Appendix A. Existing conditions report

Existing Conditions Report

Downtown Movement Plan

Task A - Existing Conditions

City of Mississauga
December 15, 2020

Version	Issue Date	Revision
Draft 1	2020-06-05	First Draft
Revision 01	2020-08-27	Address City's comments as of 2020-06-30
Revision 02	2020-11-27	Address City's and MTO's comments as of 2020-10-26
Final	2020-12-15	Address City's comments as of 2020-12-09

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1 Introduction

The City of Mississauga has initiated the Downtown Movement Plan (DMP) as a critical study that will update previous plans and identify the transportation infrastructure and policies required to support and guide the continued development of Downtown Core. The DMP is a robust, multimodal transportation study carried out as a Transportation Master Plan (TMP) satisfying Phases 1 and 2 of the Municipal Class Environmental Assessment process (Municipal Engineers Association June 2000, as amended in 2007, 2011 and 2015).

With the adoption of Mississauga's first Transportation Master Plan last year, City of Mississauga is committed to fostering the freedom to move for all travellers. Based on the City's TMP, the vision for the Downtown Core is to transform from a local focal point to a regional centre when the Hurontario LRT begins operation, connecting the Downtown Core to the rest of the Hurontario corridor from Port Credit in the south to Brampton in the north. This renewed direction, along with the proposed redevelopment at Square One Shopping Centre, creates the best opportunity to reshape the transportation network of Downtown Core.

The DMP will identify transportation programs, policies, and infrastructure to support the City's vision for the Downtown Core. This vision will be updated through a connected project called the "*Downtown Strategy"*.

As part of Phase 1 for the DMP, this report documents an analysis of the existing conditions in the Downtown Core and includes a review of the policy context, background studies, land use and demographics, travel trends, street network, transit network, cycling network, and pedestrian network. The findings of this report will help to identify the existing problems and opportunities to support and guide an integrated approach to future land use, built form, and transportation solutions.

1.1 Study Area

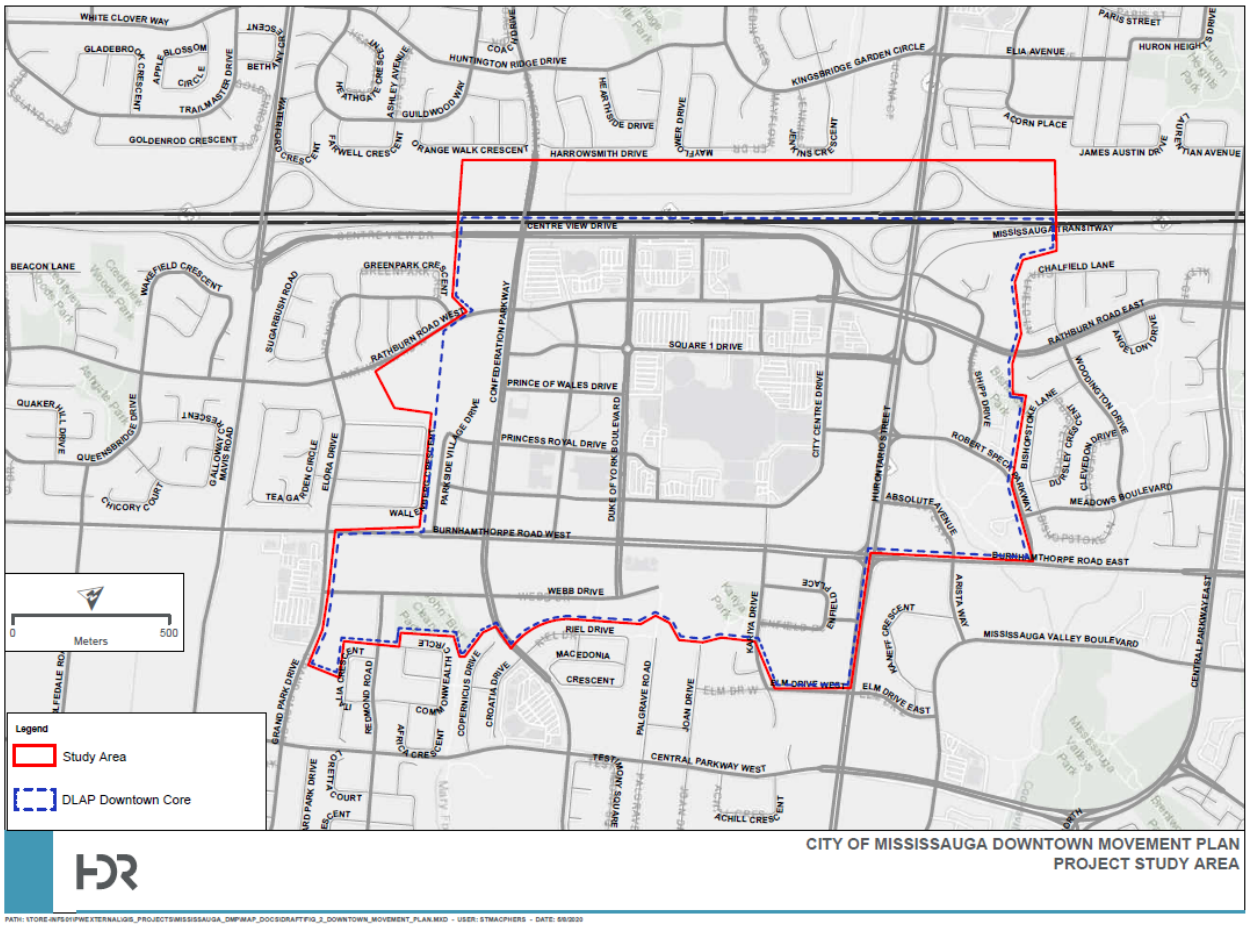
Three study areas have been identified for the DMP in order to assess the transportation conditions of the Downtown Core: the Project Study Area (Study Area), the Micro Model Area, and the EMME Subarea.

The comprehensive transportation analysis will be conducted for the Project Study Area, as illustrated in **Figure 1-1**, including the City's Downtown Core bounded by the Highway 403 corridor to the north, Chalfield Lane/Shipp Drive/Robert Speck Parkway to the east, Burnhamthorpe Road/Elm Drive to

the south, and Grand Park Drive/Wallenberg Crescent/Rathburn Road to the west. Note that the Project Study Area covers extra lands – Zonta Meadows Park and Highway 403 Lands – compared to the existing Downtown Core area delineated in the Downtown Core Local Area Plan (DLAP).

Growth and network changes in the Downtown Core will have impacts on the broader transportation network and vice versa. Therefore, two larger study areas (the Micro Model Area and EMME Subarea) are identified for the purpose of traffic modelling. The EMME Subarea, which is the broadest study area, is bounded by Eglinton Avenue to the north, Cawthra Road to the east, Queensway to the south, and Erin Mills Parkway to the west. The modelling study areas are discussed in more detail in **Section 3.7**.

Figure 1-1: Study Area



1.2 EA Process

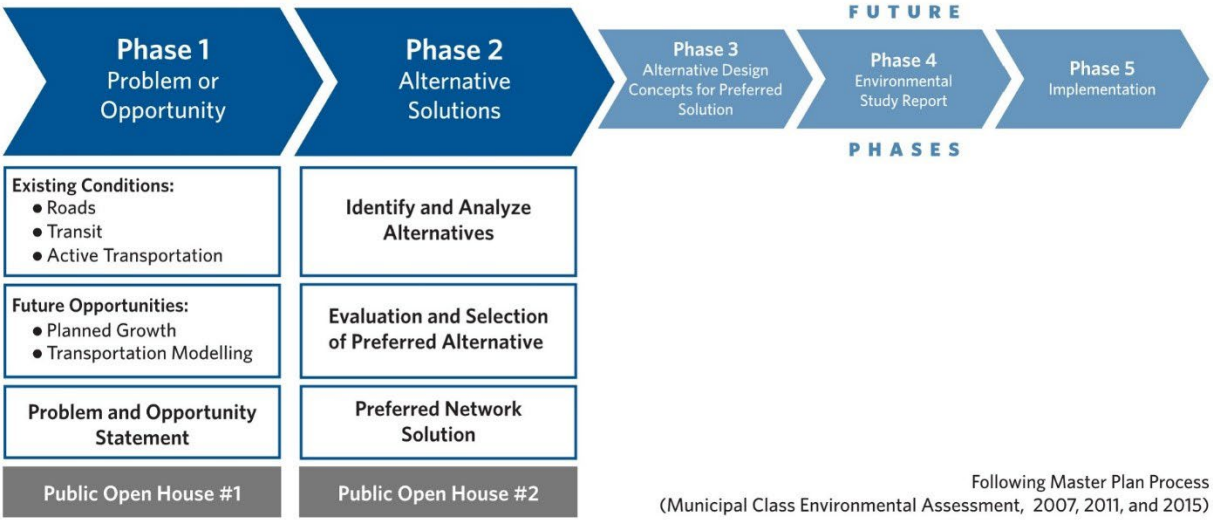
The DMP study will be carried out in accordance with Master Plan Approach #1 of the Municipal Class Environmental Assessment (EA) Process (October 2000, as amended in 2007, 2011, and 2015) as shown in **Figure 1-2**. The

DMP study will complete Phase 1 and Phase 2 of the five-phase process, where Phase 1 defines the problem and/or opportunities and Phase 2 identifies and evaluates alternative planning solutions to recommend a preferred alternative.

An important part of the Municipal Class EA process is consultation with stakeholders and the public, which will be conducted throughout the study.

Results of the Master Plan will be incorporated into the Downtown Strategy.

Figure 1-2: Municipal Class EA Process



2 Background Review and Planning Context

2.1 Provincial Planning Context

Provincial planning policies were reviewed to identify their relevance to the Downtown Core and the findings are summarized below.

2.1.1 Planning Act 2019

Recently enacted Bill 139 introduced several changes to the Planning Act, specifically the provision of protected Major Transit Station Areas for single-tier and upper-tier municipalities. The Planning Act, states:

"The official plan of a [single-tier/upper-tier] municipality may include policies that identify the area surrounding and including an existing or planned higher order transit station or stop as a protected major transit station area and that delineate the area's boundaries, and if the official plan includes such policies it must also contain policies that,

a) *identify the minimum number of residents and jobs, collectively, per hectare that are planned to be accommodated within the area;*

b) *identify the authorized uses of land in the major transit station area and of buildings or structures on lands in the area; and*

c) *identify the minimum densities that are authorized with respect to buildings and structures on lands in the area."* 2017, c. 23, Sched. 3, s. 5 (2).

2.1.2 Provincial Policy Statement 2020

The Provincial Policy Statement provides direction on land use planning and development as well as the transportation system. Relevant land use and transportation policies to the development of the City's Downtown Movement Plan include:

- 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 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 not permit development in planned corridors that could preclude or negatively affect the use of the corridor for the purpose(s) for which it was identified. New development proposed on adjacent lands to existing or planned corridors and transportation facilities should be compatible with, and supportive of, the long-term purposes of the corridor and should be designed to avoid, mitigate or minimize negative impacts on and from the corridor and transportation facilities;
- The co-location of linear infrastructure should be promoted, where appropriate; and
- When planning for corridors and rights-of-way for significant transportation, electricity transmission, and infrastructure facilities, consideration will be given to the significant resources in Section 2: Wise Use and Management of Resources.

2.1.3 A Place to Grow: Growth Plan for the Greater Golden Horseshoe 2019

Originally adopted in 2006, the 2019 update sets forth a framework for implementing the Government of Ontario's 2051 vision for building stronger, prosperous communities by better managing growth in the region. Currently, the province is considering further revisions. The Growth Plan identifies the Downtown Core as an Urban Growth Centre. Policies related to Urban Growth Centres include, but are not limited to:

1. Urban Growth Centres will be planned:
   a) as focal areas for investment in regional public service facilities, as well as commercial, recreational, cultural, and entertainment uses;

   b) to accommodate and support the transit network at the regional scale and provide connection points for inter- and intra-regional transit;

   c) to serve as high-density major employment centres that will attract provincially, nationally, or internationally significant employment uses; and

   d) to accommodate significant population and employment growth.

2. Urban growth centres will be planned to achieve, by 2031 or earlier, a minimum density target of:

   b) 200 residents and jobs combined per hectare for Downtown Mississauga.

2.1.4 Regional Transportation Plan

Metrolinx is a provincial agency responsible for planning and implementing a multi-modal transportation system across the GTHA. In 2008, they released the Big Move, which acted as the first Regional Transportation Plan (RTP) in the province. They recently updated this plan, now known as the 2041 RTP.

The RTP outlines a number of transit infrastructure projects to be completed across the GTHA such as the service overhaul of GO Transit services through Regional Express Rail (RER), as well as goals such as transit fare integration across different providers.

2.2 Regional Planning Context

Regional planning policies were reviewed to identify their relevance to Downtown Core and findings are summarized in the following sections.

2.2.1 Peel Region Official Plan, Office Consolidation 2018

The Peel Region Official Plan (ROP) provides direction to guide economic, environmental, and community-building decisions to manage growth. The Region of Peel completed the Peel Regional Official Plan Review (February 2013 Draft) to bring its Official Plan policies into conformity with provincial requirements.

The main objectives of the ROP is to recognize the urban and rural nature of Peel Region, protect the natural and cultural environment, manage resources, direct sustainable growth and set the basis for providing Regional services in an efficient and effective manner. The ROP establishes a framework for future planning activities and for public and private initiatives aimed at improving the existing physical environment.

Under the ROP, the DMP study area is considered to be part of a Conceptual Urban Growth Centre which will serve as a transit hub providing connections to the Regional Intensification Corridor (conceptual).

2.2.2 Let's Move Peel Long Range Transportation Plan 2019

The Region of Peel's Long Range Transportation Plan (LRTP) was recently updated to address transportation needs to 2041. The LRTP identifies major transportation challenges that the Region of Peel foresees over the next few decades, as well as the recommended policies, sustainable transportation strategies and road improvements required to address these challenges. A key targeted strategy is the shift to 50% sustainable mode share by 2041 which includes sustainable options such as transit, active transportation, and carpooling.

2.2.3 Region of Peel Road Characterization Study 2013

The Road Characterization Study was completed in 2013 and provides guidelines for future regional roadways that accommodate multiple transportation modes and ensures that the regional arterial network considers all road users, transportation options, health impacts, and local context. Note that there are no Regional roads within the Downtown Core.

2.2.4 Region of Peel Sustainable Transportation Strategy 2018

In 2018, Peel Regional Council approved the Sustainable Transportation Strategy (STS) which sets a goal of 50% sustainable mode share by 2041. The strategy builds on the framework established by the 2012 Active Transportation Plan, existing and ongoing plans from the area municipalities, neighbouring municipalities and input from other agencies. The STS outlines implementation plans focusing on active transportation and transportation demand management.

2.2.5 Region of Peel Strategic Goods Movement Network Study 2013

The Region of Peel Strategic Goods Movement Network Study (SGMNS) identified potential truck priority routes for goods movement to develop a hierarchical truck route network throughout Peel Region. The goal of the SGMNS is to improve, prioritize, and preserve goods movement corridors through the Region.

The SGMNS identified the DMP study area as being located within Mississauga's major business cluster with a primary and connector truck route running north-south and east-west surrounding the study area.

2.3 Municipal Planning Context

Municipal planning policies and other background studies were reviewed to identify their relevance to Downtown Core.

2.3.1 City of Mississauga Plans

CLIMATE CHANGE ACTION PLAN 2019

In 2019, the City joined other municipalities across Canada in declaring a climate emergency and also approved its Climate Change Action Plan (CCAP). In this action the City has recognized that global and local extreme weather events are a direct effect of increases in greenhouse gas (GHG) emissions, significantly from the use of gasoline fueled vehicles. The City is committed to reducing its greenhouse gas emissions and has set an ambitious and achievable greenhouse gas reduction target of 80% below 1990 levels by 2050. The Downtown Movement Plan will encourage sustainable travel in the Downtown Core to help achieve the City's climate change goals.

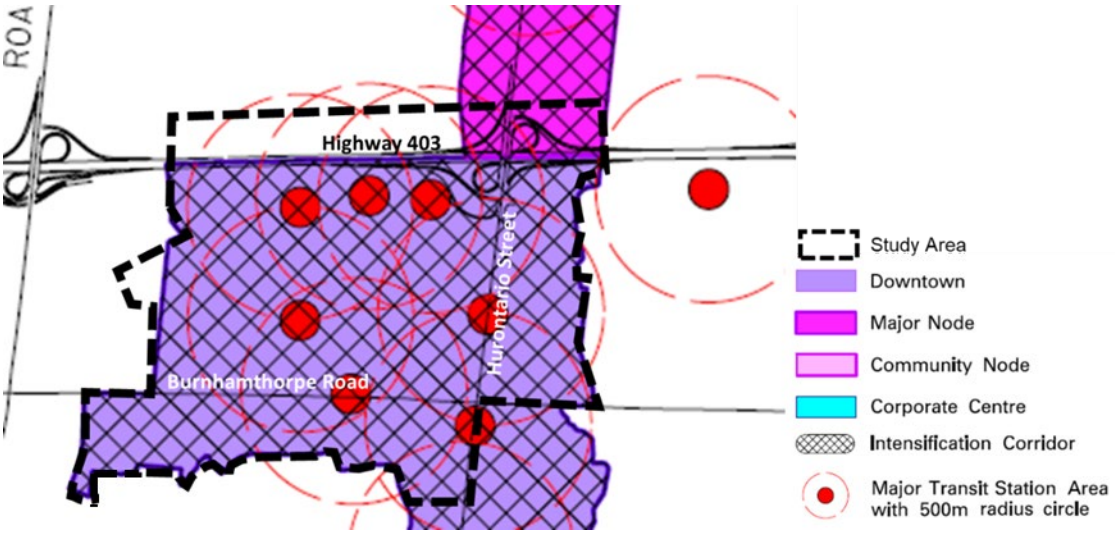
CITY OF MISSISSAUGA OFFICIAL PLAN CONSOLIDATION 2019

The Mississauga Official Plan was updated to include Local Planning Appeal Tribunal (LPAT) decisions and City Council approved Official Plan Amendments as of June 8, 2020.

The Official Plan provides a policy framework to protect, enhance, restore and expand the Natural Heritage System, to direct growth to where it will benefit the urban form, support a strong public transportation system, and address the long term sustainability of the city.

The Official Plan identifies the DMP study area as the Downtown Core. The Downtown Core falls within the Intensification Corridor and the Downtown Intensification Area as illustrated in **Figure 2-1**. Policies pertaining to the Downtown Core are found in the *Downtown Core Local Area Plan*, LPAT approval June 8, 2020, which is discussed in Section 2.3.2.

Figure 2-1: OP Schedule 2 – Intensification Areas



Source: Mississauga Official Plan (2019)

MISSISSAUGA TRANSPORTATION MASTER PLAN 2019

The Mississauga Transportation Master Plan (MTMP) aims to direct the City's investment in and stewardship of the transportation system, which is the interconnected system of:

- Infrastructure such as roadways, railways, highways, bikeways, sidewalks, walkways, and trails;
- Public rights-of-way, waterfronts, green spaces, and the lands adjacent to them;
- Public services such as transit, municipal parking, and traffic management;
- Regulations that govern service providers such as taxis, Transportation Network Companies (TNCs), and towing and delivery vehicles; and
- People who travel and engage with rules, etiquette, and on-going education.

The MTMP's vision is that "in Mississauga, everyone and everything will have the freedom to move safely, easily, and efficiently to anywhere at any time." For the Downtown Core, the vision translates to transforming a local focal point to a regional centre. The Hurontario LRT and Mississauga Transitway will connect businesses with employees and customers from across Mississauga and beyond. Square One Shopping Centre will remain a regional attraction, and more people will come and go by transit with convenient connections between modes and service providers.

OUR FUTURE MISSISSAUGA STRATEGIC PLAN 2009

Our Future Mississauga, the City's Strategic Plan, is supported by five Strategic Pillars of Change – Move, Belong, Connect, Prosper, and Green. The following Strategic Plan goals are important considerations for the Downtown Core's future transportation network:

- Develop environmental responsibility by reducing private automobile use and developing compact mix-use development;
- Connecting the communities within Mississauga and within the Greater Golden Horseshoe to support a 24-hour city;
- Build a reliable and convenient system to make transit a faster and more affordable alternative, with a transit stop within walking distance to every home and an intricate web of higher order transit;
- Increase capacity to the transportation system through strategic investment in transit, additional links in the street network and active mobility choices; and
- Direct growth by supporting transit-oriented development policies and deliberate civic actions.

