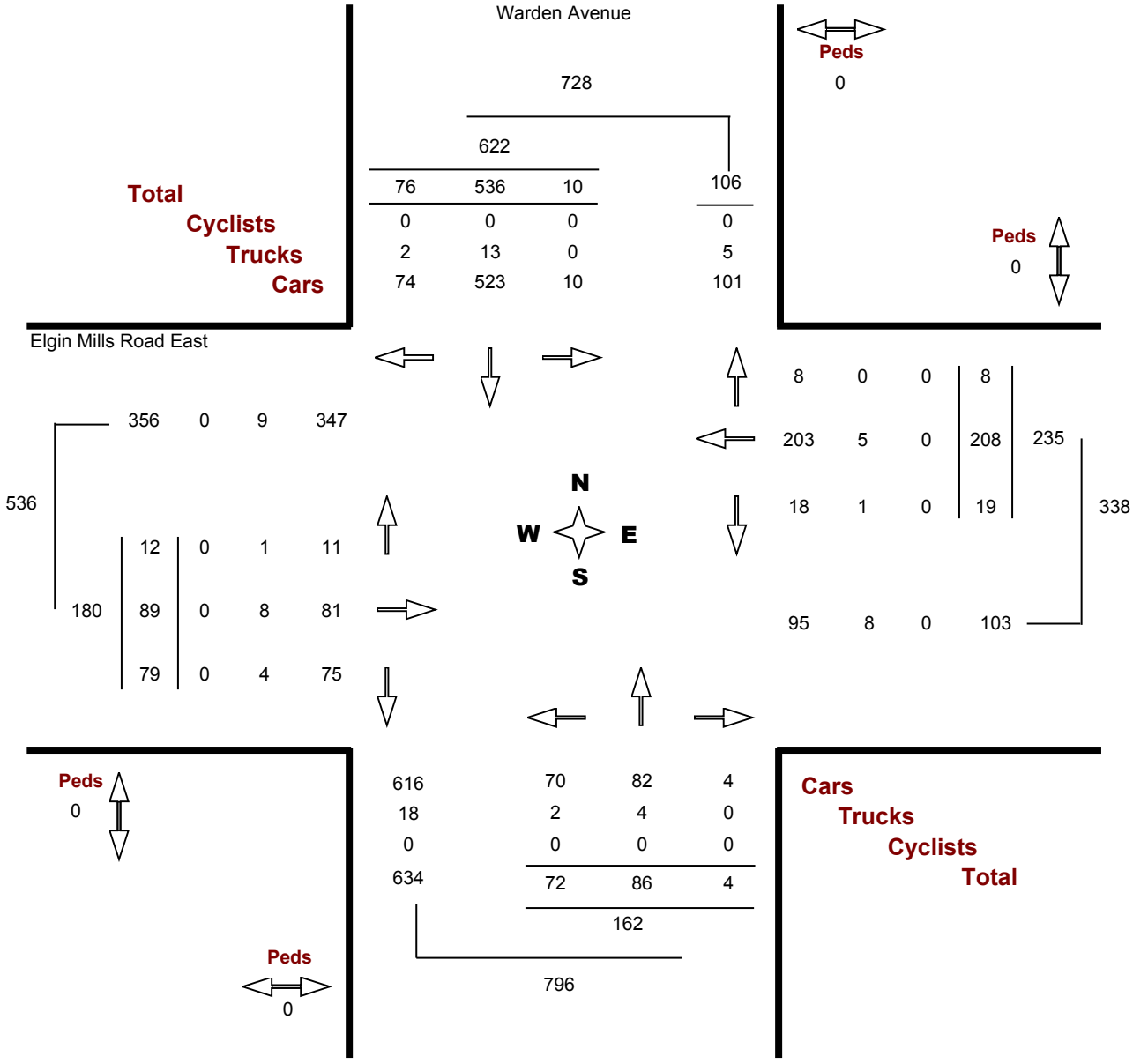


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Warden Avenue & Elgin Mills Road East
Municipality. Markham
Traffic Cont. Traffic signal
Major Dir..... None

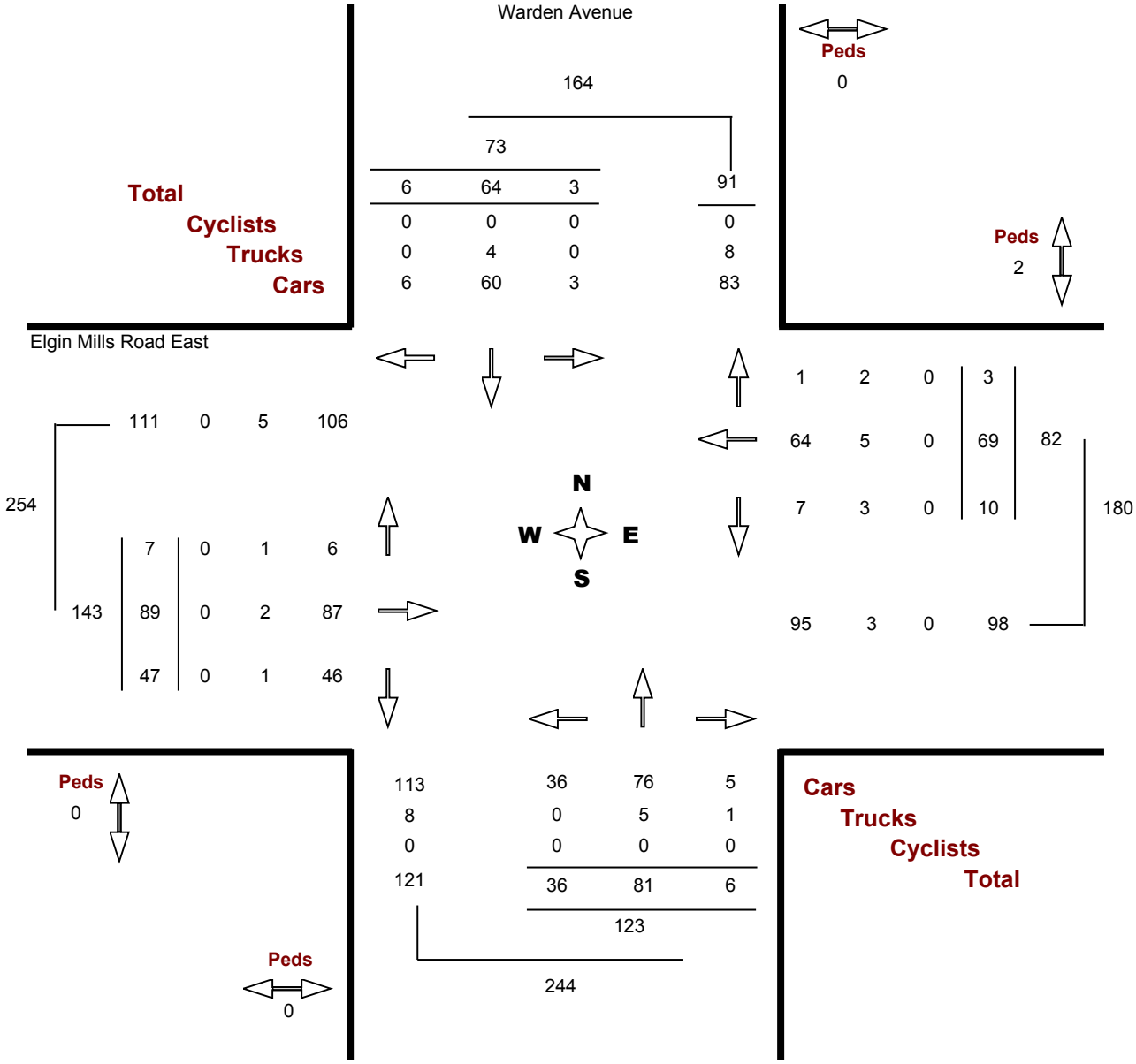
GeoID..... 4747A62F
Count Date. Wednesday, 11 November, 2009
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:30 AM — 08:30 AM



Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Warden Avenue & Elgin Mills Road East
GeoID..... 4747A62F
Municipality. Markham
Count Date. Wednesday, 11 November, 2009
Traffic Cont. Traffic signal
Count Period. 11:00 AM — 02:00 PM
Major Dir..... None
Peak Hour.... 01:00 PM — 02:00 PM

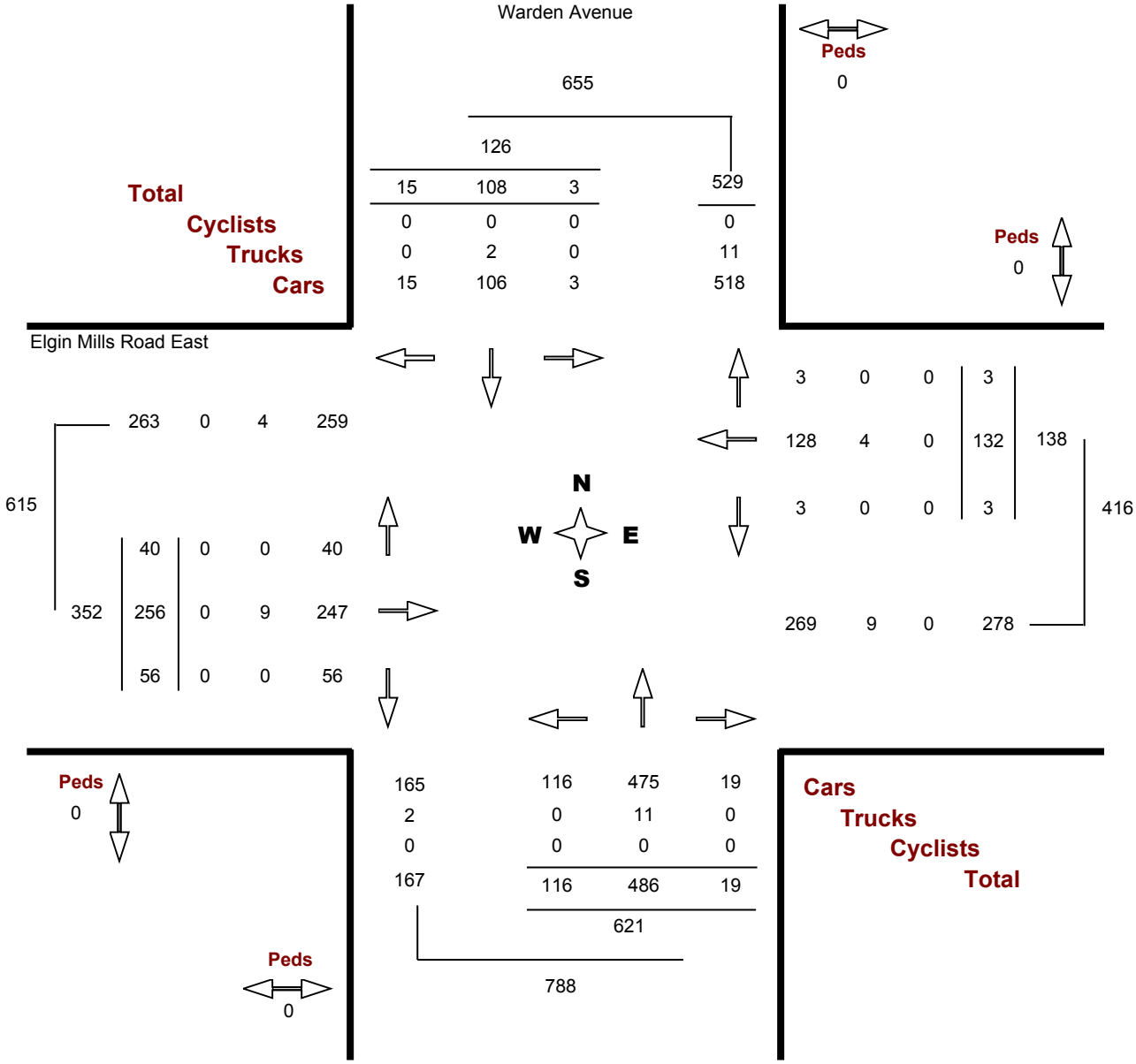


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Warden Avenue & Elgin Mills Road East
Municipality. Markham
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... 4747A62F
Count Date. Wednesday, 11 November, 2009
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 04:45 PM — 05:45 PM

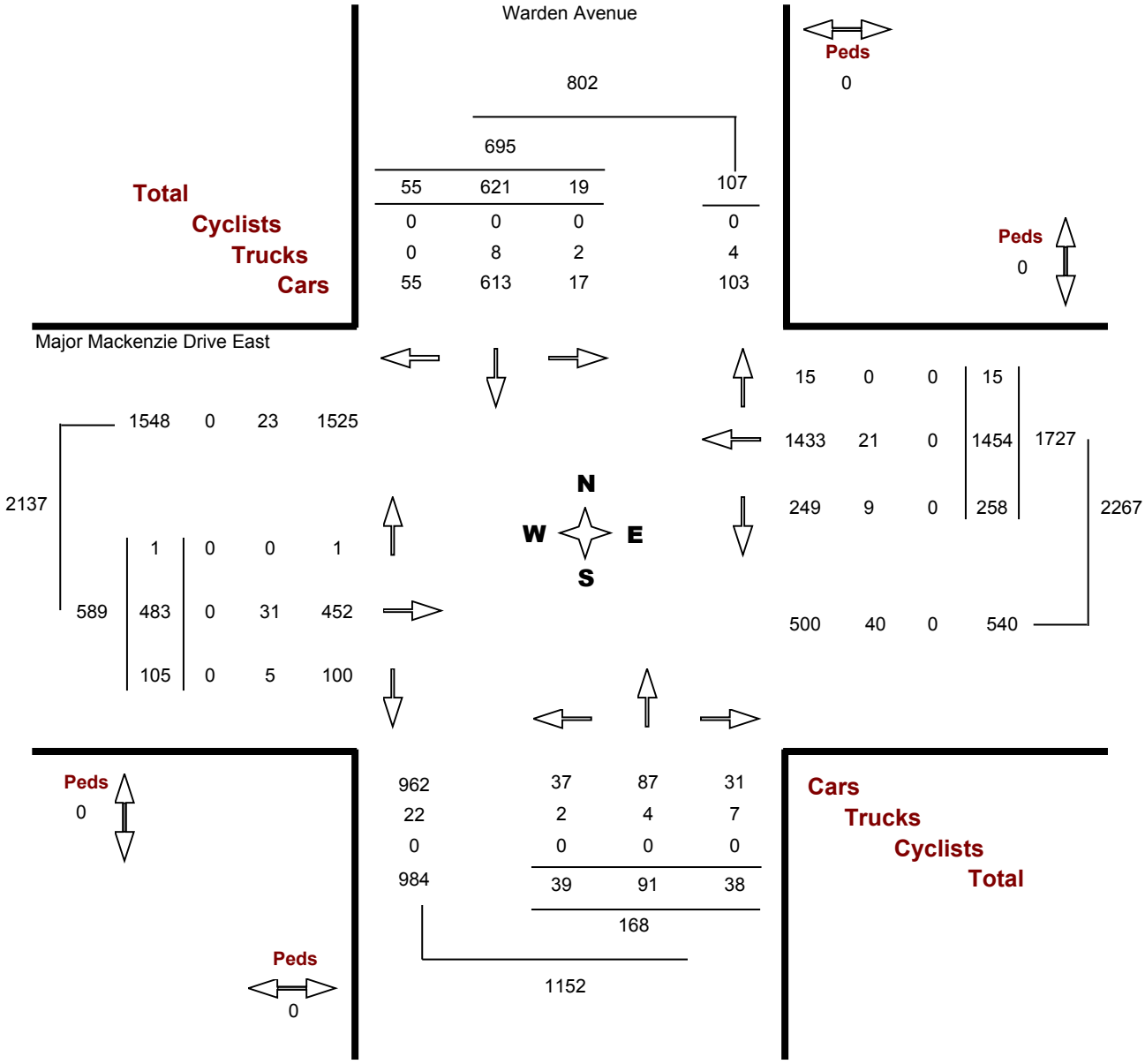


Notes:

Turning Movements Diagram
Peak Hour Report: AM Period

Location..... Major Mackenzie Drive East & Warden Avenu
Municipality. Markham
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... E2F2A6AB
Count Date. Wednesday, 14 January, 2009
Count Period. 07:00 AM — 09:00 AM
Peak Hour.... 07:45 AM — 08:45 AM

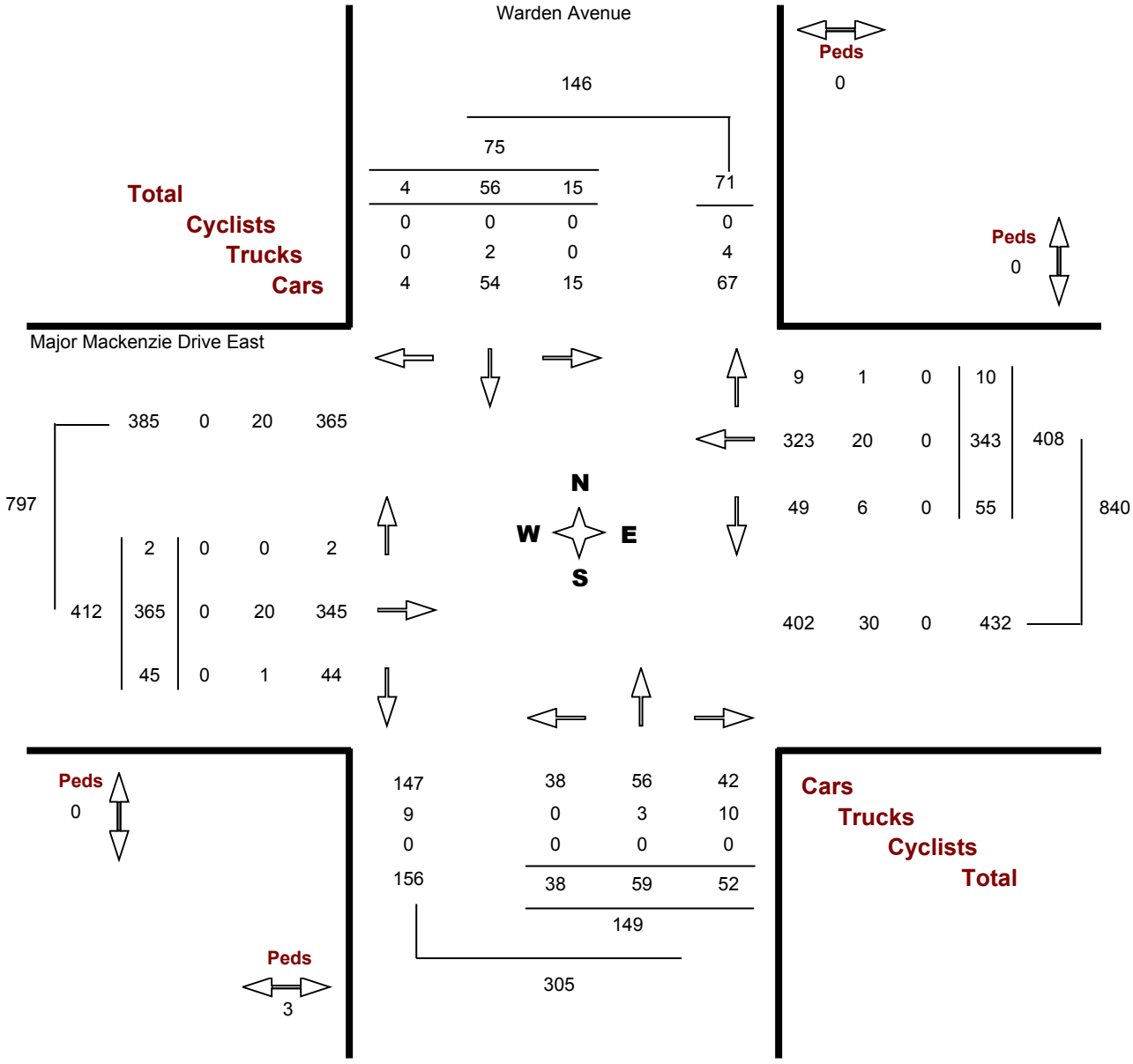


Notes:

Turning Movements Diagram
Peak Hour Report: MD Period

Location..... Major Mackenzie Drive East & Warden Avenu
Municipality. Markham
Traffic Cont. Traffic signal
Major Dir..... None

GeoID..... E2F2A6AB
Count Date. Wednesday, 14 January, 2009
Count Period. 11:00 AM — 02:00 PM
Peak Hour.... 01:00 PM — 02:00 PM

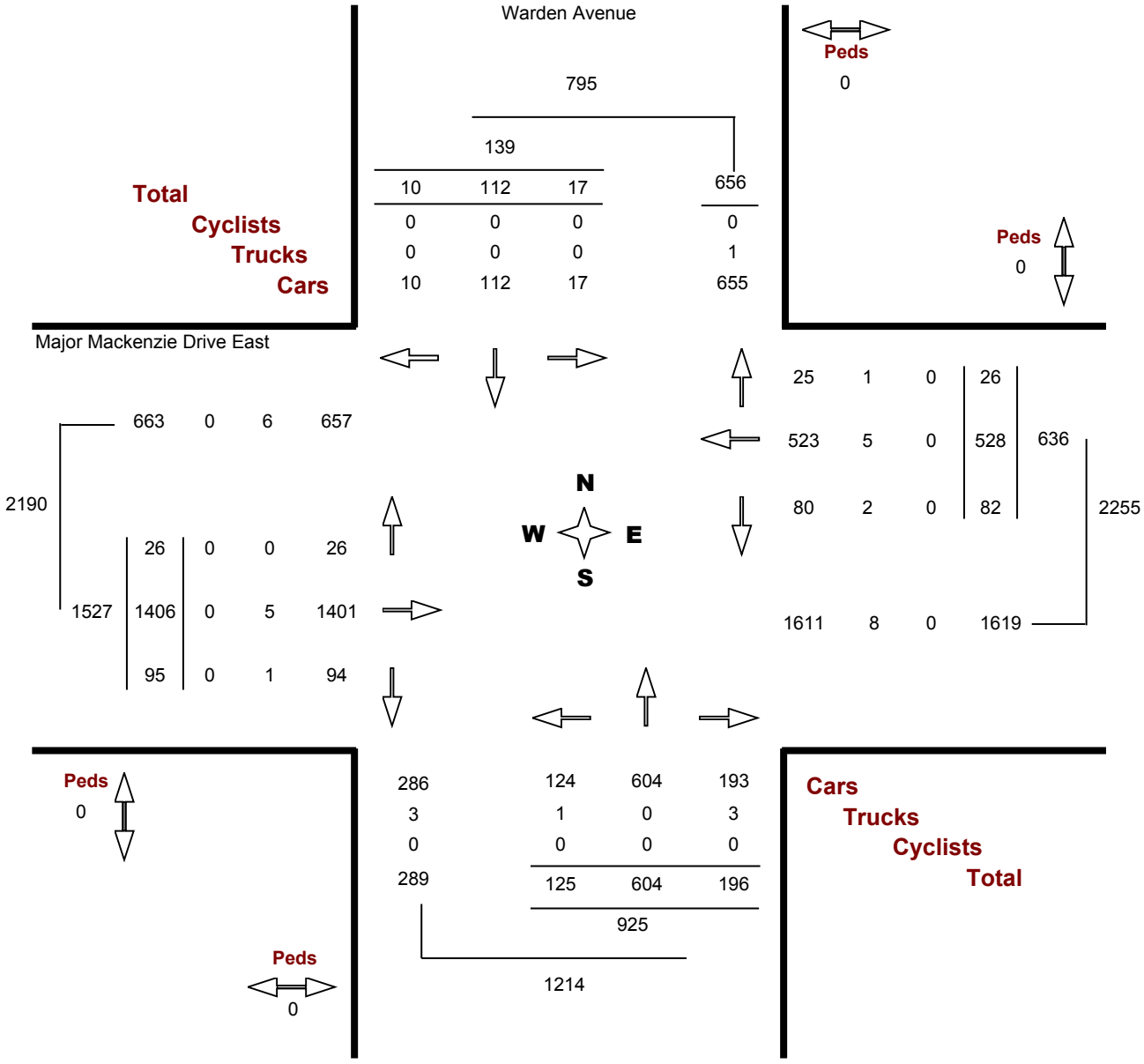


Notes:

Turning Movements Diagram
Peak Hour Report: PM Period

Location..... Major Mackenzie Drive East & Warden Avenu
Municipality. Markham
Traffic Cont. Traffic signal
Major Dir..... None

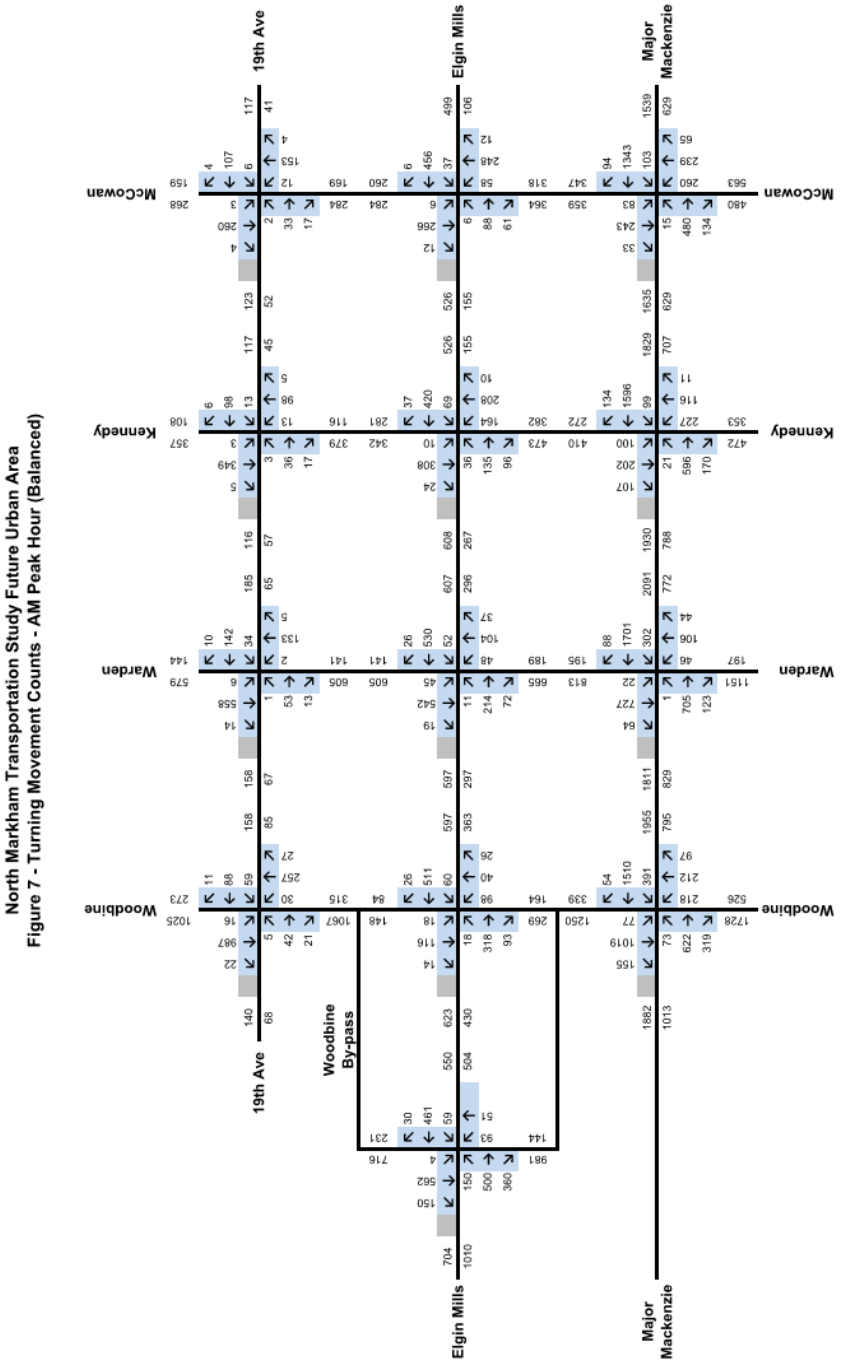
GeoID..... E2F2A6AB
Count Date. Wednesday, 14 January, 2009
Count Period. 03:00 PM — 06:00 PM
Peak Hour.... 05:00 PM — 06:00 PM



Notes:

North Markham Future Urban Area Conceptual Master Plan – Transportation Study
Traffic Model Calibration and Validation, Parsons (December 10, 2014)

Existing Turning Movement Counts (Balanced), Page 9:



North Markham Future Urban Area Conceptual Master Plan – Transportation Study
Existing Conditions Analysis, Parsons (March 13, 2015)

2031 AM Peak Hour Traffic Volumes within the FUA, Page 18

Figure 16 - 2031 AM Peak Hour Traffic Volumes within the FUA

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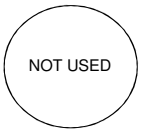
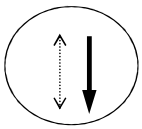
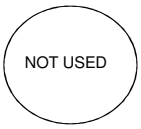
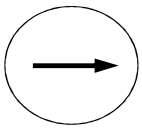
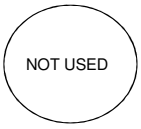
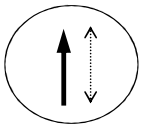
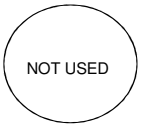
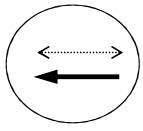
Appendix B

Signal Timing Plans

LOCATION:	**Kennedy Rd (YR 3) & Elgin Mills Rd (YR 49)**	***MUNICIPALITY:***	**Markham**
CTCS:	**756**	***COMPUTER SYSTEM:***	**Centracs**
MODE/COMMENT:	**SA**	***CONTROLLER/CABINET TYPE:***	**Econolite Cobalt / TS2 T1**
PREPARED/CHECKED BY:	**JS**	***CONFLICT FLASH:***	**Red & Red**
PREPARATION DATE:	**February 8, 2019**	***DESIGN WALK SPEED:***	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**March 6, 2019**	***CHANNEL/DROP:***	

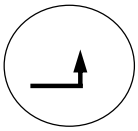
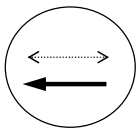
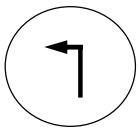
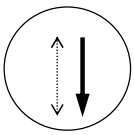
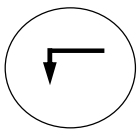
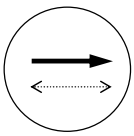
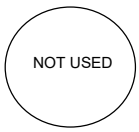
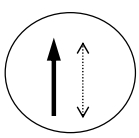
N ↑

NEMA Phase (York)		**Free** **All Day**	**Phase Mode (Fixed/Callable)**	**Remarks**
	Local Plan	Pattern 99		
	System Plan	Plan 99		
1. 	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT			Pedestrian Minimums: NSWK = 7 secs; NSFD = 19 secs EWWK = 7 secs; EWFD = 19 secs
2. Southbound  Kennedy Rd (YR 3)	WLK 7 FDW 19 MIN 20 EXT 0 MAX1 45 MAX2 0 AMB 5.0 ALR 2.5 SPLIT	**0**	Fixed	**Emergency vehicle pre-emption 3:** Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction. **Emergency vehicle pre-emption 4:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
3. 	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT			EW phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum EWG will be served. If ongoing vehicle demand exists on the stopbar loop, the EWG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or serve MAX1 during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The EWWK & EWFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the NSG.
4. Eastbound  Elgin Mills Rd (YR 49)	WLK 7 FDW 19 MIN 10 EXT 3 MAX1 30 MAX2 0 AMB 4.0 ALR 3.0 SPLIT	**0**	Callable by stopbar loop Extendable by stopbar loop.	During free plan, signal rests in NSWK and does not cycle through NSFD unless there is side street vehicle or pedestrian demand.
5. 	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT			NSFD reverts to NSWK if there is no side street demand at the end of the NSFD.
6. Northbound  Kennedy Rd (YR 3)	WLK 7 FDW 19 MIN 20 EXT 0 MAX1 45 MAX2 0 AMB 5.0 ALR 2.5 SPLIT	**0**	Fixed	
7. 	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT			**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Westbound  Elgin Mills Rd (YR 49)	WLK 7 FDW 19 MIN 10 EXT 3 MAX1 30 MAX2 0 AMB 4.0 ALR 3.0 SPLIT	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	CL OF VP	**0 (FREE)** **0 (FREE)** 0 (FREE)		

NOTES: **No pedestrian crossing on south leg**

LOCATION:	**Kennedy Rd. (YR 3) & Major Mackenzie Dr**	***MUNICIPALITY:***	**Markham**
CTCS:	**11**	***COMPUTER SYSTEM:***	**Centracs**
MODE/COMMENT:	**SA**	***CONTROLLER/CABINET TYPE:***	**Cobalt**
PREPARED/CHECKED BY:	**JS**	***CONFLICT FLASH:***	**Red & Red**
PREPARATION DATE:	**June 13, 2019**	***DESIGN WALK SPEED:***	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**June 13, 2019**	***CHANNEL/DROP:***	