MISSISSAUGA CYCLING MASTER PLAN 2018

The City of Mississauga Cycling Master Plan (2018) aims to create a place where people choose to cycle for recreation, fitness, and daily transportation needs. The four goals of the Cycling Master Plan are:

a) Improve safety for cycling;

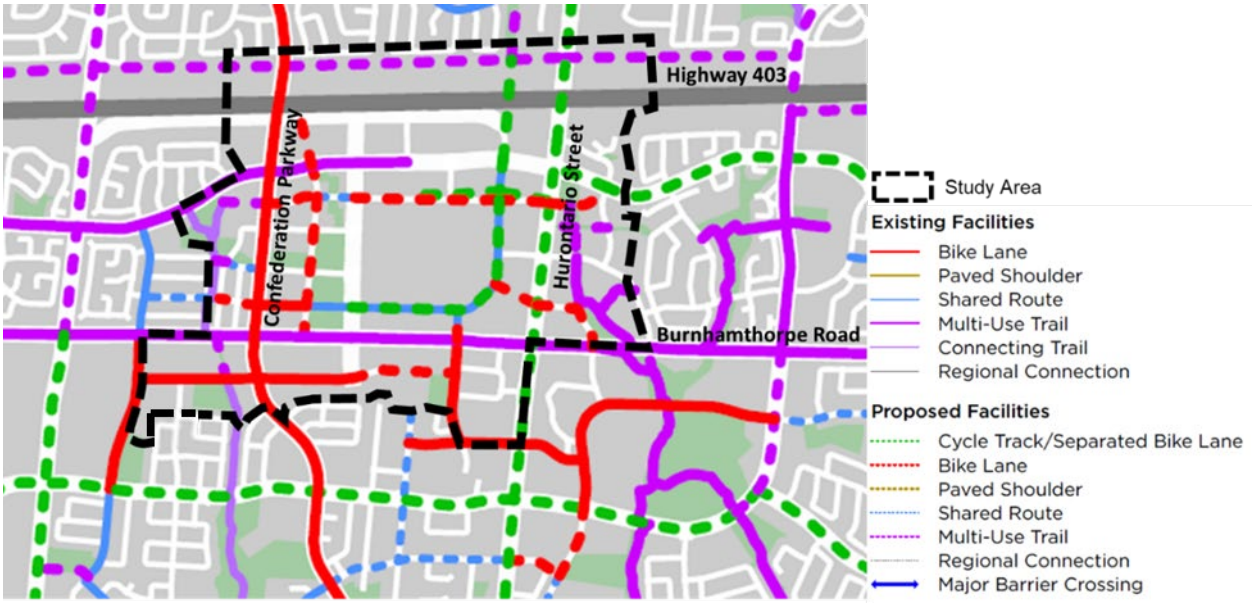
b) Build a connected, convenient and comfortable cycling network;

c) Increase the number of cycling trips in Mississauga; and

d) Foster a culture of cycling.

An extract of the Cycling Master Plan, illustrated in **Figure 2-2**, shows there are a number of proposed bike lanes and cycle tracks/separated bike lanes within the Downtown Core that will provide critical connections to existing bike lanes and multi-use trails, as well as other proposed cycling facilities. A review of existing conditions for cycling is presented in **Section 3.5**.

Figure 2-2: Proposed Cycling Network



Source: Mississauga Cycling Master Plan (2018)

MISSISSAUGA PEDESTRIAN MASTER PLAN (ONGOING)

Walking is a part of everyday life and is an efficient, cost effective and healthy way to travel around Mississauga. The City of Mississauga is developing its first ever Pedestrian Master Plan. The plan will shape how pedestrian connections are designed and implemented across neighbourhoods, helping to enhance and create safe places for people to walk in Mississauga. The plan will act as a go-to reference for pedestrian infrastructure projects until 2041, supporting the City's commitment to a Vision Zero approach.

The project will:

- review the City's existing pedestrian network, identifying gaps and opportunities for future infrastructure projects
- identify key destinations for pedestrians (e.g. transit stops, schools, local amenities etc.)
- analyse how growth and intensification will impact existing and future pedestrian infrastructure

- set short, medium and long-term service delivery and project priorities
- review best practices of pedestrian infrastructure and network design

A review of existing conditions for the pedestrian network is presented in Section 3.6.

PARKING MASTER PLAN AND IMPLEMENTATION STUDY 2019

The City's Parking Master Plan and Implementation Study (2019) laid out the vision for parking in the city and outlined the strategies for various parking management measures including parking regulations, parking facilities, governance, finance, technology, implementation, and monitoring. Through consultation with the public and the City, the vision for parking in the city was defined as:

- Parking policies and practices should consider parking as a valuable resource that influences city building, transportation choices and economic development, and provides an important service for residents and businesses;
- The City should strive to ensure a balance between parking provision and management to maximize support for Mississauga as a multi-modal city; and
- The City should strive to ensure a fair distribution of parking costs.

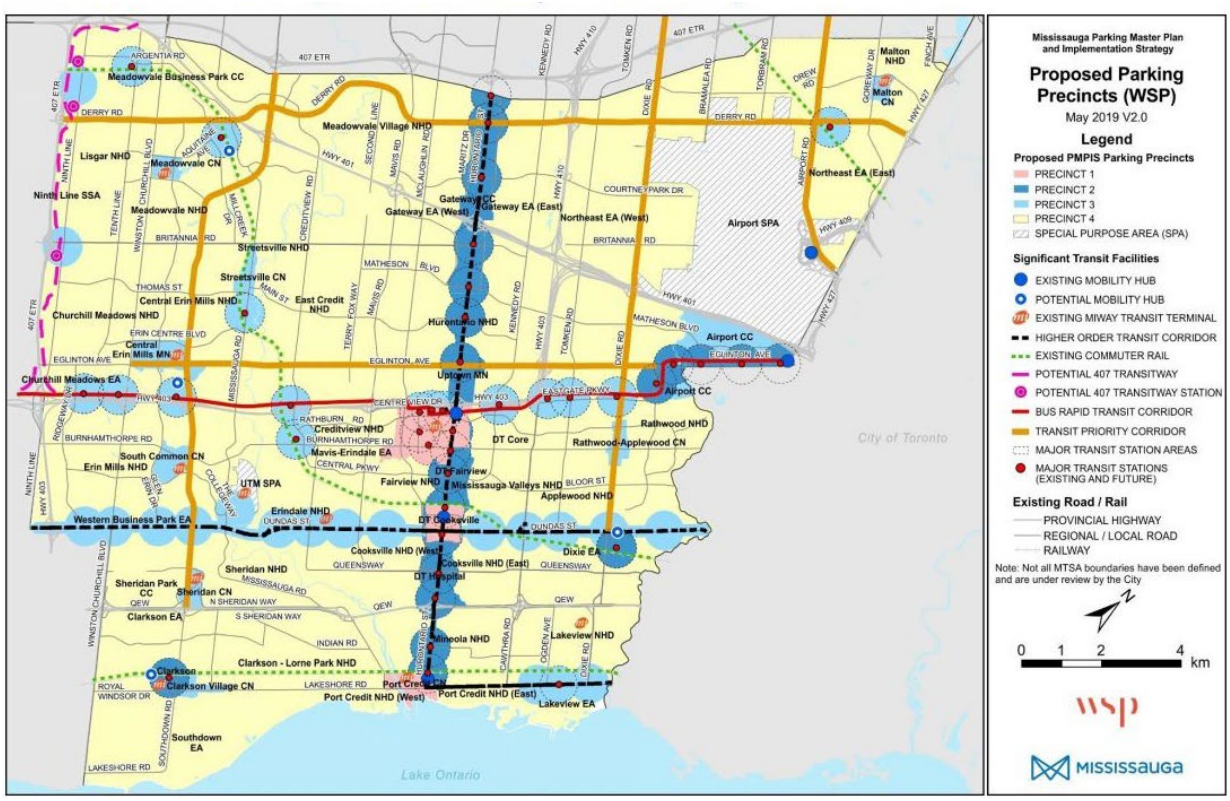
The Parking Master Plan recommended that the City require all future parking policy and practices to be strategically consistent with the vision statement.

As shown in **Figure 2-3**, the DMP study area falls within Precinct One of the proposed precinct policy areas from the City's Parking Master Plan and Implementation Study (PMPIS). The parking vision for Precinct One is to have the lowest minimum parking requirements, highest level of parking management strategies, and consideration of parking maximums for most land uses. The recommended parking management principle is a price responsive approach that makes maximum use of pricing to build, own, operate, and supply municipal parking.

There is an ongoing Parking Regulation Study that will implement this plan.

A review of existing conditions for the existing parking conditions is presented in Section 3.3.4.

Figure 2-3: Proposed Parking Precinct Areas (PMPIS)



Source: Parking Master Plan and Implementation Study (2019)

2.3.2 Downtown Core Plans

DOWNTOWN 21 MASTER PLAN 2010

The Downtown 21 Master Plan was prepared in April 2010 as an update to the Mississauga City Centre Master Plan, 1969, and builds on the 2009 City Strategic Plan. The Downtown 21 Master Plan proposed a number of new east-west and north-south streets to maximize access in and beyond the Downtown Core. **Figure 2-4** illustrates the proposed street improvements that provide additional local streets to create a fine grain network of development blocks that are walkable and well-connected.

The proposed future street network would allow these roads to be small in scale, while maximizing accessibility for pedestrians, cyclists and drivers. The new streets result in urban blocks that provide routing options for shorter-distance trips and provide additional pedestrian and bicycle-friendly routes, all of which help take the load off of other streets. While this finer grid network was proposed in the Downtown 21 Master Plan, the road network, as confirmed through Mississauga Official Plan Amendment No. 8 (MOPA #8)

known as the Downtown Core Local Area Plan, supersedes the Downtown 21 Master Plan.

Figure 2-4: Downtown 21 Proposed Street Network

Source: Mississauga Downtown 21 Master Plan (2010)

DOWNTOWN MISSISSAUGA MOVEMENT PLAN 2014

The Downtown Mississauga Movement Plan (DMMP) aims to use the guiding principles of the Downtown 21 Master Plan to address fundamental issues outlined in the DMMP. The DMMP developed a user hierarchy to prioritize different modes of movement. This hierarchy directs planning, the priority given to different modes, and investment. The user hierarchy proposed for the Movement Plan, is as follows:

1. Active transportation;
2. Transit;
3. Ride sharing / pooling and taxis;
4. Goods and servicing vehicles; and
5. General auto traffic.

The guiding principles of the DMMP include:

- Minimize the need to travel by supporting mixed use, high density development designed to be easily accessible for pedestrians and cyclists.
- Plan Multi-Modal by recognizing the inter-relationships between modes, and the choices available to users.

- A New User Hierarchy focusing on people, not vehicles.
- New mode split provided by greater transportation choices.
- Active Modes for a vibrant Urban Core where walk and bike modes are the priority (mixed use/high density, finer street grid/smaller block sizes and the creation of a walkable vibrant Downtown Core).
- An Integrated Transit Network designed around Higher Order Transit (Hurontario-Main LRT and Mississauga Transitway) and a supportive local transit network.
- Transit-Oriented Development Opportunities by linking regional Higher Order Transit to regional destinations (Square One, Living Arts Centre, City Hall, Sheridan College and future office developments).
- A New Approach to Car Parking by managing the supply, ownership, operation and pricing of off-street and on-street supply.
- Transportation Demand Management (TDM) measures promoting transportation choices, providing incentives, and supporting the efficient use of the finite downtown transportation network.
- The management of goods and servicing vehicles needs to be coordinated with the wider needs of the new urban core (i.e. routes and times of day etc.).
- Accommodating the Auto as part of a wider, integrated transportation system.

Figure 2-5 and **Figure 2-6** illustrates the proposed finer grid street network and cycling network for the Downtown Core respectively. Note that DMMP was an internal study within the City and did not go through the EA process to engage the public or stakeholders. This DMP will revisit the recommendations and seek feedback from the public and relevant stakeholders.

Figure 2-5: DMMP Finer Grid Street Network

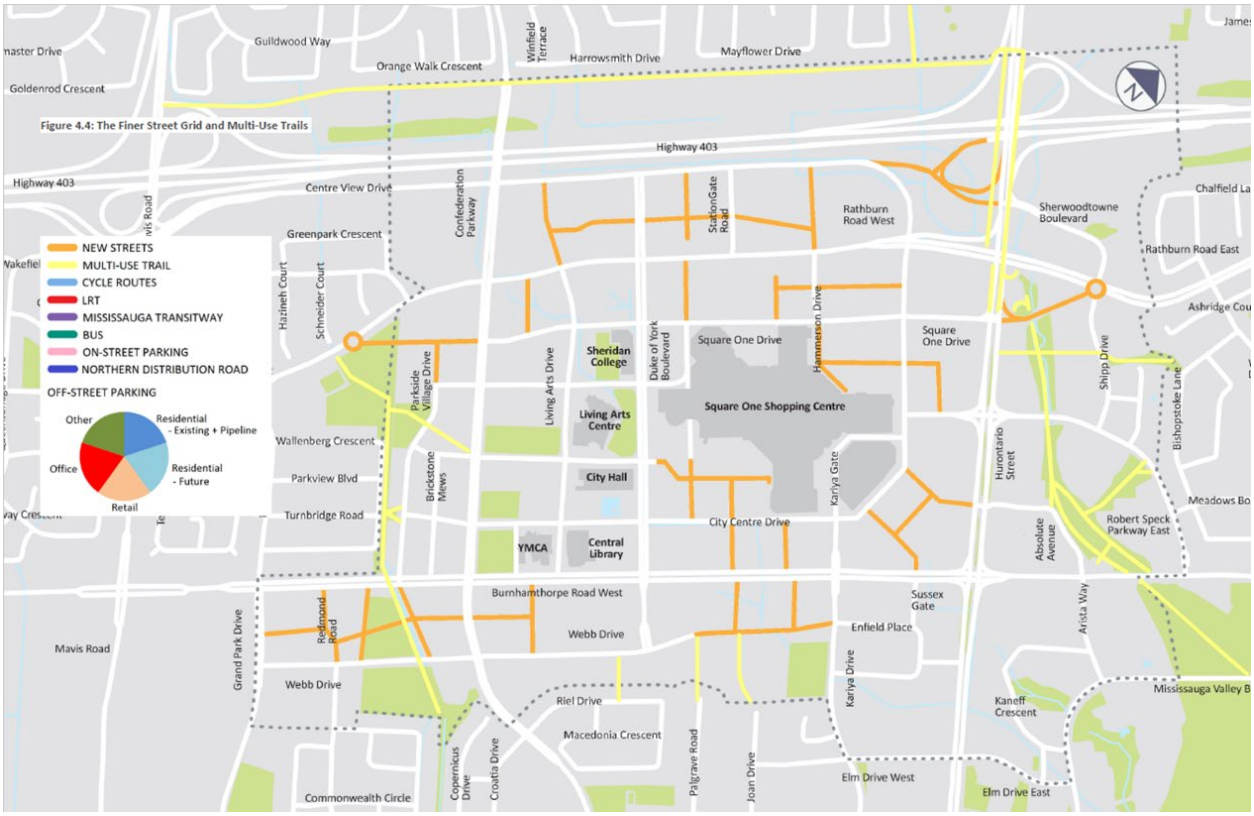


Figure 2-6: DMMP Proposed Cycling Network

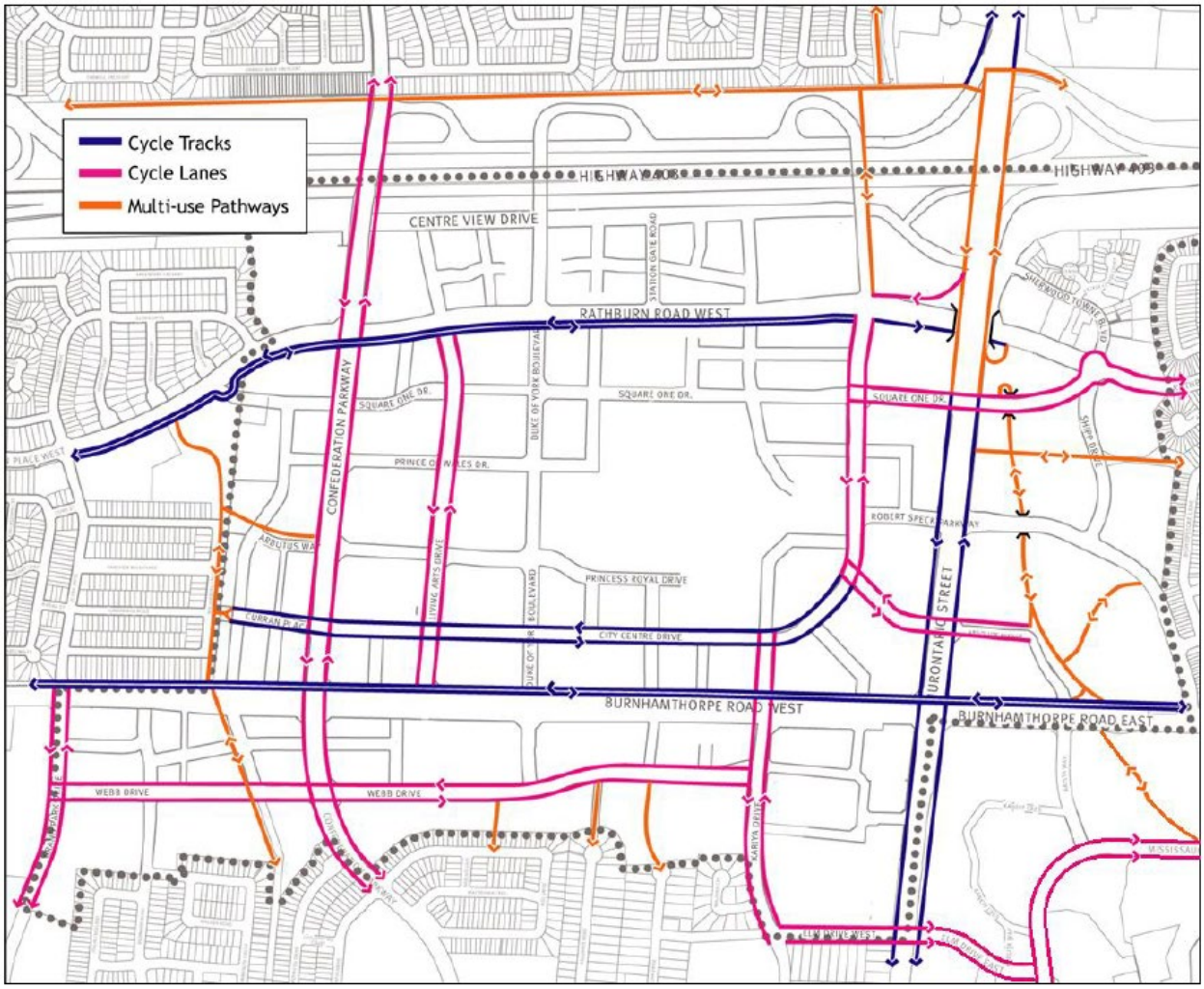
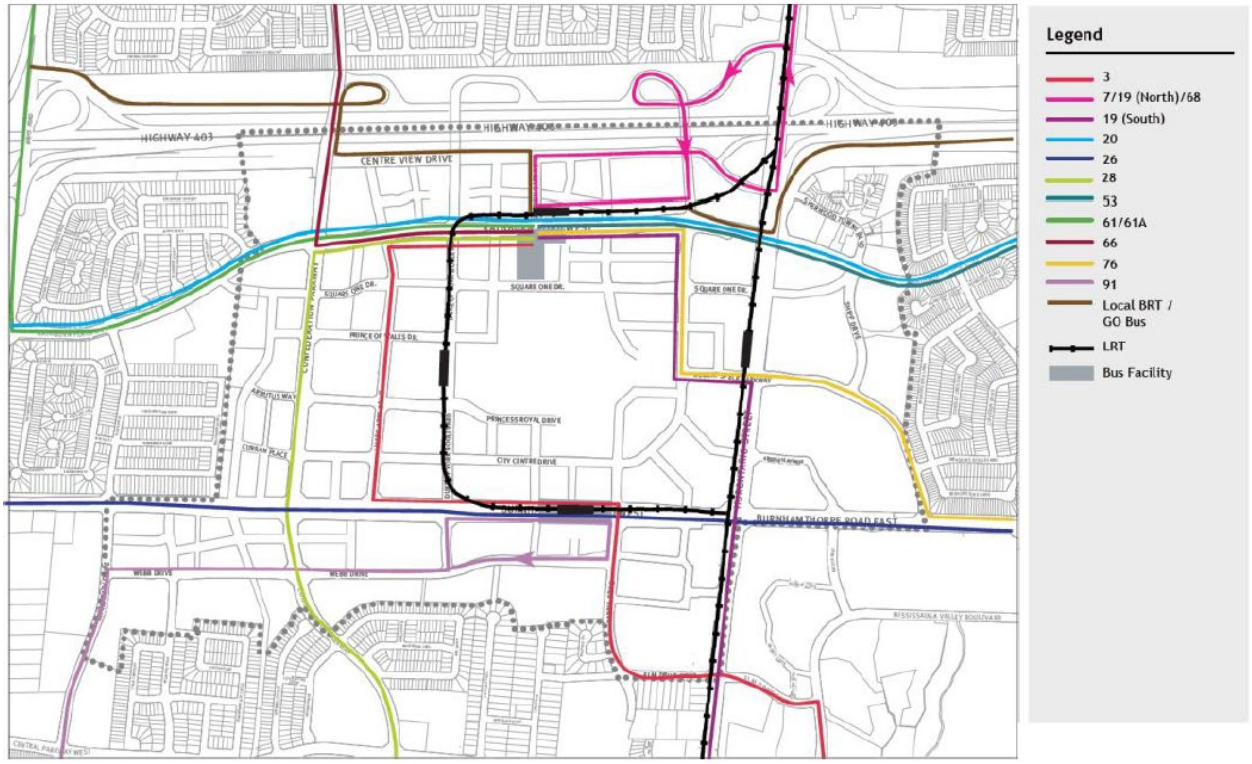


Figure 2-7 illustrates a route concept for local and regional bus networks in the Downtown Core area for the morning peak period proposed for 2031. This was developed for the Hurontario-Main LRT project as a suggested modification to existing bus transit routing to provide a complementary, and integrated local transit network to support the introduction of Hurontario-Main LRT and the Main Street Transit Hub. Since the initial proposal, the LRT loop along Duke of York Boulevard and Burnhamthorpe Road has been removed from the implementation plan by Metrolinx.