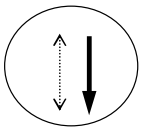
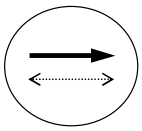
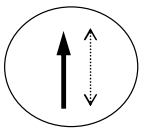
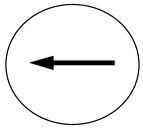
N

NEMA Phase (York)		**AM** **6:00-10:00 M-F**	**PM** **15:00-19:30 M-F**	**Free** **10:00-15:00 19:30-6:00 M-F 24 Hrs Sat & Sun**	**Phase Mode (Fixed/Callable)**	**Remarks**
	Local Plan	Pattern 1	Pattern 2	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 99		
1. E/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1				Callable/Extendable by Setback Loop	**Emergency vehicle pre-emption 3:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction.
	SPLIT	**12**	**12**	**0**		**Emergency vehicle pre-emption 4:** Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
2. Westbound  Major Mackenzie Dr	WLK 7 FDW 23 MIN 15 EXT 6 MAX1 30 MAX2 0 AMB 5.0 ALR 2.5					EW phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum EWG is 10 seconds. If ongoing vehicle demand exists on the stopbar loop, the EWG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or 19 secs during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The EWWK & EWFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the NSG.
	SPLIT	**63**	**66**	**0**		
3. N/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1				Callable/Extendable by Setback Loop	
	SPLIT	**15**	**12**	**0**		
4. Southbound  Kennedy Rd	WLK 7 FDW 24 MIN 10 EXT 3 MAX1 30 MAX2 0 AMB 5.0 ALR 2.5				Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand. During free plan, signal rests in NSWK and does not cycle through NSFD unless there is side street vehicle or pedestrian demand.
	SPLIT	**40**	**40**	**0**		
5. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1				Callable/Extendable by Setback Loop	NSFD reverts to NSWK if there is no side street demand at the end of the NSFD. **Co-ordination Review** • Increased CL from 120/120 to 130/130 secs during AM/PM peak • Adjusted offsets & splits accordingly
	SPLIT	**12**	**12**	**0**		
6. Eastbound  Major Mackenzie Dr	WLK 7 FDW 23 MIN 15 EXT 6 MAX1 30 MAX2 0 AMB 5 ALR 2.5					
	SPLIT	**63**	**66**	**0**		
 NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT					**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Northbound  Kennedy Rd	WLK 7 FDW 24 MIN 10 EXT 3 MAX1 30 MAX2 0 AMB 5 ALR 2.5				Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	SPLIT	**55**	**52**	**0**		
	CL	**130**	**130**	**0 (FREE)**		
	OF	**13**	**26**	**0 (FREE)**		
	VP	23	23	0 (FREE)		

NOTES:

LOCATION:	**Warden Ave (YR 65) & Elgin Mills Rd (YR 49)**	***MUNICIPALITY:***	**Markham**
CTCS:	**525**	***COMPUTER SYSTEM:***	**Centracs**
MODE/COMMENT:	**SA**	***CONTROLLER/CABINET TYPE:***	**Econolite Cobalt / TS2 T1**
PREPARED/CHECKED BY:	**JS**	***CONFLICT FLASH:***	**Red & Red**
PREPARATION DATE:	**February 8, 2019**	***DESIGN WALK SPEED:***	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**March 7, 2019**	***CHANNEL/DROP:***	

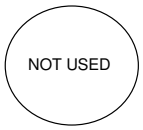
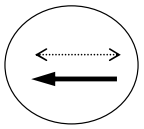
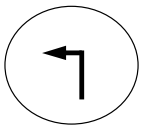
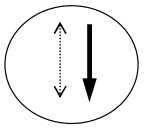
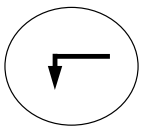
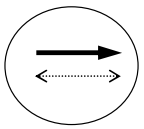
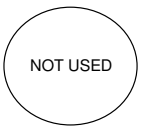
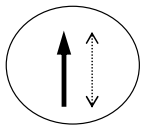
N ↑

NEMA Phase (York)		**Free** **All Day**	**Phase Mode (Fixed/Demanded/Callable)**	**Remarks**
	Local Plan	Pattern 99		
	System Plan	Plan 99		
1. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT			Pedestrian Minimums: NSWK = 7 secs; NSFD = 18 secs EWWK = 7 secs; EWFD = 21 secs
2. Southbound  Warden Ave (YR 65)	WLK 7 FDW 18 MIN 15 EXT 0 MAX1 60 MAX2 0 AMB 5.0 ALR 2.0 SPLIT	**0**	Fixed	**Emergency vehicle pre-emption 3:** Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction. **Emergency vehicle pre-emption 4:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction. EW phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum EWG will be served. If ongoing vehicle demand exists on the stopbar loop, the EWG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or serve MAX1 during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The EWWK & EWFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the NSG.
3. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT			
4. Eastbound  Elgin Mills Rd (YR 49)	WLK 7 FDW 21 MIN 10 EXT 3 MAX1 50 MAX2 0 AMB 4.5 ALR 2.5 SPLIT	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	During free plan, signal rests in NSWK and does not cycle through NSFD unless there is side street vehicle or pedestrian demand.
5. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT			NSFD reverts to NSWK if there is no side street demand at the end of the NSFD.
6. Northbound  Warden Ave (YR 65)	WLK 7 FDW 18 MIN 15 EXT 0 MAX1 60 MAX2 0 AMB 5.0 ALR 2.0 SPLIT	**0**	Fixed	
7. NOT USED	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT			
8. Westbound  Elgin Mills Rd (YR 49)	WLK 7 FDW 21 MIN 10 EXT 3 MAX1 50 MAX2 0 AMB 4.5 ALR 2.5 SPLIT	**0**	Callable by stopbar loop Extendable by stopbar loop.	**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
	CL OF VP	**0 (FREE)** **0 (FREE)** 0 (FREE)		

NOTES: **No pedestrian crossing on north leg**

LOCATION:	**Major Mackenzie Dr (YR 25) & Warden Ave (YR 65)**	*MUNICIPALITY:*	**Markham**
CTCS:	**107**	*COMPUTER SYSTEM:*	**Centracs**
MODE/COMMENT:	**SA**	*CONTROLLER/CABINET TYPE:*	**Econolite Cobalt / TS2T1**
PREPARED/CHECKED BY:	**MQL**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**December 9, 2019**	*DESIGN WALK SPEED:*	**1.0 m/s (FDW based on full crossing at 1.2 m/s)**
IMPLEMENTATION DATE:	**February 5, 2020**	*CHANNEL/DROP:*	

N

NEMA Phase (York)		AM 7:00-9:30 M-F	PM 15:00-19:00 M-F	OFF 9:30-15:00 19:00-21:00 M-F	Free 21:00-7:00 M-F 24 hrs Sat & Sun	Phase Mode (Fixed/Callable)	Remarks
	Local Plan	Pattern 1	Pattern 2	Pattern 3	Pattern 99		
	System Plan	Plan 1	Plan 2	Plan 3	Plan 99		
1. 	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT						Pedestrian Minimums: EWWK = 7 sec., EWFD = 27 sec. NSWK = 7 sec., NSFD = 27 sec.
2. Westbound  Major Mackenzie Dr	WLK 7 FDW 27 MIN 34 EXT 0 MAX1 34 MAX2 0 AMB 5.0 ALR 2.5 SPLIT	**68**	**75**	**55**	**0**	Fixed	**Emergency vehicle pre-emption 3:** Serve EWG/EWDW min 20 secs and up to 100 secs if there are continuous emergency calls in EW direction. **Emergency vehicle pre-emption 4:** Serve NSG/NSDW min 20 secs and up to 100 secs if there are continuous emergency calls in NS direction.
3. N/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1 SPLIT	**12**	**12**	**12**	**0**		NS phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum NSG is served. If ongoing vehicle demand exists on the stopbar loop, the NSG is capable of providing vehicle extensions up to the maximum green split during coordinated operation or MAX1 during Free operation. If a pedestrian call is received, the pedestrian minimum will be served. The NSWK & NSFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand. Unused extension time is given to the EWG.
4. Southbound  Warden Ave	WLK 7 FDW 27 MIN 10 EXT 3 MAX1 19 MAX2 0 AMB 4.5 ALR 3.0 SPLIT	**50**	**43**	**43**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	During coordinated operation, the signal constantly cycles through main street FDW to improve response time to side street vehicle and pedestrian demand.
5. W/B Left Turn Arrow 	WLK FDW MIN 7 EXT 3 MAX1 7 MAX2 0 AMB 3 ALR 1 SPLIT	**25**	**12**	**12**	**0**	Callable/Extendable by Setback Loop	During free plan, signal rests in EWWK and does not cycle through EWFD unless there is side street vehicle or pedestrian demand. EWFD reverts to EWWK if there is no side street demand at the end of the EWFD. **New NBLT installed**
6. Eastbound  Major Mackenzie Dr	WLK 7 FDW 27 MIN 34 EXT 0 MAX1 34 MAX2 0 AMB 5.0 ALR 2.5 SPLIT	**43**	**63**	**43**	**0**	Fixed	
7. 	WLK FDW MIN EXT MAX1 MAX2 AMB ALR SPLIT						**LEGEND:** SA - Semi-Actuated signal WLK - Walk time FDW - Flashing Don't Walk time MIN - Minimum green time EXT - Extension time MAX1 - Maximum green time 1 MAX2 - Maximum green time 2 AMB - Amber ALR -All Red CL - Cycle Length OF - Offset VP - Vehicle Permissive NSWK - North/South Walk EWWK - East/West Walk NSG - North/South Green EWG - East/West Green NSFD - North/South Flashing Don't Walk EWFD - East/West Flashing Don't Walk TSP - Transit Priority APS - Audible Pedestrian Signal RLC - Red Light Camera
8. Northbound  Warden Ave	WLK 7 FDW 27 MIN 10 EXT 3 MAX1 19 MAX2 0 AMB 4.5 ALR 3.0 SPLIT	**62**	**55**	**55**	**0**	Callable by stopbar loop and/or pushbutton; Extendable by stopbar loop.	
	CL OF VP	**130** **8** 27	**130** **65** 27	**110** **0** 27	**0 (FREE)** **0 (FREE)** 0 (FREE)		

NOTES:

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C

Speed Studies

Ontario Traffic, Inc.
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 3356
Station ID: M11
Kennedy Rd north of Major Mackenzie Dr E

Date Start: 12-Jun-19
Date End: 12-Jun-19
Date Start: 12-Jun-19

NB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 100	101 105	106 110	111 115	116 120	121 125	126 130	131 135	136 140	141 145	146 150	151 155	156 9999	
06/12 /19	0	0	0	0	0	0	0	0	0	1	0	3	2	4	8	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0	28
01:00	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6
02:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	5
05:00	0	0	0	1	2	**8**	**8**	8	0	1	2	5	6	11	3	3	3	**8**	0	0	0	0	0	0	0	0	0	0	0	0	69
06:00	0	0	**1**	0	0	1	1	0	1	1	2	6	5	16	19	11	11	2	0	0	0	**1**	0	0	0	0	0	0	0	0	78
07:00	0	0	0	0	1	0	2	0	1	10	9	30	30	50	52	26	14	1	**5**	**1**	0	1	0	0	0	0	0	0	0	0	233
08:00	0	**1**	0	**2**	1	3	5	5	**16**	**12**	**19**	**81**	**72**	**84**	**62**	**31**	**16**	5	0	0	0	0	0	0	0	0	0	0	0	0	415
09:00	0	0	0	0	**5**	5	2	3	2	5	15	28	47	58	43	24	13	0	2	0	0	0	0	0	0	0	0	0	0	0	252
10:00	0	0	1	1	2	3	1	5	7	4	15	26	48	55	35	12	10	1	1	0	0	0	0	0	0	0	0	0	0	0	227
11:00	0	1	1	1	2	2	0	**9**	4	5	16	36	53	46	54	18	7	4	1	1	0	0	0	0	0	0	0	0	0	0	261
12 PM	0	0	0	0	0	3	1	2	4	1	4	35	52	70	33	21	6	4	0	0	0	1	0	0	0	0	0	0	0	0	237
13:00	0	0	0	**3**	1	2	**7**	**6**	7	10	8	29	39	73	35	25	13	3	1	**1**	0	0	0	0	0	0	0	0	0	0	263
14:00	0	0	0	0	2	1	2	1	4	8	7	28	55	106	54	30	14	7	1	0	1	0	0	0	0	0	0	0	0	0	321
15:00	0	0	0	0	1	1	2	4	**10**	17	**46**	80	90	92	81	40	**21**	**9**	2	0	0	**2**	0	0	0	0	0	0	0	0	498
16:00	0	0	0	0	0	**4**	0	1	2	13	40	**88**	**94**	**123**	**107**	41	21	5	3	0	0	0	0	0	0	0	0	0	0	0	542
17:00	**1**	0	**4**	1	**4**	4	6	5	4	**18**	27	43	67	103	103	**54**	18	9	**4**	1	0	1	0	0	0	0	0	0	0	0	477
18:00	0	0	0	2	1	1	2	2	2	0	11	60	61	93	78	29	19	4	1	1	1	0	0	0	0	0	0	0	0	0	368
19:00	0	0	0	0	0	0	1	0	1	1	7	19	72	59	65	36	11	2	2	1	**2**	0	0	0	0	0	0	0	0	0	279
20:00	0	0	0	1	0	0	0	1	0	4	4	18	48	60	70	25	7	4	1	1	1	0	0	0	0	0	0	0	0	0	245
21:00	0	0	0	0	0	0	1	0	1	0	5	39	40	36	27	25	10	1	2	1	0	0	0	**1**	0	0	0	0	0	0	189
22:00	1	0	0	0	0	0	0	1	0	2	4	9	21	16	23	9	3	2	0	0	0	0	0	0	0	0	0	0	0	0	91
23:00	0	0	0	0	0	0	0	0	0	0	1	3	6	9	12	7	2	1	1	0	0	0	0	0	0	0	0	0	0	0	42
Total	2	2	7	12	22	38	42	53	66	113	242	666	911	1166	969	473	225	73	29	8	5	6	0	1	0	0	0	0	0	0	5131
Percent	0.0%	0.0%	0.1%	0.2%	0.4%	0.7%	0.8%	1.0%	1.3%	2.2%	4.7%	13.0 %	17.8 %	22.7 %	18.9 %	9.2%	4.4%	1.4%	0.6%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		08:00	06:00	08:00	09:00	05:00	05:00	11:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	05:00	07:00	07:00		06:00									
Vol.		1	1	2	5	8	8	9	16	12	19	81	72	84	62	31	16	8	5	1		1									
PM Peak	17:00		17:00	13:00	17:00	16:00	13:00	13:00	15:00	17:00	15:00	16:00	16:00	16:00	16:00	17:00	15:00	15:00	17:00	13:00	19:00	15:00		21:00							
Vol.	1		4	3	4	4	7	6	10	18	46	88	94	123	107	54	21	9	4	1	2	2		1							

Stats

50th Percentile : 77 KPH
85th Percentile : 86 KPH

10 KPH Pace Speed : 76-85 KPH
Number in Pace : 2135
Percent in Pace : 41.6%
Number of Vehicles > 60 KPH : 4774
Percent of Vehicles > 60 KPH : 93.0%
Mean Speed(Average) : 76 KPH

Gr Total	2	2	7	12	22	38	42	53	66	113	242	666	911	1166	969	473	225	73	29	8	5	6	0	1	0	0	0	0	0	0	5131

Stats

15th Percentile : 67 KPH
50th Percentile : 77 KPH
85th Percentile : 86 KPH
95th Percentile : 92 KPH

Mean Speed(Average) : 76 KPH
Number of Vehicles > 60 KPH : 4774
Percent of Vehicles > 60 KPH : 93.0%

Ontario Traffic, Inc.
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 3356
Station ID: M11
Kennedy Rd north of Major Mackenzie Dr E

Date Start: 12-Jun-19
Date End: 12-Jun-19
Date Start: 12-Jun-19

SB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 100	101 105	106 110	111 115	116 120	121 125	126 130	131 135	136 140	141 145	146 150	151 155	156 9999	
06/12 /19	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	4	3	1	1	0	0	0	0	0	0	0	0	0	0	14
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	6
02:00	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	6
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	5
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	6
05:00	0	0	0	0	1	0	1	0	0	1	1	1	1	4	7	9	12	3	5	2	2	0	0	0	0	0	0	0	0	0	50
06:00	0	0	0	0	0	0	0	0	0	0	1	0	1	10	27	45	62	**55**	**34**	**5**	**6**	0	**2**	0	0	0	0	0	0	0	248
07:00	0	0	0	0	0	0	3	2	**4**	2	6	17	**67**	**138**	**204**	**176**	**106**	55	23	5	0	0	0	0	0	0	0	0	0	0	808
08:00	0	0	0	0	0	1	**8**	**12**	0	**8**	6	**34**	45	112	127	115	65	42	22	2	0	0	0	0	0	0	0	0	0	0	599
09:00	0	0	**1**	**2**	0	4	0	1	0	0	3	11	31	67	106	96	52	28	12	2	0	0	0	0	0	0	0	0	0	0	416
10:00	0	0	0	0	0	2	0	0	0	2	2	4	21	46	86	77	39	21	12	2	0	0	0	0	**1**	0	0	0	0	0	315
11:00	0	0	0	0	**4**	**6**	7	5	1	2	**9**	17	20	51	47	60	32	12	3	3	2	**1**	0	0	0	0	0	0	0	0	282
12 PM	0	0	0	1	0	3	2	1	0	1	3	12	24	41	66	67	15	9	9	0	0	0	0	0	0	0	0	0	0	0	254
13:00	0	0	0	1	**4**	2	3	2	1	1	5	17	28	42	48	51	20	6	2	3	0	**1**	**1**	0	0	0	0	0	0	0	238
14:00	0	0	0	0	0	1	**7**	0	4	3	5	11	**50**	41	39	39	24	11	4	**4**	1	0	0	**1**	0	**1**	0	0	0	0	246
15:00	0	0	0	**2**	1	2	3	1	**6**	4	2	15	29	58	64	55	30	13	6	4	0	1	1	1	0	0	0	0	0	0	298
16:00	0	0	**1**	2	1	**4**	3	3	0	**10**	**8**	18	34	**73**	**95**	70	25	13	4	4	0	0	0	0	0	0	0	0	0	0	368
17:00	0	0	0	0	1	1	2	**4**	0	3	8	**21**	43	61	82	**77**	**45**	14	**10**	4	0	0	1	0	0	0	0	0	0	0	377
18:00	0	0	0	0	0	2	5	0	1	0	4	6	24	48	69	43	43	**22**	10	1	0	1	1	1	0	0	0	**1**	0	0	282
19:00	0	0	0	0	1	1	2	1	0	0	1	8	11	31	49	46	39	19	6	2	1	0	0	0	0	0	0	0	0	0	218
20:00	0	0	0	0	1	3	2	2	0	2	4	8	23	26	51	50	30	9	7	1	0	0	0	0	0	0	0	0	0	0	219
21:00	0	0	0	0	1	1	3	2	0	0	1	5	8	27	23	29	18	10	4	0	**2**	1	0	0	0	0	0	0	0	0	135
22:00	0	0	0	0	0	0	0	0	0	1	1	2	2	16	9	12	6	6	2	1	0	0	0	0	0	0	0	0	0	0	58
23:00	0	0	0	0	0	1	0	0	1	0	0	2	3	2	4	8	5	7	4	2	2	0	1	0	0	0	0	0	0	0	42
Total	0	0	2	8	16	34	51	36	18	40	72	210	466	897	1208	1131	673	359	183	50	18	5	7	3	1	1	0	1	0	0	5490
Percent	0.0%	0.0%	0.0%	0.1%	0.3%	0.6%	0.9%	0.7%	0.3%	0.7%	1.3%	3.8%	8.5%	16.3 %	22.0 %	20.6 %	12.3 %	6.5%	3.3%	0.9%	0.3%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak			09:00	09:00	11:00	11:00	08:00	08:00	07:00	08:00	11:00	08:00	07:00	07:00	07:00	07:00	07:00	07:00	06:00	06:00	06:00	06:00	11:00	06:00		10:00					
Vol.			1	2	4	6	8	12	4	8	9	34	67	138	204	176	106	55	34	5	6	1	2		1						
PM Peak			16:00	15:00	13:00	16:00	14:00	17:00	15:00	16:00	16:00	17:00	14:00	16:00	16:00	17:00	17:00	18:00	17:00	14:00	21:00	13:00	13:00	14:00		14:00		18:00			
Vol.			1	2	4	4	7	4	6	10	8	21	50	73	95	77	45	22	10	4	2	1	1	1		1		1			

Stats

50th Percentile : 84 KPH
85th Percentile : 94 KPH

10 KPH Pace Speed : 81-90 KPH
Number in Pace : 2339
Percent in Pace : 42.6%
Number of Vehicles > 60 KPH : 5285
Percent of Vehicles > 60 KPH : 96.3%
Mean Speed(Average) : 83 KPH

Gr Total	0	0	2	8	16	34	51	36	18	40	72	210	466	897	1208	1131	673	359	183	50	18	5	7	3	1	1	0	1	0	0	5490

Stats

15th Percentile : 74 KPH
50th Percentile : 84 KPH
85th Percentile : 94 KPH
95th Percentile : 100 KPH

Mean Speed(Average) : 83 KPH
Number of Vehicles > 60 KPH : 5285
Percent of Vehicles > 60 KPH : 96.3%

Ontario Traffic, Inc.
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 3356
Station ID: M11
Kennedy Rd north of Major Mackenzie Dr E

Date Start: 12-Jun-19
Date End: 12-Jun-19
Date Start: 12-Jun-19

NB, SB

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 100	101 105	106 110	111 115	116 120	121 125	126 130	131 135	136 140	141 145	146 150	151 155	156 9999	
06/12 /19	0	0	0	0	0	0	0	0	0	1	0	4	2	5	9	7	8	4	1	1	0	0	0	0	0	0	0	0	0	0	42
01:00	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	3	0	0	2	0	1	0	0	0	0	0	0	0	0	0	12
02:00	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	9
03:00	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	7
04:00	0	0	0	0	0	0	1	0	0	0	0	0	0	2	3	2	1	0	1	0	1	0	0	0	0	0	0	0	0	0	11
05:00	0	0	0	1	3	8	9	8	0	2	3	6	7	15	10	12	15	11	5	2	2	0	0	0	0	0	0	0	0	0	119
06:00	0	0	**1**	0	0	1	1	0	1	1	3	6	6	26	46	56	73	**57**	**34**	5	**6**	**1**	**2**	0	0	0	0	0	0	0	326
07:00	0	0	0	0	1	0	5	2	5	12	15	47	97	188	**256**	**202**	**120**	56	28	**6**	0	1	0	0	0	0	0	0	0	0	1041
08:00	0	**1**	0	**2**	1	4	**13**	**17**	**16**	**20**	**25**	**115**	**117**	**196**	189	146	81	47	22	2	0	0	0	0	0	0	0	0	0	0	1014
09:00	0	0	1	2	5	**9**	2	4	2	5	18	39	78	125	149	120	65	28	14	2	0	0	0	0	0	0	0	0	0	0	668
10:00	0	0	1	1	2	5	1	5	7	6	17	30	69	101	121	89	49	22	13	2	0	0	0	0	**1**	0	0	0	0	0	542
11:00	0	1	1	1	**6**	8	7	14	5	7	25	53	73	97	101	78	39	16	4	4	2	1	0	0	0	0	0	0	0	0	543
12 PM	0	0	0	1	0	6	3	3	4	2	7	47	76	111	99	88	21	13	9	0	0	1	0	0	0	0	0	0	0	0	491
13:00	0	0	0	**4**	**5**	4	**10**	8	8	11	13	46	67	115	83	76	33	9	3	4	0	1	**1**	0	0	0	0	0	0	0	501
14:00	0	0	0	0	2	2	9	1	8	11	12	39	105	147	93	69	38	18	5	4	2	0	0	**1**	0	**1**	0	0	0	0	567
15:00	0	0	0	2	2	3	5	5	**16**	21	**48**	95	119	150	145	95	51	22	8	4	0	**3**	1	1	0	0	0	0	0	0	796
16:00	0	0	1	2	1	**8**	3	4	2	**23**	48	**106**	**128**	**196**	**202**	111	46	18	7	4	0	0	0	0	0	0	0	0	0	0	910
17:00	**1**	0	**4**	1	5	5	8	**9**	4	21	35	64	110	164	185	**131**	**63**	23	**14**	**5**	0	1	1	0	0	0	0	0	0	0	854
18:00	0	0	0	2	1	3	7	2	3	0	15	66	85	141	147	72	62	**26**	11	2	1	1	1	1	0	0	0	**1**	0	0	650
19:00	0	0	0	0	1	1	3	1	1	1	8	27	83	90	114	82	50	21	8	3	**3**	0	0	0	0	0	0	0	0	0	497
20:00	0	0	0	1	1	3	2	3	0	6	8	26	71	86	121	75	37	13	8	2	1	0	0	0	0	0	0	0	0	0	464
21:00	0	0	0	0	1	1	4	2	1	0	6	44	48	63	50	54	28	11	6	1	2	1	0	1	0	0	0	0	0	0	324
22:00	1	0	0	0	0	0	0	1	0	3	5	11	23	32	32	21	9	8	2	1	0	0	0	0	0	0	0	0	0	0	149
23:00	0	0	0	0	0	1	0	0	1	0	1	5	9	11	16	15	7	8	5	2	2	0	1	0	0	0	0	0	0	0	84
Total	2	2	9	20	38	72	93	89	84	153	314	876	1377	2063	2177	1604	898	432	212	58	23	11	7	4	1	1	0	1	0	0	10621
Percent	0.0%	0.0%	0.1%	0.2%	0.4%	0.7%	0.9%	0.8%	0.8%	1.4%	3.0%	8.2%	13.0 %	19.4 %	20.5 %	15.1 %	8.5%	4.1%	2.0%	0.5%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak		08:00	06:00	08:00	11:00	09:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	08:00	07:00	07:00	07:00	06:00	06:00	07:00	06:00	06:00	06:00		10:00						
Vol.		1	1	2	6	9	13	17	16	20	25	115	117	196	256	202	120	57	34	6	6	1	2		1						
PM Peak	17:00		17:00	13:00	13:00	16:00	13:00	17:00	15:00	16:00	15:00	16:00	16:00	16:00	16:00	17:00	17:00	18:00	17:00	17:00	19:00	15:00	13:00	14:00		14:00		18:00			
Vol.	1		4	4	5	8	10	9	16	23	48	106	128	196	202	131	63	26	14	5	3	3	1	1		1		1			

Stats

50th Percentile : 81 KPH
85th Percentile : 91 KPH

10 KPH Pace Speed : 76-85 KPH
Number in Pace : 4240
Percent in Pace : 39.9%
Number of Vehicles > 60 KPH : 10059
Percent of Vehicles > 60 KPH : 94.7%
Mean Speed(Average) : 80 KPH

Gr Total	2	2	9	20	38	72	93	89	84	153	314	876	1377	2063	2177	1604	898	432	212	58	23	11	7	4	1	1	0	1	0	0	10621

Stats

15th Percentile : 70 KPH
50th Percentile : 81 KPH
85th Percentile : 91 KPH
95th Percentile : 98 KPH

Mean Speed(Average) : 80 KPH
Number of Vehicles > 60 KPH : 10059
Percent of Vehicles > 60 KPH : 94.7%

Hourly Speed Study by Speed

Location: Warden Avenue btwn Major Mackenzie Drive East & Heritage Hill Drive
Municipality: Markham
Direction: Southbound
Date: 19-Jun-18
Speed Limit: 50 Compliance: 1%

	1	2	3	4	5	6	7	8	9	10
Start Hour	0-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60
0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	1	1
6	0	0	0	0	0	1	0	1	6	4
7	0	0	0	0	0	0	3	5	9	24
8	0	0	0	0	1	0	2	11	20	32
9	0	0	0	0	0	1	2	3	23	27
10	0	0	0	0	0	0	0	3	7	13
11	0	0	0	0	0	0	0	2	2	6
12	0	0	0	0	2	0	1	0	2	11
13	0	0	0	0	0	0	0	0	2	6
14	0	0	0	0	0	0	1	1	5	5
15	0	0	0	0	0	1	2	2	6	13
16	0	0	0	0	0	0	0	2	2	9
17	0	0	0	0	0	0	0	2	3	10
18	0	0	0	0	1	0	0	0	4	5
19	0	0	0	0	0	1	0	0	5	4
20	0	0	0	0	0	0	0	1	2	2
21	0	0	0	0	0	0	0	0	2	5
22	0	0	0	0	0	0	0	0	0	1
23	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	4	4	11	33	101	178

	1	2	3	4	5	6	7	8	9	10
Start Hour	0-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60
0	0	0	0	0	0	0	0	0	0	2

1	0	0	0	0	0	0	0	0	0	4
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	1	3
6	0	0	0	0	0	0	0	0	1	6
7	1	0	0	0	0	0	0	0	4	14
8	1	0	0	0	0	0	1	1	5	75
9	0	0	0	0	0	0	1	3	3	59
10	0	0	0	0	0	0	0	0	2	31
11	1	0	0	0	0	0	0	0	4	25
12	0	0	0	0	0	0	0	0	2	26
13	0	0	0	0	0	0	0	0	2	17
14	0	0	0	0	0	0	0	0	1	14
15	0	0	0	0	0	0	0	0	4	29
16	0	0	0	0	0	0	0	0	4	53
17	0	0	0	0	0	0	0	0	4	63
18	0	0	0	0	0	0	0	0	9	39
19	0	0	0	0	0	0	0	0	3	24
20	0	0	0	0	0	0	0	0	0	23
21	0	0	0	0	0	0	0	1	2	17
22	0	0	0	0	0	0	1	0	1	6
23	0	0	0	0	0	0	0	0	1	13
Grand Total	3	0	0	0	0	0	3	5	53	543

Monday, January 20, 2020

Range

Average:	74.08	km/h
Median:	74.55	km/h
85th%	81.98	km/h
95th%	86.41	km/h

11	12	13	14	15	16	17	18	19	20	21	22
61-65	66-70	71-75	76-80	81-85	86-90	91-95	96-100	101-105	106-110	111-115	116-120
0	0	8	8	8	0	0	0	0	0	0	0
0	2	9	7	5	0	0	0	0	0	0	0
0	2	4	5	2	3	0	0	0	0	0	0
0	0	9	4	5	1	0	0	0	0	0	0
0	1	2	10	4	2	0	0	0	0	0	0
0	5	25	17	9	3	0	0	0	0	0	0
12	44	71	63	31	14	1	0	0	0	0	0
67	134	284	240	128	55	4	0	0	0	0	0
104	179	335	309	110	42	2	0	0	0	0	0
61	161	216	184	94	30	3	2	0	0	0	0
27	45	74	58	32	9	1	0	0	0	0	0
12	27	45	45	21	11	0	0	0	0	0	0
14	25	48	42	19	4	1	0	0	0	0	0
16	29	51	51	17	10	2	1	0	0	0	0
28	29	47	46	17	12	0	0	0	0	0	0
66	45	123	109	55	29	3	1	0	0	0	0
34	51	143	116	62	34	6	3	0	0	0	0
45	64	125	155	91	40	2	2	0	0	0	0
32	52	116	131	64	28	1	0	0	0	0	0
16	20	72	57	54	20	1	0	0	0	0	0
10	17	36	28	19	5	1	1	0	0	0	0
8	12	24	31	12	7	0	0	0	0	0	0
4	9	27	26	6	3	0	0	0	0	0	0
3	8	19	16	7	6	0	1	0	0	0	0
559	961	1913	1758	872	368	28	11	0	0	0	0

11	12	13	14	15	16	17	18	19	20	21	22
61-65	66-70	71-75	76-80	81-85	86-90	91-95	96-100	101-105	106-110	111-115	116-120
4	5	2	1	1	0	0	0	0	0	0	0

10	6	3	0	1	0	0	0	0	0	0	0
5	2	7	2	1	0	0	0	0	0	0	0
10	8	0	2	1	0	0	0	0	0	0	0
3	1	16	2	0	0	0	0	0	0	0	0
11	11	3	0	0	1	0	0	0	0	0	0
11	18	15	7	0	4	0	0	0	0	0	0
61	86	64	17	3	1	0	0	0	0	0	0
167	128	63	17	4	1	2	0	0	0	0	0
172	108	21	9	1	0	0	0	0	0	0	0
73	59	34	4	1	0	0	0	0	0	0	0
88	50	29	3	1	0	0	0	0	0	0	0
103	55	15	5	2	0	0	0	0	0	0	0
69	87	34	10	3	0	0	0	0	0	0	0
95	94	55	15	4	2	1	0	0	0	0	0
183	212	161	40	4	2	0	0	0	0	0	0
340	479	217	77	13	5	1	0	0	0	0	0
293	427	226	78	11	3	1	0	0	0	0	0
250	261	160	36	8	1	0	0	0	0	0	0
79	92	51	14	2	1	0	0	0	0	0	0
59	54	24	5	1	0	1	0	0	0	0	0
49	41	18	4	2	0	0	0	0	0	0	0
43	32	8	3	1	0	0	0	0	0	0	0
22	28	5	0	2	0	0	0	0	0	0	0
2200	2344	1231	351	67	21	6	0	0	0	0	0