Figure 2-7: DMMP Proposed Transit Network



DOWNTOWN CORE LOCAL AREA PLAN 2020

As of June 8, 2020, council approved the Downtown Core Local Area Plan (DLAP) as part of the Official Plan through MOPA #8. The DLAP aims to support the following key opportunities for the Downtown Core:

a) Strengthen the Core's role as the primary location for major office, highest concentration of retail commercial, mixed use, civic and cultural uses;

b) Accommodate forecasted growth without impacting the natural environment and quality of life;

c) Attract new jobs, particularly in the office sector to balance population and employment;

d) Create a fine-grained, well connected road network that supports multi-modal transportation modes: walking, cycling, transit, servicing and goods movement, and the car;

e) Develop an integrated urban place that achieves design excellence in buildings, the public realm and a distinctive, memorable character in mixed use districts; and

f) Provide a new development framework and policy regime founded on greater predictability and certainty of outcomes, to better direct growth and support existing and planned services.

The recommendations in the DLAP were developed with attention to key issues and priorities of the City and outlines specific road system policies to support the future population, employment, and land use designations within the Downtown Core. Future road improvements as proposed in the DLAP include, but are not limited to the following:

- The transit system will expand as the Downtown Core is developed.
- As part of the proposed Mississauga Bus Rapid Transit (BRT) facility, the existing transit terminal may be expanded to serve future development growth and to connect with the BRT facility. In the long term, an additional BRT station is also proposed near Hurontario Street, between Rathburn Road West and Provincial Highway 403.
- The proposed Highway 403 North Collector (Northern Distribution Road), located north of the Downtown Core, is intended to provide access to and from the Downtown Core road network. The Centre View Drive extension is intended to provide access to eastbound Highway 403 via a link east of City Centre Drive. Future functional feasibility studies are required to review those improvements which may impact Highway 403.
- The proposed City Centre Drive viaduct over the Northern Distribution Road and Highway 403 to provide a grade separated crossing to the north.

Figure 2-8 and **Figure 2-9** illustrate the proposed road and transit networks, respectively.

Figure 2-8: DLAP Schedule 2 – Long Term Road Network and Classification

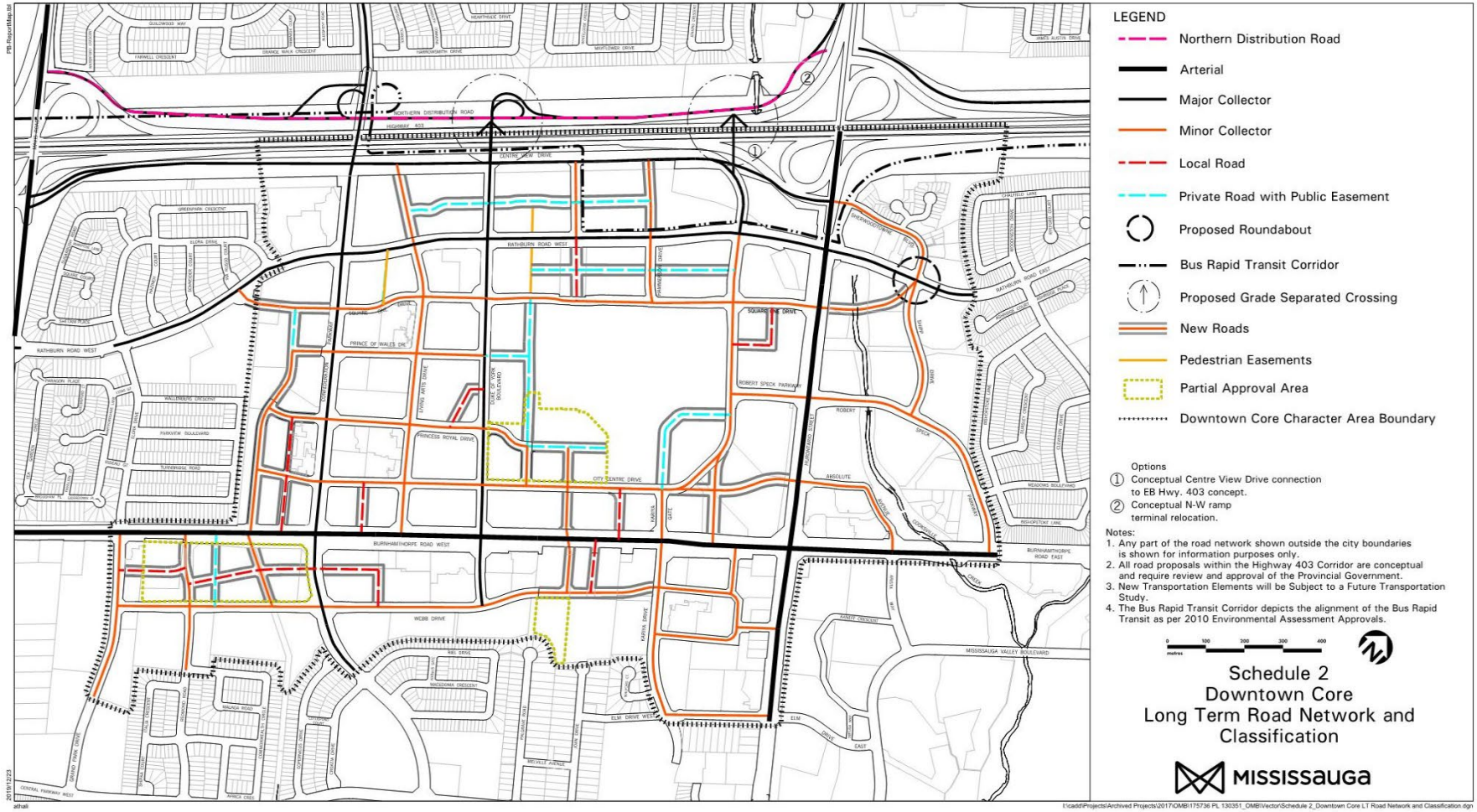
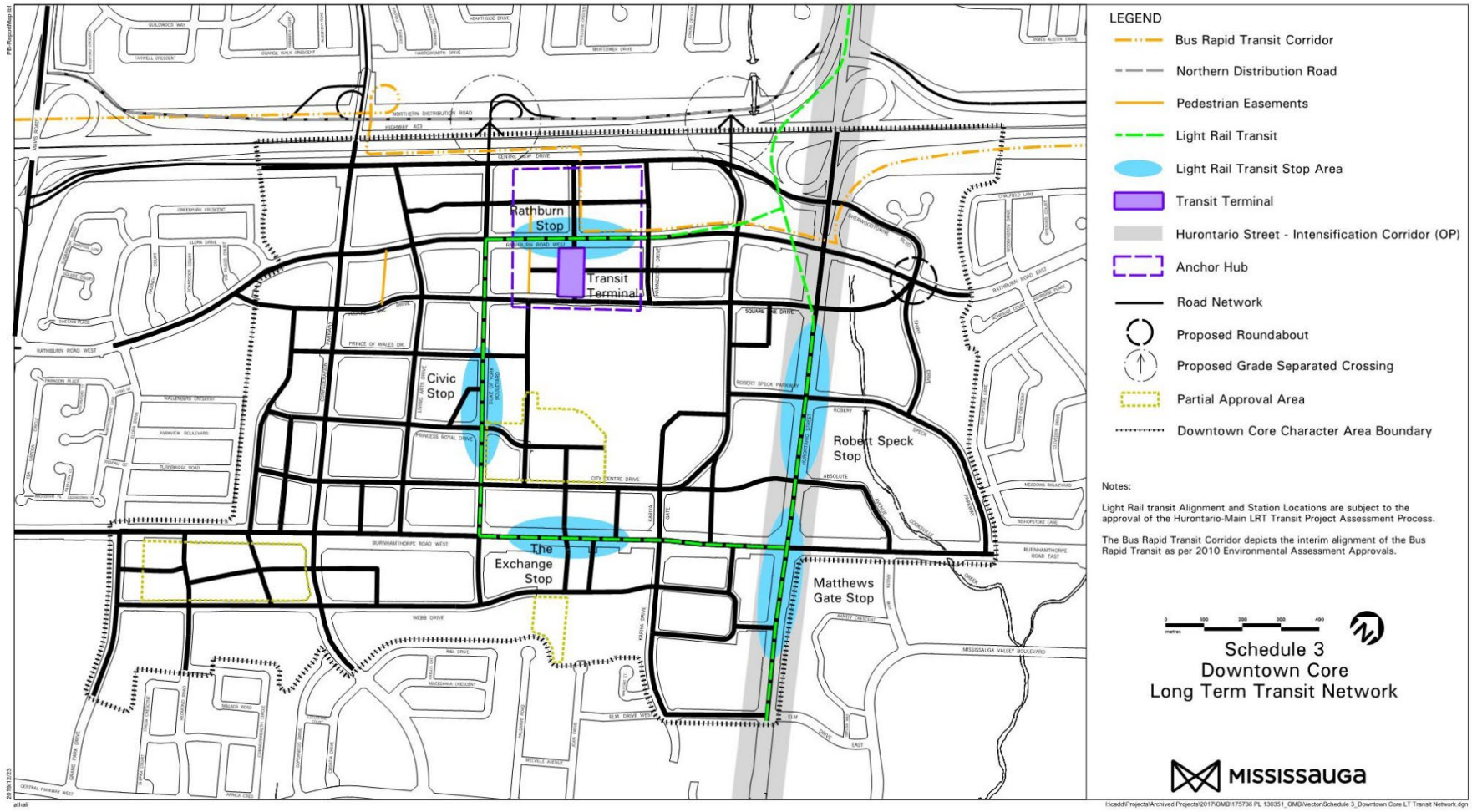


Figure 2-9: DLAP Schedule 3 – Long Term Transit Networks



2.4 Environmental Assessments

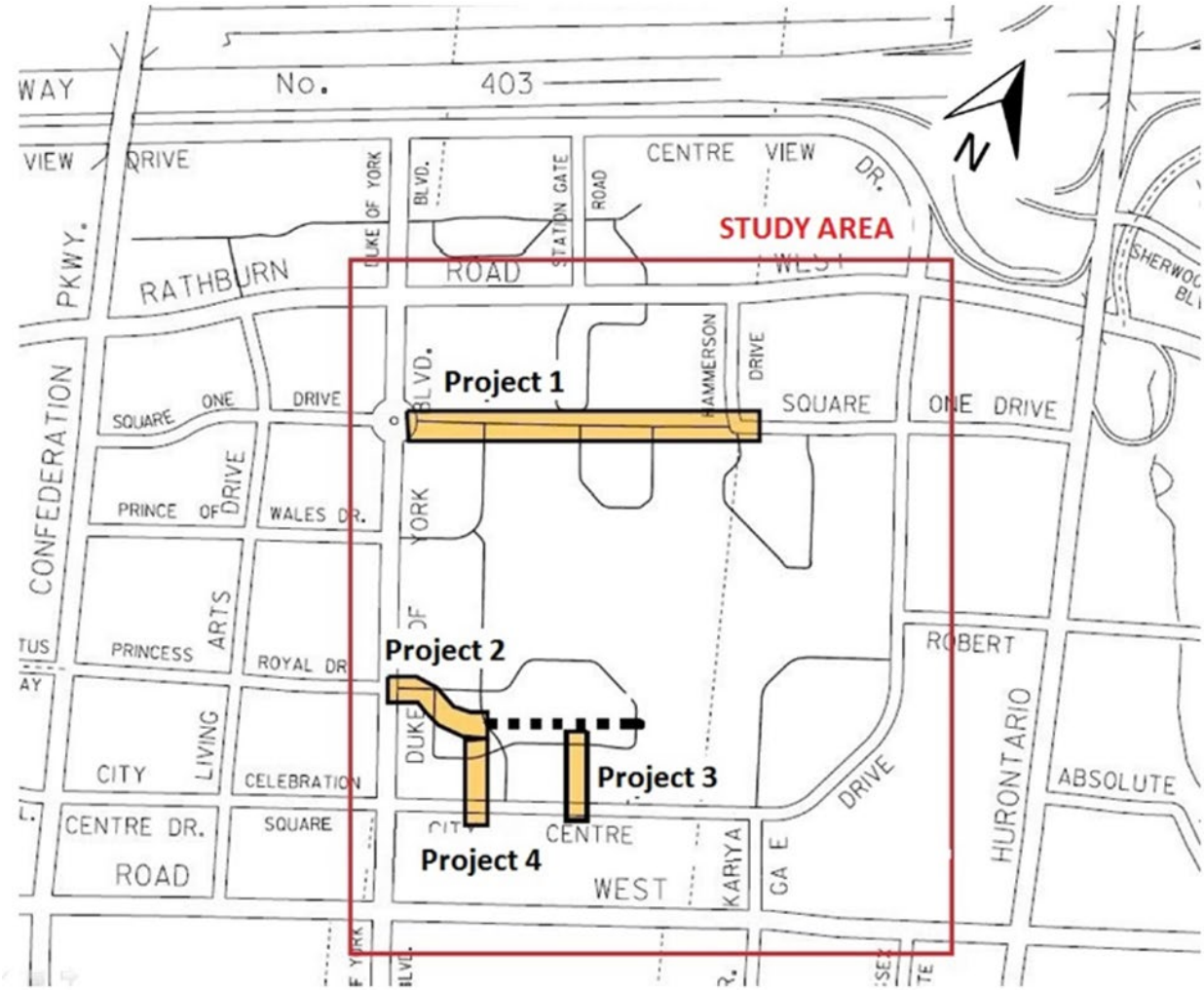
2.4.1 Downtown Core Road Improvement Master Plan Class Environmental Assessment Environmental Study Report 2015

The Downtown Mississauga Road Improvement Master Plan Class Environmental Assessment Environmental Study Report (ESR), prepared by RJ Burnside & Associates Limited, was undertaken to continue the ongoing initiation of the City's Downtown 21 Master Plan and Downtown Core Local Area Plan.

The road improvements were divided into four individual projects as illustrated in **Figure 2-10** and include Square One Drive, Princess Royal Drive, The Exchange, and Mercer Street. Project 1 converted a section of Square One Drive from a private road access for the Square One Shopping Centre to two-way minor collector street as proposed in the City's OP and the Downtown 21 Master Plan. The road improvement focused on creating a more multi-modal street to accommodate all modes of transportation, including walking, cycling, transit, and driving. Project 2, Project 3, and Project 4 were proposed city roads that facilitate an improved pedestrian, cyclist, and vehicular environment. The recommended ultimate road improvements are illustrated in Appendix L of the ESR and are listed below. Projects 1, 2, 3 and 4 have since been completed.

1. **Project 1 - Square One Drive:** 2 lanes, bus bays, and modified parking lanes (completed)
2. **Project 2 - Princess Royal Drive:** 5 lanes, at Duke of York Boulevard and 4 lanes at Mercer Street (completed)
3. **Project 3 - The Exchange:** 2 lanes with parking lay-bys (completed)
4. **Project 4 - Mercer Street:** 4 lanes (curb lanes) with on-street parking during off-peak times (completed)

Figure 2-10: Road Improvement Projects

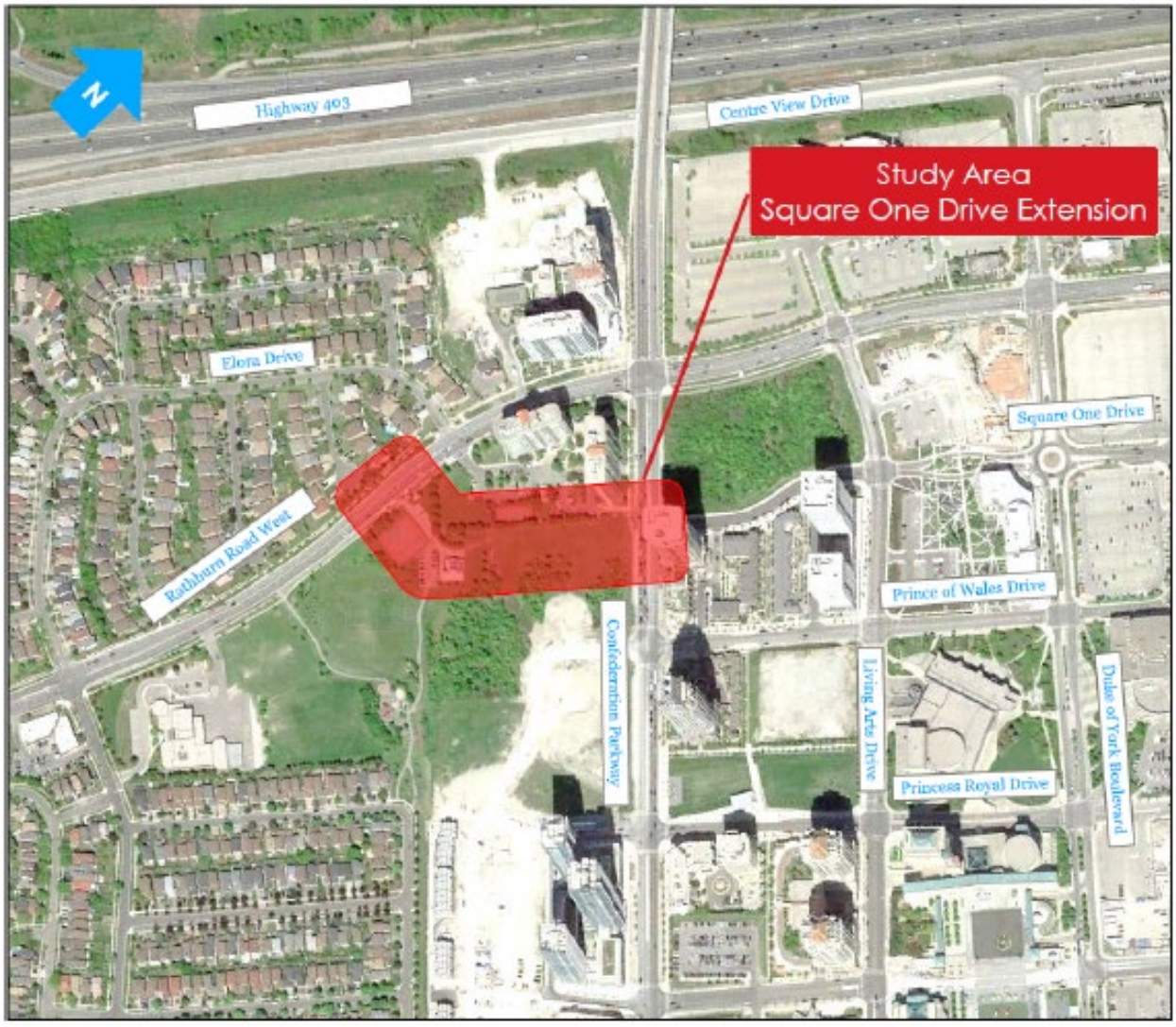


Source: Downtown Mississauga Road Improvement Master Plan Class Environmental Assessment Environmental Study Report 2015

2.4.2 Square One Drive Extension Municipal Class Environmental Assessment and Preliminary Design 2017

Following the Downtown Mississauga Road Improvement Master Plan ESR completed in 2015, a separate Environmental Assessment was undertaken to determine the feasibility of extending Square One Drive from Confederation Parkway to Rathburn Road West. The purpose of this extension would be to improve access to, from, and within Downtown Mississauga, support multi-modal transportation and encourage walking, cycling, and transit use, create a finer grid street network with walkable blocks, new routing options for local trips, and provide better transit access. **Figure 2-11** illustrates the study area for the Square One Drive Extension.

Figure 2-11: Square One Extension Study Area



Source: Square One Drive Extension Municipal Class Environmental Assessment and Preliminary Design 2017

The key features of the recommended preliminary design for **Square One Drive** are, but not limited to the following:

- Extend Square One Drive from Confederation Parkway connecting to Rathburn West.
- Construct new signalized intersection at Confederation Parkway and the new Square One Extension.
- Provide two 3.35 m through lanes between Confederation Parkway and Rathburn Road West.

- Provide a continuous 3.2 m sidewalks with a 0.5 m splash pad and 1.0 m to 2.67 m streetscape corridor on the south side between Confederation Parkway and the multi-use trail connection at Rathburn Road West.
- Provide 3.0 m to 3.5 m multi-use trail and 0.5 m splash pad on the north side between Confederation Parkway and Rathburn Road West.
- Provide 2.6 m on-street parking lane on the south side between Confederation Parkway and the Alectra Utilities entrance.
- Provide 2-lane roundabout at the intersection at the new Square One Extension and Rathburn Road West.
- Install pedestrian facilities to meet current standards set by AODA and the City of Mississauga Accessibility Design Handbook.

The key features of the recommended preliminary design for Rathburn Road West are, but not limited to the following:

- Provide four 3.5 m through lanes along Rathburn Road West.
- Re-align Rathburn Road West by shifting to the south to accommodate the new roundabout.
- Construct a new 46 m diameter, 2-lane roundabout with 4.5 m internal lane widths.
- Provide a continuous 3.5 m multi-use trail on the south side between Confederation Parkway and the existing multi-use trail in Zonta Meadows Park.
- Provide a 1.08 m to 3.59 m streetscape corridor on the north side between Confederation Parkway and the entrance of 330/350 Rathburn Road West.
- Maintain the existing concrete sidewalk and provide a 3.55 m to 14.91 m streetscape on the north side between Confederation Parkway and the west construction limit east of Elora Drive.