23	24	25	26	27	28	29	30	Grand Total
121-125	126-130	131-135	136-140	141-145	145-150	151-155	156-160	
0	0	0	0	0	0	0	0	24
0	0	0	0	0	0	0	0	23
0	0	0	0	0	0	0	0	16
0	0	0	0	0	0	0	0	19
0	0	0	0	0	0	0	0	19
0	0	0	0	0	0	0	0	61
0	0	0	0	0	0	0	0	248
0	0	0	0	0	0	0	0	953
0	0	0	0	0	0	0	0	1147
0	0	0	0	0	0	0	0	807
0	0	0	0	0	0	0	0	269
0	0	0	0	0	0	0	0	171
0	0	0	0	0	0	0	0	169
0	0	0	0	0	0	0	0	185
0	0	0	0	0	0	0	0	191
0	0	0	0	0	0	0	0	455
0	0	0	0	0	0	0	0	462
0	0	0	0	0	0	0	0	539
0	0	0	0	0	0	0	0	434
0	0	0	0	0	0	0	0	250
0	0	0	0	0	0	0	0	122
0	0	0	0	0	0	0	0	101
0	0	0	0	0	0	0	0	76
0	0	0	0	0	0	0	0	60
0	0	0	0	0	0	0	0	6801

23	24	25	26	27	28	29	30	Grand Total
121-125	126-130	131-135	136-140	141-145	145-150	151-155	156-160	
0	0	0	0	0	0	0	0	15

0	0	0	0	0	0	0	0	24
0	0	0	0	0	0	0	0	17
0	0	0	0	0	0	0	0	21
0	0	0	0	0	0	0	0	22
0	0	0	0	0	0	0	0	30
0	0	0	0	0	0	0	0	62
0	0	0	0	0	0	0	0	251
0	0	0	0	0	0	0	0	465
0	0	0	0	0	0	0	0	377
0	0	0	0	0	0	0	0	204
0	0	0	0	0	0	0	0	201
0	0	0	0	0	0	0	0	208
0	0	0	0	0	0	0	0	222
0	0	0	0	0	0	0	0	281
0	0	0	0	0	0	0	0	635
0	0	0	0	0	0	0	0	1189
0	0	0	0	0	0	0	0	1106
0	0	0	0	0	0	0	0	764
0	0	0	0	0	0	0	0	266
0	0	0	0	0	0	0	0	167
0	0	0	0	0	0	0	0	134
0	0	0	0	0	0	0	0	95
0	0	0	0	0	0	0	0	71
0	0	0	0	0	0	0	0	6827

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix D

Collision Data

Collision Details Report

From: January 1, 2010 **To:** April 30, 2021

Location ..... Kennedy Road & Elgin Mills Road East **Municipality.....** Markham

Traffic Control.... Traffic signal **Total Collisions....** 34

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
20-69060	2020-Feb-24, Mon,16:15	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other	
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
20-52964s	2020-Feb-12, Wed,10:00	Clear	Sideswipe	P.D. only	East	Dry	Changing lanes	Truck - tractor	Other motor vehicle	Improper lane change	
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
20-400925	2020-Dec-12, Sat,14:04	Rain	Angle	Non-fatal injury	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
20-342048	2020-Oct-23, Fri,18:49	Rain	Rear end	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					South	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
19-48923s	2019-Feb-12, Tue,10:15	Snow	Angle	P.D. only	West	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:					North	Slush	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
19-337309	2019-Sep-30, Mon,04:18	Clear	SMV other	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Ran off road	Lost control	
Comments:						Dry					
19-272722	2019-Aug-09, Fri,10:30	Clear	Rear end	P.D. only	East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
19-142702	2019-Apr-29, Mon,11:31	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Passenger van	Other motor vehicle	Disobeyed traffic control	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
19-124248	2019-Apr-14, Sun,11:21	Rain	Angle	Non-fatal injury	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

18-252449	2018-Aug-10, Fri,16:00	Clear	Rear end	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-68978	2017-Mar-09, Thu,02:34	Clear	SMV other	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Ran off road	Lost control
Comments:						Dry				
16-98242	2016-Apr-13, Wed,17:48	Clear	Turning movement	Non-fatal injury	South	Dry	Turning left	Automobile, station wagon	Cyclist	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Bicycle	Other motor vehicle	Driving properly
16-78072	2016-Mar-24, Thu,10:31	Rain	Angle	P.D. only	East	Slush	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Slush	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-51818	2016-Feb-24, Wed,10:35	Snow	Angle	P.D. only	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					South	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-266270	2016-Oct-01, Sat,13:20	Clear	Rear end	P.D. only	South	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
16-201087	2016-Jul-23, Sat,23:30	Clear	Rear end	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other
Comments:					East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
16-195423	2016-Jul-19, Tue,16:30	Clear	Sideswipe	Non-fatal injury	North	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-156317	2016-Jun-07, Tue,09:17	Clear	Rear end	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					South	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly
15-339938	2015-Dec-16, Wed,18:36	Rain	Angle	P.D. only	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
14-361263	2014-Dec-27, Sat,13:32	Clear	Angle	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					North	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly

14-357812	2014-Dec-22, Mon,17:10	Clear	Turning movement	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
14-160256	2014-Jun-08, Sun,19:20	Rain	SMV other	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Ran off road	Lost control
Comments:						Wet				
14-143495	2014-May-23, Fri,19:43	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
13-237880s	2013-Aug-28, Wed,08:10	Clear	Angle	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-209744s	2013-Jul-29, Mon,15:30	Clear	Rear end	P.D. only	North		Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:										
13-175856	2013-Jun-27, Thu,16:00	Clear	Rear end	Non-fatal injury	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
12215783	2012-Jul-28, Sat,12:20	Clear	Rear end	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
12169401	2012-Jun-14, Thu,15:18	Clear	Rear end	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Going ahead	Automobile, station wagon		Driving properly
11324362	2011-Nov-01, Tue,14:09	Clear	Angle	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
11218633	2011-Jul-24, Sun,11:50	Clear	Angle	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
1119109s	2011-Jan-19, Wed,18:30	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Pick-up truck	Fence/noice barrier	Driving properly
Comments:										

11128918	2011-May-03, Tue,16:25	Rain	Angle	P.D. only	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
10255622	2010-Sep-14, Tue,16:30	Clear	Turning movement	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
10216578	2010-Aug-08, Sun,11:11	Rain	Rear end	Non-fatal injury	East	Wet	Going ahead	Automobile, station wagon		Driving properly
Comments:					East	Wet	Stopped	Passenger van		Driving properly

Collision Details Report

From: January 1, 2010 **To:** April 30, 2021

Location ..... Kennedy Road & Major Mackenzie Drive East **Municipality.....** Markham

Traffic Control.... Traffic signal **Total Collisions....** 105

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
20-403602	2020-Dec-15, Tue,07:36	Snow	Turning movement	Non-fatal injury	West	Loose snow	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					East	Loose snow	Going ahead	Truck - dump	Other motor vehicle	Driving properly	
20-393996	2020-Dec-06, Sun,20:20	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
20-368477s	2020-Nov-14, Sat,15:20	Clear	Angle	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
20-338011	2020-Oct-20, Tue,16:28	Clear	Turning movement	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
20-265408s	2020-Aug-21, Fri,10:02	Clear	Rear end	P.D. only	East	Dry	Going ahead	Truck - dump	Other motor vehicle	Speed too fast for condition	
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
19-340176	2019-Oct-02, Wed,10:21	Rain	Angle	Non-fatal injury	East	Wet	Going ahead	Pick-up truck	Other motor vehicle	Disobeyed traffic control	
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
19-334765	2019-Sep-27, Fri,17:37	Clear	Angle	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					East	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly	
19-330949	2019-Sep-24, Tue,17:25	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
19-227315s	2019-Jul-04, Thu,20:45	Clear	Turning movement	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

19-21406	2019-Jan-19, Sat,09:22	Clear	Rear end	P.D. only	West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-213064	2019-Jun-25, Tue,09:23	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-97455	2018-Mar-29, Thu,16:15	Rain	Turning movement	P.D. only	West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-83953s	2018-Mar-17, Sat,13:30	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
18-7717	2018-Jan-08, Mon,08:25	Snow	Rear end	Non-fatal injury	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-388388	2018-Dec-11, Tue,17:53	Drifting Snow	Turning movement	Non-fatal injury	West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-38462	2018-Feb-04, Sun,19:09	Snow	Turning movement	Non-fatal injury	West	Packed snow	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Packed snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-343832s	2018-Oct-31, Wed,09:25	Rain	Rear end	P.D. only	North	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-296616	2018-Sep-19, Wed,07:28	Clear	Angle	Non-fatal injury	East	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-244113	2018-Aug-03, Fri,13:41	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-223577	2018-Jul-17, Tue,08:55	Clear	Angle	P.D. only	East	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

18-119928	2018-Apr-19, Thu,15:17	Clear	Rear end	P.D. only	East	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-97739	2017-Apr-05, Wed,07:00	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-71126	2017-Mar-11, Sat,02:03	Snow	Angle	Non-fatal injury	North	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					East	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-327236	2017-Nov-13, Mon,17:28	Clear	Turning movement	Non-fatal injury	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-262138	2017-Sep-10, Sun,11:34	Clear	Turning movement	P.D. only	North	Dry	Turning left	Passenger van	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-233082s	2017-Apr-11, Tue,09:23	Clear	Rear end	P.D. only	West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
17-126090	2017-Apr-30, Sun,08:33	Clear	Angle	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-99372	2016-Apr-14, Thu,18:15	Clear	Rear end	P.D. only	East	Dry	Going ahead	Passenger van	Other motor vehicle	Other
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-72299	2016-Mar-17, Thu,17:22	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-335942s	2016-Dec-16, Fri,14:50	Clear	Rear end	P.D. only	West	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-319659	2016-Nov-28, Mon,18:11	Clear	Turning movement	P.D. only	East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

16-315202	2016-Nov-23, Wed,22:46	Snow	Turning movement	P.D. only	South	Loose snow	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-305767	2016-Nov-13, Sun,12:13	Clear	Rear end	Non-fatal injury	South	Dry	Going ahead	Bicycle	Other motor vehicle	Lost control
Comments:					South	Dry	Stopped	Automobile, station wagon	Cyclist	Driving properly
16-287377	2016-Oct-24, Mon,15:18	Clear	Rear end	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-27757	2016-Jan-29, Fri,07:45			P.D. only						
Comments:										
16-250582	2016-Sep-14, Wed,17:40	Clear	Turning movement	P.D. only	West	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
16-230875	2016-Aug-25, Thu,20:55	Clear	Turning movement	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-117104	2016-May-02, Mon,08:00	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-91496	2015-Apr-04, Sat,09:50	Clear	Turning movement	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
15-338004	2015-Dec-14, Mon,15:31	Rain	Rear end	P.D. only	West	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Wet	Unknown	Automobile, station wagon	Other motor vehicle	Driving properly
15-335207	2015-Dec-11, Fri,07:55	Clear	Turning movement	P.D. only	West	Wet	Turning right	Truck - open	Other motor vehicle	Driving properly
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-318225	2015-Nov-21, Sat,08:56	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

15-2895	2015-Jan-04, Sun,13:00	Clear	Angle	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-28337	2015-Jan-29, Thu,14:19	Snow	Angle	P.D. only	East	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					North	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-276409	2015-Oct-06, Tue,07:59	Clear	Rear end	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
15-252225	2015-Sep-09, Wed,17:30	Clear	Rear end	P.D. only	East	Dry	Going ahead	Passenger van	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Passenger van	Other motor vehicle	Driving properly
15-212434	2015-Jul-30, Thu,10:50	Clear	Turning movement	P.D. only	North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Truck - dump	Other motor vehicle	Driving properly
15-20969	2015-Jan-22, Thu,11:27	Clear	SMV other	P.D. only	North	Dry	Turning left	Automobile, station wagon	Pole (sign, parking meter)	Lost control
Comments:						Dry				
15-153409	2015-Jun-03, Wed,16:02	Clear	Rear end	Non-fatal injury	East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
15-152282	2015-Jun-02, Tue,15:01	Clear	Rear end	P.D. only	East	Dry	Going ahead	Intercity bus	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
15-122520	2015-May-05, Tue,09:05	Clear	Turning movement	Non-fatal injury	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-117316	2015-Apr-30, Thu,10:20	Clear	Turning movement	Non-fatal injury	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
14-356511	2014-Dec-20, Sat,22:31	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

14-346658	2014-Dec-09, Tue,12:28	Clear	Turning movement	Non-fatal injury	West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
14-171286	2014-Jun-18, Wed,17:50	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
14-145874	2014-May-26, Mon,07:00	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
14-14260	2014-Jan-15, Wed,17:35	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
13-95951	2013-Apr-09, Tue,17:39	Rain	Rear end	Non-fatal injury	East	Wet	Going ahead	Automobile, station wagon	Skidding/sliding	Lost control
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Other
13-50038	2013-Feb-21, Thu,18:37	Clear	Angle	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-306678	2013-Nov-09, Sat,17:48	Rain	Rear end	Non-fatal injury	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
13-297767	2013-Oct-31, Thu,08:34	Rain	Turning movement	Non-fatal injury	North	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-289751s	2013-Oct-22, Tue,17:30	Clear	Angle	P.D. only	East	Dry	Going ahead			Driving properly
Comments:					West		Turning left			
13-253283	2013-Sep-12, Thu,18:23	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-239092	2013-Aug-29, Thu,09:53	Clear	Approaching	P.D. only	South	Dry	Turning left	Automobile, station wagon	Ran off road	Lost control
Comments:						Dry				

13-224116	2013-Aug-14, Wed,08:05	Clear	Turning movement	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-21968	2013-Jan-23, Wed,17:18	Clear	Angle	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
13-20766	2013-Jan-22, Tue,15:38	Clear	SMV other	P.D. only	North	Wet	Turning left	Passenger van	Ran off road	Lost control
Comments:										
13-181807s	2013-Jul-02, Tue,17:00	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped		Other motor vehicle	Driving properly
13-16352	2013-Jan-17, Thu,21:06	Snow	Rear end	Non-fatal injury	North	Loose snow	Stopped	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					North	Loose snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
13-151431s	2013-Jun-03, Mon,17:10	Clear	Rear end	P.D. only	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East		Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
13-149597	2013-Jun-01, Sat,20:07	Clear	Sideswipe	P.D. only	East	Wet	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					East	Wet	Overtaking	Automobile, station wagon	Other motor vehicle	Driving properly
13-131397	2013-May-15, Wed,07:44	Rain	Rear end	P.D. only	West	Wet	Changing lanes	Pick-up truck	Other motor vehicle	Improper lane change
Comments:					West		Slowing or stopping	Pick-up truck	Other motor vehicle	Driving properly
13-123108s	2013-May-06, Mon,17:30	Clear	Approaching	P.D. only	East	Dry	Going ahead		Other motor vehicle	Driving properly
Comments:					East		Stopped		Other motor vehicle	
13-007909s	2013-Jan-09, Wed,08:10	Clear	Angle	P.D. only	East	Wet	Going ahead		Other motor vehicle	Driving properly
Comments:					West		Turning left	Motor home	Other motor vehicle	Improper turn
1291148	2012-Mar-30, Fri,17:23	Other	Angle	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Improper passing
Comments:					North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly

1283978	2012-Mar-23, Fri,12:40	Clear	Angle	Non-fatal injury	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
1265587	2012-Mar-03, Sat,12:00	Clear	Rear end	Non-fatal injury	North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	
12272588	2012-Sep-22, Sat,16:46	Clear	Rear end	P.D. only	West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
12218226s	2012-Jul-29, Sun,21:51	Clear	Rear end	Non-reportable	North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North					
12199688s	2012-Jul-12, Thu,16:45	Clear	Rear end	Non-reportable	East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
Comments:					East					
12185469	2012-Jun-29, Fri,18:02	Clear	Angle	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
12132950	2012-May-10, Thu,17:59	Clear	Angle	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
12112334s	2012-Apr-20, Fri,12:00	Clear	Rear end	Non-reportable	West	Dry	Going ahead		Other motor vehicle	Following too close
Comments:					West	Dry	Slowing or stopping	Passenger van	Other motor vehicle	Driving properly
1172049s	2011-Mar-11, Fri,15:15	Rain	Sideswipe	Non-reportable	East	Wet	Going ahead	Truck - closed	Other motor vehicle	Driving properly
Comments:					East	Wet	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
1152750	2011-Feb-21, Mon,03:50	Snow	SMV other	P.D. only	South	Packed snow	Going ahead	Automobile, station wagon	Skidding/sliding	Lost control
Comments:						Packed snow				
1143797s	2011-Feb-12, Sat,18:15	Clear	Angle	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Dry	Turning left	Passenger van	Other motor vehicle	Improper turn
11376042s	2011-Dec-22, Thu,08:30	Clear	Rear end	Non-reportable	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West					

11367743	2011-Dec-12, Mon,18:30	Rain	Rear end	Non-fatal injury	East	Wet	Stopped	Passenger van	Other motor vehicle	Driving properly
Comments:					East	Wet	Changing lanes	Automobile, station wagon	Other motor vehicle	Following too close
1135872	2011-Feb-05, Sat,09:08	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Turning left	Pick-up truck	Other motor vehicle	Driving properly
11251033	2011-Aug-23, Tue,07:00	Clear	Angle	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
11250598	2011-Aug-22, Mon,18:19	Clear	Angle	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
11245316	2011-Aug-17, Wed,18:30	Rain	Rear end	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
11131165	2011-May-05, Thu,14:40	Clear	Angle	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
1082267	2010-Mar-29, Mon,14:20	Clear	Angle	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
1079747	2010-Mar-26, Fri,16:58	Clear	Turning movement	Non-fatal injury	East	Dry	Turning left	Automobile, station wagon		Improper turn
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
1076535	2010-Mar-23, Tue,12:50	Rain	Angle	Non-fatal injury	West	Wet	Going ahead	Automobile, station wagon		Disobeyed traffic control
Comments:					South	Wet	Going ahead	Automobile, station wagon		Driving properly
10338039	2010-Dec-08, Wed,14:54	Clear	Angle	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					South	Dry	Going ahead	Automobile, station wagon		Driving properly
10299909	2010-Oct-29, Fri,17:28	Clear	Approaching	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

10235626s	2010-Aug-26, Thu,11:00	Clear	Rear end	Non-reportable	West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West					
1021344	2010-Jan-23, Sat,20:48	Clear	Turning movement	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
10171106	2010-Jun-25, Fri,12:55	Clear	Turning movement	Non-fatal injury	South	Dry	Turning left	Pick-up truck	Other motor vehicle	Disobeyed traffic control
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
10169835s	2010-Jun-24, Thu,09:00	Rain	Rear end	Non-reportable	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Wet	Stopped	Truck - closed	Other motor vehicle	
10168679	2010-Jun-23, Wed,07:20	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South		Stopped	Pick-up truck	Other motor vehicle	Driving properly
10134707s	2010-May-20, Thu,14:00	Clear	Rear end	Non-reportable	East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
10111376	2010-Apr-27, Tue,07:37	Clear	Angle	P.D. only	West	Dry				Improper lane change
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

Collision Details Report

From: January 1, 2010 **To:** April 30, 2021

Location ..... Kennedy Road btwn Major Mackenzie Drive East & Elgin Mills Road East **Municipality.....** Markham

Traffic Control.... **Total Collisions....** 24

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
21-34386	2021-Jan-29, Fri,18:55	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
20-72796	2020-Feb-27, Thu,17:29	Strong wind	Approaching	P.D. only	South	Ice	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:					North	Ice	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
20-72753	2020-Feb-27, Thu,16:57	Drifting Snow	Approaching	P.D. only	North	Ice	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:					South	Ice	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
20-407593	2020-Dec-18, Fri,18:24	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
20-3845	2020-Jan-03, Fri,23:31	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	deer					Dry					
19-239482	2019-Jul-14, Sun,21:33	Clear	SMV other	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Lost control	
Comments:	deer					Dry					
18-405645	2018-Dec-29, Sat,06:25	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	deer					Dry					
18-186006	2018-Jun-15, Fri,04:05	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	deer					Dry					
17-368156	2017-Dec-25, Mon,23:51	Drifting Snow	Rear end	Non-fatal injury	North	Loose snow	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

17-305380	2017-Oct-22, Sun,23:00	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:	deer					Dry				
15-55121	2015-Feb-25, Wed,11:51	Drifting Snow	SMV other	P.D. only	North	Loose snow	Going ahead	Automobile, station wagon	Steel guide rail	Lost control
Comments:						Loose snow				
15-53740	2015-Feb-25, Wed,02:28	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other	Lost control
Comments:										
15-53498	2015-Feb-24, Tue,18:30	Drifting Snow	Approaching	Non-fatal injury	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-2402	2015-Jan-03, Sat,18:43	Clear	SMV other	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Skidding/sliding	Speed too fast for condition
Comments:						Wet				
15-200387	2015-Jul-19, Sun,12:51	Clear	Turning movement	Non-fatal injury	North	Dry	Overtaking	Passenger van	Other motor vehicle	Lost control
Comments:					North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
14-319690	2014-Nov-09, Sun,17:00	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:						Dry				
14-236737	2014-Aug-18, Mon,16:07	Clear	SMV other	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Ran off road	Lost control
Comments:										
12229163	2012-Aug-10, Fri,09:26	Rain	Rear end	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North		Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
12130288	2012-May-08, Tue,03:00	Rain	SMV other	Non-fatal injury	South	Wet	Going ahead	Automobile, station wagon	Skidding/sliding	Lost control
Comments:										
11212900	2011-Jul-19, Tue,05:12	Clear	SMV other	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Pole (utility, power)	Lost control
Comments:						Dry				
1092534s	2010-Apr-08, Thu,18:30	Clear	Rear end	Non-reportable	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

1068175	2010-Mar-14, Sun,08:19	Rain	SMV other	P.D. only	North	Wet	Going ahead	Passenger van	Ditch	Lost control
Comments:						Wet				
10316872s	2010-Nov-13, Sat,14:30	Clear	Rear end	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
10299037	2010-Oct-28, Thu,19:26	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North		Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly

Collision Details Report

From: January 1, 2010 **To:** April 30, 2021

Location ..... Warden Avenue & Elgin Mills Road East **Municipality.....** Markham

Traffic Control.... Traffic signal **Total Collisions....** 37

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
20-179943	2020-Jun-15, Mon,16:48	Clear	Sideswipe	Non-fatal injury	North	Dry	Making "U" turn	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					North	Dry	Turning left	Motorcycle	Other motor vehicle	Driving properly	
19-389518s	2019-Nov-11, Mon,17:24	Snow	Turning movement	P.D. only	North	Loose snow	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					South	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
19-223326s	2019-Jul-02, Tue,16:04	Clear	Sideswipe	P.D. only	West	Dry	Making "U" turn	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					West		Going ahead	Pick-up truck	Other motor vehicle	Driving properly	
19-20623s	2019-Jan-18, Fri,14:27	Clear	Angle	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
19-135049s	2019-Apr-23, Tue,07:30	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle		
Comments:					South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Improper passing	
18-369872s	2018-Nov-24, Sat,12:39	Clear	Angle	P.D. only	West	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
18-360630	2018-Nov-15, Thu,18:01	Snow	SMV other	Non-fatal injury	West	Loose snow	Going ahead	Automobile, station wagon	Other	Lost control	
Comments:	other										
18-303993s	2018-Sep-26, Wed,08:41	Rain	Rear end	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					South	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
18-138645	2018-May-05, Sat,14:22	Clear	Turning movement	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

17-42527s	2017-Feb-10, Fri,15:30	Snow	Angle	P.D. only	East	Slush	Turning right	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					North	Slush	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-359530s	2017-Dec-15, Fri,16:55	Snow	Angle	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-357142s	2017-Dec-13, Wed,08:00	Clear	Rear end	P.D. only	South	Dry	Stopped	Delivery van	Other motor vehicle	Other
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-228220	2017-Aug-06, Sun,14:50	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
17-173878s	2017-Jun-14, Wed,17:15	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
16-51691	2016-Feb-24, Wed,08:07	Snow	Sideswipe	P.D. only	South	Slush	Going ahead	Pick-up truck	Other motor vehicle	Lost control
Comments:					North	Slush	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-336351	2016-Dec-17, Sat,04:39	Snow	SMV other	P.D. only	West	Loose snow	Going ahead	Automobile, station wagon	Tree, shrub, stump	Lost control
Comments:						Loose snow				
16-324942	2016-Dec-04, Sun,14:45	Clear	Turning movement	P.D. only	North	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
16-304437	2016-Nov-11, Fri,20:05	Clear	SMV other	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:						Dry				
15-312148	2015-Nov-14, Sat,18:06	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:						Dry				
15-251549	2015-Sep-09, Wed,07:55	Rain	SMV other	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Ditch	Following too close
Comments:						Wet				
15-112095	2015-Apr-25, Sat,06:35	Clear	Sideswipe	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Cyclist	Speed too fast for condition
Comments:					East	Dry	Going ahead	Bicycle	Other motor vehicle	Driving properly

14-57152	2014-Feb-27, Thu,09:50	Snow	Rear end	Non-fatal injury	South	Loose snow	Going ahead	Pick-up truck	Other motor vehicle	Driving properly
Comments:					South	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
14-323525	2014-Nov-13, Thu,20:00	Clear	SMV other	P.D. only	North	Dry	Going ahead	Pick-up truck	Animal - wild	Driving properly
Comments:						Dry				
14-266228s	2014-Sep-15, Mon,15:30	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North		Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
14-228410	2014-Aug-10, Sun,13:15	Clear	SMV other	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Ran off road	Lost control
Comments:						Dry				
14-131403	2014-May-11, Sun,17:11	Clear	Sideswipe	Non-fatal injury	West	Dry	Overtaking	Automobile, station wagon	Cyclist	Improper passing
Comments:					West		Going ahead	Bicycle	Other motor vehicle	Driving properly
14-054214s	2014-Feb-24, Mon,17:08	Clear	Rear end	P.D. only	South	Ice	Going ahead		Other motor vehicle	Driving properly
Comments:					South		Stopped		Other motor vehicle	
13-262107s	2013-Sep-22, Sun,15:50	Clear	Angle	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					South		Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
13-244964s	2013-Sep-04, Wed,08:10	Clear	Rear end	P.D. only	West	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West		Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
13-175158	2013-Jun-26, Wed,23:20	Clear	Approaching	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Ran off road	Speed too fast for condition
Comments:						Dry				
1230886	2012-Jan-31, Tue,08:39	Clear	Angle	Non-fatal injury	West	Wet	Turning left		Other motor vehicle	Improper turn
Comments:					South	Wet	Going ahead		Other motor vehicle	Driving properly
12262425	2012-Sep-12, Wed,14:54	Clear	SMV other	Non-fatal injury	East	Dry	Other	Motorcycle	Ran off road	Exceeding speed limit
Comments:						Dry				
1148957s	2011-Feb-17, Thu,07:45	Clear	Rear end	Non-reportable	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South					

11315914	2011-Oct-24, Mon,11:57	Clear	Angle	P.D. only	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper lane change
10323495	2010-Nov-23, Tue,07:20	Other	Angle	Non-fatal injury	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
10319017s	2010-Nov-17, Wed,16:45	Rain	Rear end	Non-reportable	South	Wet	Slowing or stopping	Automobile, station wagon		Driving properly
Comments:					South					
10232645s	2010-Aug-23, Mon,18:14	Clear	Rear end	Non-reportable	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close

Collision Details Report

From: January 1, 2010 **To:** April 30, 2021

Location ..... Warden Avenue & Heritage Hill Drive **Municipality.....** Markham

Traffic Control.... Stop sign **Total Collisions....** 4

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
18-199362	2018-Jun-26, Tue,18:13	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
16-190315	2016-Jul-14, Thu,09:15	Rain	Approaching	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
13-120314	2013-May-04, Sat,00:44	Clear	SMV other	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Ran off road	Lost control	
Comments:											
12300960	2012-Oct-22, Mon,08:33	Clear	Rear end	Non-fatal injury	South	Dry	Going ahead		Other motor vehicle		
Comments:					South	Dry	Going ahead		Other motor vehicle		

Collision Details Report

From: January 1, 2010 **To:** April 30, 2021

Location ..... Major Mackenzie Drive East & Warden Avenue **Municipality.....** Markham

Traffic Control.... Traffic signal **Total Collisions....** 100

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
10115297s	2010-Apr-29, Thu,12:30	Clear	SMV other	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Curb	Driving properly	
Comments:											
10119581s	2010-May-05, Wed,07:40	Clear	Angle	Non-reportable	East	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:					South	Wet	Going ahead	Truck - closed	Other motor vehicle	Driving properly	
10157179	2010-Jun-11, Fri,17:40	Clear	Rear end	P.D. only	East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
10168340s	2010-Jun-22, Tue,19:00	Clear	Rear end	Non-reportable	East	Dry	Stopped	Automobile, station wagon		Driving properly	
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle		
10193110s	2010-Jul-16, Fri,17:00	Clear	Rear end	Non-reportable	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					East	Dry	Slowing or stopping	Truck - closed	Other motor vehicle	Other	
10296889s	2010-Oct-26, Tue,18:30	Rain	Rear end	Non-reportable	East	Wet	Stopped		Other motor vehicle	Driving properly	
Comments:					East	Wet	Slowing or stopping		Other motor vehicle	Speed too fast for condition	
10300000	2010-Oct-29, Fri,19:00	Clear	Angle	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
10337618s	2010-Dec-08, Wed,08:17	Clear	Sideswipe	Non-reportable	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly	
10351127s	2010-Dec-22, Wed,14:00	Clear	Rear end	Non-reportable	North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	

1050160	2010-Feb-23, Tue,10:28	Clear	Sideswipe	P.D. only	North	Dry	Turning right	Truck-other	Other motor vehicle	Driving properly
Comments:					North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
1083447	2010-Mar-30, Tue,18:00	Clear	Turning movement	P.D. only	West	Dry	Turning left		Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
1093258	2010-Apr-09, Fri,13:06	Clear	Angle	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
11152880	2011-May-25, Wed,10:40	Clear	Rear end	P.D. only	North	Dry	Slowing or stopping	Ambulance	Other motor vehicle	Lost control
Comments:					North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
11209089	2011-Jul-15, Fri,17:30	Clear	Rear end	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
11228721s	2011-Aug-02, Tue,14:00	Clear	Rear end	Non-reportable	West	Dry	Stopped		Other motor vehicle	Driving properly
Comments:					West	Dry	Slowing or stopping		Other motor vehicle	
11292039	2011-Sep-30, Fri,20:25	Rain	Angle	P.D. only	North	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
11293612s	2011-Oct-02, Sun,13:00	Rain	Rear end	Non-reportable	East	Wet	Going ahead		Other motor vehicle	Following too close
Comments:					East					
11294330s	2011-Oct-02, Sun,13:00	Clear	Rear end	Non-reportable	East	Dry	Stopped		Other motor vehicle	Driving properly
Comments:					East					
11324037	2011-Nov-01, Tue,09:25		Turning movement	P.D. only	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
11333548s	2011-Nov-10, Thu,08:15	Clear	Turning movement	Non-reportable	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn

11353780s	2011-Nov-30, Wed,15:35	Clear	Angle	Non-reportable	North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	
1146278	2011-Feb-15, Tue,09:04	Clear	Angle	Non-fatal injury	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
1150753	2011-Feb-19, Sat,03:00	Strong wind	Approaching	Non-fatal injury	East	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					West	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
1198861s	2011-Apr-06, Wed,08:45	Clear	Rear end	Non-reportable	South	Dry	Stopped		Other motor vehicle	Driving properly
Comments:					South	Dry	Slowing or stopping		Other motor vehicle	Following too close
12105255s	2012-Apr-13, Fri,15:45	Clear	Rear end	Non-reportable	North	Dry	Going ahead		Other motor vehicle	Following too close
Comments:					North	Dry	Slowing or stopping		Other motor vehicle	Driving properly
12132248s	2012-May-09, Wed,17:30	Clear	Rear end	Non-reportable	East	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
Comments:					East					
1218764	2012-Jan-19, Thu,11:18	Snow	Angle	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
1219151s	2012-Jan-19, Thu,14:41	Clear	Rear end	Non-reportable	North	Dry	Stopped		Other motor vehicle	Driving properly
Comments:					North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
12230538	2012-Aug-11, Sat,17:09	Rain	Rear end	P.D. only	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					West	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
12262059	2012-Sep-12, Wed,08:48	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
12267825s	2012-Sep-17, Mon,17:20	Clear	Rear end	Non-reportable	East	Dry	Going ahead	Truck - closed	Other motor vehicle	Driving properly
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	