2.4.3 Living Arts Drive Extension Municipal Class Environmental Assessment 2018

The extension of Living Arts Drive was identified as a future road network improvement in the Downtown 21 Master Plan, 2010. The Municipal Class Environmental Assessment (EA) was undertaken by Stantec to evaluate the need to extend Living Arts Drive from Rathburn Road West to Centre View

Drive in order to address the problems and opportunities within the Downtown Core area. **Figure 2-12** illustrates the EA study area.

Figure 2-12: Living Arts Drive EA Study Area

Source: Living Arts Drive Extension Municipal Class Environmental Assessment 2018

Based on the EA, it was determined that Alternative 5 – Extension of Living Arts Drive fully addresses the identified problems and opportunities by maximizing access to, from, and within the Downtown for all modes of transportation, contributing to a fine grain street network, and supporting a multi-modal transportation system.

The preferred solution will consist of extending Living Arts Drive from Rathburn Road West to Centre View Drive with the following elements:

- 26 m right-of-way (ROW);
- 2.5 m sidewalks on both sides;

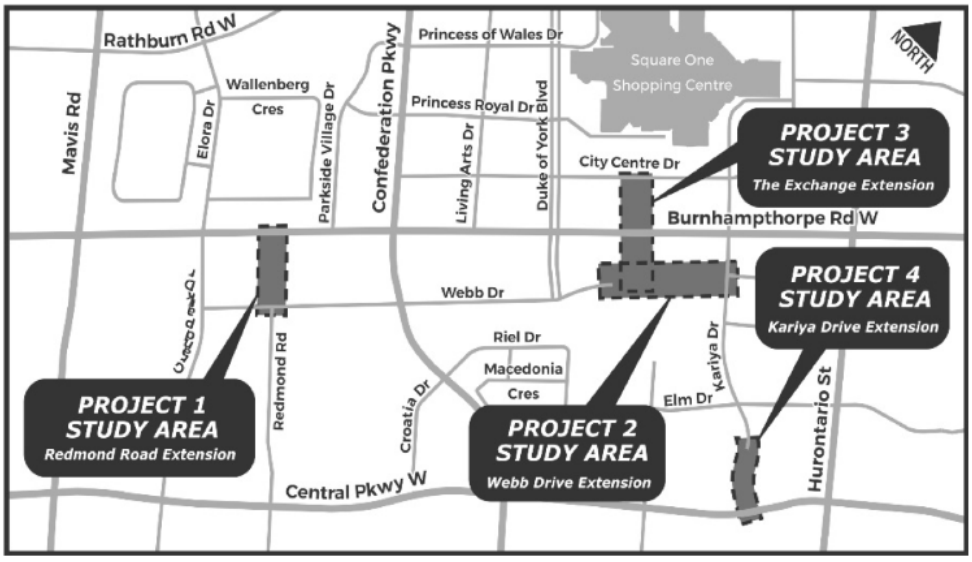
- on-street bicycle lanes in each direction;
- a new signalized intersection with Centre View Drive; and
- a new mid-block intersection.

2.4.4 Municipal Class Environmental Assessment Studies For the Extensions Of Redmond Road, Webb Drive, The Exchange And Kariya Drive, 2020

The City of Mississauga has completed four studies to plan for the transportation needs in the Downtown Core. The road improvements are divided into four individual projects as illustrated in **Figure 2-13** and includes the extension of Redmond Road, Webb Drive, The Exchange, and Kariya Drive.

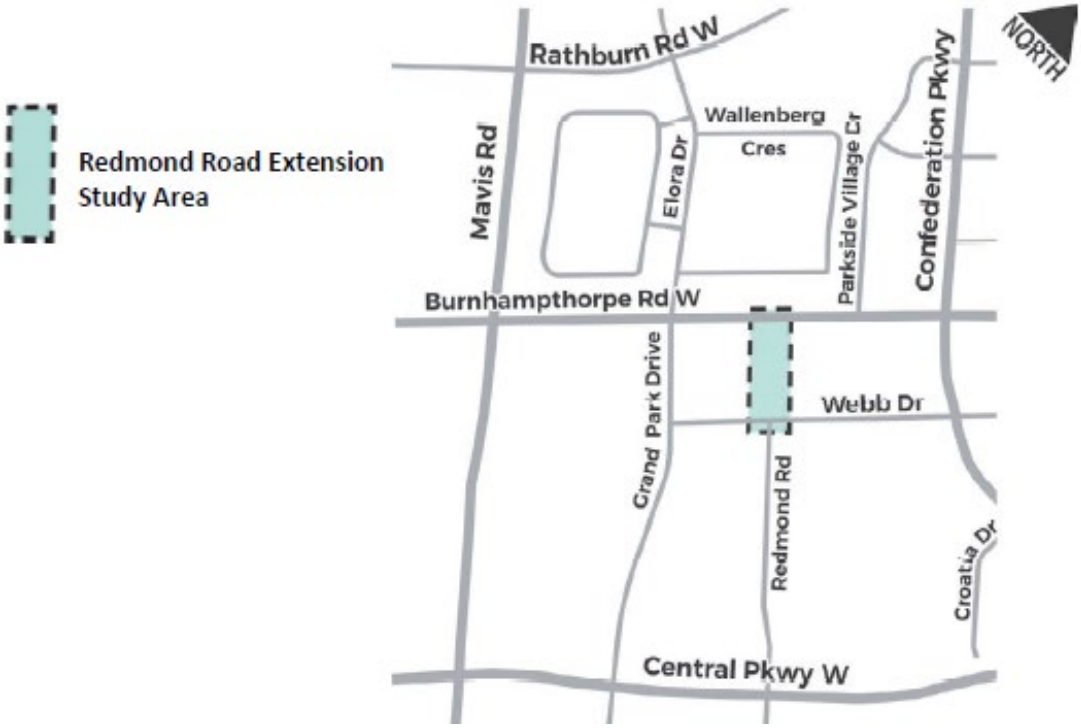
1. **Project 1 –** Redmond Road from Webb Drive to Burnhamthorpe Road
2. **Project 2 –** Webb Drive from Duke of York Boulevard to Kariya Drive
3. **Project 3 –** The Exchange from City Centre Drive to Webb Drive
4. **Project 4 –** Kariya Drive from Elm Drive to Central Parkway

Figure 2-13: Project Study Areas for the Four Downtown EAs



For Project No. 1, a municipal Class Environmental Assessment (EA) was undertaken by WSP to evaluate the need to extend Redmond Road from Webb Drive to Burnhamthorpe Road West. **Figure 2-14** illustrates the EA study area.

Figure 2-14: Redmond Road EA Study Area

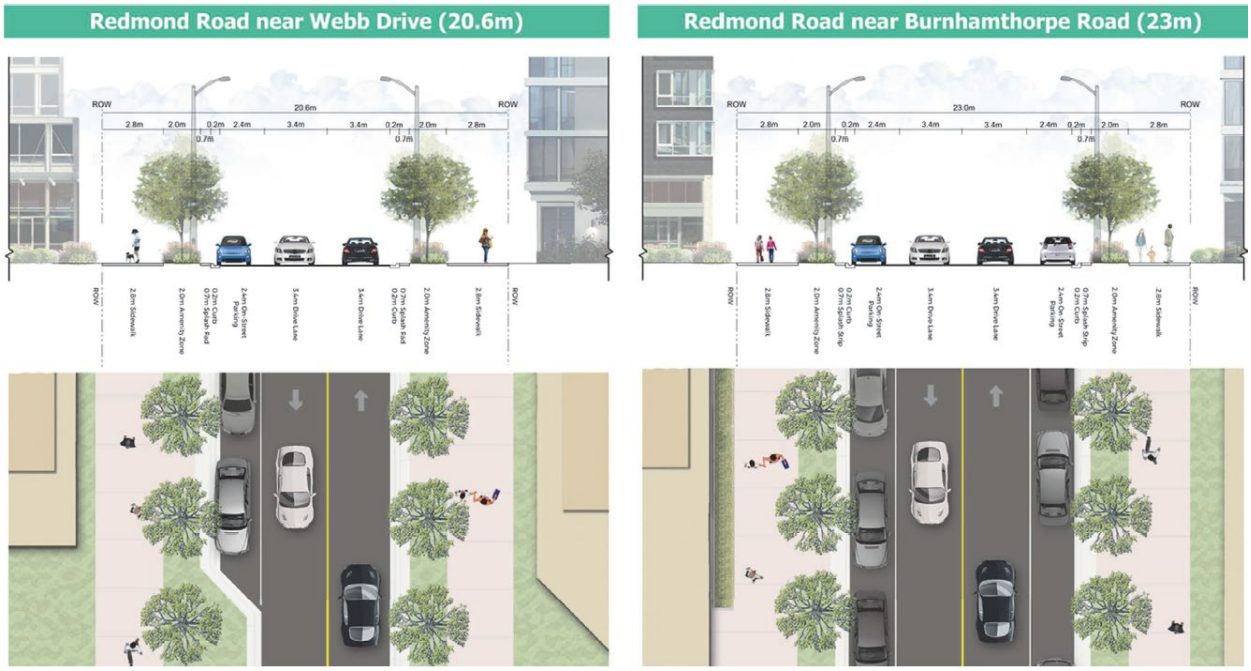


Source: Redmond Road Extension Schedule B Municipal Class Environmental Assessment, 2020

Based on this EA, it was determined that Alternative 4 – Extension of Redmond Road fully addresses the identified problems and opportunities by contributing to a fine grain street network, supporting a multi-modal transportation system, and providing a new north-south collector road within the planned “M City” community.

Two road design concepts were provided for the preferred design that were based on the City’s Standard City Centre Cross-Section. The right-of-way will vary from 20.6 m to 23 m. Both rights-of-way will provide 2.8 m sidewalks on both sides, on street parking on one or both sides, and landscaped amenity boulevards on both sides. **Figure 2-15** illustrates the preferred cross-sections.

Figure 2-15: Preferred Redmond Road Cross-Section



Source: Redmond Road Extension Schedule B Municipal Class Environmental Assessment 2020

Project No. 2 is a Schedule B Municipal Class EA for Webb Drive extension. The study area is shown in **Figure 2-16**.

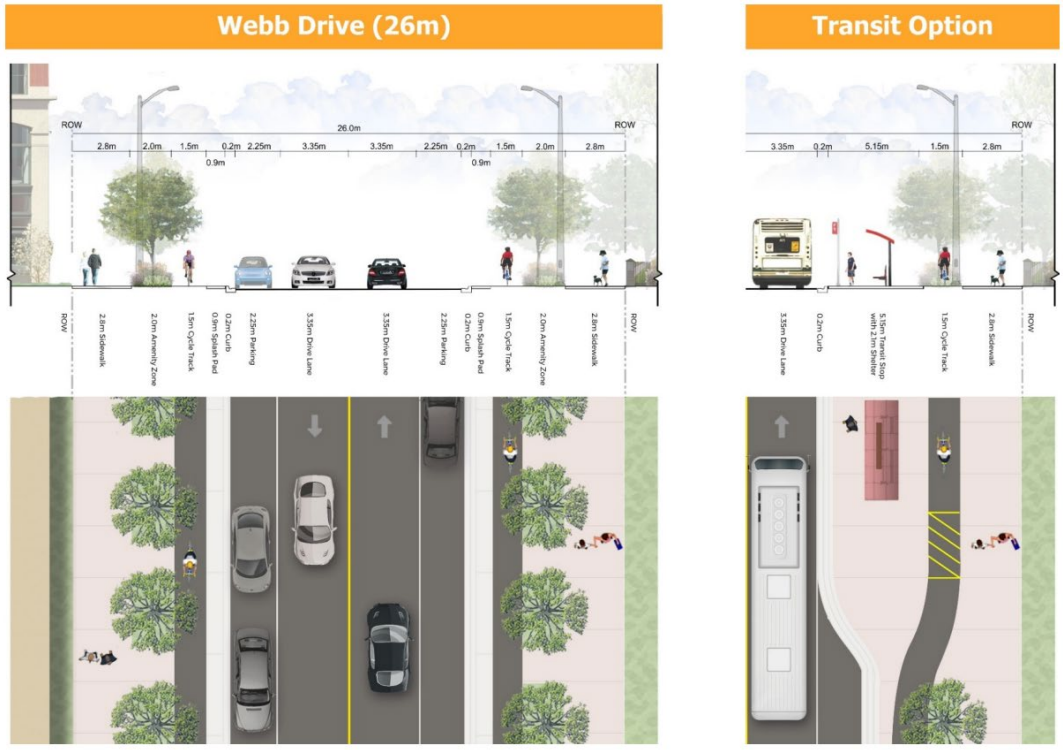
Figure 2-16: Webb Drive Road EA Study Area

Source: Webb Drive Extension Schedule B Municipal Class Environmental Assessment, 2020

Based on this EA, Alternative 4 - Extend Webb Drive was preferred because it fully addresses the Problems and Opportunities by supporting the creation of an urban environment, creating a fine-grained downtown street network, providing redundancy in the road network, providing for future expansion of MiWay, creating smaller and more walkable blocks, and supporting a mixed-use community.

A design concept as shown in **Figure 2-17** was developed for the Preferred Planning Solution to extend Webb Drive by approximately 300 m, from its existing terminus located at Duke of York Boulevard, to a new intersection at Kariya Drive.

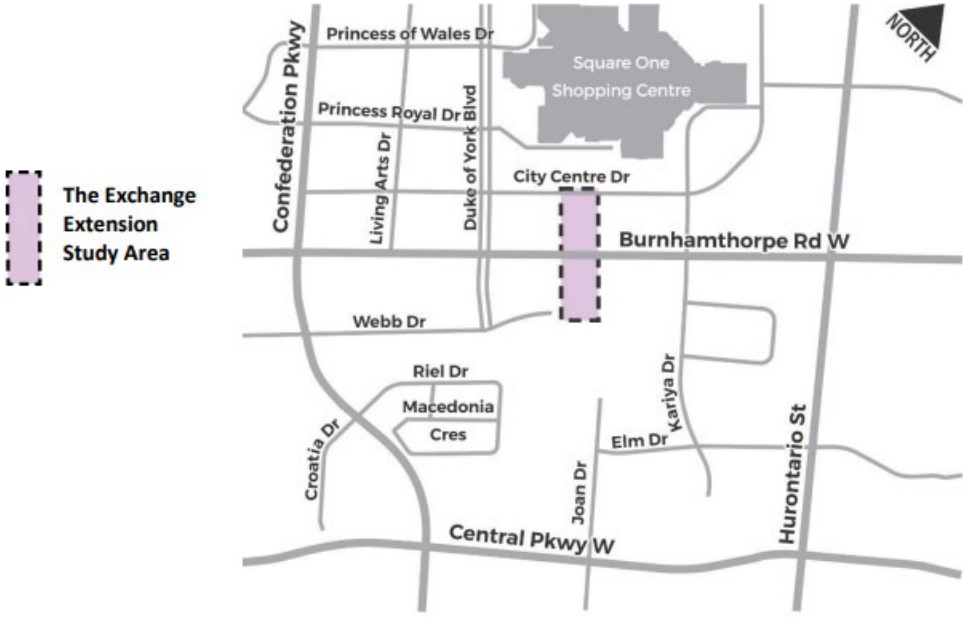
Figure 2-17: Preferred Webb Drive Cross-Section



Source: Webb Drive Extension Schedule B Municipal Class Environmental Assessment, 2020

Project No. 3 is a Schedule B Municipal Class EA for The Exchange extension. The study area is shown in **Figure 2-18.**

Figure 2-18: The Exchange Extension EA Study Area



Source: The Exchange Extension Schedule B Municipal Class Environmental Assessment, 2020

Based on this EA, Alternative 4 – Extend The Exchange was preferred because it fully addresses the Problems and Opportunities by supporting the creation of an urban neighbourhood environment, creating a fine-grained downtown street network, providing redundancy in the road network, creating smaller and more walkable blocks, and supporting a mixed-use community.

A design concept as shown in **Figure 2-18** was developed for the Preferred Planning Solution to extend The Exchange from City Centre Drive to Webb Drive.

Figure 2-19: Preferred The Exchange Cross-section

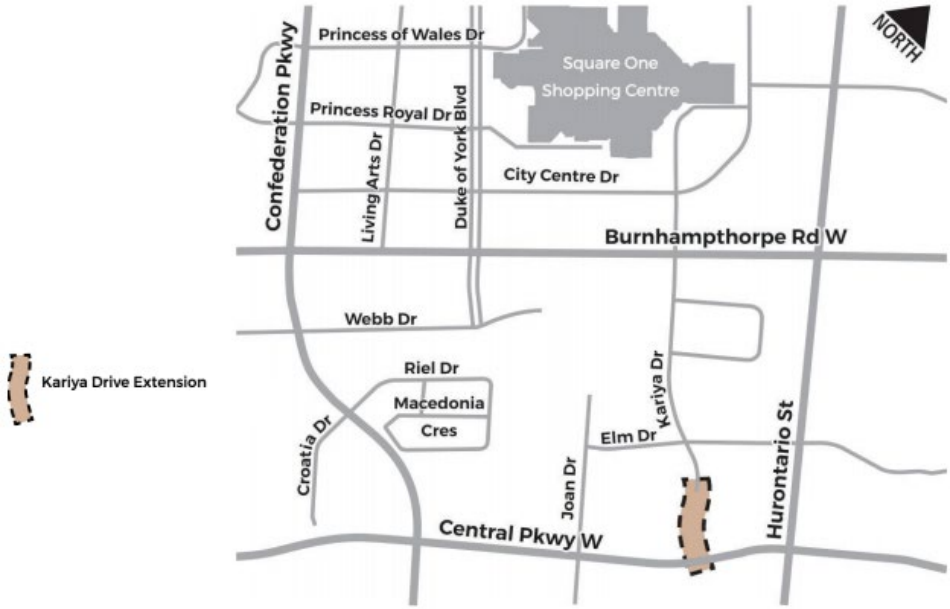
Source: The Exchange Extension Schedule B Municipal Class Environmental Assessment, 2020

Project No. 4 is a Schedule B Municipal Class EA for Kariya Drive extension. The study area is shown in **Figure 2-20.**

Based on this EA, Alternative 4 - Extension of Kariya Drive was preferred because it fully addresses the Problems and Opportunities by supporting the creation of an urban neighbourhood environment, expanding the minor collector road network to provide enhanced connectivity for all modes, providing redundancy in the road network, and creating smaller and more walkable blocks.

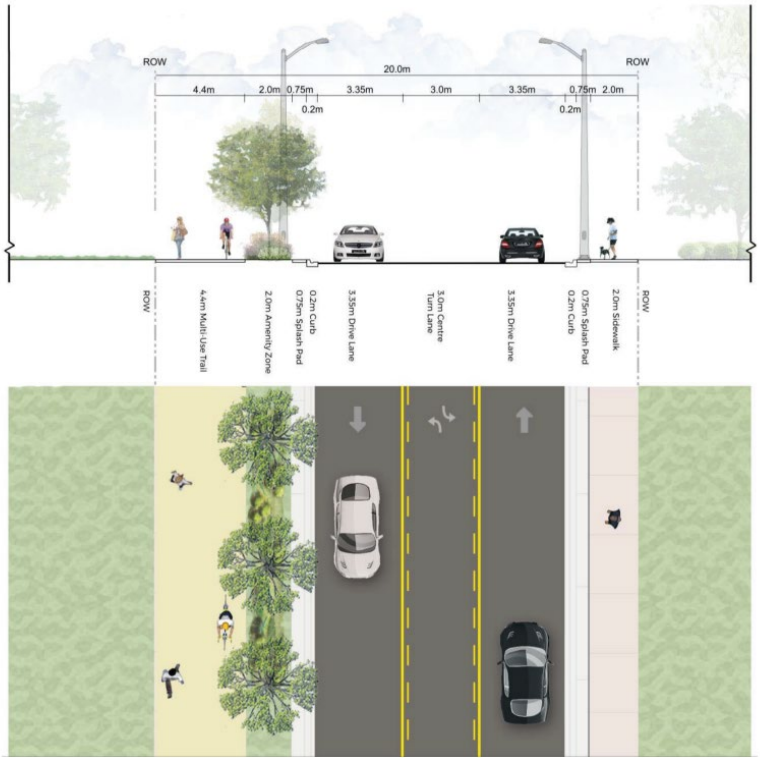
A design concept as shown in **Figure 2-21** was developed for the Preferred Planning Solution to extend Kariya Drive by about 150 m, from its existing terminus located south of Elm Drive, to a new intersection at Central Parkway West.

Figure 2-20: Kariya Drive Extension EA Study Area



Source: Kariya Drive Extension Schedule B Municipal Class Environmental Assessment, 2020

Figure 2-21: Preferred Kariya Drive Cross-Section

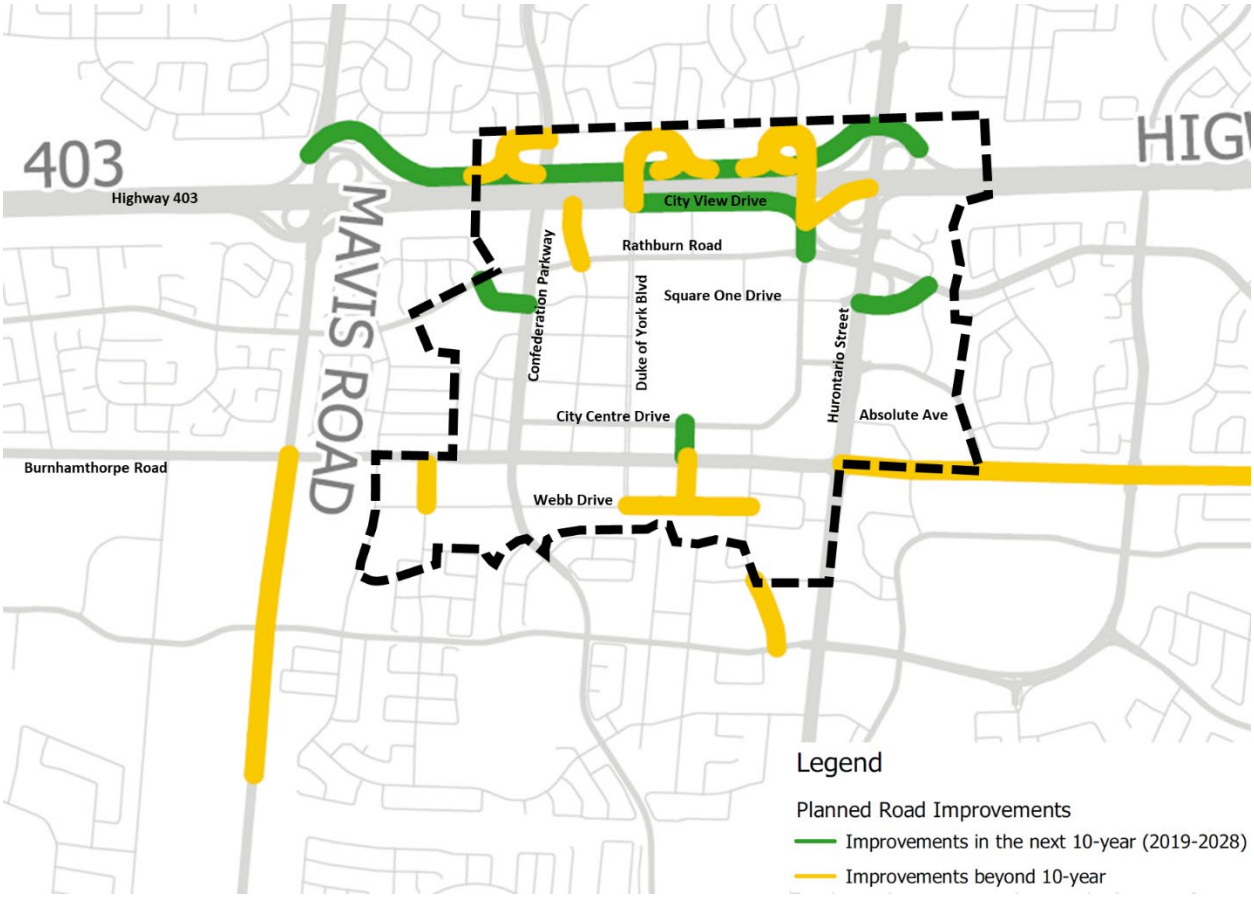


Source: Kariya Drive Extension Schedule B Municipal Class Environmental Assessment, 2020

2.5 2019 Development Charges Improvements

The 2019 Development Charges Update Transportation Background Study (2019 DC) completed in May 2019, identified future road improvements that include road widening, road extensions, and new road construction to serve growth. Within the study area, the 2019 DC lists 17 road projects as illustrated in **Figure 2-22.**

Figure 2-22: 2019 Development Charges Future Road Improvements



Source: 2019 Development Charges Update Transportation Background Study

2.6 Downtown Strategy

The City of Mississauga's ongoing Downtown Strategy is building on the Downtown 21 Master Plan (2010), which first outlined a vision to transform the Downtown from "suburban to urban" and laid the foundation for the current Downtown Core. This study will create a downtown for today and tomorrow by developing a new guiding document which builds on the success of the Downtown Core and provide direction for the future. It will reflect what people want to see – a vibrant place to live, work, learn, be entertained, raise a family and most of all, choose to be.

As part of the Downtown Strategy study, public engagement was conducted during Phase 1 (June – December 2019) to better understand who uses the Downtown and how they use it. Feedback was collected through pop-ups, digital engagement, stakeholder meetings, and a survey. The following is a summary of what was heard from participants across the platforms about opportunities that should be considered in the DMP:

- Several comments were made through the online survey regarding the need for improved transit services in the Downtown, including increased frequency, extended service hours (i.e. after 6 pm, on weekends, during major events), better transit connectivity, improved transit/direct transit from the outskirts of Mississauga to the Downtown Core, affordable transit payment options, and better connection from the Downtown Core to Toronto and Oakville. Respondents also commented on the need for improved and/or additional bus stops and shelters, to protect from the elements and in some cases reduce distances between the stops.
- Majority of respondents expressed that walkability is really important in the Downtown and needs improvement. Respondents expressed that the Downtown is not easy to get around for a person with mobility issues as it is inaccessible or unpleasant. They would like to see greater accessibility, safer street crossings, better maintenance of sidewalks, improved winter walkability, improved pedestrian connections, improved connections for kids walking to school, and improved signal timing in favour of pedestrians. Respondents identified that they would like to see more 'pedestrian only' streets and/or streets that can be closed during set times/dates to become 'pedestrian only'. Respondents also identified that the network of sidewalks in the Downtown would benefit from greater connectivity. Some residents raised issues about north-south connections (e.g. to Fairview Public School and to the Transit Terminal); and some with east-west connections (e.g. between Absolute Towers and Square One Mall, and to the Cooksville Creek and Mississauga Valleys Community Centre).
- Respondents stated that they would like to see protected, safe and connected bike lanes throughout the Downtown. They also commented on the need for cycling infrastructure, bicycle rental stations and prioritized cycling intersections.
- The City heard an array of comments related to parking and opportunities in the Downtown, including the need for more parking options, particularly for people who work or run a business in the Downtown, but also the desire for less surface parking as it detracts from the creation of a vibrant Downtown. The surface parking impacts residents and visitors experiences as they have to walk through large parking lots in order to get to places and it makes the Downtown feel disconnected.

3 Existing Conditions

3.1 Land Use and Demographics

3.1.1 Land Use

Existing land uses within the study area are shown in **Figure 3-1**. The largest land use within the study area is Transportation Right-of-Way (ROW), which occupies 34% of all land. Excluding the land occupied by ROW, the eight most prevalent land uses in the study area (as illustrated in **Figure 3-1**), which collectively comprise 91% of non-ROW land, are:

- General Retail Commercial 26%
- Office 16%
- Vacant 12%
- Residential Apartments 12%
- Open Space/Greenlands 9%
- Utility/Public Work 7%
- Mixed Residential Commercial ≥5 Storeys 5%
- Public/Institutional 3%

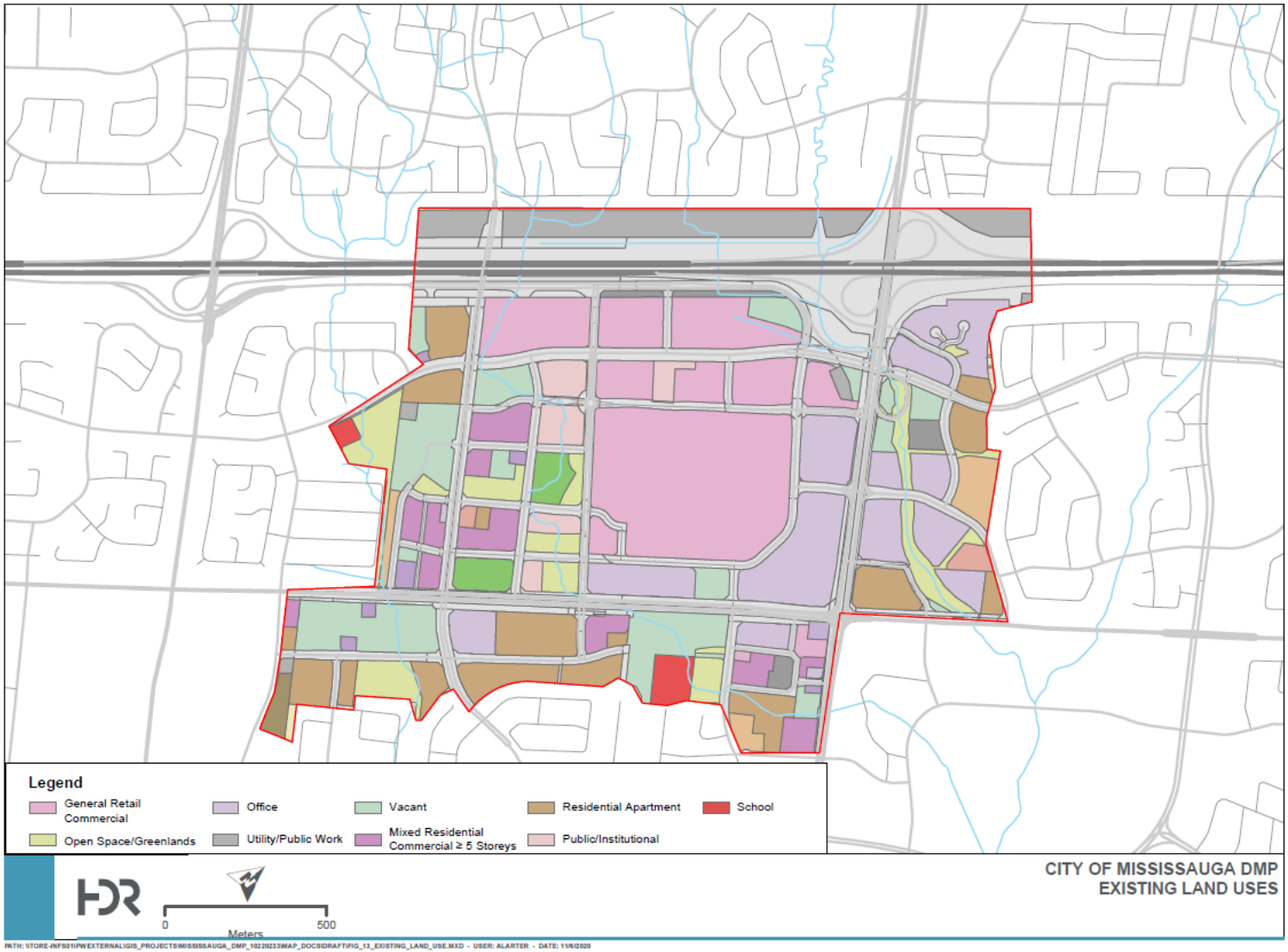
General Retail Commercial and Office land uses tend to be clustered towards the centre of the study area, surrounding the Square One shopping centre, as well as in office parks to the east of Hurontario Street. Residential Apartment land uses tend to lie on the periphery of the study area, while Mixed Residential Commercial can be primarily found in newer development areas along Confederation Parkway. Vacant land pending development can be found throughout the study area, although concentrated on its periphery (especially south of Burnhamthorpe Road). Significant open space and greenlands within the study area include Zonta Meadows Park, Celebration Square, John Bud Cleary Park, Kariya Park, and Cooksville Creek.

There also exist eleven further land use categories not listed above within the study area, including lower-density forms of residential development, community and cultural centres, public and municipal parking, schools, and places of religious assembly. These land uses collectively comprise only 9% of land not occupied by ROW.

The City of Mississauga's Official Plan outlines land use designations across the City, including a specific plan for the Downtown Core as shown in **Figure 3-2**. The major difference compared to the existing land uses is the

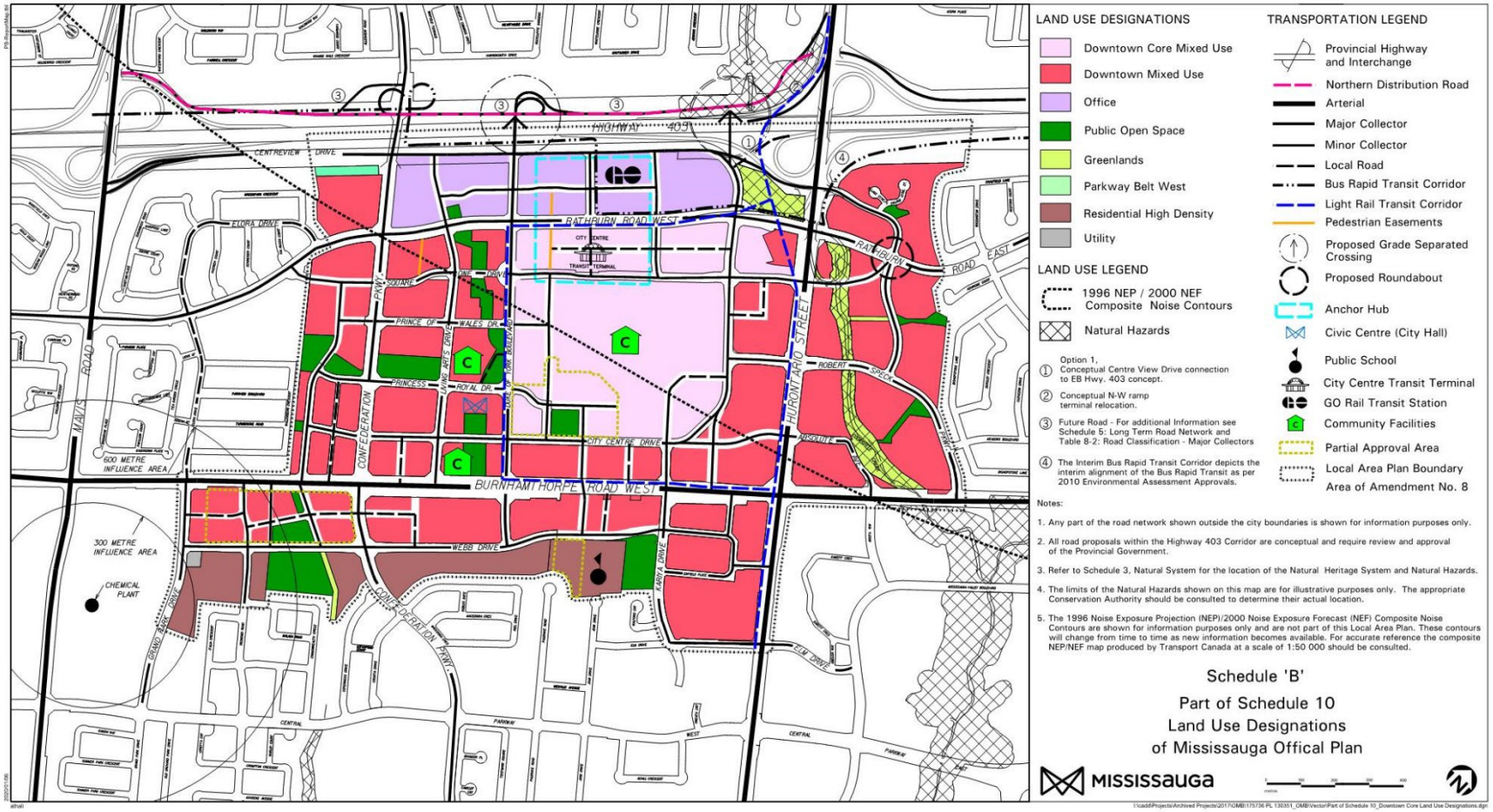
Downtown Mixed Use which covers most of the lands in the Downtown Core surrounding the Square one, while the Square One Mall and its parking lots is the *Downtown Core Mixed Use* bounded by Duke of York Boulevard, City Centre Drive, and Rathburn Road West. The lands north of Rathburn Road West to Highway 403 are *Office* designation. In addition, there are lands south of Webb Drive and west of Kariya Drive designated as *Residential High Density*.

Figure 3-1: Existing Land Uses within the Study Area



Source: 2019 Mississauga Existing Land Use Survey

Figure 3-2: Downtown Core Land Use Designations

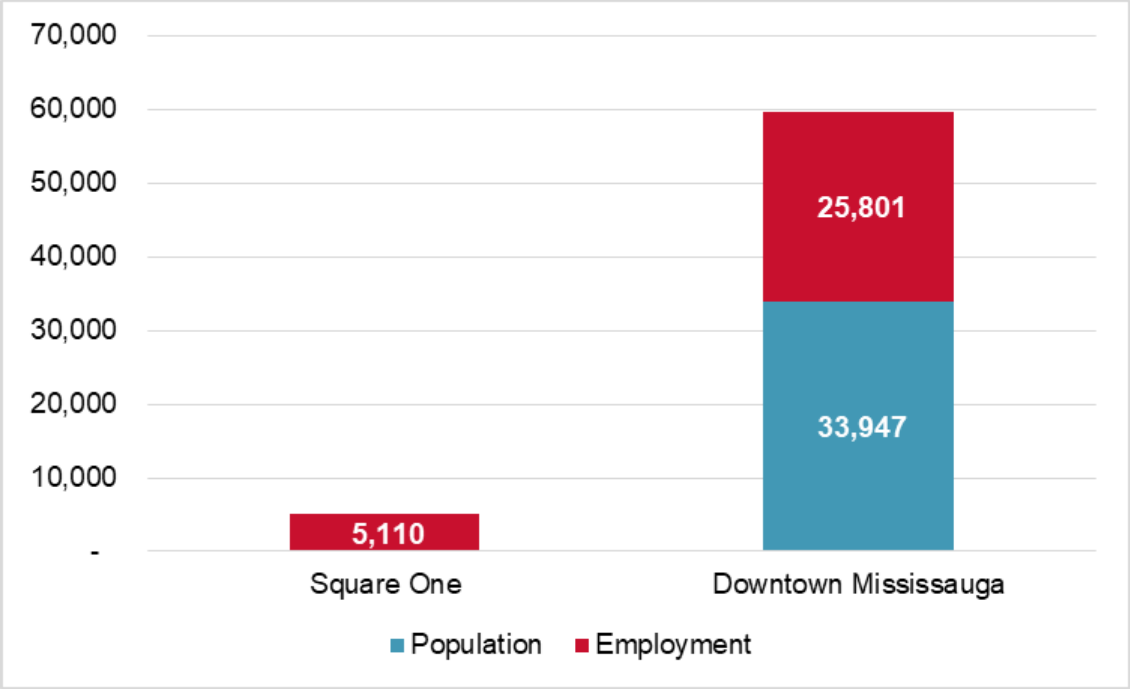


Source: Amendment No. 8 to Mississauga Official Plan (June 8, 2020)

3.1.2 Population and Employment

The proportion of people and jobs in the Downtown Core (study area) is around 57% population (33,947 people) and 43% employment (25,801 jobs). Note that these are pre-COVID-19 estimates and represent a “normal” existing condition. Surveys in 2020 might find different results but cannot be deemed a “normal” existing condition at this time. Approximately 20% of the total employment is from Square One alone (5,110 jobs), as shown in **Figure 3-3**.

Figure 3-3. 2019 Population and Employment Numbers



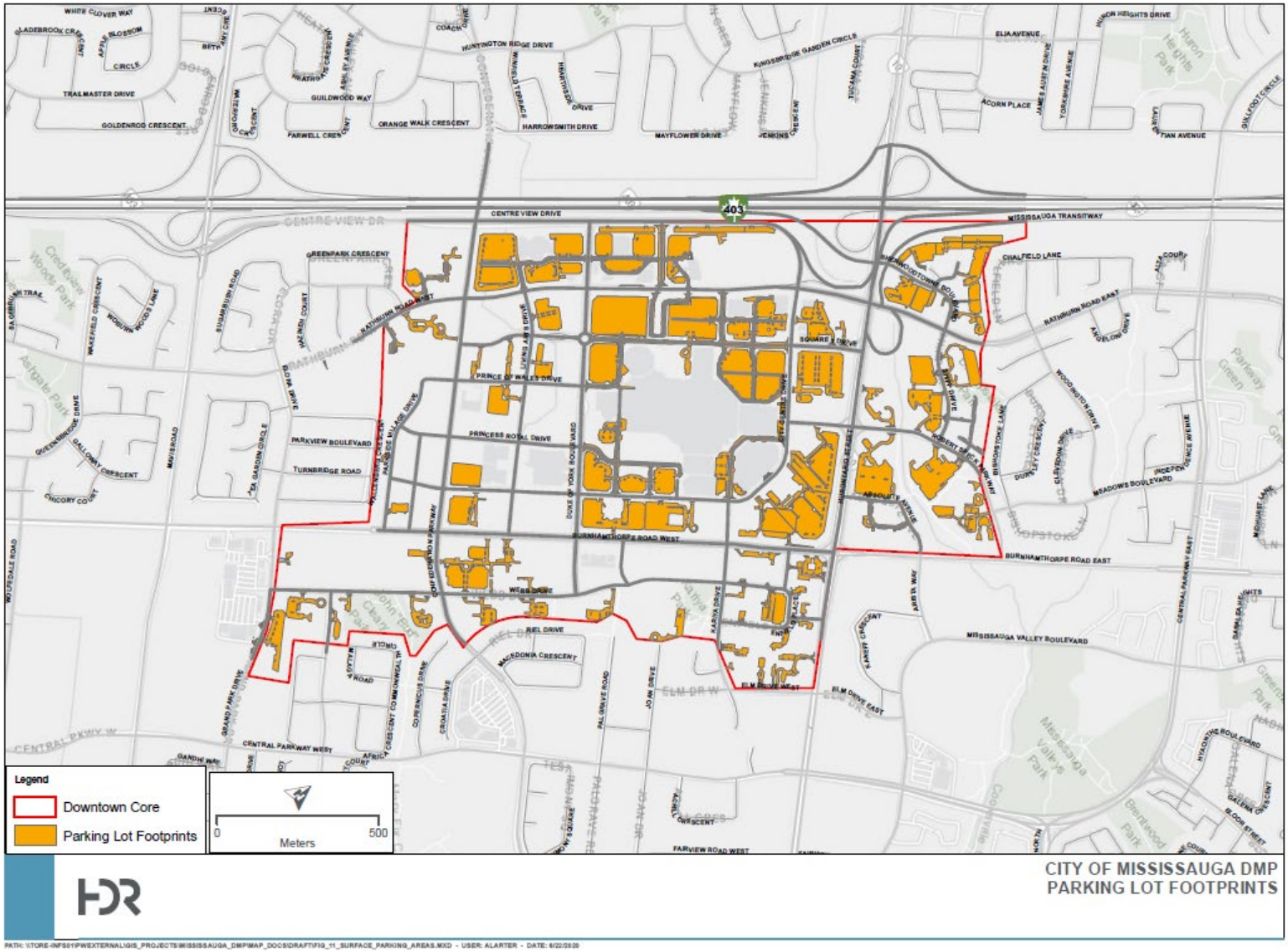
Source: City of Mississauga

3.1.3 Surface Parking

The study area is auto-oriented, with approximately 51 ha of surface parking lots, as shown in **Figure 3-4,** to serve Square One and other uses. This totals 29% of the Downtown Core land area, not including road rights-of-way. Easy access to free parking encourages automobile travel to the area and large parking lots present challenges to pedestrians trying to safely navigate across these large expanses.