12273498	2012-Sep-23, Sun,16:08	Rain	Rear end	P.D. only	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					East	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
1230952	2012-Jan-31, Tue,09:00	Clear	SMV other	P.D. only	North	Wet	Going ahead	Truck - dump	Other	Driving properly
Comments:						Wet				
12329767	2012-Nov-21, Wed,18:35	Fog, mist, smoke, dust	Angle	P.D. only	West	Dry	Making "U" turn	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-035635s	2013-Feb-06, Wed,12:30		Approaching	P.D. only	East		Going ahead	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					East		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-124159	2013-May-07, Tue,17:31	Clear	Rear end	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
13-126199	2013-May-09, Thu,16:58	Clear	Angle	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North	Dry	Changing lanes	Automobile, station wagon	Other motor vehicle	Driving properly
13-173347	2013-Jun-25, Tue,09:00	Rain	Sideswipe	P.D. only	South	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-186805	2013-Jul-08, Mon,09:50	Clear	Rear end	P.D. only	South	Dry	Reversing	Automobile, station wagon	Other motor vehicle	Other
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
13-195129	2013-Jul-16, Tue,09:45	Clear	SMV other	Non-fatal injury	West	Dry	Going ahead	Automobile, station wagon	Ran off road	Lost control
Comments:						Dry				
13-34275	2013-Feb-05, Tue,11:59	Clear	Rear end	P.D. only	West	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Exceeding speed limit
Comments:					West	Wet	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
13-39259	2013-Feb-11, Mon,06:25	Freezing Rain	Approaching	Non-fatal injury	East	Ice	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					West	Ice	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-85138	2013-Mar-29, Fri,13:48	Clear	SMV other	P.D. only	East	Dry	Turning right	Automobile, station wagon	Curb	Lost control
Comments:										

14-114315s	2014-Apr-24, Thu,19:00	Clear	Rear end	P.D. only	East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East		Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close
14-131636	2014-May-11, Sun,22:51	Clear	Rear end	P.D. only	East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
14-263494	2014-Sep-12, Fri,17:18	Clear	Rear end	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
14-328945	2014-Nov-20, Thu,08:19	Clear	Rear end	P.D. only	East	Wet	Going ahead	School bus	Other motor vehicle	Speed too fast for condition
Comments:					East	Loose snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
15-108188	2015-Apr-21, Tue,09:30	Rain	Rear end	Non-fatal injury	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Other
Comments:					South	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
15-11183	2015-Jan-12, Mon,17:59	Clear	Turning movement	Non-fatal injury	South	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Wet	Going ahead	Automobile, station wagon	Steel guide rail	Driving properly
15-159536	2015-Jun-07, Sun,04:00	Clear	Rear end	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-162735	2015-Jun-11, Thu,17:21	Clear	Rear end	Non-fatal injury	North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Other
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-167356	2015-Jun-17, Wed,12:15	Clear	Angle	P.D. only	West	Dry	Going ahead	Bicycle	Other motor vehicle	Failed to yield right-of-way
Comments:					North	Dry	Slowing or stopping	Automobile, station wagon	Cyclist	Driving properly
15-175421	2015-Jun-25, Thu,13:15	Clear	Other	P.D. only	South	Dry	Reversing	Pick-up truck	Other motor vehicle	Improper lane change
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
15-193996	2015-Jul-13, Mon,18:23	Clear	Turning movement	P.D. only	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Driving properly

15-19734	2015-Jan-21, Wed,07:50	Clear	SMV other	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Ran off road	Other
Comments:										
15-202777	2015-Jul-21, Tue,16:10	Clear	Turning movement	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
15-252450	2015-Sep-10, Thu,00:39	Clear	SMV other	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:						Dry				
15-266731	2015-Sep-25, Fri,09:46	Clear	Rear end	Non-fatal injury	West	Dry	Going ahead	Other	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Other	Other motor vehicle	Driving properly
15-270628	2015-Sep-29, Tue,14:09	Clear	Turning movement	P.D. only	East	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
15-335690	2015-Dec-11, Fri,15:47	Clear	Turning movement	Non-fatal injury	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
15-88437	2015-Apr-01, Wed,09:51	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-207868	2016-Aug-01, Mon,22:32	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
16-216217	2016-Aug-10, Wed,17:16	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-229827	2016-Aug-24, Wed,20:50	Clear	SMV other	P.D. only	East	Dry	Turning right	Automobile, station wagon	Curb	Lost control
Comments:						Dry				
16-283728	2016-Oct-20, Thu,11:50	Rain	Angle	Non-fatal injury	East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Disobeyed traffic control
Comments:					North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

16-294863	2016-Nov-01, Tue,17:06	Clear	Rear end	P.D. only	East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Improper lane change
Comments:					East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
16-320294	2016-Nov-29, Tue,11:40	Clear	Rear end	Non-fatal injury	West	Dry	Overtaking	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-330031	2016-Dec-09, Fri,17:33	Clear	Turning movement	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-338642	2016-Dec-20, Tue,08:09	Clear	Turning movement	Non-fatal injury	South	Dry	Turning left	Delivery van	Other motor vehicle	Failed to yield right-of-way
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
16-37605	2016-Feb-08, Mon,18:03	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
16-43037	2016-Feb-14, Sun,16:37	Clear	Turning movement	P.D. only	South	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-135145	2017-May-09, Tue,08:59	Clear	Rear end	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
17-162790	2017-Jun-05, Mon,07:36	Clear	Turning movement	P.D. only	East	Dry	Making "U" turn	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-18767	2017-Jan-19, Thu,17:29	Clear	Turning movement	Non-fatal injury	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Driving properly
17-224340	2017-Aug-02, Wed,17:40	Rain	Turning movement	Non-fatal injury	North	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-23614	2017-Jan-24, Tue,14:52	Rain	Turning movement	P.D. only	North	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

17-238686	2017-Aug-16, Wed,19:02	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-262353	2017-Sep-10, Sun,17:01	Clear	Rear end	P.D. only	East	Dry	Going ahead	Passenger van	Other motor vehicle	Following too close
Comments:					East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
17-275983	2017-Sep-24, Sun,14:48	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
17-61464	2017-Mar-01, Wed,18:20	Rain	Turning movement	P.D. only	West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-177000	2018-Jun-07, Thu,20:33	Clear	Angle	Non-fatal injury	North	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-204211	2018-Jun-30, Sat,21:05	Clear	Sideswipe	Non-fatal injury	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-230520	2018-Jul-23, Mon,06:55	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					East	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
18-343729s	2018-Oct-31, Wed,07:40	Rain	Turning movement	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					South	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
18-345436	2018-Nov-01, Thu,15:37	Rain	Angle	Non-fatal injury	South	Wet	Going ahead	Pick-up truck	Other motor vehicle	Speed too fast for condition
Comments:					West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
18-391724	2018-Dec-14, Fri,18:30	Rain	Turning movement	P.D. only	West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
18-401226	2018-Dec-24, Mon,02:55	Snow	SMV other	Non-fatal injury	East	Ice	Going ahead	Automobile, station wagon	Pole (sign, parking meter)	Other
Comments:						Ice				

18-6661	2018-Jan-07, Sun,14:50	Clear	Angle	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-184960	2019-Jun-03, Mon,11:30	Clear	Turning movement	Non-fatal injury	West	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Exceeding speed limit
19-22492s	2019-Jan-20, Sun,11:33	Clear	Rear end	Non-fatal injury	East	Loose snow	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					East	Loose snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-227051s	2019-Jul-05, Fri,08:32	Clear	Sideswipe	P.D. only	West	Dry	Changing lanes	Passenger van	Other motor vehicle	Improper lane change
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-299590	2019-Aug-29, Thu,20:33	Clear	Rear end	P.D. only	West	Dry	Going ahead	Intercity bus	Other motor vehicle	Following too close
Comments:					West	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-308762s	2019-Sep-06, Fri,06:44	Clear	Turning movement	P.D. only	North	Dry	Turning left	Automobile, station wagon	Other motor vehicle	Failed to yield right-of-way
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
19-399636	2019-Nov-20, Wed,15:45	Clear	Other	P.D. only	East	Dry	Reversing	Automobile, station wagon	Other motor vehicle	Other
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
19-413271s	2019-Dec-03, Tue,08:37	Clear	Rear end	P.D. only	South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Following too close
19-81742	2019-Mar-11, Mon,07:20	Clear	Rear end	P.D. only	West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
20-22803s	2020-Jan-19, Sun,13:39	Clear	Rear end	P.D. only	East	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other
Comments:					East		Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
20-278108s	2020-Aug-31, Mon,16:40	Clear	Rear end	P.D. only	East	Dry	Going ahead	Pick-up truck	Other motor vehicle	Following too close
Comments:					East	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly

20-71724	2020-Feb-26, Wed,17:33	Snow	Rear end	P.D. only	East	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Lost control
Comments:					East	Loose snow	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly
21-21826	2021-Jan-19, Tue,08:53	Clear	Turning movement	P.D. only	West	Wet	Turning left	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					East	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly

Collision Details Report

From: January 1, 2010 **To:** April 30, 2021

Location ..... Warden Avenue btwn Heritage Hill Drive & Elgin Mills Road East **Municipality.....** Markham

Traffic Control.... **Total Collisions....** 16

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
20-71729	2020-Feb-26, Wed,17:35	Snow	Rear end	P.D. only	North	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition	
Comments:					North	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
20-48789	2020-Feb-09, Sun,06:21	Snow	SMV other	P.D. only	North	Loose snow	Going ahead	Automobile, station wagon	Animal - wild	Driving properly	
Comments:	deer										
19-391105	2019-Nov-13, Wed,07:40	Clear	Other	P.D. only	South	Dry	Reversing	Farm tractor	Other motor vehicle	Lost control	
Comments:					North	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
19-370855	2019-Oct-27, Sun,02:09	Rain	SMV other	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Fence/noice barrier	Lost control	
Comments:						Wet					
19-315978	2019-Sep-12, Thu,07:51	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
19-193650	2019-Jun-10, Mon,08:20	Rain	Rear end	Non-fatal injury	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					South	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
19-154074	2019-May-08, Wed,22:19	Clear	SMV other	Non-fatal injury	South	Dry	Going ahead	Automobile, station wagon	Tree, shrub, stump	Lost control	
Comments:											
18-19152s	2018-Jan-18, Thu,16:15	Clear	Rear end	P.D. only	North	Wet	Going ahead	Passenger van	Other motor vehicle	Driving properly	
Comments:					North	Wet	Stopped	Passenger van	Other motor vehicle	Driving properly	
17-367803	2017-Dec-25, Mon,12:46	Strong wind	Approaching	P.D. only	North	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					South	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

16-84731	2016-Mar-31, Thu,09:23	Rain	Rear end	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					South	Wet	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
16-103382	2016-Apr-18, Mon,15:49	Clear	Sideswipe	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Improper turn
Comments:					North	Dry	Stopped	Pick-up truck	Other motor vehicle	Driving properly
14-57029	2014-Feb-27, Thu,09:58	Strong wind	Rear end	P.D. only	South	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Speed too fast for condition
Comments:					South	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
13-57863	2013-Mar-01, Fri,16:45	Clear	Rear end	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close
Comments:					North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly
13-39263	2013-Feb-11, Mon,06:46	Rain	SMV other	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Ran off road	Lost control
Comments:										
1052586	2010-Feb-25, Thu,16:52	Drifting Snow	SMV other	Non-fatal injury	South	Loose snow	Going ahead	Automobile, station wagon	Ditch	Lost control
Comments:										
10223938	2010-Aug-15, Sun,12:30	Clear	Sideswipe	P.D. only	South	Dry	Overtaking	Automobile, station wagon	Other motor vehicle	Improper passing
Comments:					South		Going ahead	Passenger van	Other motor vehicle	Driving properly

Collision Details Report

From: January 1, 2010 **To:** April 30, 2021

Location ..... Warden Avenue btwn Major Mackenzie Drive East & Heritage Hill Drive **Municipality.....** Markham

Traffic Control.... **Total Collisions....** 13

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
19-422602	2019-Dec-11, Wed,07:40	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					South	Dry	Slowing or stopping	School bus	Other motor vehicle	Driving properly	
18-258603	2018-Aug-15, Wed,17:37	Clear	Rear end	Non-fatal injury	North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
18-224831s	2018-Jul-18, Wed,08:50	Clear	Rear end	P.D. only	South	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					South	Dry	Slowing or stopping	Passenger van	Other motor vehicle	Driving properly	
18-130586	2018-Apr-28, Sat,18:08	Clear	Rear end	P.D. only	North	Dry	Making "U" turn	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments:					North	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
16-290202	2016-Oct-27, Thu,14:30	Rain	SMV other	P.D. only	North	Wet	Going ahead	Automobile, station wagon	Animal - wild	Lost control	
Comments:						Wet					
16-124107	2016-May-09, Mon,08:00	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle		
Comments:					South	Dry	Stopped	Automobile, station wagon	Other motor vehicle	Driving properly	
16-113568	2016-Apr-28, Thu,08:05	Clear	Rear end	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Following too close	
Comments:					South		Slowing or stopping	Pick-up truck	Other motor vehicle	Driving properly	
15-43268	2015-Feb-14, Sat,20:54	Drifting Snow	SMV other	P.D. only	North	Loose snow	Going ahead	Automobile, station wagon	Ran off road	Speed too fast for condition	
Comments:						Loose snow					
13-51084	2013-Feb-22, Fri,18:53	Snow	Approaching	P.D. only	South	Slush	Going ahead	Automobile, station wagon	Skidding/sliding	Lost control	
Comments:					North		Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	

13-23905	2013-Jan-25, Fri,14:35	Rain	SMV other	P.D. only	South	Wet	Going ahead	Automobile, station wagon	Ran off road	Driving properly
Comments:										
12345012	2012-Dec-08, Sat,02:54	Clear	SMV unattended vehicle	P.D. only	North	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:						Dry				
10270263s	2010-Sep-28, Tue,11:15	Rain	Sideswipe	Non-reportable	North	Wet	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly
Comments:					North					
10133675s	2010-May-17, Mon,23:00	Clear	SMV unattended vehicle	Non-reportable	South	Dry	Going ahead	Automobile, station wagon	Animal - wild	Driving properly
Comments:										

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

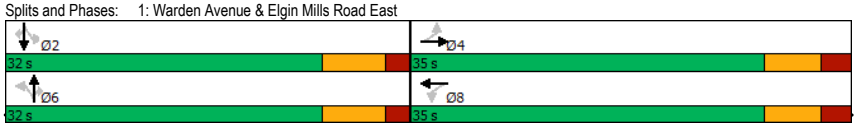
Appendix E

2021 Existing Conditions Synchro Reports

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	19	293	137	681	79	149	11	6	830	80
Future Volume (vph)	19	293	137	681	79	149	11	6	830	80
Lane Group Flow (vph)	22	498	159	808	92	173	13	7	965	93
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		8		6			2	
Permitted Phases	4		8		6		6	2		2
Detector Phase	4	4	8	8	6	6	6	2	2	2
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	52.2%	52.2%	52.2%	52.2%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.5	2.5	2.5	2.5	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)	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	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.21	0.68	0.60	1.03	0.83	0.25	0.02	0.02	1.37	0.15
Control Delay	18.5	20.6	27.4	62.0	75.8	15.8	0.1	13.5	200.6	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	20.6	27.4	62.0	75.8	15.8	0.1	13.5	200.6	6.9
Queue Length 50th (m)	1.7	45.2	14.8	~104.0	10.1	14.5	0.0	0.5	~163.4	2.2
Queue Length 95th (m)	6.5	70.8	#33.0	#160.4	#32.9	25.8	0.0	2.7	#213.2	9.4
Internal Link Dist (m)		180.4		543.1		1650.0			238.4	
Turn Bay Length (m)	70.0		80.0		125.0		30.0	100.0		30.0
Base Capacity (vph)	106	729	263	786	111	682	650	464	702	632
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.68	0.60	1.03	0.83	0.25	0.02	0.02	1.37	0.15

Intersection Summary
Cycle Length: 67
Actuated Cycle Length: 67
Natural Cycle: 100
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Warden Avenue & Elgin Mills Road East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	293	135	137	681	14	79	149	11	6	830	80
Future Volume (vph)	19	293	135	137	681	14	79	149	11	6	830	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Frt	1.00	0.95		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1699		1738	1879		1772	1830	1633	1825	1883	1585
Flt Permitted	0.14	1.00		0.35	1.00		0.16	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	254	1699		631	1879		298	1830	1633	1245	1883	1585
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	22	341	157	159	792	16	92	173	13	7	965	93
RTOR Reduction (vph)	0	19	0	0	1	0	0	0	8	0	0	41
Lane Group Flow (vph)	22	479	0	159	807	0	92	173	5	7	965	52
Heavy Vehicles (%)	8%	9%	5%	5%	2%	0%	3%	5%	0%	0%	2%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	28.0	28.0		28.0	28.0		25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	28.0	28.0		28.0	28.0		25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.37	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)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	106	710		263	785		111	682	609	464	702	591
v/s Ratio Prot		0.28			c0.43			0.09			c0.51	
v/s Ratio Perm	0.09			0.25			0.31		0.00	0.01		0.03
v/c Ratio	0.21	0.67		0.60	1.03		0.83	0.25	0.01	0.02	1.37	0.09
Uniform Delay, d1	12.4	15.8		15.2	19.5		19.1	14.5	13.2	13.2	21.0	13.6
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	1.0	2.5		3.9	39.4		48.3	0.9	0.0	0.1	177.5	0.3
Delay (s)	13.4	18.3		19.1	58.9		67.3	15.4	13.2	13.3	198.5	13.9
Level of Service	B	B		B	E		E	B	B	B	F	B
Approach Delay (s)		18.1			52.4			32.5			181.2	
Approach LOS		B			D			C			F	

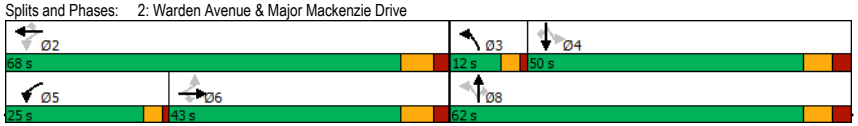
Intersection Summary					
HCM 2000 Control Delay	92.6	HCM 2000 Level of Service	F		
HCM 2000 Volume to Capacity ratio	1.19				
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	14.0		
Intersection Capacity Utilization	124.5%	ICU Level of Service	H		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	613	133	327	1844	19	62	146	61	30	994	88
Future Volume (vph)	1	613	133	327	1844	19	62	146	61	30	994	88
Lane Group Flow (vph)	1	659	143	352	1983	20	67	157	66	32	1069	95
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	6	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	34.0	34.0	34.0	7.0	34.0	34.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	41.5	41.5	41.5	11.0	41.5	41.5	11.0	41.5	41.5	41.5	41.5	41.5
Total Split (s)	43.0	43.0	43.0	25.0	68.0	68.0	12.0	62.0	62.0	50.0	50.0	50.0
Total Split (%)	33.1%	33.1%	33.1%	19.2%	52.3%	52.3%	9.2%	47.7%	47.7%	38.5%	38.5%	38.5%
Yellow Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.5	2.5	2.5	1.0	2.5	2.5	1.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	4.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.02	0.66	0.26	0.85	1.10	0.02	0.41	0.11	0.11	0.08	1.68	0.15
Control Delay	36.0	44.5	6.9	40.4	85.7	0.1	28.6	23.5	5.0	31.2	344.3	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	44.5	6.9	40.4	85.7	0.1	28.6	23.5	5.0	31.2	344.3	5.2
Queue Length 50th (m)	0.2	80.1	0.0	55.6	~308.2	0.0	9.7	12.6	0.0	5.7	~403.5	0.0
Queue Length 95th (m)	1.8	101.2	15.6	#96.6	#349.6	0.0	18.6	19.8	7.8	13.4	#482.2	10.0
Internal Link Dist (m)		203.6			501.9			120.0			316.9	
Turn Bay Length (m)	58.0		90.0	138.0		111.0	48.0		32.0	146.0		80.0
Base Capacity (vph)	60	1000	557	432	1803	813	167	1503	633	380	635	615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.66	0.26	0.81	1.10	0.02	0.40	0.10	0.10	0.08	1.68	0.15

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 127.5
Natural Cycle: 145
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Warden Avenue & Major Mackenzie Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	613	133	327	1844	19	62	146	61	30	994	88
Future Volume (vph)	1	613	133	327	1844	19	62	146	61	30	994	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	4.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3444	1570	1772	3614	1633	1738	3510	1384	1659	1902	1633
Flt Permitted	0.11	1.00	1.00	0.22	1.00	1.00	0.09	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	208	3444	1570	415	3614	1633	157	3510	1384	1140	1902	1633
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)	1	659	143	352	1983	20	67	157	66	32	1069	95
RTOR Reduction (vph)	0	0	102	0	0	11	0	0	39	0	0	63
Lane Group Flow (vph)	1	659	41	352	1983	9	67	157	27	32	1069	32
Heavy Vehicles (%)	0%	6%	4%	3%	1%	0%	5%	4%	18%	10%	1%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	37.0	37.0	37.0	60.6	60.6	60.6	52.7	52.7	52.7	42.6	42.6	42.6
Effective Green, g (s)	37.0	37.0	37.0	60.6	63.6	60.6	52.7	52.7	52.7	42.6	42.6	42.6
Actuated g/C Ratio	0.29	0.29	0.29	0.47	0.50	0.47	0.41	0.41	0.41	0.33	0.33	0.33
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	59	993	452	403	1791	771	139	1441	568	378	631	542
v/s Ratio Prot		0.19		0.13	c0.55		c0.02	0.04			c0.56	
v/s Ratio Perm	0.00		0.03	0.28		0.01	0.17		0.02	0.03		0.02
v/c Ratio	0.02	0.66	0.09	0.87	1.11	0.01	0.48	0.11	0.05	0.08	1.69	0.06
Uniform Delay, d1	32.6	40.2	33.4	24.8	32.4	18.0	30.5	23.3	22.7	29.5	42.9	29.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	3.5	0.4	18.4	57.0	0.0	2.6	0.0	0.0	0.1	319.2	0.0
Delay (s)	33.2	43.7	33.8	43.2	89.4	18.0	33.1	23.4	22.8	29.5	362.0	29.2
Level of Service	C	D	C	D	F	B	C	C	C	C	F	C
Approach Delay (s)		41.9			81.9			25.5			326.7	
Approach LOS		D			F			C			F	

Intersection Summary

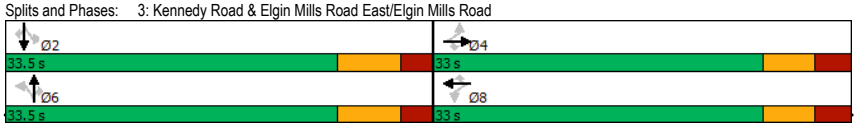
HCM 2000 Control Delay	134.5	HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio	1.38				
Actuated Cycle Length (s)	128.3	Sum of lost time (s)		23.0	
Intersection Capacity Utilization	147.9%	ICU Level of Service		H	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	176	86	63	589	11	116	229	7	14	621	85
Future Volume (vph)	11	176	86	63	589	11	116	229	7	14	621	85
Lane Group Flow (vph)	13	200	98	72	669	13	132	260	8	16	706	97
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Detector Phase	4	4	4	8	8	8	6	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (%)	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	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	7.5	7.5	7.5	7.5	7.5	7.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.11	0.28	0.14	0.18	0.94	0.02	1.14	0.35	0.01	0.04	0.93	0.14
Control Delay	15.9	15.2	3.9	14.7	44.4	0.1	152.7	16.0	0.0	12.9	41.4	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	15.2	3.9	14.7	44.4	0.1	152.7	16.0	0.0	12.9	41.4	5.7
Queue Length 50th (m)	1.0	16.3	0.0	5.6	76.5	0.0	~19.6	22.0	0.0	1.2	81.3	1.6
Queue Length 95th (m)	4.4	28.7	7.3	13.1	#132.8	0.0	#47.6	37.1	0.0	4.3	#139.8	9.0
Internal Link Dist (m)		1347.2			145.4			1762.3			135.7	
Turn Bay Length (m)	100.0		50.0	143.0		58.0	142.0		48.0	45.0		40.0
Base Capacity (vph)	119	737	697	420	730	690	116	737	685	455	759	684
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.27	0.14	0.17	0.92	0.02	1.14	0.35	0.01	0.04	0.93	0.14

Intersection Summary

Cycle Length: 66.5
Actuated Cycle Length: 65.8
Natural Cycle: 90
Control Type: Semi Act-Uncoord
~ Queue shown is maximum after two cycles.
Volume exceeds capacity, queue is theoretically infinite.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Kennedy Road & Elgin Mills Road East/Elgin Mills Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	176	86	63	589	11	116	229	7	14	621	85
Future Volume (vph)	11	176	86	63	589	11	116	229	7	14	621	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	1865	1617	1601	1847	1633	1825	1865	1633	1825	1921	1617
Flt Permitted	0.16	1.00	1.00	0.63	1.00	1.00	0.15	1.00	1.00	0.60	1.00	1.00
Satd. Flow (perm)	304	1865	1617	1065	1847	1633	296	1865	1633	1150	1921	1617
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	12	200	98	72	669	12	132	260	8	16	706	97
RTOR Reduction (vph)	0	0	60	0	0	8	0	0	5	0	0	46
Lane Group Flow (vph)	13	200	38	72	669	5	132	260	3	16	706	51
Heavy Vehicles (%)	0%	3%	1%	14%	4%	0%	0%	3%	0%	0%	0%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	25.3	25.3	25.3	25.3	25.3	25.3	26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	25.3	25.3	25.3	25.3	25.3	25.3	26.0	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38	0.38	0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	116	717	621	409	710	627	116	736	645	454	759	638
v/s Ratio Prot		0.11			c0.36			0.14			0.37	
v/s Ratio Perm	0.04		0.02	0.07		0.00	c0.45		0.00	0.01		0.03
v/c Ratio	0.11	0.28	0.06	0.18	0.94	0.01	1.14	0.35	0.00	0.04	0.93	0.08
Uniform Delay, d1	13.0	14.0	12.8	13.4	19.5	12.5	19.9	14.0	12.1	12.2	19.0	12.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2	0.0	0.2	20.8	0.0	125.4	1.3	0.0	0.1	19.5	0.2
Delay (s)	13.5	14.2	12.8	13.6	40.3	12.5	145.3	15.3	12.1	12.4	38.5	12.7
Level of Service	B	B	B	B	D	B	F	B	B	B	D	B
Approach Delay (s)		13.7			37.3			58.2			35.0	
Approach LOS		B			D			E			C	

Intersection Summary

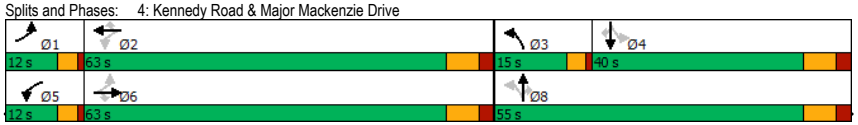
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	65.8	Sum of lost time (s)	14.5	
Intersection Capacity Utilization	112.9%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	573	237	170	1854	135	262	247	95	70	483	121
Future Volume (vph)	27	573	237	170	1854	135	262	247	95	70	483	121
Lane Group Flow (vph)	30	630	260	187	2037	148	288	271	104	77	531	133
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	37.5	37.5	11.0	37.5	37.5	11.0	38.5	38.5	38.5	38.5	38.5
Total Split (s)	12.0	63.0	63.0	12.0	63.0	63.0	15.0	55.0	55.0	40.0	40.0	40.0
Total Split (%)	9.2%	48.5%	48.5%	9.2%	48.5%	48.5%	11.5%	42.3%	42.3%	30.8%	30.8%	30.8%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	2.5	2.5	1.0	2.5	2.5	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	-3.0	0.0	-2.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.5	7.5	4.0	4.5	7.5	2.0	7.5	7.5	7.5	7.5	7.5
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	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.18	0.39	0.30	0.43	1.08	0.18	0.91	0.23	0.17	0.34	0.74	0.31
Control Delay	15.1	23.7	3.5	16.6	74.6	5.1	64.4	30.4	5.9	45.8	52.1	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	23.7	3.5	16.6	74.6	5.1	64.4	30.4	5.9	45.8	52.1	8.3
Queue Length 50th (m)	2.9	51.8	0.0	20.0	~304.9	1.8	51.5	24.9	0.0	16.0	63.3	0.0
Queue Length 95th (m)	8.1	73.9	15.4	36.4	#383.4	14.4	#96.9	35.3	11.7	30.5	81.8	15.6
Internal Link Dist (m)		1479.7			222.6			139.6			212.5	
Turn Bay Length (m)	56.0		66.0	60.0		145.0	120.0		55.0	60.0		65.0
Base Capacity (vph)	176	1609	872	432	1891	839	315	1391	692	296	952	522
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.39	0.30	0.43	1.08	0.18	0.91	0.19	0.15	0.26	0.56	0.25

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 122.4
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Queue shown is maximum after two cycles.
Volume exceeds capacity, queue is theoretically infinite.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Kennedy Road & Major Mackenzie Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	573	237	170	1854	135	262	247	95	70	483	121
Future Volume (vph)	27	573	237	170	1854	135	262	247	95	70	483	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.5	7.5	4.0	4.5	7.5	2.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1755	3544	1609	1789	3614	1547	1789	3579	1617	1807	3579	1595
Flt Permitted	0.07	1.00	1.00	0.34	1.00	1.00	0.25	1.00	1.00	0.58	1.00	1.00
Satd. Flow (perm)	129	3544	1609	633	3614	1547	476	3579	1617	1112	3579	1595
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)	30	630	260	187	2037	148	288	271	104	77	531	133
RTOR Reduction (vph)	0	0	140	0	0	68	0	0	71	0	0	107
Lane Group Flow (vph)	30	630	120	187	2037	80	288	271	33	77	531	26
Confl. Peds. (#/hr)	2		2	2		2	1					1
Heavy Vehicles (%)	4%	3%	0%	2%	1%	3%	2%	2%	1%	1%	2%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	61.5	57.3	57.3	69.1	61.1	61.1	39.7	39.7	39.7	24.7	24.7	24.7
Effective Green, g (s)	61.5	57.3	57.3	69.1	64.1	61.1	41.7	39.7	39.7	24.7	24.7	24.7
Actuated g/C Ratio	0.50	0.46	0.46	0.56	0.52	0.49	0.34	0.32	0.32	0.20	0.20	0.20
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	119	1637	743	427	1868	762	297	1145	517	221	712	317
v/s Ratio Prot	0.01	0.18		c0.03	c0.56		c0.10	0.08			c0.15	
v/s Ratio Perm	0.12		0.07	0.22		0.05	0.22		0.02	0.07		0.02
v/c Ratio	0.25	0.38	0.16	0.44	1.09	0.11	0.97	0.24	0.06	0.35	0.75	0.08
Uniform Delay, d1	27.7	21.8	19.4	14.3	30.0	16.8	36.1	31.0	29.3	42.7	46.7	40.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.7	0.5	0.7	50.1	0.3	43.4	0.1	0.1	1.0	4.3	0.1
Delay (s)	28.8	22.5	19.9	15.0	80.1	17.1	79.5	31.1	29.3	43.7	51.0	40.5
Level of Service	C	C	B	B	F	B	E	C	C	D	D	D
Approach Delay (s)		22.0			71.0			51.8			48.3	
Approach LOS		C			E			D			D	

Intersection Summary

HCM 2000 Control Delay	55.1	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.00				
Actuated Cycle Length (s)	124.0	Sum of lost time (s)		21.0	
Intersection Capacity Utilization	102.0%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

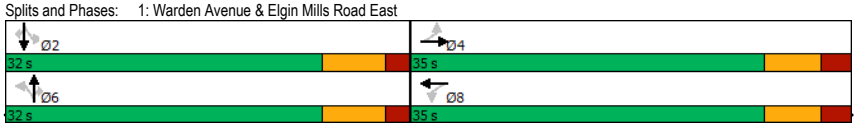
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	19	293	137	681	79	149	11	6	830	80
Future Volume (vph)	19	293	137	681	79	149	11	6	830	80
Lane Group Flow (vph)	22	498	159	808	92	173	13	7	965	93
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		8		6			2	
Permitted Phases	4		8		6		6	2		2
Detector Phase	4	4	8	8	6	6	6	2	2	2
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	52.2%	52.2%	52.2%	52.2%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.5	2.5	2.5	2.5	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	-2.5	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	4.5	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.21	0.67	0.60	1.03	0.82	0.25	0.02	0.02	1.25	0.15
Control Delay	18.5	19.9	27.4	62.0	74.1	15.8	0.1	13.5	145.9	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	19.9	27.4	62.0	74.1	15.8	0.1	13.5	145.9	6.8
Queue Length 50th (m)	1.7	44.1	14.8	~104.0	10.1	14.5	0.0	0.5	~154.0	2.2
Queue Length 95th (m)	6.5	69.4	#33.0	#160.4	#32.7	25.7	0.0	2.7	#203.8	9.4
Internal Link Dist (m)		180.4		543.1		1650.0			238.4	
Turn Bay Length (m)	70.0		80.0		125.0		30.0	100.0		30.0
Base Capacity (vph)	106	739	263	786	112	689	650	464	772	638
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.67	0.60	1.03	0.82	0.25	0.02	0.02	1.25	0.15

Intersection Summary
Cycle Length: 67
Actuated Cycle Length: 67
Natural Cycle: 80
Control Type: Semi Act-Uncoord

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

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

Splits and Phases: 1: Warden Avenue & Elgin Mills Road East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	293	135	137	681	14	79	149	11	6	830	80
Future Volume (vph)	19	293	135	137	681	14	79	149	11	6	830	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	4.5	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
Frt	1.00	0.95		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1710		1738	1879		1789	1847	1633	1825	1883	1601
Flt Permitted	0.14	1.00		0.35	1.00		0.16	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	254	1710		631	1879		301	1847	1633	1245	1883	1601
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	22	341	157	159	792	16	92	173	13	7	965	93
RTOR Reduction (vph)	0	24	0	0	1	0	0	0	8	0	0	41
Lane Group Flow (vph)	22	474	0	159	807	0	92	173	5	7	965	52
Heavy Vehicles (%)	8%	8%	5%	5%	2%	0%	2%	4%	0%	0%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	28.0	28.0		28.0	28.0		25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	28.0	28.0		28.0	28.0		25.0	25.0	25.0	25.0	27.5	25.0
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.37	0.37	0.37	0.37	0.41	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)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	106	714		263	785		112	689	609	464	772	597
v/s Ratio Prot		0.28			c0.43			0.09			c0.51	
v/s Ratio Perm	0.09			0.25			0.31		0.00	0.01		0.03
v/c Ratio	0.21	0.66		0.60	1.03		0.82	0.25	0.01	0.02	1.25	0.09
Uniform Delay, d1	12.4	15.7		15.2	19.5		19.0	14.5	13.2	13.2	19.8	13.6
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	1.0	2.3		3.9	39.4		46.7	0.9	0.0	0.1	123.1	0.3
Delay (s)	13.4	18.0		19.1	58.9		65.7	15.4	13.2	13.3	142.9	13.9
Level of Service	B	B		B	E		E	B	B	B	F	B
Approach Delay (s)		17.8			52.4			32.0			130.8	
Approach LOS		B			D			C			F	

Intersection Summary					
HCM 2000 Control Delay	73.5	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.19				
Actuated Cycle Length (s)	67.0	Sum of lost time (s)		14.0	
Intersection Capacity Utilization	122.5%	ICU Level of Service		H	
Analysis Period (min)	15				
c Critical Lane Group					

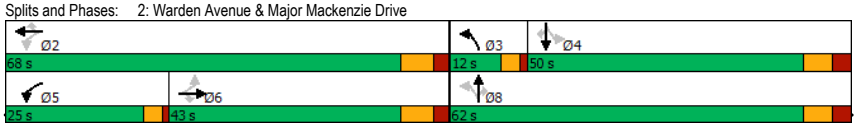
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	613	133	327	1844	19	62	146	61	30	994	88
Future Volume (vph)	1	613	133	327	1844	19	62	146	61	30	994	88
Lane Group Flow (vph)	1	659	143	352	1983	20	67	157	66	32	1069	95
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	6	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	34.0	34.0	34.0	7.0	34.0	34.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	41.5	41.5	41.5	11.0	41.5	41.5	11.0	41.5	41.5	41.5	41.5	41.5
Total Split (s)	43.0	43.0	43.0	25.0	68.0	68.0	12.0	62.0	62.0	50.0	50.0	50.0
Total Split (%)	33.1%	33.1%	33.1%	19.2%	52.3%	52.3%	9.2%	47.7%	47.7%	38.5%	38.5%	38.5%
Yellow Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.5	2.5	2.5	1.0	2.5	2.5	1.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	-2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	5.0	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.02	0.66	0.26	0.85	1.11	0.02	0.41	0.11	0.11	0.08	1.68	0.15
Control Delay	36.0	44.5	6.9	40.4	89.3	0.1	28.6	23.5	5.0	31.2	344.3	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	44.5	6.9	40.4	89.3	0.1	28.6	23.5	5.0	31.2	344.3	5.2
Queue Length 50th (m)	0.2	80.1	0.0	55.6	~310.1	0.0	9.7	12.6	0.0	5.7	~403.5	0.0
Queue Length 95th (m)	1.8	101.2	15.6	#96.6	#351.6	0.0	18.6	19.8	7.8	13.4	#482.2	10.0
Internal Link Dist (m)		203.6			501.9			120.0			316.9	
Turn Bay Length (m)	58.0		90.0	138.0		111.0	48.0		32.0	146.0		80.0
Base Capacity (vph)	60	1000	557	432	1788	813	167	1503	633	380	635	615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.66	0.26	0.81	1.11	0.02	0.40	0.10	0.10	0.08	1.68	0.15

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 127.5
Natural Cycle: 145
Control Type: Semi Act-Uncoord

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

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

Splits and Phases: 2: Warden Avenue & Major Mackenzie Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	613	133	327	1844	19	62	146	61	30	994	88
Future Volume (vph)	1	613	133	327	1844	19	62	146	61	30	994	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	5.0	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3444	1570	1772	3614	1633	1738	3510	1384	1659	1902	1633
Flt Permitted	0.11	1.00	1.00	0.22	1.00	1.00	0.09	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	208	3444	1570	415	3614	1633	157	3510	1384	1140	1902	1633
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)	1	659	143	352	1983	20	67	157	66	32	1069	95
RTOR Reduction (vph)	0	0	102	0	0	11	0	0	39	0	0	63
Lane Group Flow (vph)	1	659	41	352	1983	9	67	157	27	32	1069	32
Heavy Vehicles (%)	0%	6%	4%	3%	1%	0%	5%	4%	18%	10%	1%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	37.0	37.0	37.0	60.6	60.6	60.6	52.7	52.7	52.7	42.6	42.6	42.6
Effective Green, g (s)	37.0	37.0	37.0	60.6	63.1	60.6	52.7	52.7	52.7	42.6	42.6	42.6
Actuated g/C Ratio	0.29	0.29	0.29	0.47	0.49	0.47	0.41	0.41	0.41	0.33	0.33	0.33
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	59	993	452	403	1777	771	139	1441	568	378	631	542
v/s Ratio Prot		0.19		0.13	c0.55		c0.02	0.04			c0.56	
v/s Ratio Perm	0.00		0.03	0.28		0.01	0.17		0.02	0.03		0.02
v/c Ratio	0.02	0.66	0.09	0.87	1.12	0.01	0.48	0.11	0.05	0.08	1.69	0.06
Uniform Delay, d1	32.6	40.2	33.4	24.8	32.6	18.0	30.5	23.3	22.7	29.5	42.9	29.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	3.5	0.4	18.4	60.6	0.0	2.6	0.0	0.0	0.1	319.2	0.0
Delay (s)	33.2	43.7	33.8	43.2	93.2	18.0	33.1	23.4	22.8	29.5	362.0	29.2
Level of Service	C	D	C	D	F	B	C	C	C	C	F	C
Approach Delay (s)		41.9			85.1			25.5			326.7	
Approach LOS		D			F			C			F	

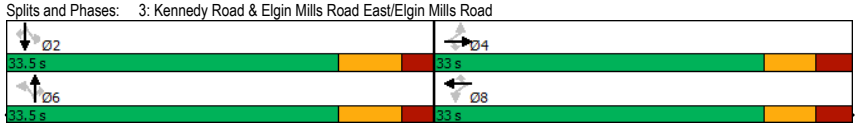
Intersection Summary					
HCM 2000 Control Delay	136.1	HCM 2000 Level of Service	F		
HCM 2000 Volume to Capacity ratio	1.38				
Actuated Cycle Length (s)	128.3	Sum of lost time (s)	23.0		
Intersection Capacity Utilization	148.3%	ICU Level of Service	H		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	176	86	63	589	11	116	229	7	14	621	85
Future Volume (vph)	11	176	86	63	589	11	116	229	7	14	621	85
Lane Group Flow (vph)	13	200	98	72	669	13	132	260	8	16	706	97
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Detector Phase	4	4	4	8	8	8	6	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (%)	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	-2.5	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	5.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.11	0.28	0.14	0.18	0.94	0.02	1.11	0.35	0.01	0.04	0.93	0.14
Control Delay	15.9	15.2	3.9	14.7	44.4	0.1	141.0	16.0	0.0	12.9	41.4	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	15.2	3.9	14.7	44.4	0.1	141.0	16.0	0.0	12.9	41.4	5.7
Queue Length 50th (m)	1.0	16.3	0.0	5.6	76.5	0.0	~19.2	22.0	0.0	1.2	81.3	1.6
Queue Length 95th (m)	4.4	28.7	7.3	13.1	#132.8	0.0	#47.2	37.1	0.0	4.3	#139.8	9.0
Internal Link Dist (m)		1347.2			145.4			1762.3			135.7	
Turn Bay Length (m)	100.0		50.0	143.0		58.0	142.0		48.0	45.0		40.0
Base Capacity (vph)	119	737	697	420	730	690	119	737	685	455	759	684
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.27	0.14	0.17	0.92	0.02	1.11	0.35	0.01	0.04	0.93	0.14

Intersection Summary

Cycle Length: 66.5
Actuated Cycle Length: 65.8
Natural Cycle: 90
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Kennedy Road & Elgin Mills Road East/Elgin Mills Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	176	86	63	589	11	116	229	7	14	621	85
Future Volume (vph)	11	176	86	63	589	11	116	229	7	14	621	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	1865	1617	1601	1847	1633	1825	1865	1633	1825	1921	1617
Flt Permitted	0.16	1.00	1.00	0.63	1.00	1.00	0.14	1.00	1.00	0.60	1.00	1.00
Satd. Flow (perm)	304	1865	1617	1065	1847	1633	276	1865	1633	1150	1921	1617
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	12	200	98	72	669	12	132	260	8	16	706	97
RTOR Reduction (vph)	0	0	60	0	0	8	0	0	5	0	0	46
Lane Group Flow (vph)	13	200	38	72	669	5	132	260	3	16	706	51
Heavy Vehicles (%)	0%	3%	1%	14%	4%	0%	0%	3%	0%	0%	0%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	25.3	25.3	25.3	25.3	25.3	25.3	26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	25.3	25.3	25.3	25.3	25.3	25.3	28.5	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38	0.38	0.43	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	116	717	621	409	710	627	119	736	645	454	759	638
v/s Ratio Prot		0.11			c0.36			0.14			0.37	
v/s Ratio Perm	0.04		0.02	0.07		0.00	c0.48		0.00	0.01		0.03
v/c Ratio	0.11	0.28	0.06	0.18	0.94	0.01	1.11	0.35	0.00	0.04	0.93	0.08
Uniform Delay, d1	13.0	14.0	12.8	13.4	19.5	12.5	18.6	14.0	12.1	12.2	19.0	12.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2	0.0	0.2	20.8	0.0	114.9	1.3	0.0	0.1	19.5	0.2
Delay (s)	13.5	14.2	12.8	13.6	40.3	12.5	133.5	15.3	12.1	12.4	38.5	12.7
Level of Service	B	B	B	B	D	B	F	B	B	B	D	B
Approach Delay (s)		13.7			37.3			54.3			35.0	
Approach LOS		B			D			D			C	

Intersection Summary

HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	1.08			
Actuated Cycle Length (s)	65.8	Sum of lost time (s)	14.5	
Intersection Capacity Utilization	110.8%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	573	237	170	1854	135	262	247	95	70	483	121
Future Volume (vph)	27	573	237	170	1854	135	262	247	95	70	483	121
Lane Group Flow (vph)	30	630	260	187	2037	148	288	271	104	77	531	133
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	37.5	37.5	11.0	37.5	37.5	11.0	38.5	38.5	38.5	38.5	38.5
Total Split (s)	13.0	63.0	63.0	13.0	63.0	63.0	15.0	54.0	54.0	39.0	39.0	39.0
Total Split (%)	10.0%	48.5%	48.5%	10.0%	48.5%	48.5%	11.5%	41.5%	41.5%	30.0%	30.0%	30.0%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	2.5	2.5	1.0	2.5	2.5	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	-2.5	0.0	-2.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.5	7.5	4.0	5.0	7.5	2.0	7.5	7.5	7.5	7.5	7.5
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	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.18	0.39	0.30	0.42	1.08	0.18	0.93	0.24	0.18	0.35	0.74	0.31
Control Delay	15.0	24.1	3.6	16.0	74.9	5.0	67.3	30.9	5.9	46.5	53.0	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	24.1	3.6	16.0	74.9	5.0	67.3	30.9	5.9	46.5	53.0	8.5
Queue Length 50th (m)	2.9	52.8	0.0	20.1	~307.9	1.8	52.2	25.2	0.0	16.2	64.1	0.0
Queue Length 95th (m)	7.9	73.9	15.4	35.7	#381.5	14.2	#99.6	35.8	11.8	30.8	82.7	15.8
Internal Link Dist (m)		1479.7			222.6			139.6			212.5	
Turn Bay Length (m)	56.0		66.0	60.0		145.0	120.0		55.0	60.0		65.0
Base Capacity (vph)	190	1599	868	445	1890	844	311	1353	675	284	916	507
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.39	0.30	0.42	1.08	0.18	0.93	0.20	0.15	0.27	0.58	0.26

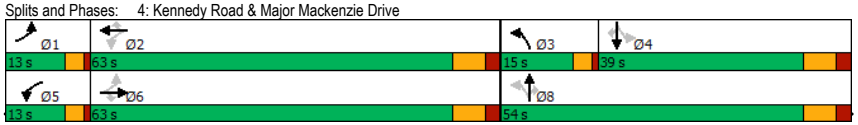
Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 123.2
Natural Cycle: 150
Control Type: Semi-Act-Uncoord

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

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

Splits and Phases: 4: Kennedy Road & Major Mackenzie Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	573	237	170	1854	135	262	247	95	70	483	121
Future Volume (vph)	27	573	237	170	1854	135	262	247	95	70	483	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.5	7.5	4.0	5.0	7.5	2.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1755	3544	1609	1789	3614	1547	1789	3579	1617	1807	3579	1595
Flt Permitted	0.07	1.00	1.00	0.33	1.00	1.00	0.25	1.00	1.00	0.58	1.00	1.00
Satd. Flow (perm)	129	3544	1609	628	3614	1547	471	3579	1617	1112	3579	1595
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)	30	630	260	187	2037	148	288	271	104	77	531	133
RTOR Reduction (vph)	0	0	141	0	0	67	0	0	71	0	0	107
Lane Group Flow (vph)	30	630	119	187	2037	81	288	271	33	77	531	26
Confl. Peds. (#/hr)	2		2	2		2	1					1
Heavy Vehicles (%)	4%	3%	0%	2%	1%	3%	2%	2%	1%	1%	2%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	61.5	57.3	57.3	70.2	62.0	62.0	39.7	39.7	39.7	24.7	24.7	24.7
Effective Green, g (s)	61.5	57.3	57.3	70.2	64.5	62.0	41.7	39.7	39.7	24.7	24.7	24.7
Actuated g/C Ratio	0.49	0.46	0.46	0.56	0.52	0.50	0.33	0.32	0.32	0.20	0.20	0.20
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	118	1625	738	435	1866	767	294	1137	513	219	707	315
v/s Ratio Prot	0.01	0.18		c0.03	c0.56		c0.10	0.08			c0.15	
v/s Ratio Perm	0.12		0.07	0.21		0.05	0.22		0.02	0.07		0.02
v/c Ratio	0.25	0.39	0.16	0.43	1.09	0.10	0.98	0.24	0.06	0.35	0.75	0.08
Uniform Delay, d1	27.9	22.3	19.8	14.1	30.2	16.7	36.7	31.4	29.7	43.2	47.2	40.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.7	0.5	0.7	50.6	0.3	46.3	0.1	0.1	1.0	4.5	0.1
Delay (s)	29.1	23.0	20.2	14.8	80.8	17.0	83.0	31.6	29.7	44.2	51.7	41.0
Level of Service	C	C	C	B	F	B	F	C	C	D	D	D
Approach Delay (s)		22.4			71.6			53.6			49.0	
Approach LOS		C			E			D			D	

Intersection Summary						
HCM 2000 Control Delay	55.9	HCM 2000 Level of Service	E			
HCM 2000 Volume to Capacity ratio	1.00					
Actuated Cycle Length (s)	124.9	Sum of lost time (s)	21.0			
Intersection Capacity Utilization	102.4%	ICU Level of Service	G			
Analysis Period (min)	15					

c Critical Lane Group

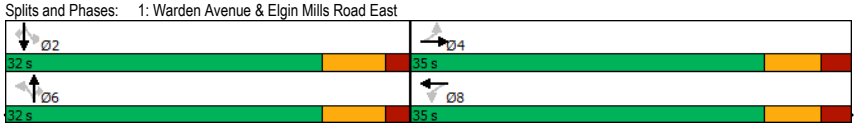
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	40	559	18	227	159	757	121	12	153	18
Future Volume (vph)	40	559	18	227	159	757	121	12	153	18
Lane Group Flow (vph)	44	710	20	264	177	841	134	13	170	20
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		8		6			2	
Permitted Phases	4		8		6		6	2		2
Detector Phase	4	4	8	8	6	6	6	2	2	2
Switch Phase										
Minimum Initial (s)	10.0	10.0	5.0	5.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	52.2%	52.2%	52.2%	52.2%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.5	2.5	2.5	2.5	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)	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	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.09	0.94	0.17	0.35	0.37	1.18	0.20	0.11	0.24	0.03
Control Delay	12.6	41.4	16.8	14.7	18.2	118.2	8.7	16.8	15.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	41.4	16.8	14.7	18.2	118.2	8.7	16.8	15.5	0.1
Queue Length 50th (m)	3.2	78.9	1.5	21.1	15.7	~130.4	5.2	1.0	14.2	0.0
Queue Length 95th (m)	8.7	#144.1	6.1	36.7	30.4	#191.9	15.3	4.5	26.4	0.2
Internal Link Dist (m)		180.4		543.1		1650.0			238.4	
Turn Bay Length (m)	70.0		80.0		125.0		30.0	100.0		30.0
Base Capacity (vph)	486	787	121	790	474	714	661	116	721	660
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.90	0.17	0.33	0.37	1.18	0.20	0.11	0.24	0.03

Intersection Summary
Cycle Length: 67
Actuated Cycle Length: 66
Natural Cycle: 90
Control Type: Semi Act-Uncoord

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

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

Splits and Phases: 1: Warden Avenue & Elgin Mills Road East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	559	80	18	227	11	159	757	121	12	153	18
Future Volume (vph)	40	559	80	18	227	11	159	757	121	12	153	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	1837		1825	1855		1825	1883	1633	1825	1902	1633
Flt Permitted	0.60	1.00		0.15	1.00		0.65	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	1146	1837		286	1855		1248	1883	1633	307	1902	1633
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	621	89	20	252	12	177	841	134	13	170	20
RTOR Reduction (vph)	0	8	0	0	2	0	0	0	42	0	0	12
Lane Group Flow (vph)	44	702	0	20	262	0	177	841	92	13	170	8
Heavy Vehicles (%)	0%	3%	0%	0%	3%	0%	0%	2%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	26.9	26.9		26.9	26.9		25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	26.9	26.9		26.9	26.9		25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.38	0.38	0.38	0.38	0.38	0.38
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)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	467	749		116	757		473	714	619	116	721	619
v/s Ratio Prot		c0.38			0.14			c0.45			0.09	
v/s Ratio Perm	0.04			0.07			0.14		0.06	0.04		0.00
v/c Ratio	0.09	0.94		0.17	0.35		0.37	1.18	0.15	0.11	0.24	0.01
Uniform Delay, d1	12.0	18.7		12.4	13.4		14.8	20.5	13.4	13.3	13.9	12.8
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	0.1	19.1		0.7	0.3		2.3	94.2	0.5	1.9	0.8	0.0
Delay (s)	12.1	37.8		13.1	13.7		17.0	114.7	14.0	15.2	14.7	12.8
Level of Service	B	D		B	B		B	F	B	B	B	B
Approach Delay (s)		36.3			13.7			88.0			14.6	
Approach LOS		D			B			F			B	

Intersection Summary				
HCM 2000 Control Delay	56.6	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.05			
Actuated Cycle Length (s)	65.9	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	104.1%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

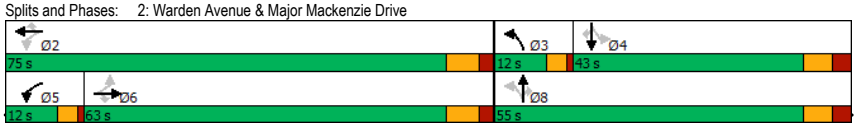
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	1783	120	104	670	29	200	967	314	27	179	16
Future Volume (vph)	33	1783	120	104	670	29	200	967	314	27	179	16
Lane Group Flow (vph)	36	1938	130	113	728	32	217	1051	341	29	195	17
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	6	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	34.0	34.0	34.0	7.0	34.0	34.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	41.5	41.5	41.5	11.0	41.5	41.5	11.0	41.5	41.5	41.5	41.5	41.5
Total Split (s)	63.0	63.0	63.0	12.0	75.0	75.0	12.0	55.0	55.0	43.0	43.0	43.0
Total Split (%)	48.5%	48.5%	48.5%	9.2%	57.7%	57.7%	9.2%	42.3%	42.3%	33.1%	33.1%	33.1%
Yellow Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.5	2.5	2.5	1.0	2.5	2.5	1.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.11	1.20	0.17	0.65	0.37	0.04	0.53	0.83	0.53	0.48	0.41	0.03
Control Delay	23.6	129.6	6.8	37.6	18.2	0.1	33.8	44.6	21.8	68.0	41.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	129.6	6.8	37.6	18.2	0.1	33.8	44.6	21.8	68.0	41.9	0.1
Queue Length 50th (m)	5.5	~324.6	3.7	13.5	57.0	0.0	38.0	125.4	39.1	6.2	40.5	0.0
Queue Length 95th (m)	12.8	#366.3	15.6	#36.3	71.3	0.3	57.8	151.7	67.4	#18.1	62.3	0.0
Internal Link Dist (m)		203.6			501.9			120.0			316.9	
Turn Bay Length (m)	58.0		90.0	138.0		111.0	48.0		32.0	146.0		80.0
Base Capacity (vph)	318	1613	773	176	1954	882	408	1375	696	68	540	535
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	1.20	0.17	0.64	0.37	0.04	0.53	0.76	0.49	0.43	0.36	0.03

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 126.3
Natural Cycle: 145
Control Type: Semi Act-Uncoord

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

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

Splits and Phases: 2: Warden Avenue & Major Mackenzie Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	1783	120	104	670	29	200	967	314	27	179	16
Future Volume (vph)	33	1783	120	104	670	29	200	967	314	27	179	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3650	1617	1789	3650	1585	1825	3650	1617	1825	1921	1633
Flt Permitted	0.38	1.00	1.00	0.07	1.00	1.00	0.49	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	720	3650	1617	126	3650	1585	946	3650	1617	243	1921	1633
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)	36	1938	130	113	728	32	217	1051	341	29	195	17
RTOR Reduction (vph)	0	0	59	0	0	15	0	0	91	0	0	13
Lane Group Flow (vph)	36	1938	71	113	728	17	217	1051	250	29	195	4
Heavy Vehicles (%)	0%	0%	1%	2%	0%	3%	0%	0%	1%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	55.8	55.8	55.8	67.6	67.6	67.6	43.6	43.6	43.6	31.6	31.6	31.6
Effective Green, g (s)	55.8	55.8	55.8	67.6	67.6	67.6	43.6	43.6	43.6	31.6	31.6	31.6
Actuated g/C Ratio	0.44	0.44	0.44	0.54	0.54	0.54	0.35	0.35	0.35	0.25	0.25	0.25
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	318	1613	714	170	1955	849	382	1261	558	60	481	408
v/s Ratio Prot		c0.53		c0.04	0.20		0.04	c0.29			0.10	
v/s Ratio Perm	0.05		0.04	0.31		0.01	0.16		0.15	0.12		0.00
v/c Ratio	0.11	1.20	0.10	0.66	0.37	0.02	0.57	0.83	0.45	0.48	0.41	0.01
Uniform Delay, d1	20.7	35.2	20.5	27.6	17.0	13.8	33.0	38.0	32.0	40.3	39.5	35.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	96.9	0.3	9.4	0.5	0.0	1.9	4.9	0.6	6.0	0.6	0.0
Delay (s)	21.4	132.1	20.8	37.1	17.5	13.8	34.9	42.8	32.6	46.4	40.0	35.6
Level of Service	C	F	C	D	B	B	C	D	C	D	D	D
Approach Delay (s)		123.3			19.9			39.6			40.5	
Approach LOS		F			B			D			D	

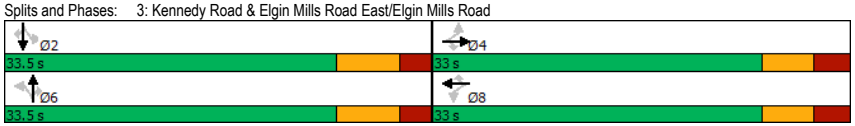
Intersection Summary					
HCM 2000 Control Delay	72.6	HCM 2000 Level of Service	E		
HCM 2000 Volume to Capacity ratio	1.05				
Actuated Cycle Length (s)	126.2	Sum of lost time (s)	23.0		
Intersection Capacity Utilization	116.7%	ICU Level of Service	H		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	543	102	16	184	6	90	386	44	12	243	13
Future Volume (vph)	47	543	102	16	184	6	90	386	44	12	243	13
Lane Group Flow (vph)	48	560	105	16	190	6	93	398	45	12	251	13
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Detector Phase	4	4	4	8	8	8	6	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (%)	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	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	7.5	7.5	7.5	7.5	7.5	7.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.11	0.83	0.17	0.10	0.28	0.01	0.19	0.51	0.07	0.03	0.32	0.02
Control Delay	13.8	30.2	4.0	15.0	15.4	0.0	14.6	17.6	2.7	13.0	15.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	30.2	4.0	15.0	15.4	0.0	14.6	17.6	2.7	13.0	15.0	0.1
Queue Length 50th (m)	3.7	57.9	0.0	1.2	15.4	0.0	7.4	36.5	0.0	0.9	21.0	0.0
Queue Length 95th (m)	9.6	#96.2	7.9	4.9	28.2	0.0	16.4	60.0	3.5	3.8	36.8	0.0
Internal Link Dist (m)		1347.2			145.4			1762.3			135.7	
Turn Bay Length (m)	100.0		50.0	143.0		58.0	142.0		48.0	45.0		40.0
Base Capacity (vph)	506	785	715	178	785	717	477	785	668	369	785	712
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.71	0.15	0.09	0.24	0.01	0.19	0.51	0.07	0.03	0.32	0.02

Intersection Summary
Cycle Length: 66.5
Actuated Cycle Length: 63.3
Natural Cycle: 70
Control Type: Semi Act-Uncoord

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

Splits and Phases: 3: Kennedy Road & Elgin Mills Road East/Elgin Mills Road



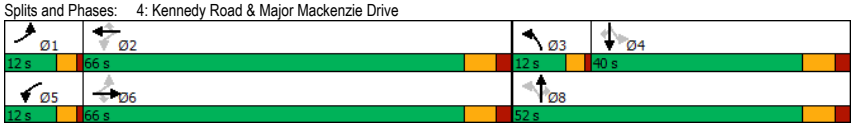
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	543	102	16	184	6	90	386	44	12	243	13
Future Volume (vph)	47	543	102	16	184	6	90	386	44	12	243	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	1902	1585	1825	1902	1633	1825	1902	1526	1825	1902	1633
Flt Permitted	0.64	1.00	1.00	0.23	1.00	1.00	0.60	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1226	1902	1585	435	1902	1633	1159	1902	1526	896	1902	1633
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	48	560	105	16	190	6	93	398	45	12	251	13
RTOR Reduction (vph)	0	0	67	0	0	4	0	0	26	0	0	8
Lane Group Flow (vph)	48	560	38	16	190	2	93	398	19	12	251	5
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%	0%	1%	7%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	22.6	22.6	22.6	22.6	22.6	22.6	26.1	26.1	26.1	26.1	26.1	26.1
Effective Green, g (s)	22.6	22.6	22.6	22.6	22.6	22.6	26.1	26.1	26.1	26.1	26.1	26.1
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	438	680	566	155	680	583	478	785	630	370	785	674
v/s Ratio Prot		c0.29			0.10			c0.21			0.13	
v/s Ratio Perm	0.04		0.02	0.04		0.00	0.08		0.01	0.01		0.00
v/c Ratio	0.11	0.82	0.07	0.10	0.28	0.00	0.19	0.51	0.03	0.03	0.32	0.01
Uniform Delay, d1	13.6	18.5	13.4	13.5	14.5	13.1	11.8	13.8	11.0	11.0	12.5	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	8.0	0.0	0.3	0.2	0.0	0.9	2.3	0.1	0.2	1.1	0.0
Delay (s)	13.7	26.5	13.4	13.8	14.7	13.1	12.7	16.1	11.1	11.2	13.6	10.9
Level of Service	B	C	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)		23.7			14.6			15.1			13.4	
Approach LOS		C			B			B			B	

Intersection Summary					
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.65				
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	14.5		
Intersection Capacity Utilization	94.4%	ICU Level of Service	F		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	1858	233	81	773	32	218	323	160	81	244	26
Future Volume (vph)	37	1858	233	81	773	32	218	323	160	81	244	26
Lane Group Flow (vph)	38	1896	238	83	789	33	222	330	163	83	249	27
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	37.5	37.5	11.0	37.5	37.5	11.0	38.5	38.5	38.5	38.5	38.5
Total Split (s)	12.0	66.0	66.0	12.0	66.0	66.0	12.0	52.0	52.0	40.0	40.0	40.0
Total Split (%)	9.2%	50.8%	50.8%	9.2%	50.8%	50.8%	9.2%	40.0%	40.0%	30.8%	30.8%	30.8%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	2.5	2.5	1.0	2.5	2.5	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
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	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.08	0.97	0.26	0.44	0.39	0.04	0.70	0.37	0.33	0.58	0.52	0.09
Control Delay	8.2	40.3	8.6	19.4	15.6	0.1	47.3	36.0	10.7	62.4	48.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	40.3	8.6	19.4	15.6	0.1	47.3	36.0	10.7	62.4	48.4	0.6
Queue Length 50th (m)	2.6	203.0	12.9	5.8	51.4	0.0	40.3	31.7	4.9	17.3	27.0	0.0
Queue Length 95th (m)	7.5	#300.0	31.0	19.0	76.9	0.0	62.3	44.7	21.0	33.5	39.6	0.0
Internal Link Dist (m)		1479.7			222.6			139.6			212.5	
Turn Bay Length (m)	56.0		66.0	60.0		145.0	120.0		55.0	60.0		65.0
Base Capacity (vph)	473	1959	918	196	2025	941	315	1490	737	316	1077	554
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.97	0.26	0.42	0.39	0.04	0.70	0.22	0.22	0.26	0.23	0.05

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 109.6
Natural Cycle: 140
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Kennedy Road & Major Mackenzie Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	1858	233	81	773	32	218	323	160	81	244	26
Future Volume (vph)	37	1858	233	81	773	32	218	323	160	81	244	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3650	1612	1755	3614	1597	1824	3650	1612	1824	3614	1612
Flt Permitted	0.32	1.00	1.00	0.07	1.00	1.00	0.47	1.00	1.00	0.55	1.00	1.00
Satd. Flow (perm)	614	3650	1612	120	3614	1597	897	3650	1612	1061	3614	1612
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	38	1896	238	83	789	33	222	330	163	83	249	27
RTOR Reduction (vph)	0	0	54	0	0	15	0	0	102	0	0	23
Lane Group Flow (vph)	38	1896	184	83	789	18	222	330	61	83	249	4
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	0%	0%	0%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	63.7	59.6	59.6	67.3	61.4	61.4	26.7	26.7	26.7	14.7	14.7	14.7
Effective Green, g (s)	63.7	59.6	59.6	67.3	61.4	61.4	26.7	26.7	26.7	14.7	14.7	14.7
Actuated g/C Ratio	0.57	0.54	0.54	0.61	0.55	0.55	0.24	0.24	0.24	0.13	0.13	0.13
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	396	1956	863	159	1995	881	282	876	387	140	477	213
v/s Ratio Prot	0.00	c0.52		c0.03	0.22		c0.06	0.09			0.07	
v/s Ratio Perm	0.05		0.11	0.29		0.01	c0.13		0.04	0.08		0.00
v/c Ratio	0.10	0.97	0.21	0.52	0.40	0.02	0.79	0.38	0.16	0.59	0.52	0.02
Uniform Delay, d1	10.5	24.9	13.5	24.6	14.3	11.3	38.2	35.3	33.4	45.4	45.0	42.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	14.3	0.6	3.1	0.6	0.0	13.5	0.3	0.2	6.6	1.0	0.0
Delay (s)	10.6	39.2	14.1	27.7	14.9	11.3	51.7	35.6	33.6	52.0	46.0	42.0
Level of Service	B	D	B	C	B	B	D	D	C	D	D	D
Approach Delay (s)		36.0			15.9			40.1			47.1	
Approach LOS		D			B			D			D	