No new surface parking is permitted within the Downtown Core (existing can remain) such that any new developments are required to provide either underground or within above ground parking structures.

Figure 3-4: Surface Parking in Study Area



3.2 Travel Trends

The Transportation Tomorrow Survey (TTS) is a household travel survey that occurs every 5 years, coinciding with Census years. Data from the 2006, 2011, and 2016 TTS surveys have been analyzed to establish existing travel trends to/from the study area and, particularly, to the Square One Shopping Centre area (2006 Traffic Zone 3851).

The TTS is predicated on asking a survey respondent about their travel patterns and travel modes on a typical fall weekday for the respondent and the respondent's household members. It has been documented by the Data Management Group (DMG), who collects and manages the data, that the survey under-reports discretionary (i.e. non-commuting) trips, particularly non-home based trips. Given the significant presence of a large retail centre (Square One Shopping Centre) in Downtown Core, travel demand reported in TTS is likely lower than what is typically experienced on a weekday at the shopping centre. Additionally, TTS does not provide information on weekend travel demand, so alternative sources must be consulted. One such source is StreetLight Data that can capture more retail-related travel pattern data for both weekdays and weekends.

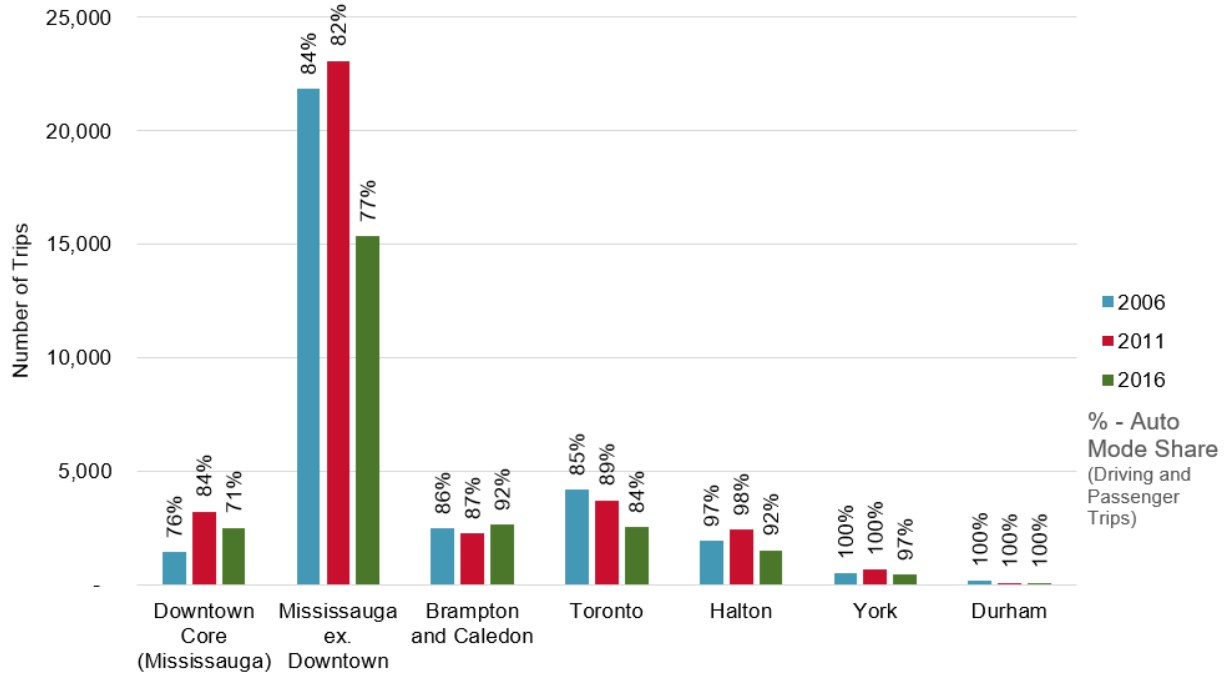
3.2.1 Vehicle Travel Demand

Most of the daily trips to Square One are from within Mississauga. **Figure 3-5** shows the number of daily trips from Mississauga and other areas across the GTA. There has been a fluctuation in the number of trips to Square One over the years with a significant drop when comparing trips from 2011 to 2016. However as previously stated, TTS has a known issue of under-reporting discretionary trips (including shopping trips), which may explain lower than expected volumes. Note that, for comparison, the customer data from Oxford Properties (owners of Square One) showed an increase in customer volumes of 22% between 2000 and 2016. Outside of Mississauga, trips to Square One are mostly auto-based.

Figure 3-6 shows the daily trips to the Downtown Core, which reveals similar patterns. Auto mode share to the Downtown has generally been decreasing from all areas except Brampton and Caledon (2% increase between 2006 and 2016).

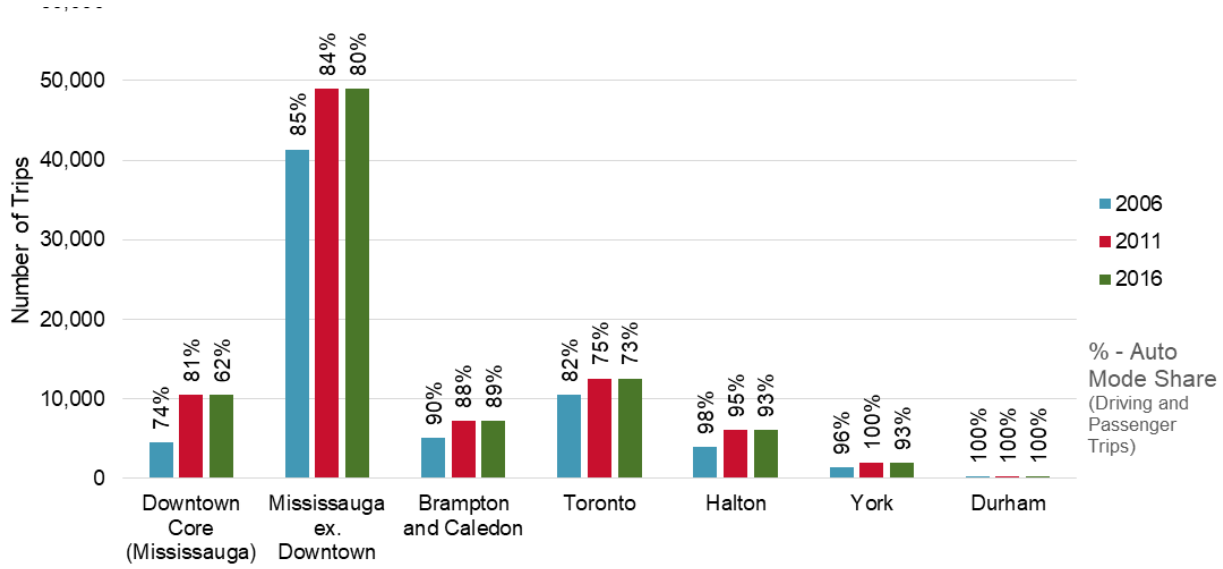
Both figures also show that the majority of trips destined to Downtown Core originate from within Mississauga.

Figure 3-5: Historical Origins of Daily Trips Destined to Square One (2006 to 2016)



Source: TTS

Figure 3-6: Historical Origins of Daily Trips Destined to Downtown Core (2006 to 2016)



Source: TTS

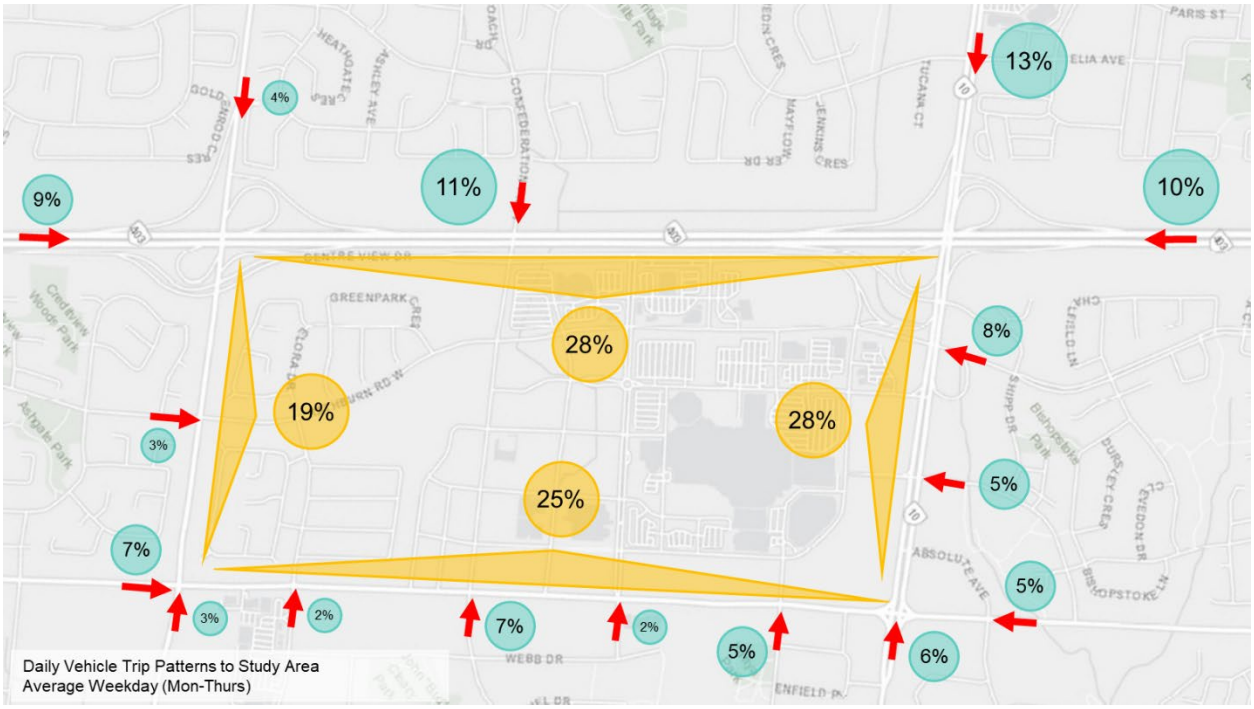
Notes: It is important to note that the TTS is based on a 5% sample size. Although the graphs may show 100% auto travel from certain regions, it may represent a small number of trips. For example, the 2016 survey indicated only 77 vehicle trips from Durham Region to Square One, compared to 9,120 vehicle trips from Mississauga (excluding Downtown). Ultimately, TTS data should be used to help guide judgement on travel patterns, but should not be taken as absolute fact.

3.2.2 Vehicle Travel Patterns

To supplement TTS data, a detailed analysis was conducted using StreetLight data that captures approximately 20% of all trips anonymously using location-based data. The StreetLight InSight platform is a tool that allows analyses of local traffic patterns for key access corridors to the Downtown Core. While this data provides similar insights to TTS data, the key benefit is that it can better identify commercial/leisure trip patterns that are not typically captured in TTS.

Figure 3-7 illustrates the average daily weekday (2019) vehicle travel patterns to the Downtown Core. The majority of the trips are coming from the east (28%) and from the north (28%) of the study area. The primary corridors being used are Highway 403 from the east (10%), Confederation Parkway from the north (11%), and Hurontario Street from the north (13%).

Figure 3-7: Daily Vehicle Travel Patterns to Study Area - Average Weekday (2019)

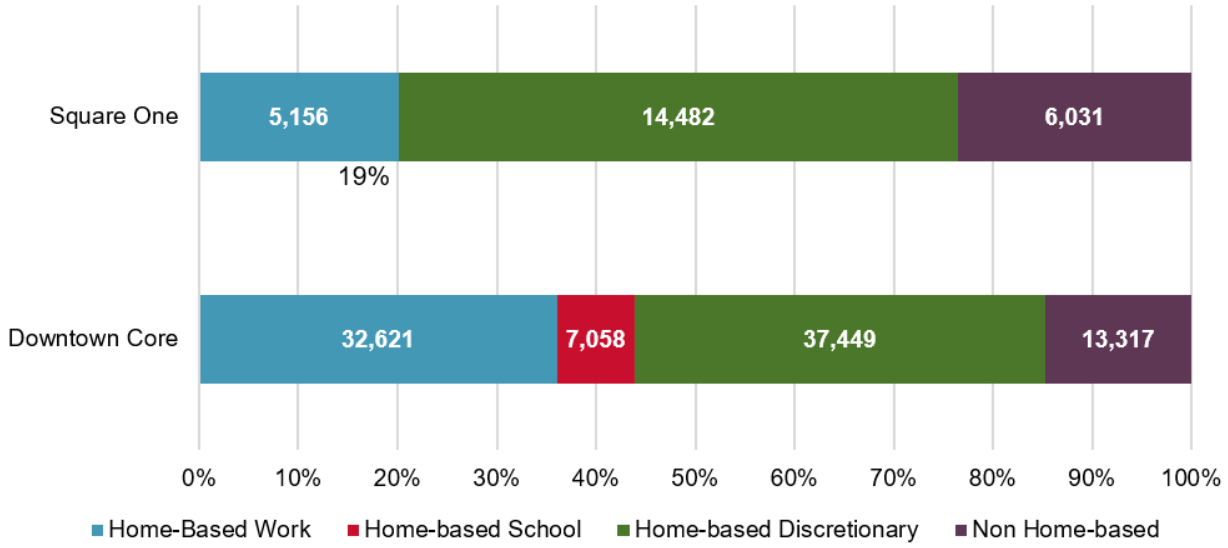


Source: StreetLight Data (2019)

3.2.3 Trip Purpose

Figure 3-8 shows the trip purposes for daily trips destined to the Downtown Core and to Square One. The majority of trips to the Downtown Core are home-based work trips (i.e. home-to-work or work-to-home) and home-based discretionary trips (i.e. trips to/from uses other than work or school to/from home). Square One trips are mostly home-based discretionary trips, reflecting primarily shopping trips as expected.

Figure 3-8: Daily Trip Purpose for Trips Destined to Square One and Downtown Core (2016)

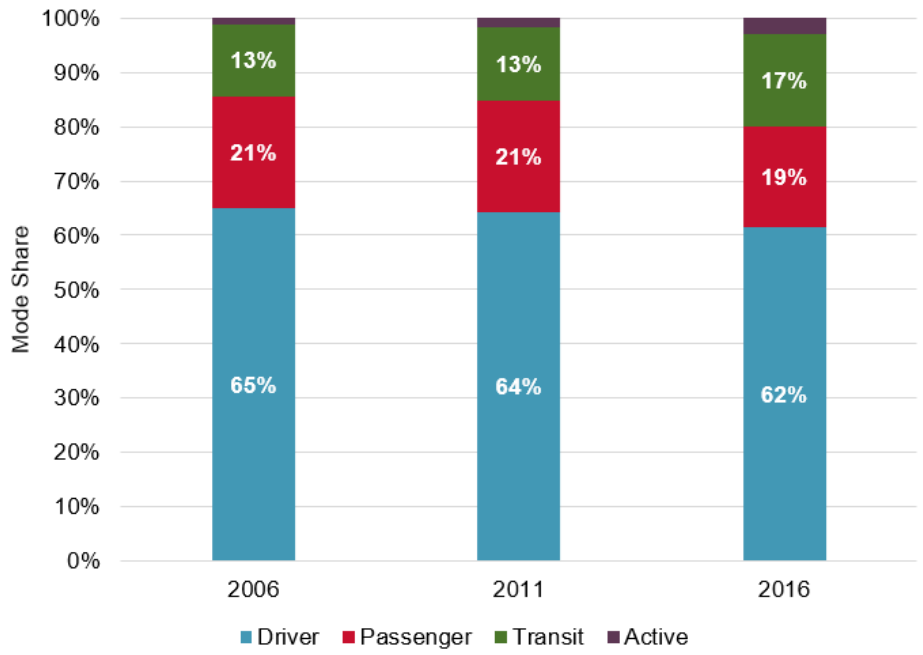


Source: TTS (Note that 2016 TTS reported HBS trips destined to Square One. Through discussion with the Data Management Group, these trips were found to be destined to the Sheridan College and TriOS College, thus removed from the chart for Square one.

3.2.4 Mode Share

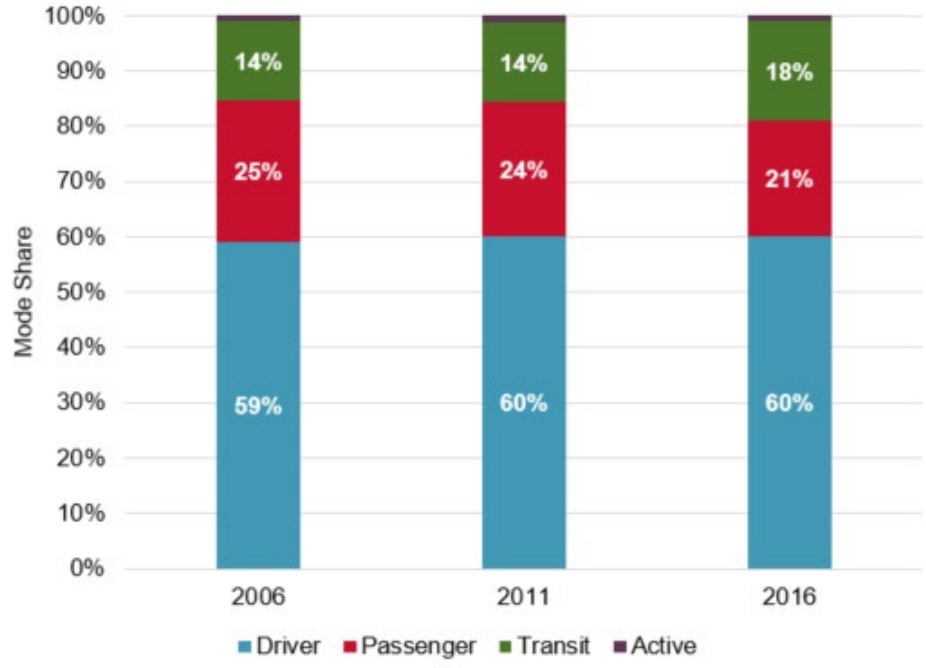
Daily travel to the Downtown Core was primarily made by automobile between 2006 and 2016. There has been some decreases to driving and passenger mode shares as shown in **Figure 3-9**, with slight increases to transit and active mode. Travel to Square One is also primarily by automobile as shown in **Figure 3-10**, with very slight changes in driving mode share over time but overall higher transit mode share.

Figure 3-9: Historical Daily Mode Share for Trips Destined to Downtown Core (2006-2016)



Source: TTS

Figure 3-10: Historical Daily Mode Share for Trips Destined to Square One (2006-2016)

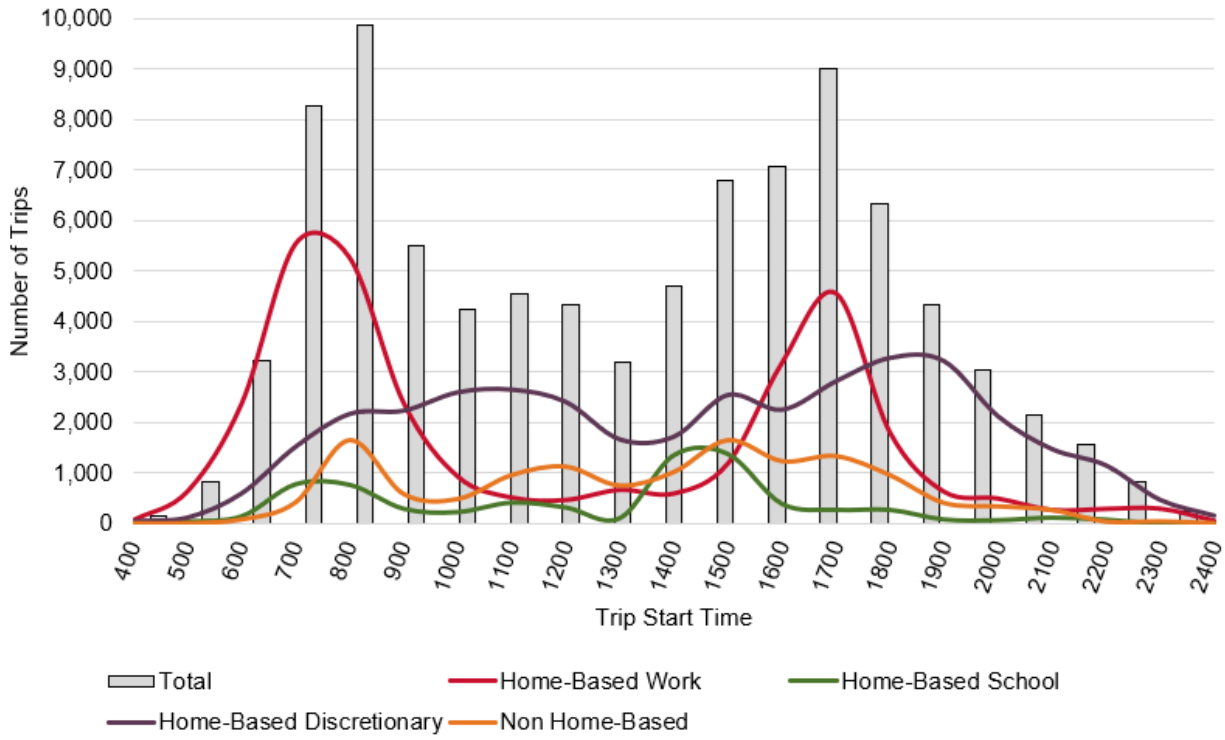


Source: TTS

3.2.5 Peaking Characteristics

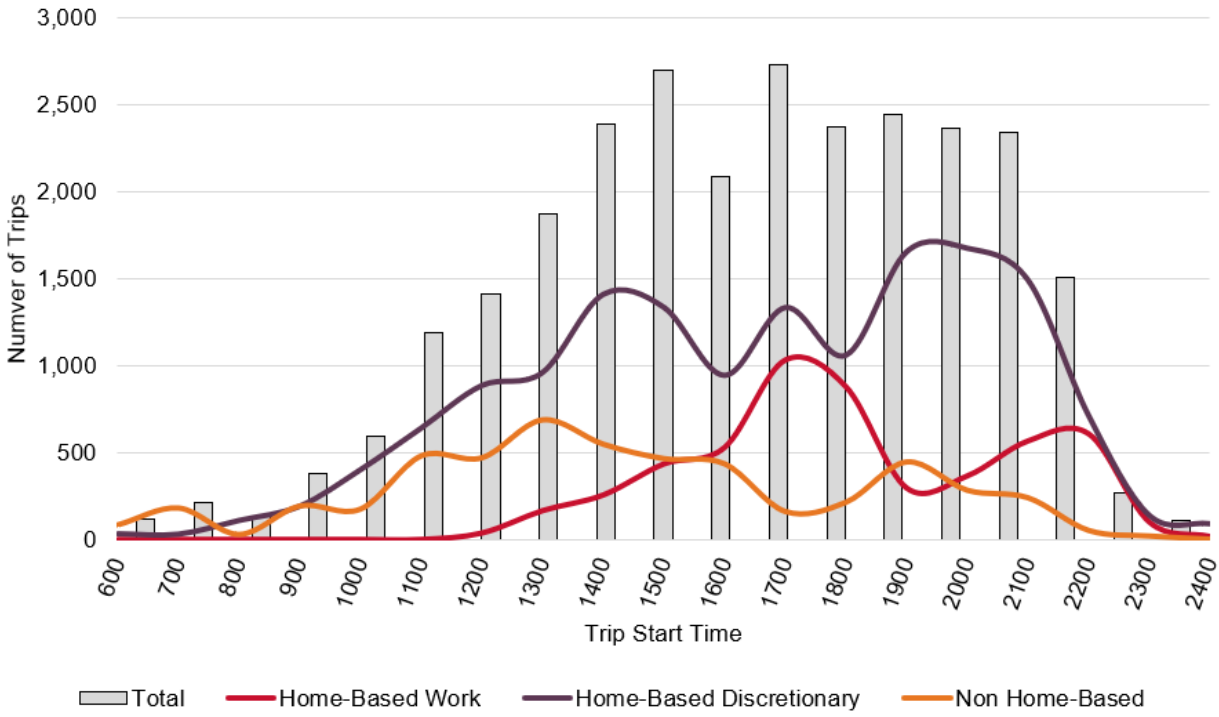
The distribution of trips to the Downtown Core by start time and trip purpose on an average weekday is shown in **Figure 3-11**. As expected, there are two distinct peaks, the morning peak and afternoon peak, when home-based work (commuting) trips dominate. A wider distribution of trips is observed during the PM period as a result of home-based discretionary trips. For trips to Square One, trips are more evenly spread out over the afternoon and evening as shown in **Figure 3-12**. This reflects the high proportion of home-based discretionary trips to this zone, and the increase in shopping trips from the mid-afternoon through to the evening hours.

Figure 3-11: Trips Destined to Downtown Core by Number of Trips by Start Time and Trip Purpose (2016)



Source: TTS

Figure 3-12: Number of Trips by Start Time and Trip Purpose to Square One (2016)



Source: TTS

3.2.6 Active Trips

Figure 3-13 illustrates the mode share for daily trips destined to the Downtown Core that are up to 5 km in length. Trips up to 5 km are considered to be candidates for active travel (walking or cycling). The majority of trips to the Downtown Core are auto-based but there has been an increase in active trips between 2006 and 2016, with noticeable increase in walking by 9%. For trips less than 2 km in length, the walking mode split has increased from 14% in 2006 and 2011, to 28% in 2016.

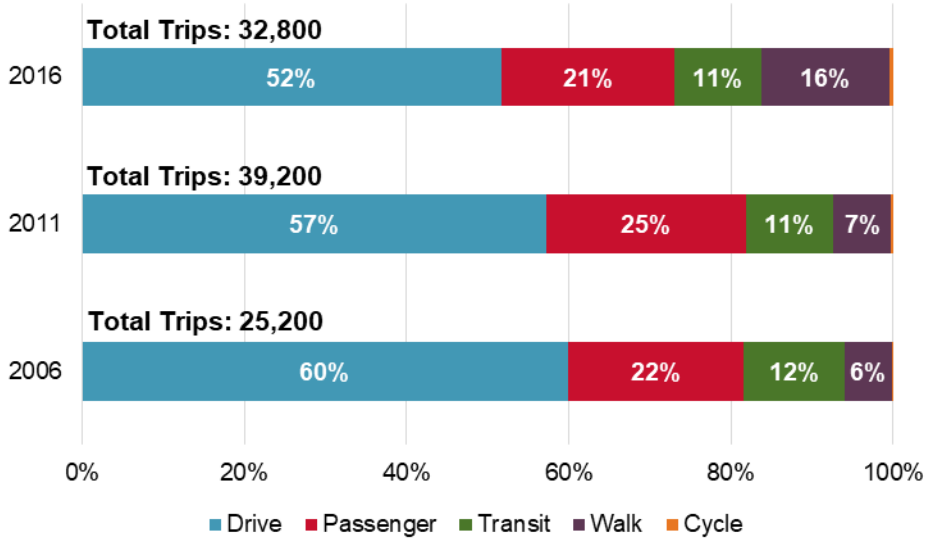
It should be noted that the number of short trips (less than 5 km) in 2016 (32,800 trips representing 36% of all trips) was lower than 2011 (39,200 trips representing 42% of all trips).

StreetLight data was also reviewed to identify travel patterns for active trips destined to the Downtown Core. **Figure 3-14** illustrates the average daily weekday cycling travel patterns to the Downtown Core. Although the same metrics for pedestrian trips are not available on StreetLight, cycling patterns

can help identify corridors that currently better support active trips and corridors that can be improved.

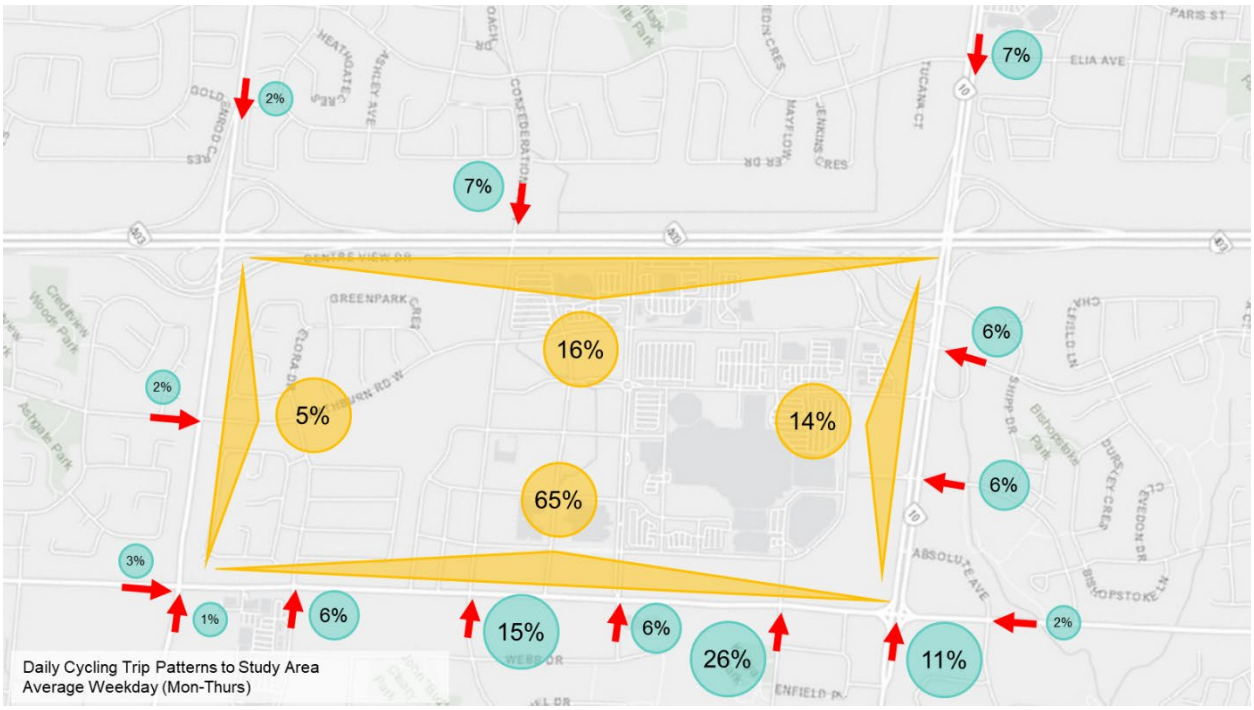
The majority of cycling trips to the Downtown Core are coming from the south along Kariya Drive (26%), Confederation Parkway (15%) and Hurontario Street (11%). The distribution of cycling trips is similar to that of vehicle trips when Highway 403 trips are excluded from the vehicle distribution (shown in **Figure 3-7**). Highway 403 forms a barrier to active travel along the north side of the study area. Limited crossing opportunities and the need to cross free-flow freeway ramps are barriers for active trips to/from the north. Additionally, Square One Shopping Centre forms a barrier to vehicular and cycling trips, while allowing pedestrians to pass through.

Figure 3-13: Historical Daily Trips Destined to Downtown Core for Trips ≤ 5 km (2006 to 2016)



Source: TTS

Figure 3-14: Daily Cycling Travel Patterns to Downtown Core - Average Weekday (2018)



Source: Streetlight Data (2018)

3.3 Existing Street Network

This section presents the road classification, network connectivity and continuity, network constraints, intersection density, and collision analysis of the existing street network. Traffic operations analysis is presented separately in **Section 3.7**.

3.3.1 Network Configuration and Constraints

The Downtown Core is supported by a network of arterial, collector, and local streets. Highway 403 is a major freeway corridor along the north boundary of the study area. It plays a significant role in bringing trips to and from the downtown area with accesses to the freeway provided at the interchanges of Mavis Road and Hurontario Street. Hurontario Street is the primary north-south arterial and Burnhamthorpe Road is the primary east-west arterial that serve the study area. **Figure 3-15** shows the current road classification and **Figure 3-16** shows lane configuration and intersection control for the study area.

The road network has a number of discontinuous roads as illustrated in **Figure 3-17**. These discontinuities limit connections and access to/from the

broader area resulting in congestion at major intersections that do provide connectivity. Highway 403, the large expanse of surface parking, and distances between buildings also act as barriers to pedestrian and cyclist connectivity. The Square One Shopping Centre is another barrier to downtown movement for vehicle and cyclist trips, but can be used by pedestrians.

Figure 3-18 illustrates the network constraints and challenges within the study area. The highway interchange at Hurontario Street creates congestion at Square One Drive, the primary access to the shopping centre from Highway 403. The Hurontario Street bridge over Rathburn Road is a physical barrier for active transportation, as there is only limited sidewalk access between Hurontario Street and Rathburn Road. Highway 403 also is a constraint as it limits access to/from the residential area to the north, with only two crossing points at Hurontario Street and at Confederation Parkway.