Intersection Summary					
HCM 2000 Control Delay	33.3	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.92				
Actuated Cycle Length (s)	111.2	Sum of lost time (s)		23.0	
Intersection Capacity Utilization	97.3%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

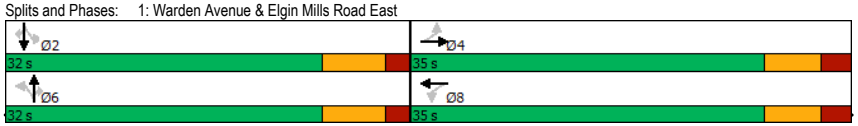
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	40	559	18	227	159	757	121	12	153	18
Future Volume (vph)	40	559	18	227	159	757	121	12	153	18
Lane Group Flow (vph)	44	710	20	264	177	841	134	13	170	20
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		8		6			2	
Permitted Phases	4		8		6		6	2		2
Detector Phase	4	4	8	8	6	6	6	2	2	2
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	52.2%	52.2%	52.2%	52.2%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.5	2.5	2.5	2.5	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	-2.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.5	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.09	0.94	0.17	0.35	0.37	1.07	0.20	0.11	0.24	0.03
Control Delay	12.6	41.4	16.8	14.7	18.2	75.9	8.7	16.8	15.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	41.4	16.8	14.7	18.2	75.9	8.7	16.8	15.5	0.1
Queue Length 50th (m)	3.2	78.9	1.5	21.1	15.7	~121.0	5.2	1.0	14.2	0.0
Queue Length 95th (m)	8.7	#144.1	6.1	36.7	30.4	#182.5	15.3	4.5	26.4	0.2
Internal Link Dist (m)		180.4		543.1		1650.0			238.4	
Turn Bay Length (m)	70.0		80.0		125.0		30.0	100.0		30.0
Base Capacity (vph)	486	787	121	790	474	785	661	116	721	660
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.90	0.17	0.33	0.37	1.07	0.20	0.11	0.24	0.03

Intersection Summary
Cycle Length: 67
Actuated Cycle Length: 66
Natural Cycle: 90
Control Type: Semi Act-Uncoord

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

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

Splits and Phases: 1: Warden Avenue & Elgin Mills Road East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	559	80	18	227	11	159	757	121	12	153	18
Future Volume (vph)	40	559	80	18	227	11	159	757	121	12	153	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	4.5	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
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	1837		1825	1855		1825	1883	1633	1825	1902	1633
Flt Permitted	0.60	1.00		0.15	1.00		0.65	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	1146	1837		286	1855		1248	1883	1633	307	1902	1633
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	621	89	20	252	12	177	841	134	13	170	20
RTOR Reduction (vph)	0	8	0	0	2	0	0	0	42	0	0	12
Lane Group Flow (vph)	44	702	0	20	262	0	177	841	92	13	170	8
Heavy Vehicles (%)	0%	3%	0%	0%	3%	0%	0%	2%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	26.9	26.9		26.9	26.9		25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	26.9	26.9		26.9	26.9		25.0	27.5	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.38	0.42	0.38	0.38	0.38	0.38
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)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	467	749		116	757		473	785	619	116	721	619
v/s Ratio Prot		c0.38			0.14			c0.45			0.09	
v/s Ratio Perm	0.04			0.07			0.14		0.06	0.04		0.00
v/c Ratio	0.09	0.94		0.17	0.35		0.37	1.07	0.15	0.11	0.24	0.01
Uniform Delay, d1	12.0	18.7		12.4	13.4		14.8	19.2	13.4	13.3	13.9	12.8
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	0.1	19.1		0.7	0.3		2.3	53.0	0.5	1.9	0.8	0.0
Delay (s)	12.1	37.8		13.1	13.7		17.0	72.2	14.0	15.2	14.7	12.8
Level of Service	B	D		B	B		B	E	B	B	B	B
Approach Delay (s)		36.3			13.7			56.9			14.6	
Approach LOS		D			B			E			B	

Intersection Summary				
HCM 2000 Control Delay	41.7	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	1.05			
Actuated Cycle Length (s)	65.9	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	102.0%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

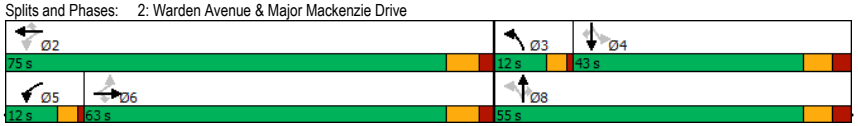
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	1783	120	104	670	29	200	967	314	27	179	16
Future Volume (vph)	33	1783	120	104	670	29	200	967	314	27	179	16
Lane Group Flow (vph)	36	1938	130	113	728	32	217	1051	341	29	195	17
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	6	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	34.0	34.0	34.0	7.0	34.0	34.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	41.5	41.5	41.5	11.0	41.5	41.5	11.0	41.5	41.5	41.5	41.5	41.5
Total Split (s)	63.0	63.0	63.0	12.0	75.0	75.0	12.0	55.0	55.0	43.0	43.0	43.0
Total Split (%)	48.5%	48.5%	48.5%	9.2%	57.7%	57.7%	9.2%	42.3%	42.3%	33.1%	33.1%	33.1%
Yellow Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.5	2.5	2.5	1.0	2.5	2.5	1.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	-2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	5.0	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.11	1.15	0.17	0.65	0.37	0.04	0.53	0.83	0.52	0.48	0.41	0.03
Control Delay	23.6	107.4	6.8	37.6	18.2	0.1	33.8	44.6	21.7	68.0	41.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	107.4	6.8	37.6	18.2	0.1	33.8	44.6	21.7	68.0	41.9	0.1
Queue Length 50th (m)	5.5	~314.7	3.7	13.5	57.0	0.0	38.0	125.4	38.9	6.2	40.5	0.0
Queue Length 95th (m)	12.8	#356.5	15.6	#36.3	71.3	0.3	57.8	151.7	67.3	#18.1	62.3	0.0
Internal Link Dist (m)		203.6			501.9			120.0			316.9	
Turn Bay Length (m)	58.0		90.0	138.0		111.0	48.0		32.0	146.0		80.0
Base Capacity (vph)	318	1685	773	176	1954	882	408	1375	696	68	540	535
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	1.15	0.17	0.64	0.37	0.04	0.53	0.76	0.49	0.43	0.36	0.03

Intersection Summary
Cycle Length: 130
Actuated Cycle Length: 126.3
Natural Cycle: 145
Control Type: Semi Act-Uncoord

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

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

Splits and Phases: 2: Warden Avenue & Major Mackenzie Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	1783	120	104	670	29	200	967	314	27	179	16
Future Volume (vph)	33	1783	120	104	670	29	200	967	314	27	179	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	5.0	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3650	1617	1789	3650	1585	1825	3650	1617	1825	1921	1633
Flt Permitted	0.38	1.00	1.00	0.07	1.00	1.00	0.49	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	720	3650	1617	126	3650	1585	946	3650	1617	243	1921	1633
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)	36	1938	130	113	728	32	217	1051	341	29	195	17
RTOR Reduction (vph)	0	0	59	0	0	15	0	0	92	0	0	13
Lane Group Flow (vph)	36	1938	71	113	728	17	217	1051	249	29	195	4
Heavy Vehicles (%)	0%	0%	1%	2%	0%	3%	0%	0%	1%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	55.8	55.8	55.8	67.6	67.6	67.6	43.6	43.6	43.6	31.6	31.6	31.6
Effective Green, g (s)	55.8	58.3	55.8	67.6	67.6	67.6	43.6	43.6	43.6	31.6	31.6	31.6
Actuated g/C Ratio	0.44	0.46	0.44	0.54	0.54	0.54	0.35	0.35	0.35	0.25	0.25	0.25
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	318	1686	714	170	1955	849	382	1261	558	60	481	408
v/s Ratio Prot		c0.53		c0.04	0.20		0.04	c0.29			0.10	
v/s Ratio Perm	0.05		0.04	0.31		0.01	0.16		0.15	0.12		0.00
v/c Ratio	0.11	1.15	0.10	0.66	0.37	0.02	0.57	0.83	0.45	0.48	0.41	0.01
Uniform Delay, d1	20.7	34.0	20.5	27.6	17.0	13.8	33.0	38.0	32.0	40.3	39.5	35.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	74.7	0.3	9.4	0.5	0.0	1.9	4.9	0.6	6.0	0.6	0.0
Delay (s)	21.4	108.6	20.8	37.1	17.5	13.8	34.9	42.8	32.5	46.4	40.0	35.6
Level of Service	C	F	C	D	B	B	C	D	C	D	D	D
Approach Delay (s)		101.7			19.9			39.6			40.5	
Approach LOS		F			B			D			D	

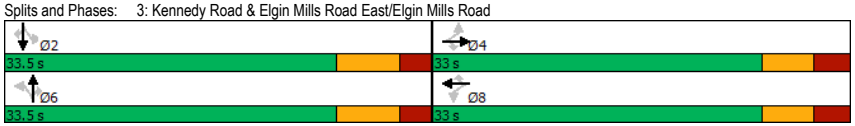
Intersection Summary					
HCM 2000 Control Delay	63.1	HCM 2000 Level of Service	E		
HCM 2000 Volume to Capacity ratio	1.03				
Actuated Cycle Length (s)	126.2	Sum of lost time (s)	20.5		
Intersection Capacity Utilization	116.7%	ICU Level of Service	H		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	543	102	16	184	6	90	386	44	12	243	13
Future Volume (vph)	47	543	102	16	184	6	90	386	44	12	243	13
Lane Group Flow (vph)	48	560	105	16	190	6	93	398	45	12	251	13
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Detector Phase	4	4	4	8	8	8	6	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	5.0	5.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (%)	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	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	7.5	7.5	7.5	7.5	7.5	7.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.11	0.83	0.17	0.10	0.28	0.01	0.19	0.51	0.07	0.03	0.32	0.02
Control Delay	13.8	30.2	4.0	15.0	15.4	0.0	14.6	17.6	2.7	13.0	15.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	30.2	4.0	15.0	15.4	0.0	14.6	17.6	2.7	13.0	15.0	0.1
Queue Length 50th (m)	3.7	57.9	0.0	1.2	15.4	0.0	7.4	36.5	0.0	0.9	21.0	0.0
Queue Length 95th (m)	9.6	#96.2	7.9	4.9	28.2	0.0	16.4	60.0	3.5	3.8	36.8	0.0
Internal Link Dist (m)		1347.2			145.4			1762.3			135.7	
Turn Bay Length (m)	100.0		50.0	143.0		58.0	142.0		48.0	45.0		40.0
Base Capacity (vph)	506	785	715	178	785	717	477	785	668	369	785	712
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.71	0.15	0.09	0.24	0.01	0.19	0.51	0.07	0.03	0.32	0.02

Intersection Summary
Cycle Length: 66.5
Actuated Cycle Length: 63.3
Natural Cycle: 70
Control Type: Semi-Act-Uncoord

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

Splits and Phases: 3: Kennedy Road & Elgin Mills Road East/Elgin Mills Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	543	102	16	184	6	90	386	44	12	243	13
Future Volume (vph)	47	543	102	16	184	6	90	386	44	12	243	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	1902	1585	1825	1902	1633	1825	1902	1526	1825	1902	1633
Flt Permitted	0.64	1.00	1.00	0.23	1.00	1.00	0.60	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1226	1902	1585	435	1902	1633	1159	1902	1526	896	1902	1633
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	48	560	105	16	190	6	93	398	45	12	251	13
RTOR Reduction (vph)	0	0	67	0	0	4	0	0	26	0	0	8
Lane Group Flow (vph)	48	560	38	16	190	2	93	398	19	12	251	5
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%	0%	1%	7%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	22.6	22.6	22.6	22.6	22.6	22.6	26.1	26.1	26.1	26.1	26.1	26.1
Effective Green, g (s)	22.6	22.6	22.6	22.6	22.6	22.6	26.1	26.1	26.1	26.1	26.1	26.1
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	438	680	566	155	680	583	478	785	630	370	785	674
v/s Ratio Prot		c0.29			0.10			c0.21			0.13	
v/s Ratio Perm	0.04		0.02	0.04		0.00	0.08		0.01	0.01		0.00
v/c Ratio	0.11	0.82	0.07	0.10	0.28	0.00	0.19	0.51	0.03	0.03	0.32	0.01
Uniform Delay, d1	13.6	18.5	13.4	13.5	14.5	13.1	11.8	13.8	11.0	11.0	12.5	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	8.0	0.0	0.3	0.2	0.0	0.9	2.3	0.1	0.2	1.1	0.0
Delay (s)	13.7	26.5	13.4	13.8	14.7	13.1	12.7	16.1	11.1	11.2	13.6	10.9
Level of Service	B	C	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)		23.7			14.6			15.1			13.4	
Approach LOS		C			B			B			B	

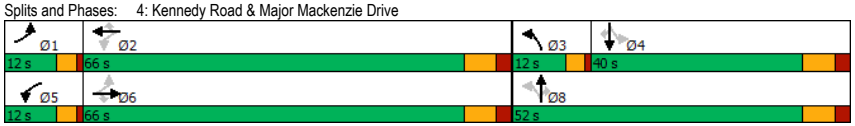
Intersection Summary				
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	14.5	
Intersection Capacity Utilization	93.9%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	1858	233	81	773	32	218	323	160	81	244	26
Future Volume (vph)	37	1858	233	81	773	32	218	323	160	81	244	26
Lane Group Flow (vph)	38	1896	238	83	789	33	222	330	163	83	249	27
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	37.5	37.5	11.0	37.5	37.5	11.0	38.5	38.5	38.5	38.5	38.5
Total Split (s)	12.0	66.0	66.0	12.0	66.0	66.0	12.0	52.0	52.0	40.0	40.0	40.0
Total Split (%)	9.2%	50.8%	50.8%	9.2%	50.8%	50.8%	9.2%	40.0%	40.0%	30.8%	30.8%	30.8%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	2.5	2.5	1.0	2.5	2.5	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
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	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.08	0.97	0.26	0.44	0.39	0.04	0.70	0.37	0.33	0.58	0.52	0.09
Control Delay	8.2	40.3	8.6	19.4	15.6	0.1	47.3	36.0	10.7	62.4	48.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	40.3	8.6	19.4	15.6	0.1	47.3	36.0	10.7	62.4	48.4	0.6
Queue Length 50th (m)	2.6	203.0	12.9	5.8	51.4	0.0	40.3	31.7	4.9	17.3	27.0	0.0
Queue Length 95th (m)	7.5	#300.0	31.0	19.0	76.9	0.0	62.3	44.7	21.0	33.5	39.6	0.0
Internal Link Dist (m)		1479.7			222.6			139.6			212.5	
Turn Bay Length (m)	56.0		66.0	60.0		145.0	120.0		55.0	60.0		65.0
Base Capacity (vph)	473	1959	918	196	2025	941	315	1490	737	316	1077	554
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.97	0.26	0.42	0.39	0.04	0.70	0.22	0.22	0.26	0.23	0.05

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 109.6
Natural Cycle: 140
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Kennedy Road & Major Mackenzie Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	1858	233	81	773	32	218	323	160	81	244	26
Future Volume (vph)	37	1858	233	81	773	32	218	323	160	81	244	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3650	1612	1755	3614	1597	1824	3650	1612	1824	3614	1612
Flt Permitted	0.32	1.00	1.00	0.07	1.00	1.00	0.47	1.00	1.00	0.55	1.00	1.00
Satd. Flow (perm)	614	3650	1612	120	3614	1597	897	3650	1612	1061	3614	1612
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	38	1896	238	83	789	33	222	330	163	83	249	27
RTOR Reduction (vph)	0	0	54	0	0	15	0	0	102	0	0	23
Lane Group Flow (vph)	38	1896	184	83	789	18	222	330	61	83	249	4
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	0%	0%	0%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	63.7	59.6	59.6	67.3	61.4	61.4	26.7	26.7	26.7	14.7	14.7	14.7
Effective Green, g (s)	63.7	59.6	59.6	67.3	61.4	61.4	26.7	26.7	26.7	14.7	14.7	14.7
Actuated g/C Ratio	0.57	0.54	0.54	0.61	0.55	0.55	0.24	0.24	0.24	0.13	0.13	0.13
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	396	1956	863	159	1995	881	282	876	387	140	477	213
v/s Ratio Prot	0.00	c0.52		c0.03	0.22		c0.06	0.09			0.07	
v/s Ratio Perm	0.05		0.11	0.29		0.01	c0.13		0.04	0.08		0.00
v/c Ratio	0.10	0.97	0.21	0.52	0.40	0.02	0.79	0.38	0.16	0.59	0.52	0.02
Uniform Delay, d1	10.5	24.9	13.5	24.6	14.3	11.3	38.2	35.3	33.4	45.4	45.0	42.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	14.3	0.6	3.1	0.6	0.0	13.5	0.3	0.2	6.6	1.0	0.0
Delay (s)	10.6	39.2	14.1	27.7	14.9	11.3	51.7	35.6	33.6	52.0	46.0	42.0
Level of Service	B	D	B	C	B	B	D	D	C	D	D	D
Approach Delay (s)		36.0			15.9			40.1			47.1	
Approach LOS		D			B			D			D	

Intersection Summary					
HCM 2000 Control Delay	33.3	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.92				
Actuated Cycle Length (s)	111.2	Sum of lost time (s)		23.0	
Intersection Capacity Utilization	97.3%	ICU Level of Service		F	
Analysis Period (min)	15				

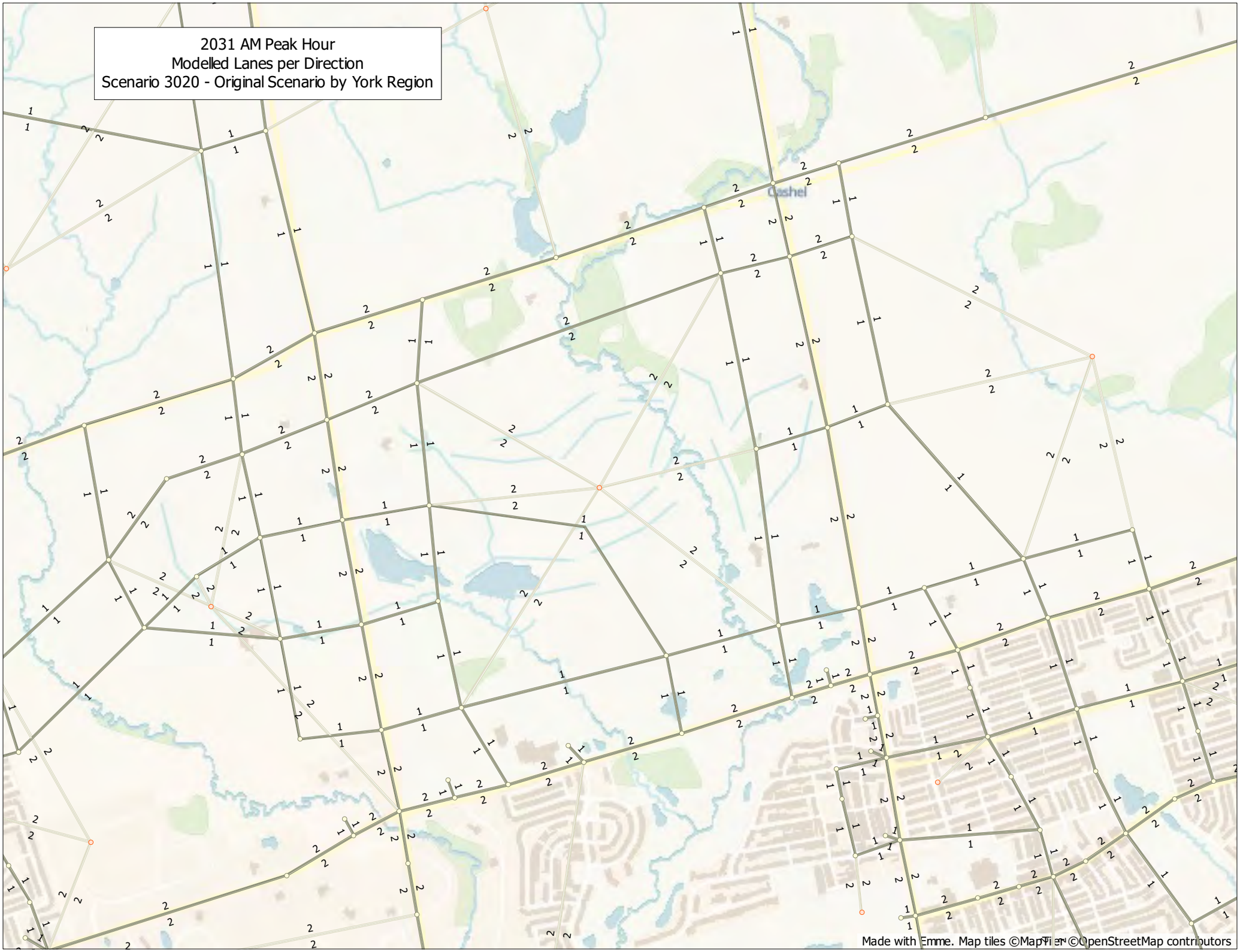
c Critical Lane Group

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix F

York Region's Transportation Model Refinements
EMME Plots


2031 AM Peak Hour
Modelled Lanes per Direction
Scenario 3020 - Original Scenario by York Region
Cashel
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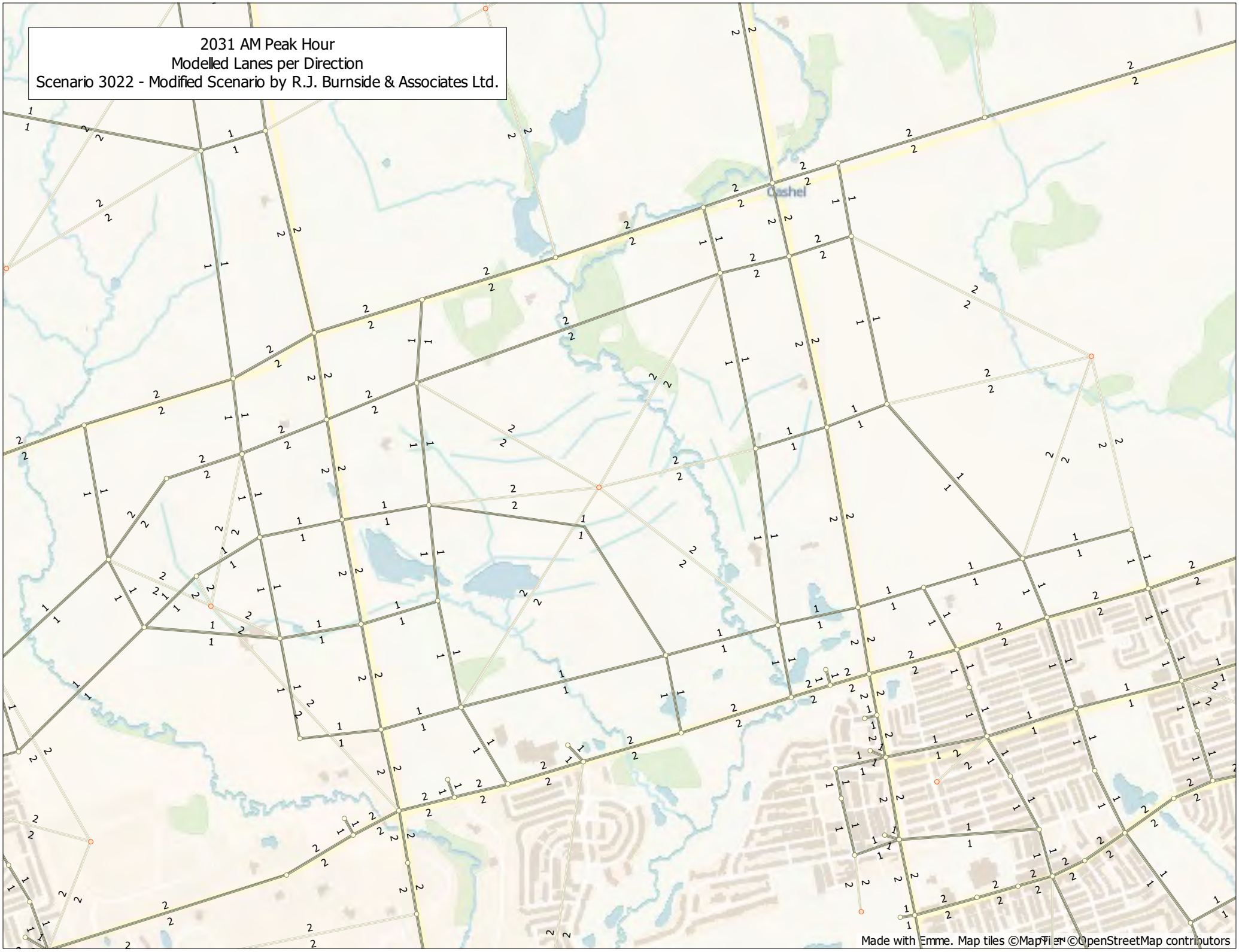
2031 AM Peak Hour
Modelled Lanes per Direction
Scenario 3022 - Modified Scenario by R.J. Burnside & Associates Ltd.
Cashel
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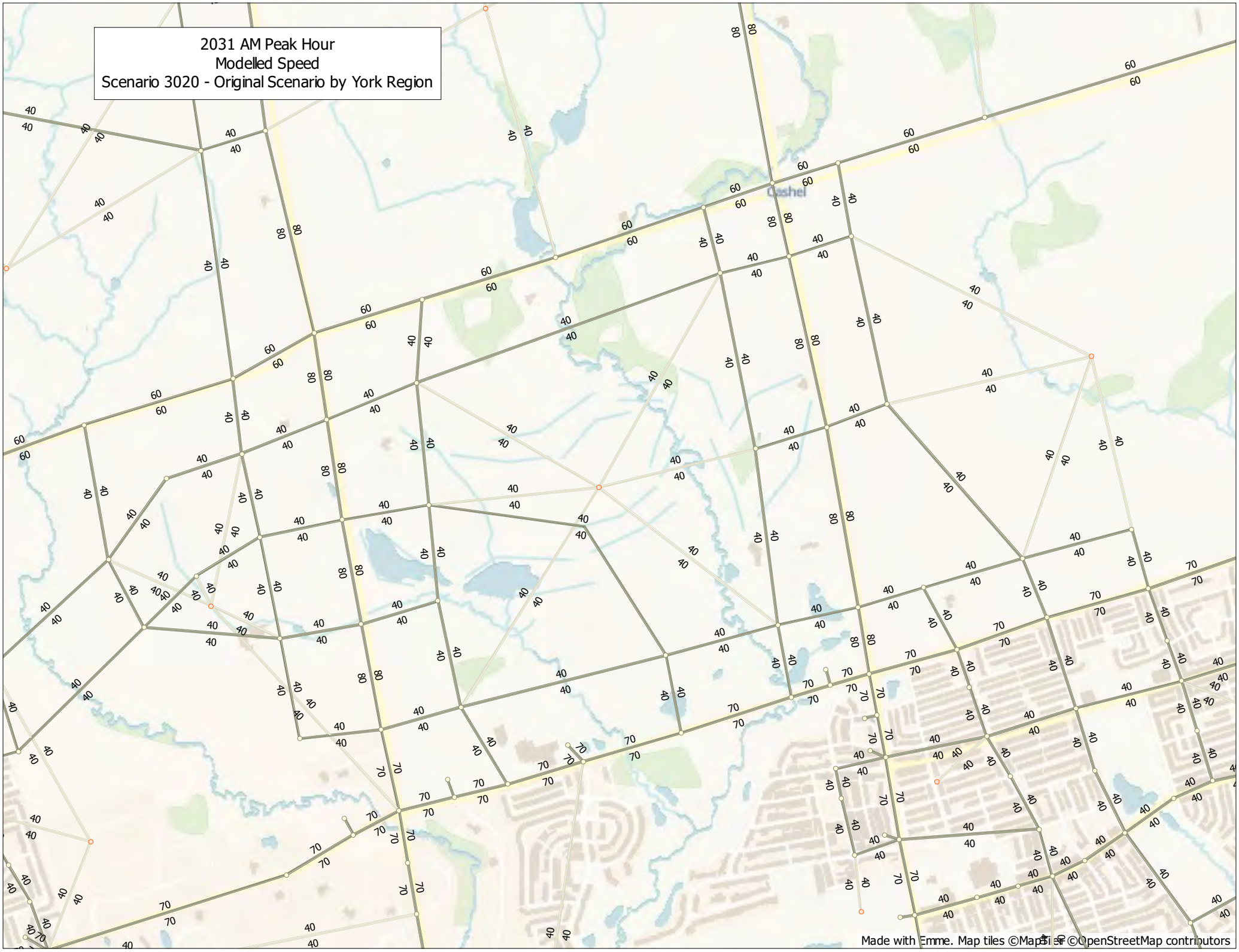
2031 AM Peak Hour
Modelled Speed
Scenario 3020 - Original Scenario by York Region
Cashel
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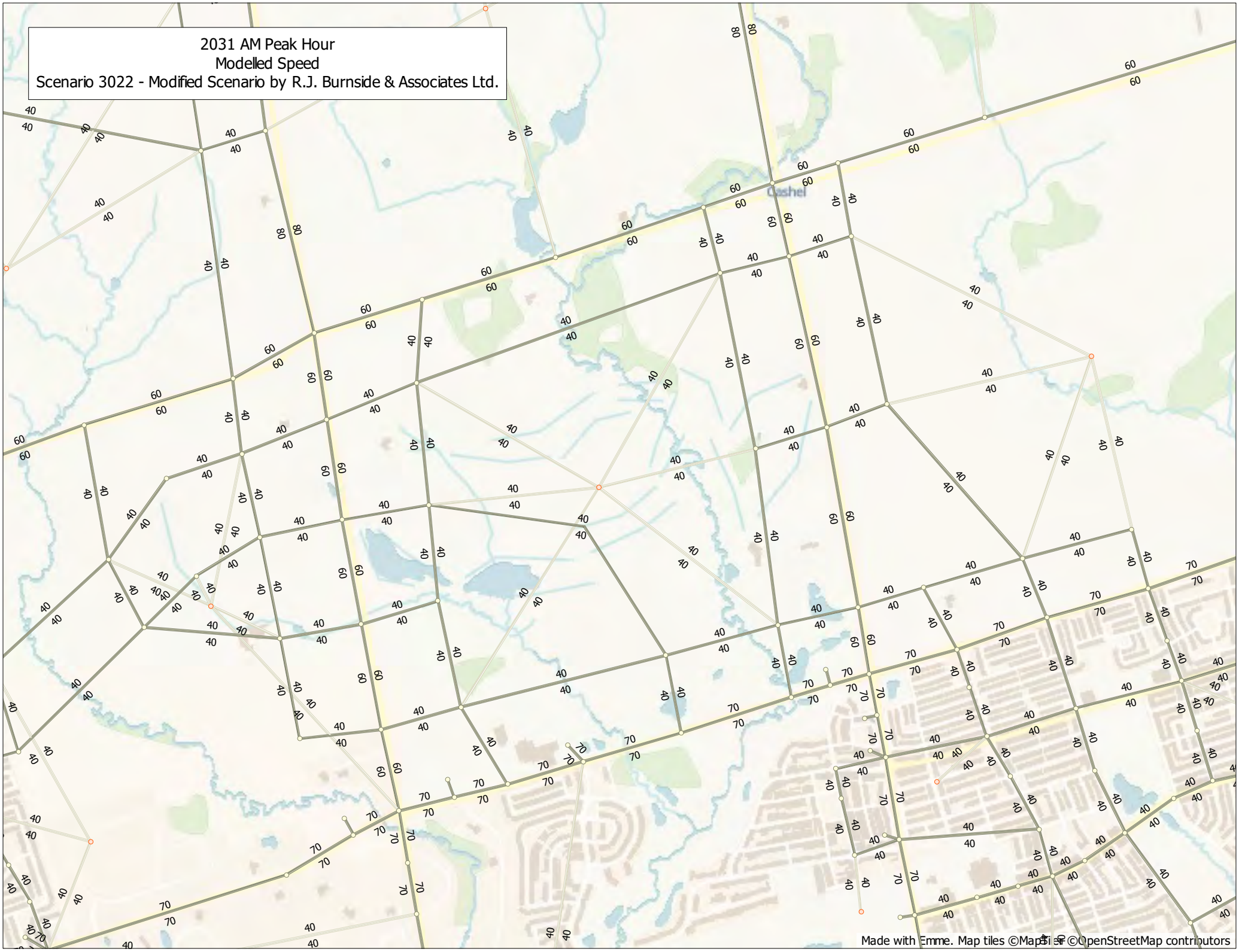
2031 AM Peak Hour
Modelled Speed
Scenario 3022 - Modified Scenario by R.J. Burnside & Associates Ltd.
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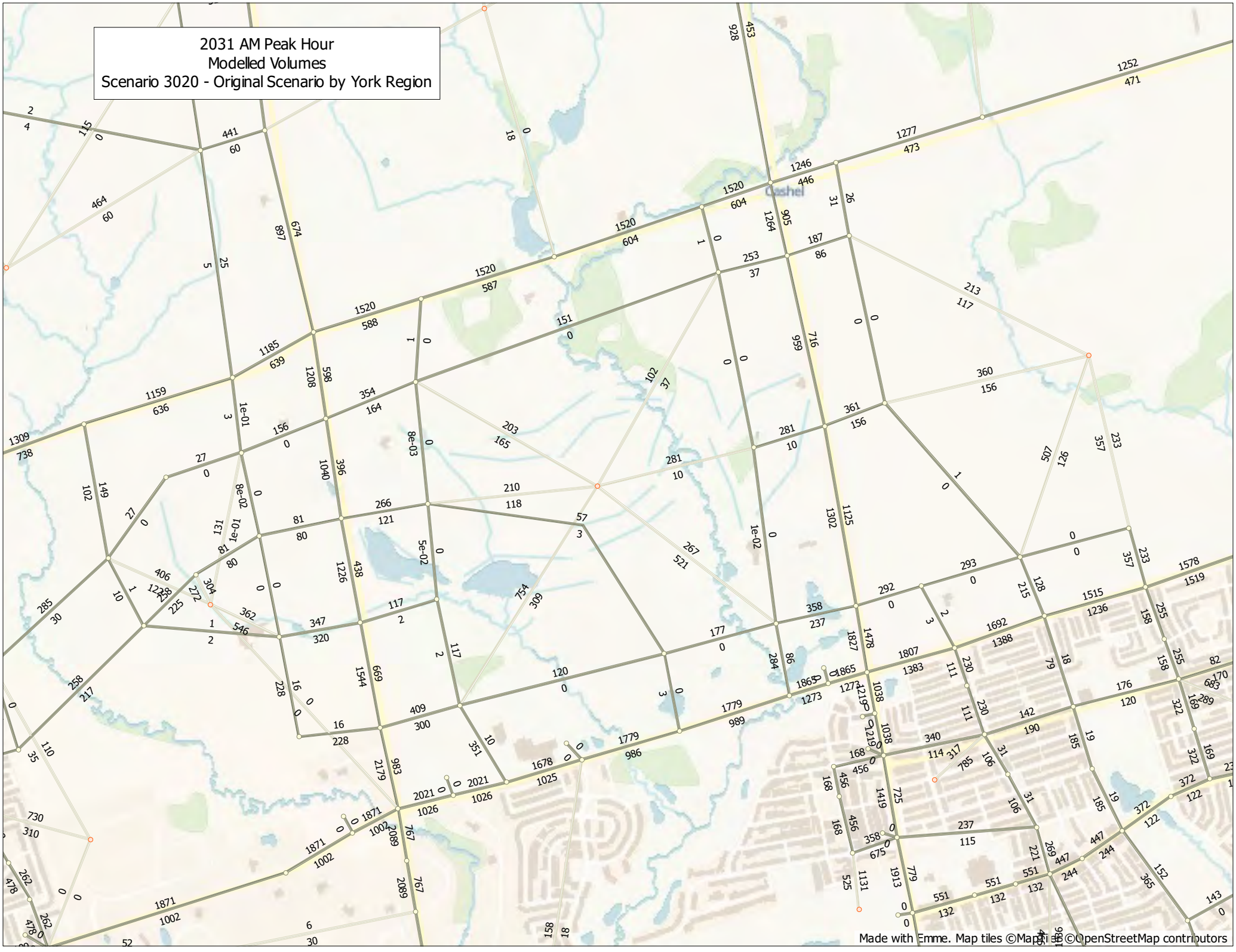
2031 AM Peak Hour
Modelled Volumes
Scenario 3020 - Original Scenario by York Region
Cashel
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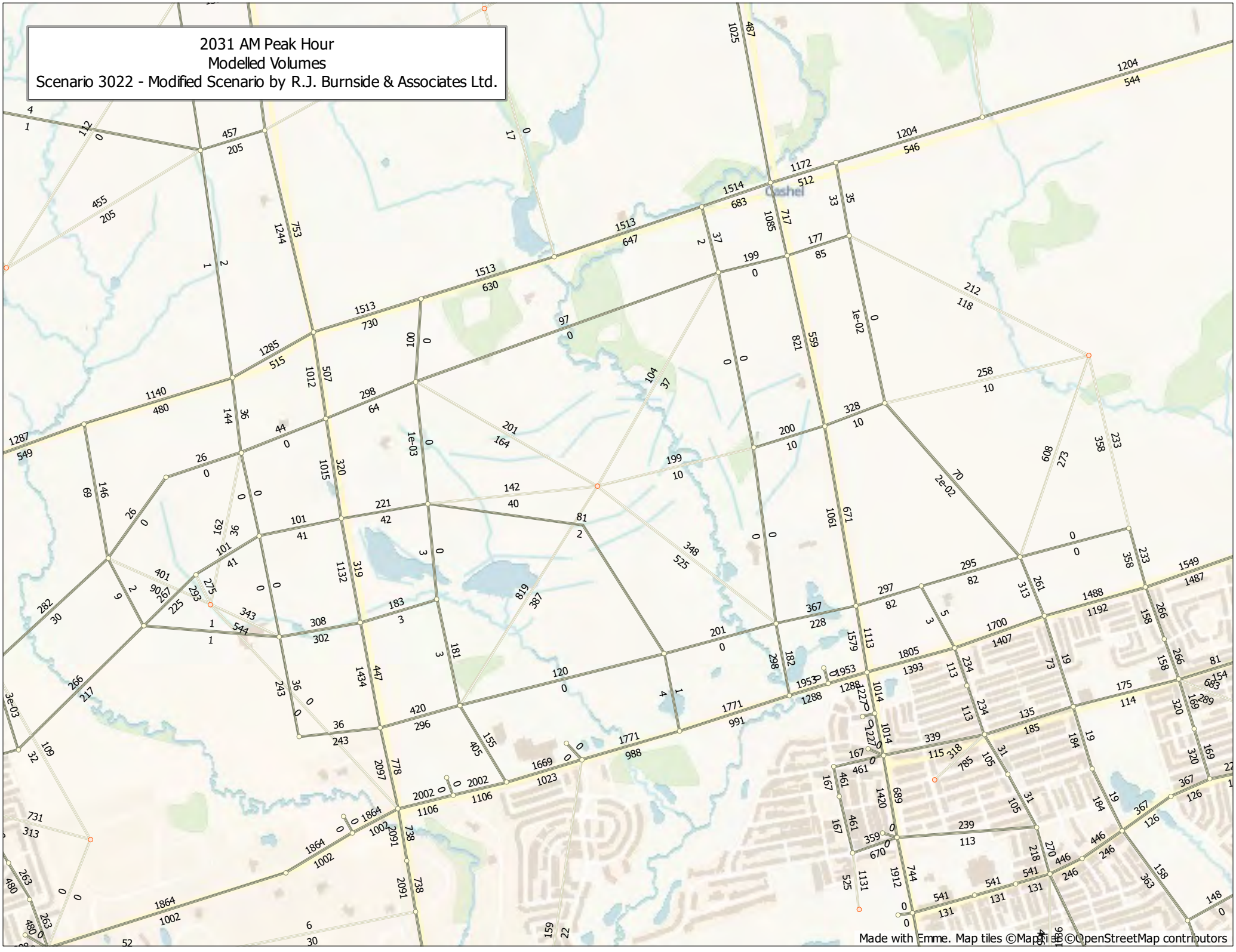
2031 AM Peak Hour
Modelled Volumes
Scenario 3022 - Modified Scenario by R.J. Burnside & Associates Ltd.
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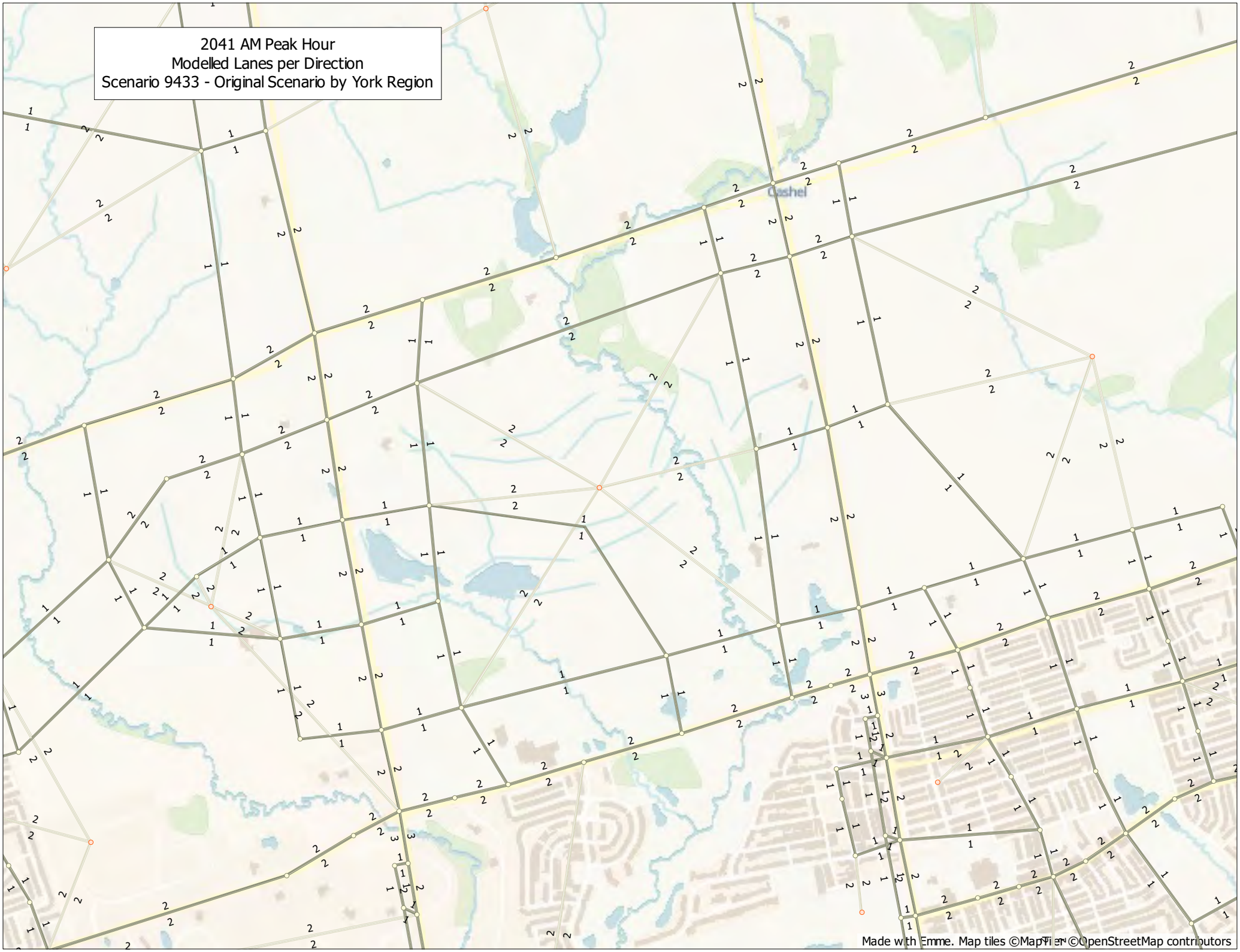
2041 AM Peak Hour
Modelled Lanes per Direction
Scenario 9433 - Original Scenario by York Region
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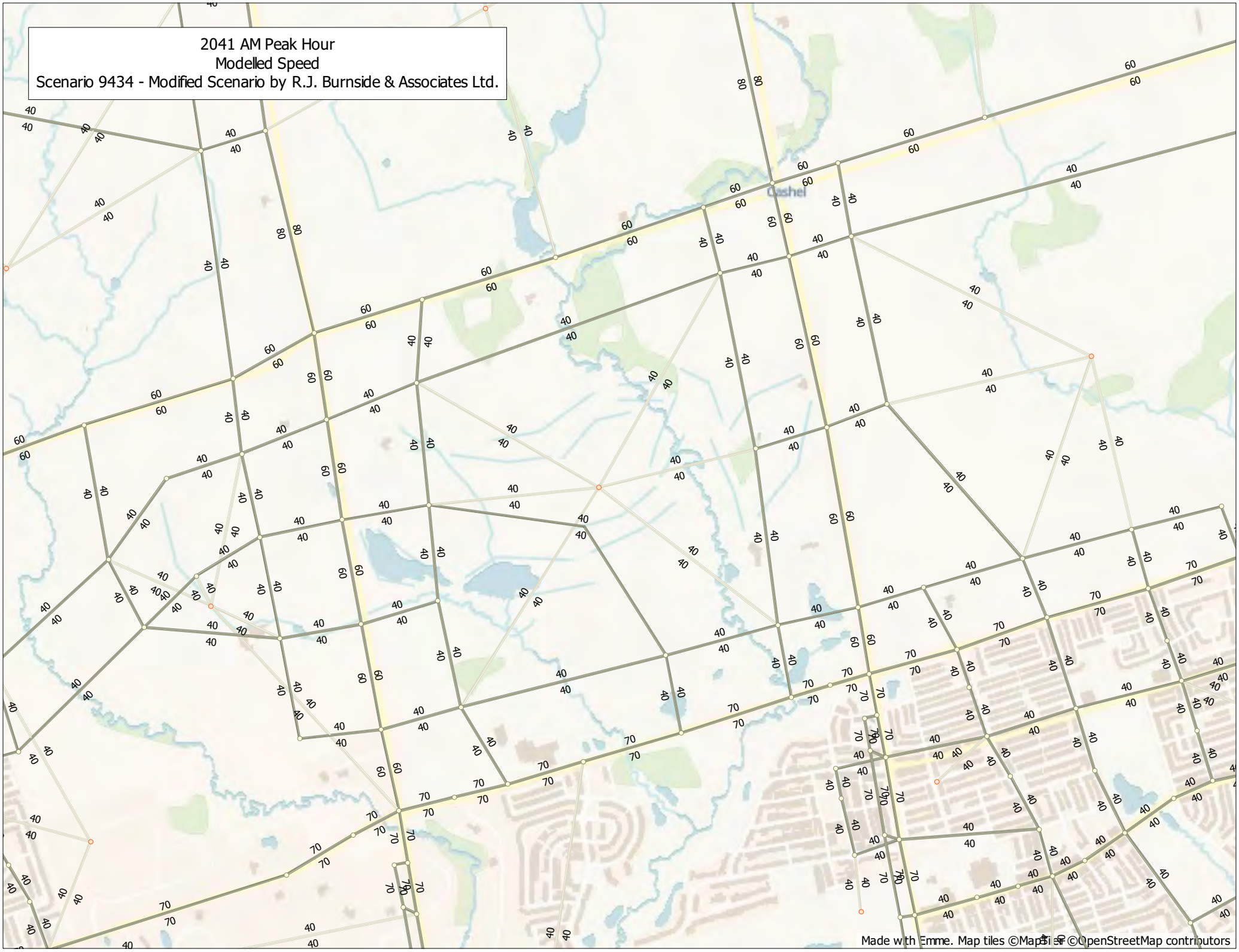
2041 AM Peak Hour
Modelled Speed
Scenario 9434 - Modified Scenario by R.J. Burnside & Associates Ltd.
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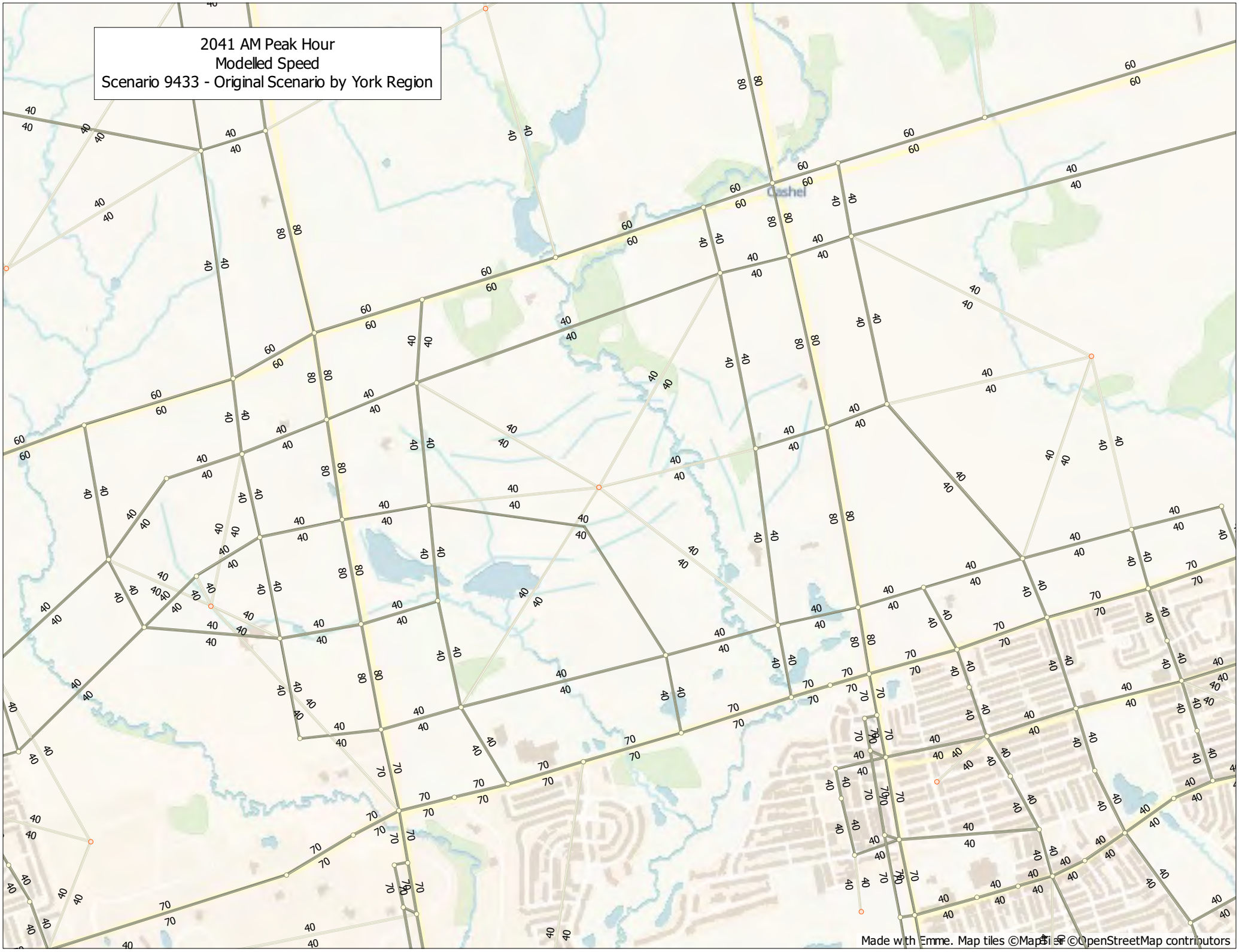
2041 AM Peak Hour
Modelled Speed
Scenario 9433 - Original Scenario by York Region
Cashel
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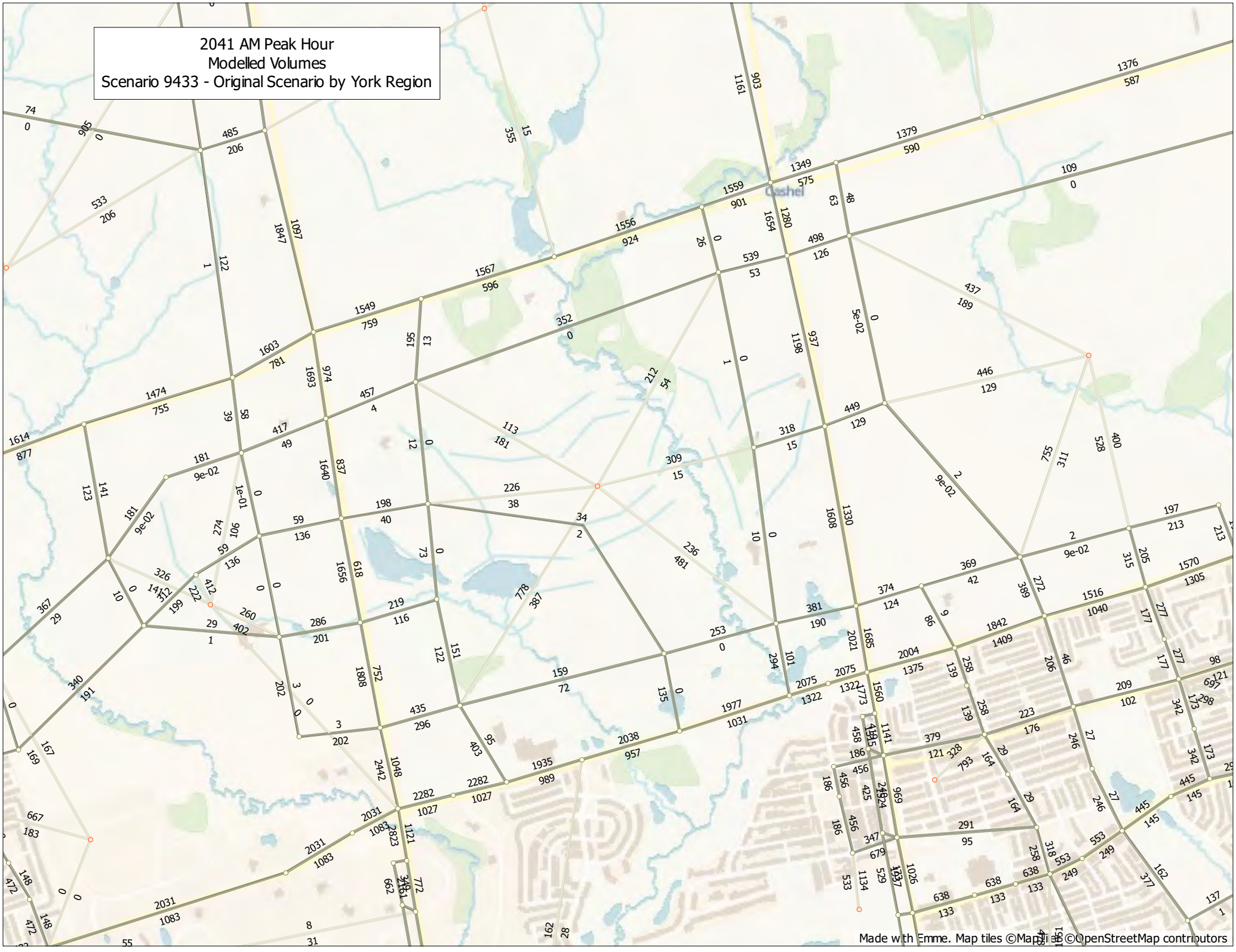
2041 AM Peak Hour
Modelled Volumes
Scenario 9433 - Original Scenario by York Region
Cashel
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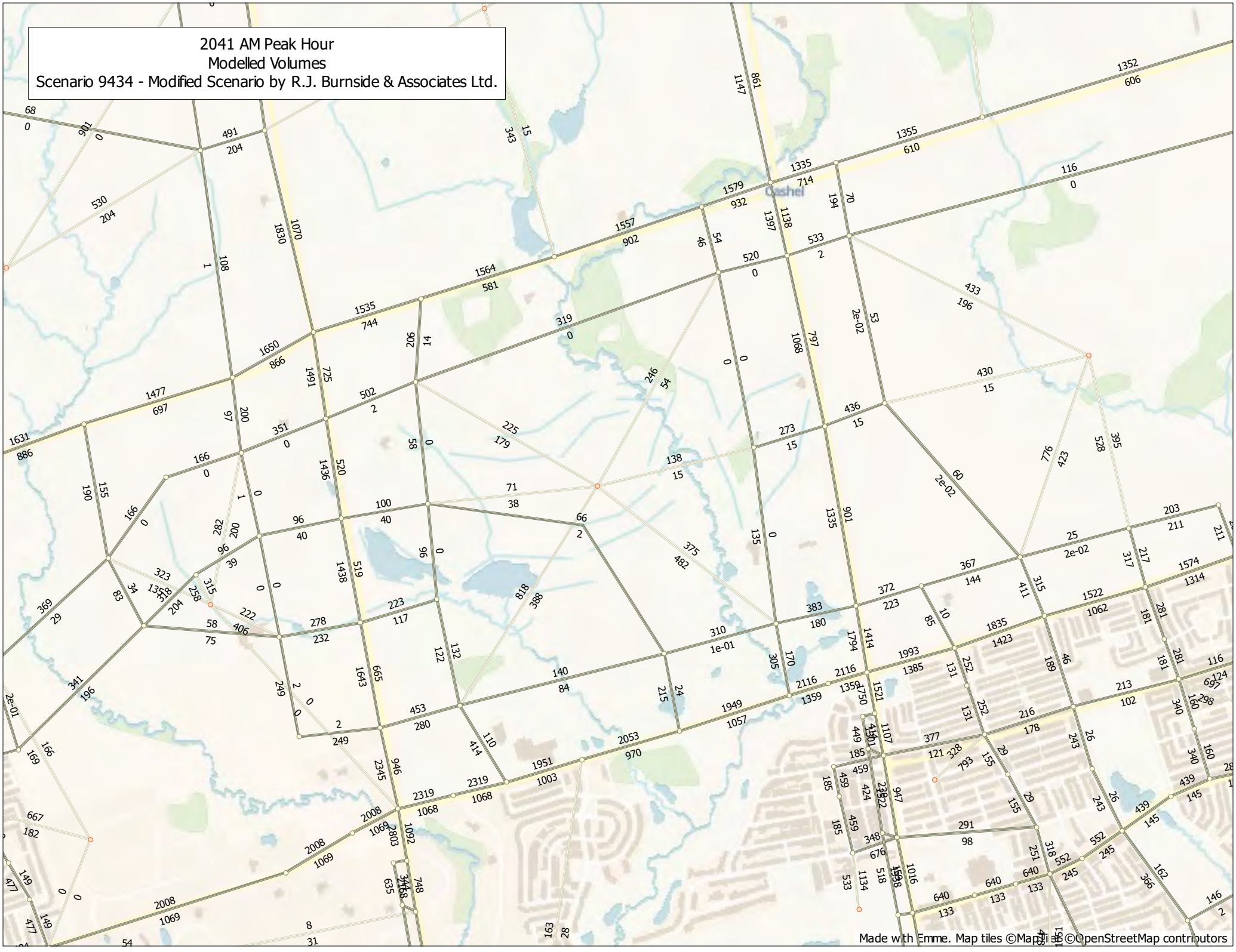
2041 AM Peak Hour
Modelled Volumes
Scenario 9434 - Modified Scenario by R.J. Burnside & Associates Ltd.
Cashel
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BURNSIDE

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Appendix G

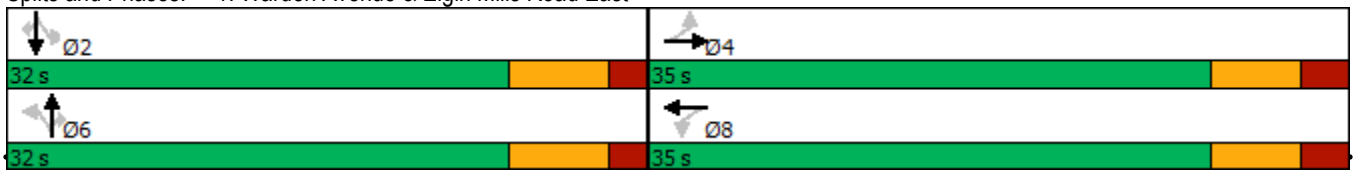
2041 Future Conditions Synchro Reports

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	24	606	176	1408	101	244	14	7	1651	100
Future Volume (vph)	24	606	176	1408	101	244	14	7	1651	100
Lane Group Flow (vph)	28	906	205	1657	117	284	16	8	1920	116
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		8		6			2	
Permitted Phases	4		8		6		6	2		2
Detector Phase	4	4	8	8	6	6	6	2	2	2
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	52.2%	52.2%	52.2%	52.2%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.5	2.5	2.5	2.5	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	-2.5	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	4.5	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.26	1.25	1.88	2.11	1.04	0.41	0.02	0.02	2.49	0.18
Control Delay	20.8	147.7	450.0	522.3	127.2	17.8	0.1	13.6	690.7	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	147.7	450.0	522.3	127.2	17.8	0.1	13.6	690.7	8.1
Queue Length 50th (m)	2.2	~146.3	~40.0	~343.6	~16.2	25.5	0.0	0.6	~408.3	4.0
Queue Length 95th (m)	8.0	#197.1	#60.5	#395.8	#41.5	41.3	0.0	2.8	#457.5	12.3
Internal Link Dist (m)		180.4		543.1		1650.0			238.4	
Turn Bay Length (m)	70.0		80.0		125.0		30.0	100.0		30.0
Base Capacity (vph)	106	723	109	786	112	689	650	404	772	638
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	1.25	1.88	2.11	1.04	0.41	0.02	0.02	2.49	0.18

Intersection Summary

Cycle Length: 67
Actuated Cycle Length: 67
Natural Cycle: 110
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Warden Avenue & Elgin Mills Road East



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	606	173	176	1408	17	101	244	14	7	1651	100
Future Volume (vph)	24	606	173	176	1408	17	101	244	14	7	1651	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	4.5	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
Frt	1.00	0.97		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1730		1738	1880		1789	1847	1633	1825	1883	1601
Flt Permitted	0.14	1.00		0.14	1.00		0.16	1.00	1.00	0.57	1.00	1.00
Satd. Flow (perm)	254	1730		261	1880		301	1847	1633	1086	1883	1601
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	28	705	201	205	1637	20	117	284	16	8	1920	116
RTOR Reduction (vph)	0	1	0	0	1	0	0	0	10	0	0	41
Lane Group Flow (vph)	28	905	0	205	1656	0	117	284	6	8	1920	75
Heavy Vehicles (%)	8%	8%	5%	5%	2%	0%	2%	4%	0%	0%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	28.0	28.0		28.0	28.0		25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	28.0	28.0		28.0	28.0		25.0	25.0	25.0	25.0	27.5	25.0
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.37	0.37	0.37	0.37	0.41	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)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	106	722		109	785		112	689	609	405	772	597
v/s Ratio Prot		0.52			c0.88			0.15			c1.02	
v/s Ratio Perm	0.11			0.78			0.39		0.00	0.01		0.05
v/c Ratio	0.26	1.25		1.88	2.11		1.04	0.41	0.01	0.02	2.49	0.13
Uniform Delay, d1	12.8	19.5		19.5	19.5		21.0	15.6	13.2	13.3	19.8	13.8
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	1.3	125.5		428.9	503.9		97.5	1.8	0.0	0.1	673.0	0.4
Delay (s)	14.1	145.0		448.4	523.4		118.5	17.4	13.2	13.4	692.8	14.2
Level of Service	B	F		F	F		F	B	B	B	F	B
Approach Delay (s)		141.1			515.1			45.6			651.6	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	464.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.40		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	185.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

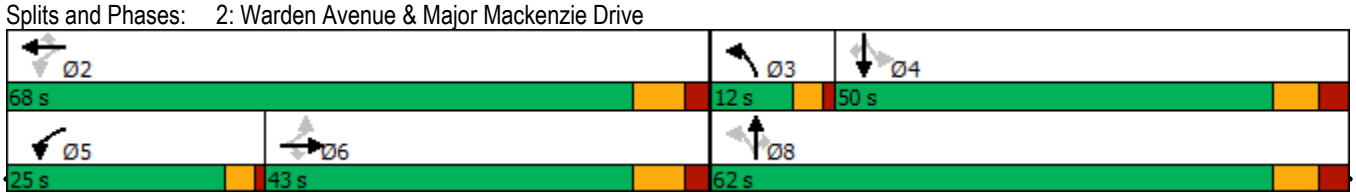
2: Warden Avenue & Major Mackenzie Drive

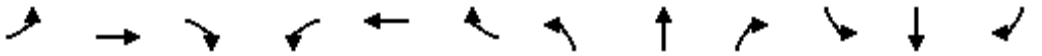
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	677	140	344	2037	24	65	239	64	38	1628	113
Future Volume (vph)	1	677	140	344	2037	24	65	239	64	38	1628	113
Lane Group Flow (vph)	1	728	151	370	2190	26	70	257	69	41	1751	122
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	6	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	34.0	34.0	34.0	7.0	34.0	34.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	41.5	41.5	41.5	11.0	41.5	41.5	11.0	41.5	41.5	41.5	41.5	41.5
Total Split (s)	43.0	43.0	43.0	25.0	68.0	68.0	12.0	62.0	62.0	50.0	50.0	50.0
Total Split (%)	33.1%	33.1%	33.1%	19.2%	52.3%	52.3%	9.2%	47.7%	47.7%	38.5%	38.5%	38.5%
Yellow Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.5	2.5	2.5	1.0	2.5	2.5	1.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	-2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	4.0	5.0	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.02	0.75	0.27	0.93	1.22	0.03	0.43	0.18	0.11	0.12	2.76	0.20
Control Delay	36.0	48.1	6.9	57.5	136.8	0.1	29.2	24.4	5.4	32.0	815.9	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	48.1	6.9	57.5	136.8	0.1	29.2	24.4	5.4	32.0	815.9	8.7
Queue Length 50th (m)	0.2	90.7	0.0	64.6	~368.1	0.0	10.2	21.4	0.0	7.4	~766.4	3.0
Queue Length 95th (m)	1.8	113.7	15.8	#123.9	#409.0	0.0	19.3	30.5	8.6	16.2	#846.8	16.6
Internal Link Dist (m)		203.6			501.9			120.0			316.9	
Turn Bay Length (m)	58.0		90.0	138.0		111.0	48.0		32.0	146.0		80.0
Base Capacity (vph)	60	969	550	401	1788	812	167	1502	633	345	634	615
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.75	0.27	0.92	1.22	0.03	0.42	0.17	0.11	0.12	2.76	0.20

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 127.5
Natural Cycle: 145
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Warden Avenue & Major Mackenzie Drive





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	677	140	344	2037	24	65	239	64	38	1628	113
Future Volume (vph)	1	677	140	344	2037	24	65	239	64	38	1628	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	4.0	5.0	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3444	1570	1772	3614	1633	1738	3510	1384	1659	1902	1633
Flt Permitted	0.11	1.00	1.00	0.17	1.00	1.00	0.09	1.00	1.00	0.59	1.00	1.00
Satd. Flow (perm)	214	3444	1570	322	3614	1633	157	3510	1384	1035	1902	1633
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)	1	728	151	370	2190	26	70	257	69	41	1751	122
RTOR Reduction (vph)	0	0	109	0	0	14	0	0	41	0	0	70
Lane Group Flow (vph)	1	728	42	370	2190	12	70	257	28	41	1751	52
Heavy Vehicles (%)	0%	6%	4%	3%	1%	0%	5%	4%	18%	10%	1%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	35.9	35.9	35.9	60.6	60.6	60.6	52.8	52.8	52.8	42.6	42.6	42.6
Effective Green, g (s)	35.9	35.9	35.9	60.6	63.1	60.6	52.8	52.8	52.8	42.6	42.6	42.6
Actuated g/C Ratio	0.28	0.28	0.28	0.47	0.49	0.47	0.41	0.41	0.41	0.33	0.33	0.33
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	59	962	438	385	1776	770	140	1443	569	343	631	541
v/s Ratio Prot		0.21		0.15	c0.61		c0.02	0.07			c0.92	
v/s Ratio Perm	0.00		0.03	0.30		0.01	0.18		0.02	0.04		0.03
v/c Ratio	0.02	0.76	0.10	0.96	1.23	0.02	0.50	0.18	0.05	0.12	2.77	0.10
Uniform Delay, d1	33.5	42.3	34.2	29.8	32.7	18.0	30.5	24.0	22.7	29.9	42.9	29.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	5.5	0.4	35.6	110.0	0.0	2.8	0.1	0.0	0.2	803.2	0.1
Delay (s)	34.0	47.8	34.7	65.4	142.7	18.1	33.3	24.1	22.8	30.0	846.1	29.7
Level of Service	C	D	C	E	F	B	C	C	C	C	F	C
Approach Delay (s)		45.5			130.4			25.5			776.5	
Approach LOS		D			F			C			F	

Intersection Summary			
HCM 2000 Control Delay	324.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.89		
Actuated Cycle Length (s)	128.4	Sum of lost time (s)	23.0
Intersection Capacity Utilization	187.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

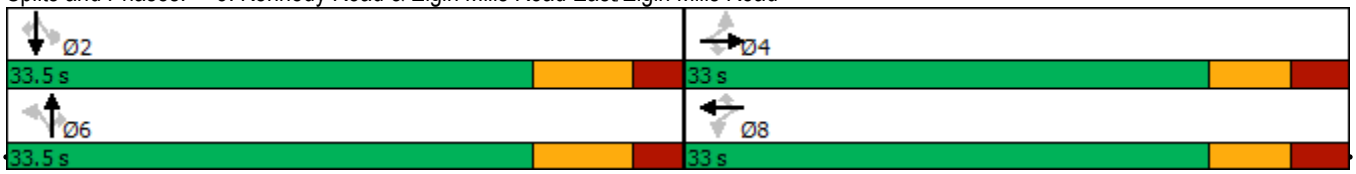
3: Kennedy Road & Elgin Mills Road East/Elgin Mills Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	364	110	81	1218	14	149	375	9	17	922	106
Future Volume (vph)	14	364	110	81	1218	14	149	375	9	17	922	106
Lane Group Flow (vph)	16	414	125	92	1384	16	169	426	10	19	1048	120
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Detector Phase	4	4	4	8	8	8	6	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (%)	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	-2.5	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	5.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.14	0.57	0.18	0.33	1.92	0.02	1.47	0.58	0.01	0.06	1.40	0.18
Control Delay	16.9	19.6	7.2	18.5	438.2	0.1	276.2	20.0	0.0	13.5	208.7	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	19.6	7.2	18.5	438.2	0.1	276.2	20.0	0.0	13.5	208.7	7.7
Queue Length 50th (m)	1.3	38.8	3.9	7.7	~270.2	0.0	~29.4	40.2	0.0	1.4	~177.6	4.1
Queue Length 95th (m)	5.0	61.5	12.5	18.0	#330.9	0.0	#48.1	63.6	0.0	5.0	#235.4	12.7
Internal Link Dist (m)		1347.2			145.4			1762.3			135.7	
Turn Bay Length (m)	100.0		50.0	143.0		58.0	142.0		48.0	45.0		40.0
Base Capacity (vph)	115	729	677	275	722	683	115	729	678	310	751	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.57	0.18	0.33	1.92	0.02	1.47	0.58	0.01	0.06	1.40	0.18

Intersection Summary

Cycle Length: 66.5
Actuated Cycle Length: 66.5
Natural Cycle: 80
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Kennedy Road & Elgin Mills Road East/Elgin Mills Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	364	110	81	1218	14	149	375	9	17	922	106
Future Volume (vph)	14	364	110	81	1218	14	149	375	9	17	922	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	1865	1617	1601	1847	1633	1825	1865	1633	1825	1921	1617
Flt Permitted	0.15	1.00	1.00	0.42	1.00	1.00	0.14	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	296	1865	1617	704	1847	1633	270	1865	1633	795	1921	1617
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	16	414	125	92	1384	16	169	426	10	19	1048	120
RTOR Reduction (vph)	0	0	45	0	0	10	0	0	6	0	0	40
Lane Group Flow (vph)	16	414	80	92	1384	6	169	426	4	19	1048	80
Heavy Vehicles (%)	0%	3%	1%	14%	4%	0%	0%	3%	0%	0%	0%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	26.0	28.5	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.43	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	115	729	632	275	722	638	115	729	638	310	751	632
v/s Ratio Prot		0.22			c0.75			0.23			0.55	
v/s Ratio Perm	0.05		0.05	0.13		0.00	c0.63		0.00	0.02		0.05
v/c Ratio	0.14	0.57	0.13	0.33	1.92	0.01	1.47	0.58	0.01	0.06	1.40	0.13
Uniform Delay, d1	13.0	15.9	13.0	14.2	20.2	12.4	19.0	16.0	12.4	12.6	20.2	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	1.0	0.1	0.7	417.8	0.0	252.3	3.4	0.0	0.4	186.1	0.4
Delay (s)	13.6	16.9	13.1	14.9	438.0	12.4	271.3	19.4	12.4	13.0	206.3	13.4
Level of Service	B	B	B	B	F	B	F	B	B	B	F	B
Approach Delay (s)		15.9			407.3			89.7			183.7	
Approach LOS		B			F			F			F	

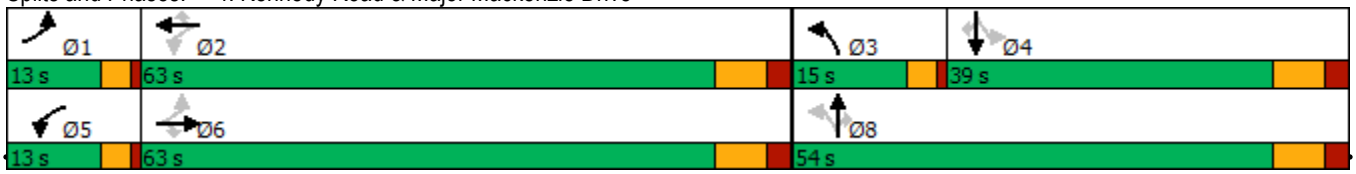
Intersection Summary			
HCM 2000 Control Delay	231.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.76		
Actuated Cycle Length (s)	66.5	Sum of lost time (s)	14.5
Intersection Capacity Utilization	148.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	633	249	179	2048	173	275	405	100	90	791	155
Future Volume (vph)	35	633	249	179	2048	173	275	405	100	90	791	155
Lane Group Flow (vph)	38	696	274	197	2251	190	302	445	110	99	869	170
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	37.5	37.5	11.0	37.5	37.5	11.0	38.5	38.5	38.5	38.5	38.5
Total Split (s)	13.0	63.0	63.0	13.0	63.0	63.0	15.0	54.0	54.0	39.0	39.0	39.0
Total Split (%)	10.0%	48.5%	48.5%	10.0%	48.5%	48.5%	11.5%	41.5%	41.5%	30.0%	30.0%	30.0%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	2.5	2.5	1.0	2.5	2.5	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	-2.5	0.0	-2.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.5	7.5	4.0	5.0	7.5	2.0	7.5	7.5	7.5	7.5	7.5
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	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.24	0.46	0.33	0.52	1.31	0.24	1.25	0.35	0.17	0.44	1.00	0.35
Control Delay	17.2	27.8	3.7	20.1	173.7	6.2	171.0	31.6	5.6	48.9	80.2	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	27.8	3.7	20.1	173.7	6.2	171.0	31.6	5.6	48.9	80.2	13.7
Queue Length 50th (m)	4.3	65.9	0.0	24.3	~396.9	4.9	~79.1	43.7	0.0	21.6	~118.3	8.0
Queue Length 95th (m)	9.4	82.7	15.6	37.5	#442.2	18.9	#135.8	57.7	12.2	39.6	#162.0	27.1
Internal Link Dist (m)		1479.7			222.6			139.6			212.5	
Turn Bay Length (m)	56.0		66.0	60.0		145.0	120.0		55.0	60.0		65.0
Base Capacity (vph)	180	1513	843	382	1720	791	242	1280	649	227	867	484
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.46	0.33	0.52	1.31	0.24	1.25	0.35	0.17	0.44	1.00	0.35

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Kennedy Road & Major Mackenzie Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	633	249	179	2048	173	275	405	100	90	791	155
Future Volume (vph)	35	633	249	179	2048	173	275	405	100	90	791	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.5	7.5	4.0	5.0	7.5	2.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1755	3544	1609	1789	3614	1547	1789	3579	1617	1807	3579	1595
Flt Permitted	0.07	1.00	1.00	0.29	1.00	1.00	0.11	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	131	3544	1609	549	3614	1547	212	3579	1617	940	3579	1595
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)	38	696	274	197	2251	190	302	445	110	99	869	170
RTOR Reduction (vph)	0	0	156	0	0	85	0	0	71	0	0	99
Lane Group Flow (vph)	38	696	118	197	2251	105	302	445	39	99	869	71
Confl. Peds. (#/hr)	2		2	2		2	1					1
Heavy Vehicles (%)	4%	3%	0%	2%	1%	3%	2%	2%	1%	1%	2%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	62.2	56.3	56.3	68.4	59.4	59.4	46.5	46.5	46.5	31.5	31.5	31.5
Effective Green, g (s)	62.2	56.3	56.3	68.4	61.9	59.4	48.5	46.5	46.5	31.5	31.5	31.5
Actuated g/C Ratio	0.48	0.43	0.43	0.52	0.47	0.45	0.37	0.36	0.36	0.24	0.24	0.24
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	135	1525	692	372	1710	702	235	1272	574	226	861	384
v/s Ratio Prot	0.01	0.20		c0.04	c0.62		c0.13	0.12			c0.24	
v/s Ratio Perm	0.12		0.07	0.24		0.07	0.35		0.02	0.11		0.04
v/c Ratio	0.28	0.46	0.17	0.53	1.32	0.15	1.29	0.35	0.07	0.44	1.01	0.19
Uniform Delay, d1	29.1	26.4	22.9	17.8	34.5	20.9	36.2	31.0	27.8	42.1	49.7	39.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	1.0	0.5	1.4	146.6	0.4	156.6	0.2	0.1	1.4	33.0	0.2
Delay (s)	30.2	27.4	23.4	19.2	181.1	21.4	192.8	31.2	27.9	43.5	82.6	39.7
Level of Service	C	C	C	B	F	C	F	C	C	D	F	D
Approach Delay (s)		26.4			157.5			87.7			72.8	
Approach LOS		C			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	106.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	130.8	Sum of lost time (s)	21.0
Intersection Capacity Utilization	116.8%	ICU Level of Service	H
Analysis Period (min)	15		

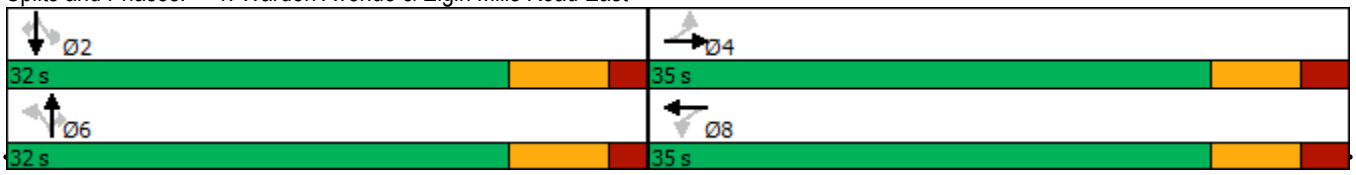
c Critical Lane Group

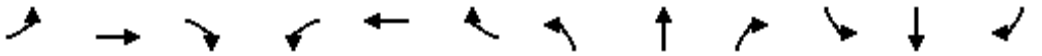
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	50	1156	23	469	204	1240	155	15	251	22
Future Volume (vph)	50	1156	23	469	204	1240	155	15	251	22
Lane Group Flow (vph)	58	1464	27	561	237	1442	180	17	292	26
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		8		6			2	
Permitted Phases	4		8		6		6	2		2
Detector Phase	4	4	8	8	6	6	6	2	2	2
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (s)	35.0	35.0	35.0	35.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	52.2%	52.2%	52.2%	52.2%	47.8%	47.8%	47.8%	47.8%	47.8%	47.8%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.5	2.5	2.5	2.5	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	-2.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	4.5	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.28	1.98	0.25	0.71	0.61	1.90	0.28	0.15	0.42	0.04
Control Delay	17.4	465.1	19.9	22.3	25.1	431.4	10.7	18.1	17.9	0.9
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	465.1	19.9	22.3	25.1	431.4	10.7	18.1	17.9	0.9
Queue Length 50th (m)	4.6	~296.5	2.1	55.5	23.3	~283.0	9.4	1.4	26.3	0.0
Queue Length 95th (m)	12.1	#349.2	7.6	82.5	42.5	#334.1	20.2	5.4	42.2	0.8
Internal Link Dist (m)		180.4		543.1		1650.0			238.4	
Turn Bay Length (m)	70.0		80.0		125.0		30.0	100.0		30.0
Base Capacity (vph)	208	740	109	786	389	758	650	114	702	638
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	1.98	0.25	0.71	0.61	1.90	0.28	0.15	0.42	0.04

Intersection Summary

Cycle Length: 67
Actuated Cycle Length: 67
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Warden Avenue & Elgin Mills Road East





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	1156	103	23	469	14	204	1240	155	15	251	22
Future Volume (vph)	50	1156	103	23	469	14	204	1240	155	15	251	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	4.5	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
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1761		1738	1876		1789	1847	1633	1825	1883	1601
Flt Permitted	0.28	1.00		0.14	1.00		0.55	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	500	1761		261	1876		1045	1847	1633	307	1883	1601
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	58	1344	120	27	545	16	237	1442	180	17	292	26
RTOR Reduction (vph)	0	5	0	0	2	0	0	0	41	0	0	16
Lane Group Flow (vph)	58	1459	0	27	559	0	237	1442	139	17	292	10
Heavy Vehicles (%)	8%	8%	5%	5%	2%	0%	2%	4%	0%	0%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4			8			6		6	2		2
Actuated Green, G (s)	28.0	28.0		28.0	28.0		25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	28.0	28.0		28.0	28.0		25.0	27.5	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.37	0.41	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)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	208	735		109	784		389	758	609	114	702	597
v/s Ratio Prot		c0.83			0.30			c0.78			0.16	
v/s Ratio Perm	0.12			0.10			0.23		0.09	0.06		0.01
v/c Ratio	0.28	1.99		0.25	0.71		0.61	1.90	0.23	0.15	0.42	0.02
Uniform Delay, d1	12.8	19.5		12.7	16.2		17.0	19.8	14.4	13.9	15.6	13.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	448.4		1.2	3.1		6.9	411.0	0.9	2.7	1.8	0.0
Delay (s)	13.6	467.9		13.9	19.3		24.0	430.8	15.3	16.7	17.4	13.3
Level of Service	B	F		B	B		C	F	B	B	B	B
Approach Delay (s)		450.5			19.0			338.7			17.0	
Approach LOS		F			B			F			B	

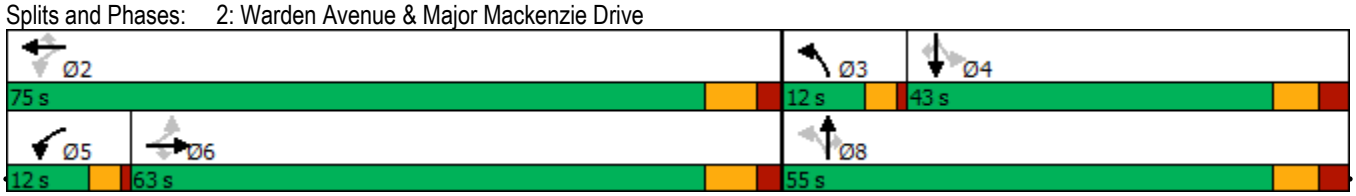
Intersection Summary			
HCM 2000 Control Delay	309.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.03		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	160.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

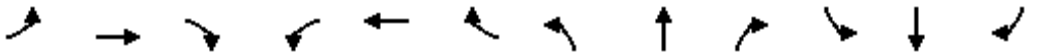
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	1970	126	109	740	37	210	1584	330	35	293	21
Future Volume (vph)	42	1970	126	109	740	37	210	1584	330	35	293	21
Lane Group Flow (vph)	45	2118	135	117	796	40	226	1703	355	38	315	23
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	6	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	34.0	34.0	34.0	7.0	34.0	34.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	41.5	41.5	41.5	11.0	41.5	41.5	11.0	41.5	41.5	41.5	41.5	41.5
Total Split (s)	63.0	63.0	63.0	12.0	75.0	75.0	12.0	55.0	55.0	43.0	43.0	43.0
Total Split (%)	48.5%	48.5%	48.5%	9.2%	57.7%	57.7%	9.2%	42.3%	42.3%	33.1%	33.1%	33.1%
Yellow Time (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	2.5	2.5	2.5	1.0	2.5	2.5	1.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	-2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	5.0	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.16	1.38	0.18	0.70	0.42	0.05	0.74	1.33	0.63	0.72	0.61	0.04
Control Delay	24.8	204.0	7.3	43.0	20.1	1.0	45.4	187.8	30.7	106.0	47.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	204.0	7.3	43.0	20.1	1.0	45.4	187.8	30.7	106.0	47.0	0.1
Queue Length 50th (m)	7.0	~378.0	4.4	14.0	64.1	0.0	40.1	~297.4	56.0	8.8	70.5	0.0
Queue Length 95th (m)	15.6	#419.0	16.6	#39.5	79.3	1.8	#64.4	#339.6	89.8	#29.3	101.4	0.0
Internal Link Dist (m)		203.6			501.9			120.0			316.9	
Turn Bay Length (m)	58.0		90.0	138.0		111.0	48.0		32.0	146.0		80.0
Base Capacity (vph)	288	1540	732	169	1876	882	307	1282	562	53	519	522
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	1.38	0.18	0.69	0.42	0.05	0.74	1.33	0.63	0.72	0.61	0.04

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Natural Cycle: 145
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Warden Avenue & Major Mackenzie Drive





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	1970	126	109	740	37	210	1584	330	35	293	21
Future Volume (vph)	42	1970	126	109	740	37	210	1584	330	35	293	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	5.0	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3444	1570	1772	3614	1633	1738	3510	1384	1659	1902	1633
Flt Permitted	0.35	1.00	1.00	0.07	1.00	1.00	0.33	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	674	3444	1570	125	3614	1633	605	3510	1384	197	1902	1633
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)	45	2118	135	117	796	40	226	1703	355	38	315	23
RTOR Reduction (vph)	0	0	60	0	0	19	0	0	57	0	0	17
Lane Group Flow (vph)	45	2118	75	117	796	21	226	1703	298	38	315	6
Heavy Vehicles (%)	0%	6%	4%	3%	1%	0%	5%	4%	18%	10%	1%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	55.6	55.6	55.6	67.5	67.5	67.5	47.5	47.5	47.5	35.5	35.5	35.5
Effective Green, g (s)	55.6	58.1	55.6	67.5	67.5	67.5	47.5	47.5	47.5	35.5	35.5	35.5
Actuated g/C Ratio	0.43	0.45	0.43	0.52	0.52	0.52	0.37	0.37	0.37	0.27	0.27	0.27
Clearance Time (s)	7.5	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	288	1539	671	164	1876	847	290	1282	505	53	519	445
v/s Ratio Prot		c0.62		c0.04	0.22		0.05	c0.49			0.17	
v/s Ratio Perm	0.07		0.05	0.32		0.01	0.24		0.22	0.19		0.00
v/c Ratio	0.16	1.38	0.11	0.71	0.42	0.02	0.78	1.33	0.59	0.72	0.61	0.01
Uniform Delay, d1	22.8	36.0	22.4	28.8	19.3	15.2	36.6	41.2	33.4	42.7	41.2	34.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	173.5	0.3	13.7	0.7	0.1	12.4	153.3	1.8	36.9	2.0	0.0
Delay (s)	24.0	209.4	22.7	42.5	20.0	15.3	49.0	194.5	35.1	79.7	43.2	34.5
Level of Service	C	F	C	D	B	B	D	F	D	E	D	C
Approach Delay (s)		194.8			22.5			155.3			46.3	
Approach LOS		F			C			F			D	

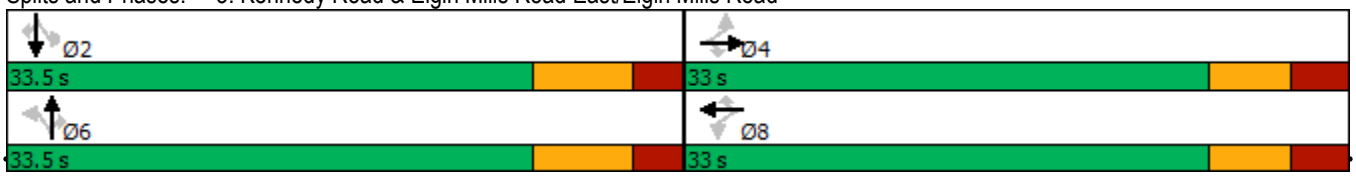
Intersection Summary			
HCM 2000 Control Delay	142.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.5
Intersection Capacity Utilization	133.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

3: Kennedy Road & Elgin Mills Road East/Elgin Mills Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	1123	131	21	380	7	115	632	56	15	398	16
Future Volume (vph)	59	1123	131	21	380	7	115	632	56	15	398	16
Lane Group Flow (vph)	67	1276	149	24	432	8	131	718	64	17	452	18
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Detector Phase	4	4	4	8	8	8	6	6	6	2	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	5.0	5.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (s)	33.0	33.0	33.0	33.0	33.0	33.0	33.5	33.5	33.5	33.5	33.5	33.5
Total Split (%)	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	50.4%	50.4%	50.4%	50.4%	50.4%	50.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	2.5	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	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	7.5	7.5	7.5	7.5	7.5	7.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
v/c Ratio	0.22	1.75	0.22	0.24	0.60	0.01	0.45	0.98	0.09	0.15	0.60	0.03
Control Delay	16.1	364.6	7.9	21.0	20.4	0.0	21.3	52.9	4.2	17.1	20.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	364.6	7.9	21.0	20.4	0.0	21.3	52.9	4.2	17.1	20.3	0.1
Queue Length 50th (m)	5.4	~240.7	5.3	1.9	41.1	0.0	11.6	85.1	0.0	1.3	43.1	0.0
Queue Length 95th (m)	13.2	#300.7	15.0	7.4	65.0	0.0	25.6	#145.9	5.8	5.4	67.3	0.0
Internal Link Dist (m)		1347.2			145.4			1762.3			135.7	
Turn Bay Length (m)	100.0		50.0	143.0		58.0	142.0		48.0	45.0		40.0
Base Capacity (vph)	298	729	680	101	722	683	289	729	678	115	751	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	1.75	0.22	0.24	0.60	0.01	0.45	0.98	0.09	0.15	0.60	0.03

Intersection Summary
Cycle Length: 66.5
Actuated Cycle Length: 66.5
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Kennedy Road & Elgin Mills Road East/Elgin Mills Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	1123	131	21	380	7	115	632	56	15	398	16
Future Volume (vph)	59	1123	131	21	380	7	115	632	56	15	398	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	1865	1617	1601	1847	1633	1825	1865	1633	1825	1921	1617
Flt Permitted	0.40	1.00	1.00	0.15	1.00	1.00	0.38	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	763	1865	1617	259	1847	1633	739	1865	1633	296	1921	1617
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	67	1276	149	24	432	8	131	718	64	17	452	18
RTOR Reduction (vph)	0	0	48	0	0	5	0	0	39	0	0	11
Lane Group Flow (vph)	67	1276	101	24	432	3	131	718	25	17	452	7
Heavy Vehicles (%)	0%	3%	1%	14%	4%	0%	0%	3%	0%	0%	0%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			6			2	
Permitted Phases	4		4	8		8	6		6	2		2
Actuated Green, G (s)	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	298	729	632	101	722	638	288	729	638	115	751	632
v/s Ratio Prot		c0.68			0.23			c0.38			0.24	
v/s Ratio Perm	0.09		0.06	0.09		0.00	0.18		0.02	0.06		0.00
v/c Ratio	0.22	1.75	0.16	0.24	0.60	0.00	0.45	0.98	0.04	0.15	0.60	0.01
Uniform Delay, d1	13.5	20.2	13.2	13.6	16.1	12.4	15.0	20.1	12.5	13.1	16.1	12.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	343.3	0.1	1.2	1.3	0.0	5.1	29.9	0.1	2.7	3.6	0.0
Delay (s)	13.9	363.6	13.3	14.8	17.4	12.4	20.1	49.9	12.6	15.8	19.7	12.4
Level of Service	B	F	B	B	B	B	C	D	B	B	B	B
Approach Delay (s)		312.9			17.2			43.0			19.3	
Approach LOS		F			B			D			B	

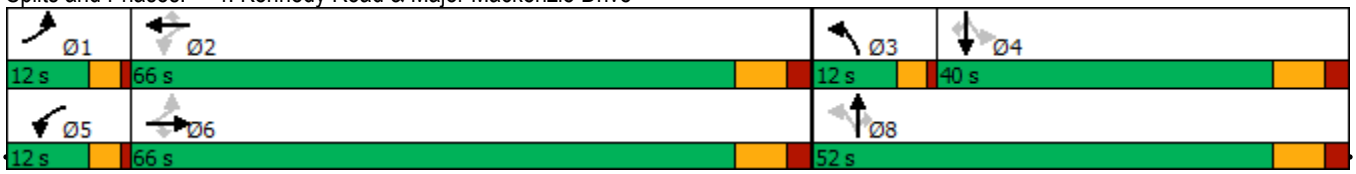
Intersection Summary			
HCM 2000 Control Delay	156.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	66.5	Sum of lost time (s)	14.5
Intersection Capacity Utilization	127.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	2053	245	85	854	41	229	529	168	104	400	33
Future Volume (vph)	47	2053	245	85	854	41	229	529	168	104	400	33
Lane Group Flow (vph)	52	2256	269	93	938	45	252	581	185	114	440	36
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Detector Phase	1	6	6	5	2	2	3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	37.5	37.5	11.0	37.5	37.5	11.0	38.5	38.5	38.5	38.5	38.5
Total Split (s)	12.0	66.0	66.0	12.0	66.0	66.0	12.0	52.0	52.0	40.0	40.0	40.0
Total Split (%)	9.2%	50.8%	50.8%	9.2%	50.8%	50.8%	9.2%	40.0%	40.0%	30.8%	30.8%	30.8%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	2.5	2.5	1.0	2.5	2.5	1.0	2.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
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	Max	Max	None	Max	Max	None	None	None	None	None	None
v/c Ratio	0.16	1.30	0.32	0.53	0.51	0.05	0.98	0.56	0.33	0.74	0.65	0.09
Control Delay	11.9	168.5	12.7	27.0	22.2	0.1	88.8	38.2	11.9	73.1	49.6	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	168.5	12.7	27.0	22.2	0.1	88.8	38.2	11.9	73.1	49.6	0.5
Queue Length 50th (m)	4.5	~359.0	20.7	8.3	76.7	0.0	47.1	61.3	9.2	25.6	51.0	0.0
Queue Length 95th (m)	11.5	#448.8	44.9	24.9	112.5	0.0	#92.4	78.3	26.5	46.1	67.4	0.0
Internal Link Dist (m)		1479.7			222.6			139.6			212.5	
Turn Bay Length (m)	56.0		66.0	60.0		145.0	120.0		55.0	60.0		65.0
Base Capacity (vph)	345	1734	843	184	1848	842	257	1332	684	224	973	510
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	1.30	0.32	0.51	0.51	0.05	0.98	0.44	0.27	0.51	0.45	0.07

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 119.9
Natural Cycle: 150
Control Type: Semi Act-Uncoord
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Kennedy Road & Major Mackenzie Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	2053	245	85	854	41	229	529	168	104	400	33
Future Volume (vph)	47	2053	245	85	854	41	229	529	168	104	400	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1755	3544	1609	1789	3614	1547	1789	3579	1617	1807	3579	1596
Flt Permitted	0.24	1.00	1.00	0.07	1.00	1.00	0.29	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)	439	3544	1609	123	3614	1547	549	3579	1617	824	3579	1596
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)	52	2256	269	93	938	45	252	581	185	114	440	36
RTOR Reduction (vph)	0	0	56	0	0	22	0	0	94	0	0	29
Lane Group Flow (vph)	52	2256	213	93	938	23	252	581	91	114	440	7
Confl. Peds. (#/hr)	2		2	2		2	1					1
Heavy Vehicles (%)	4%	3%	0%	2%	1%	3%	2%	2%	1%	1%	2%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2		3	8			4	
Permitted Phases	6		6	2		2	8		8	4		4
Actuated Green, G (s)	65.4	59.6	59.6	69.0	61.4	61.4	34.6	34.6	34.6	22.6	22.6	22.6
Effective Green, g (s)	65.4	59.6	59.6	69.0	61.4	61.4	34.6	34.6	34.6	22.6	22.6	22.6
Actuated g/C Ratio	0.54	0.49	0.49	0.57	0.51	0.51	0.29	0.29	0.29	0.19	0.19	0.19
Clearance Time (s)	4.0	7.5	7.5	4.0	7.5	7.5	4.0	7.5	7.5	7.5	7.5	7.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	300	1748	793	175	1836	786	239	1025	463	154	669	298
v/s Ratio Prot	0.01	c0.64		c0.03	0.26		c0.07	0.16			0.12	
v/s Ratio Perm	0.09		0.13	0.27		0.01	c0.23		0.06	0.14		0.00
v/c Ratio	0.17	1.29	0.27	0.53	0.51	0.03	1.05	0.57	0.20	0.74	0.66	0.02
Uniform Delay, d1	13.9	30.6	17.9	26.1	19.7	14.8	41.3	36.7	32.6	46.3	45.5	40.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	135.2	0.8	3.1	1.0	0.1	73.3	0.7	0.2	17.3	2.3	0.0
Delay (s)	14.2	165.8	18.7	29.1	20.7	14.9	114.5	37.4	32.8	63.6	47.9	40.1
Level of Service	B	F	B	C	C	B	F	D	C	E	D	D
Approach Delay (s)		147.4			21.2			55.7			50.4	
Approach LOS		F			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	93.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	120.8	Sum of lost time (s)	23.0
Intersection Capacity Utilization	107.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

R.J. Burnside & Associates Limited