Figure 3-15: Existing Road Network

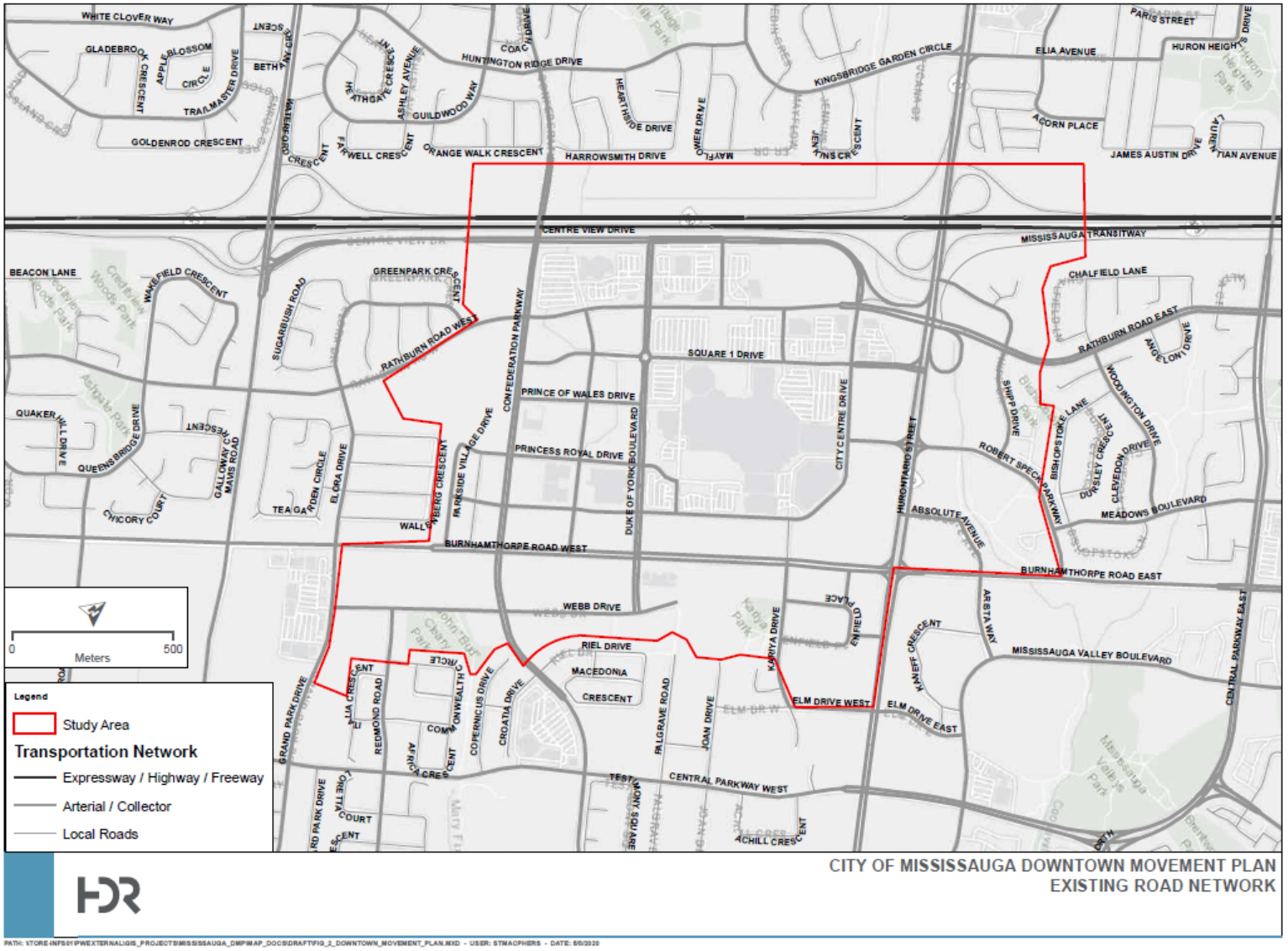


Figure 3-16: Lane Configuration and Intersection Control Type

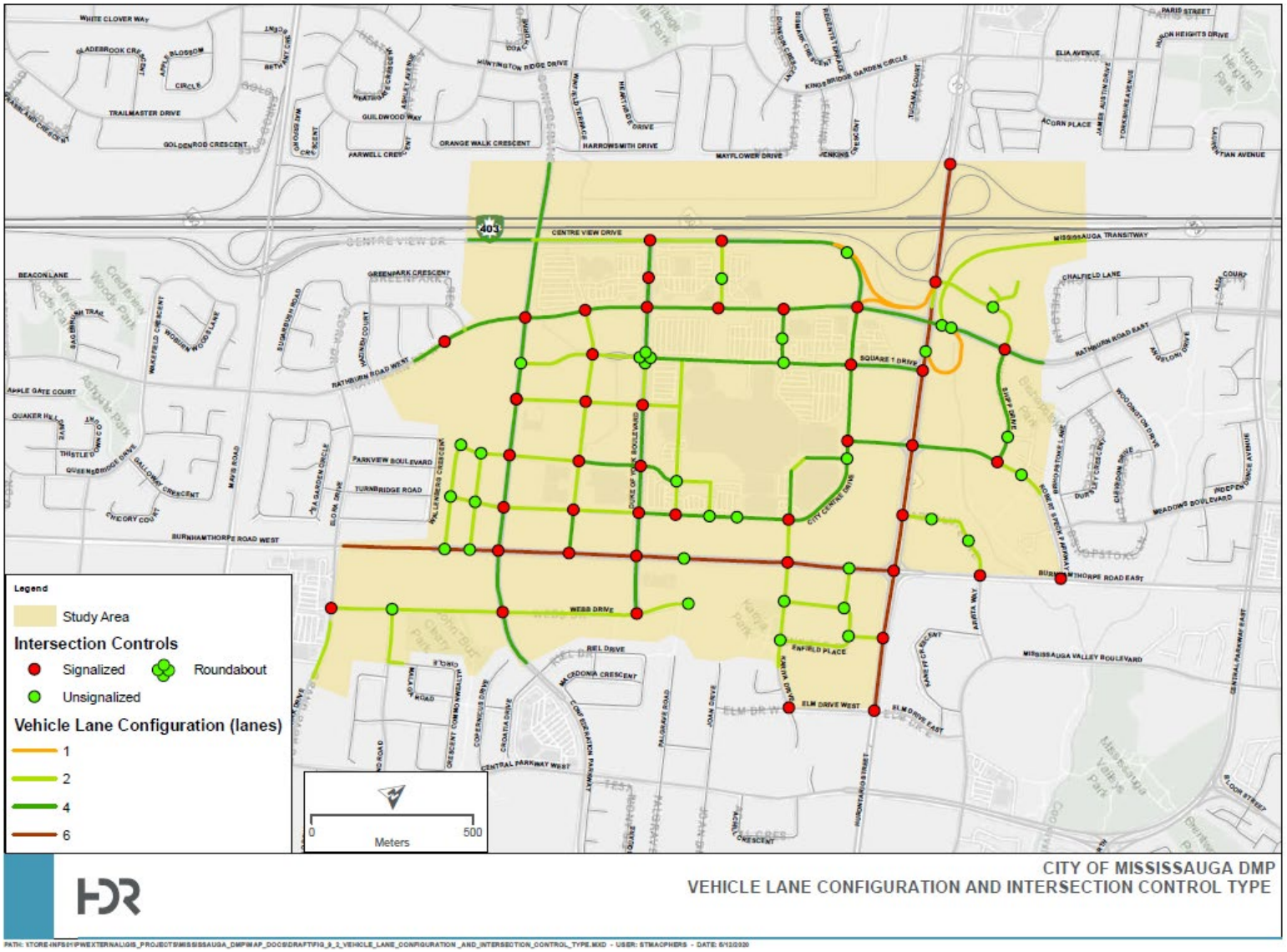


Figure 3-17: Network Continuity

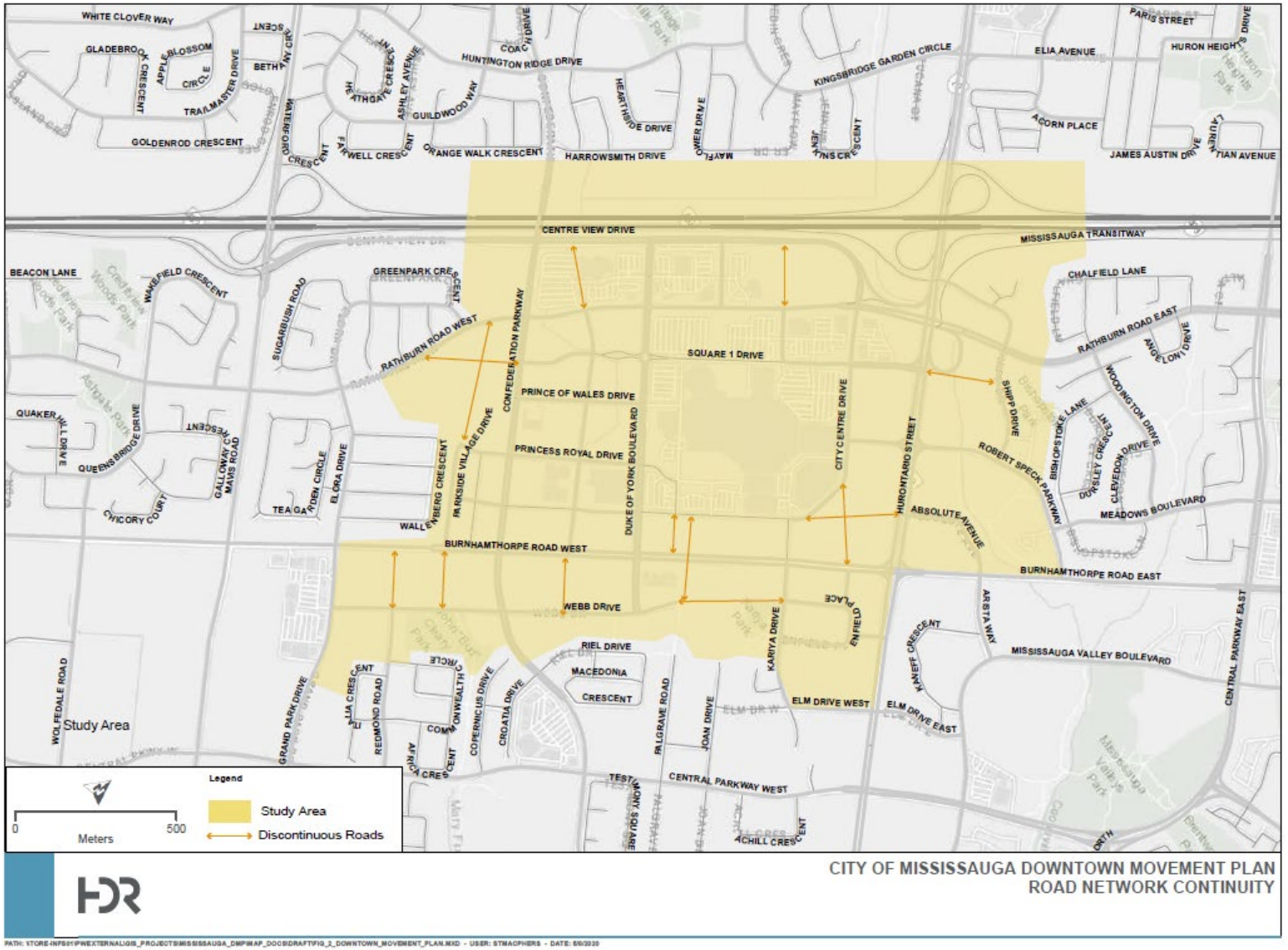
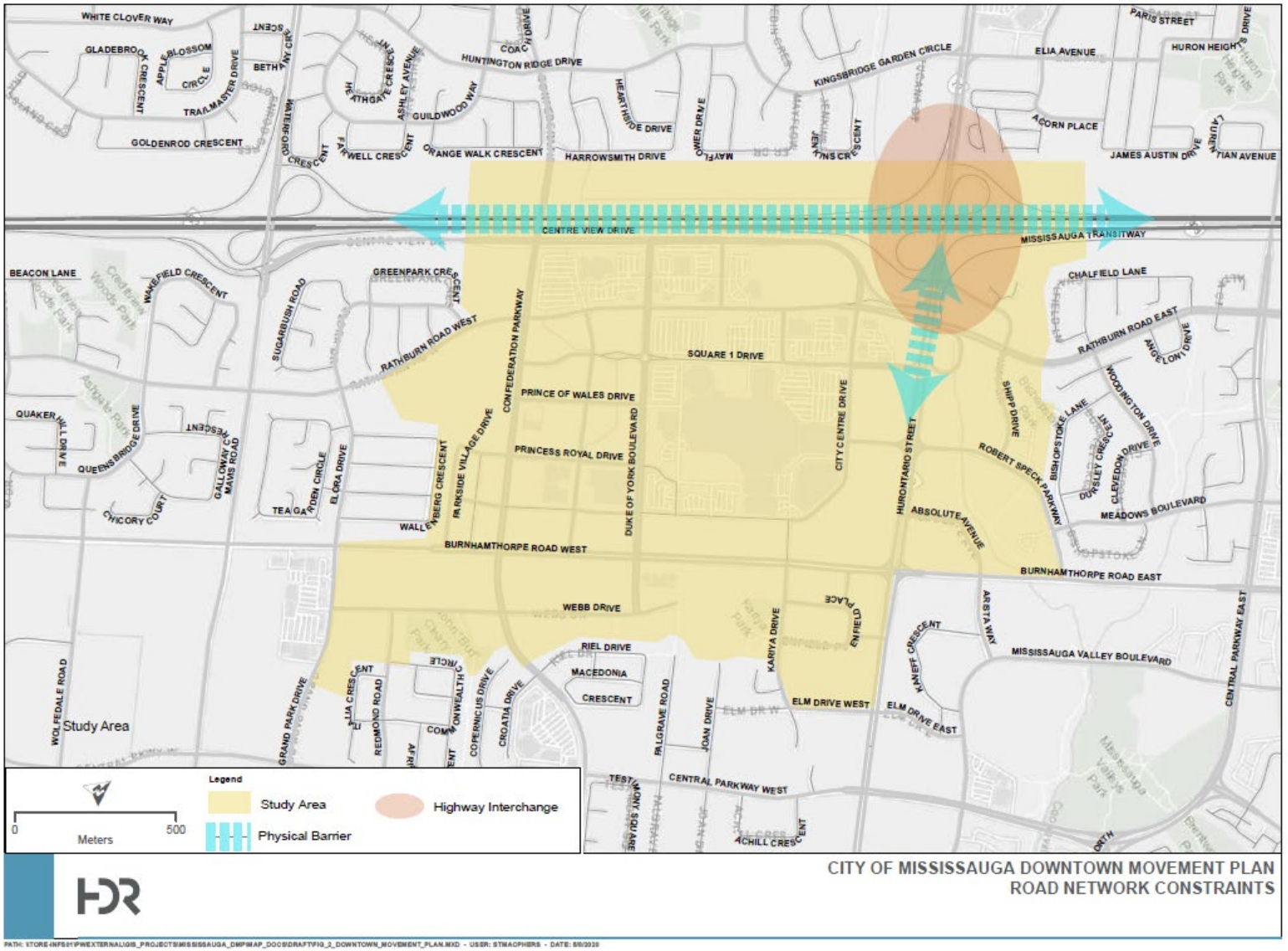


Figure 3-18: Road Network Constraints



3.3.2 Intersection Density

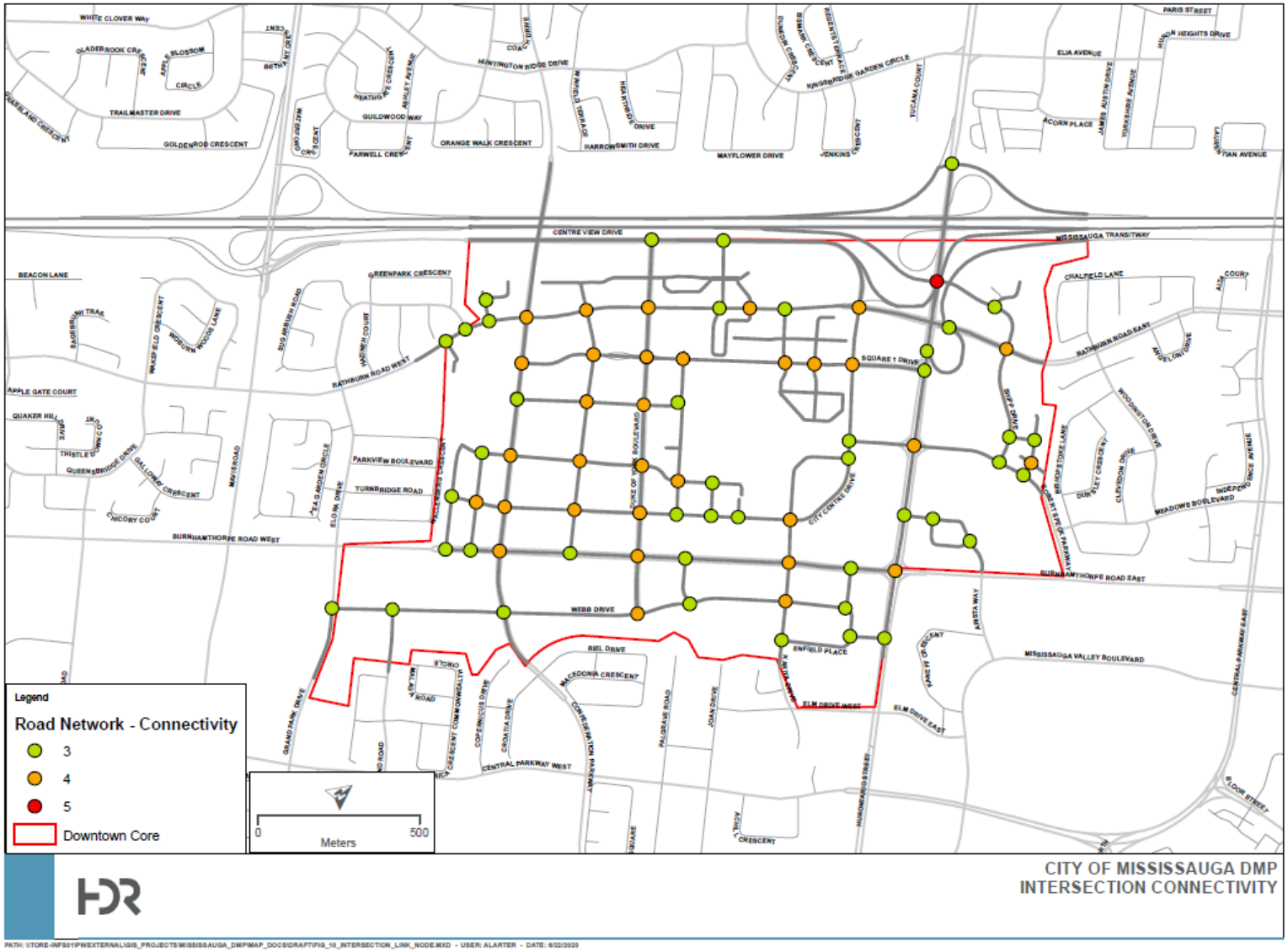
Intersection density is used to evaluate the connectivity of the street network. A higher density score (more intersections per hectare) indicate a grid network that maximizes connectivity while lower scores indicate larger block sizes and poor connectivity. Based on the Ministry of Transportation's (MTO's) ***Transit Supportive Guidelines*** (2012), mixed-use nodes and corridors should achieve an intersection density of 0.6 or more. **Figure 3-19** provides examples of street networks and their associated intersection density score.

Figure 3-19: Examples of Street Network and Intersection Density Score

Source: Transit Supportive Guidelines, 2012 (http://www.mto.gov.on.ca/english/transit/supportive-guideline/layout-local-streets.shtml)

The study area has 76 intersections over approximately 292 hectares as shown in **Figure 3-20** which highlight the number of road connections per intersection (e.g. 3-leg, or 4-leg intersections). Although the resulting intersection density of 0.26 intersections per hectare appears low, it should be noted that the shopping centre is a significant portion of the study area. The large surface parking area also contributes to the low intersection density.

Figure 3-20: Intersection Connectivity and Density



3.3.3 Collisions

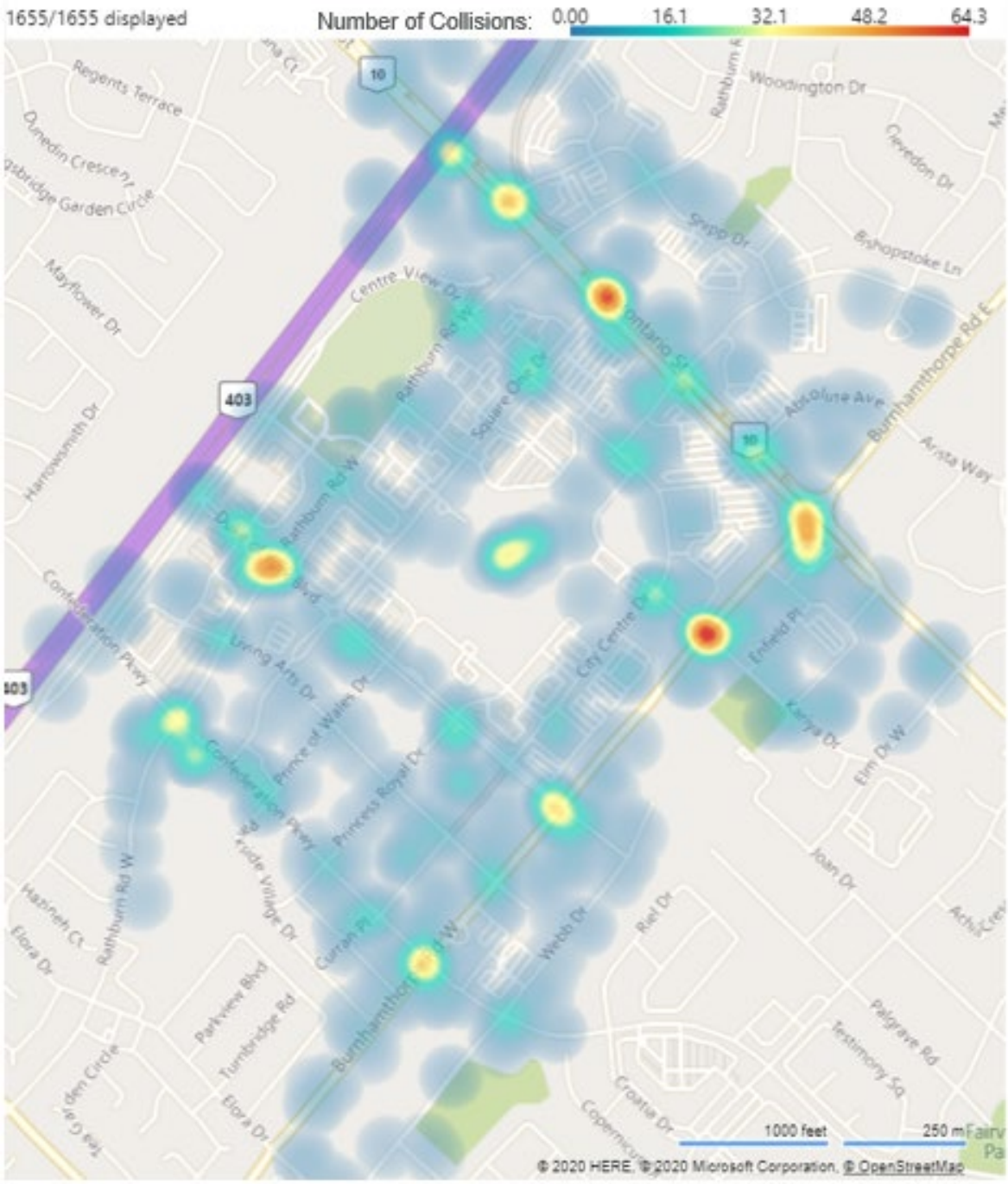
A safety assessment and collision review was completed for the study area. The analysis is based on intersection-related and segment-related collision records from the City of Mississauga for the 5-year period between January 2014 and December 2018. It is noted that Highway 403 collision data was not included in the analysis as the highway is not within the City's jurisdiction. The detailed collision analysis is included in **Appendix A**.

Over the 5-year period, a total of 1,729 collisions were reported within the study area. **Figure 3-21** shows a heat map of collisions in the study area, where the orange and red colours highlight locations where collisions were most prominent. During the analysis period, most collisions were observed to occur at the major intersections of arterial and collector roads, including Burnhamthorpe Road, Hurontario Street, Confederation Parkway, and Rathburn Road.

Figure 3-22 provides an overview of key collision statistics for the study area. There has been a slight downward trend in the number of collisions observed each year. There were two fatal collisions in the study area over the five years. Approximately 6% of all collisions involved vulnerable road users such as pedestrians and cyclists. On a daily basis, collisions were mostly occurring during the PM peak period (4:00pm to 7:00pm) when traffic volumes and pedestrian activities are high, resulting in more potential for conflicts.

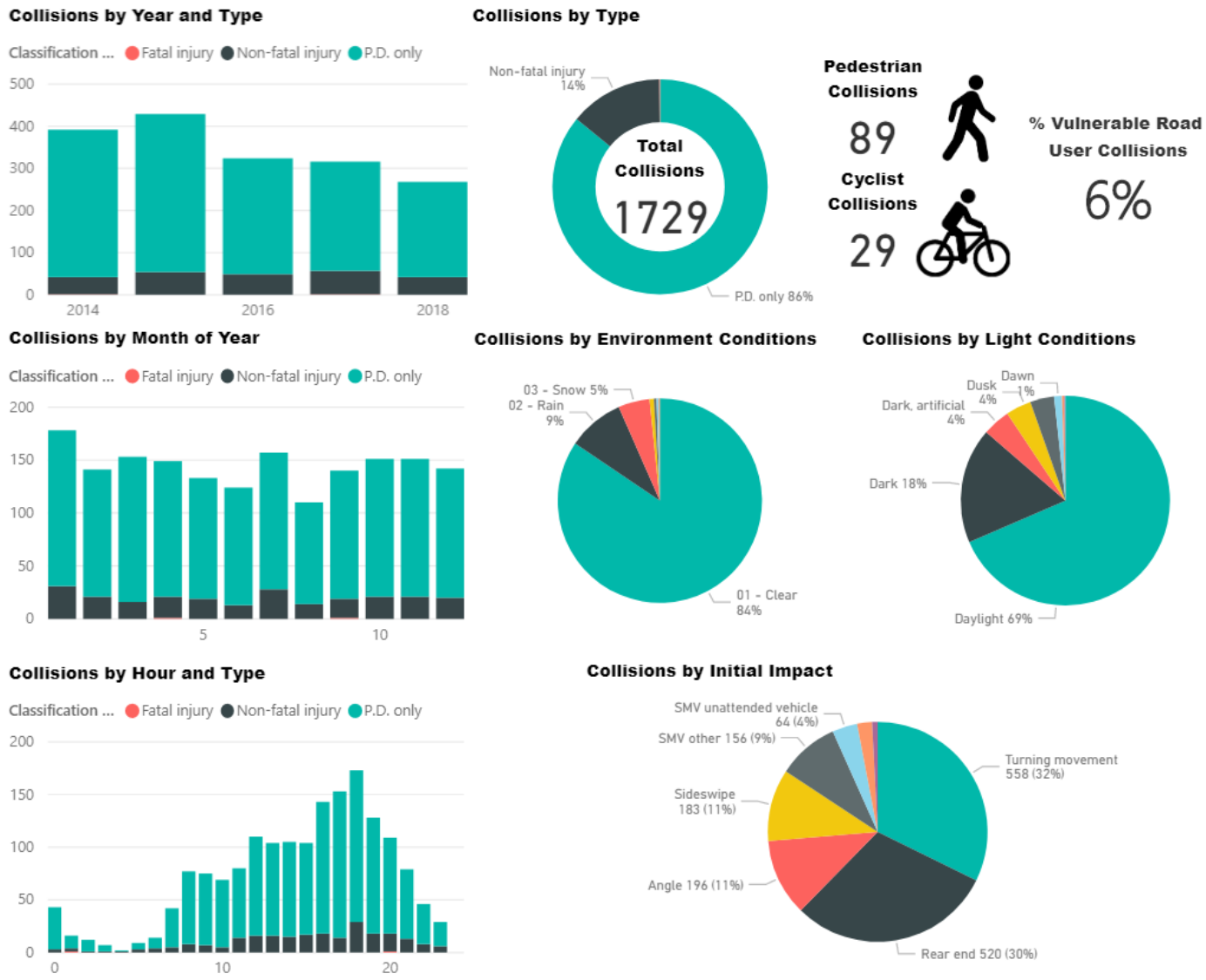
The most common type of collision by impact observed in the study area are turning movement collisions (32%). Rear end collisions accounted for 30% of all intersection collisions, with 64% of these collisions being a result of vehicles following too closely.

Figure 3-21: Collision Heat Map of Study Area (2014 – 2018)



Note: There are 74 collisions not shown in the heat map due to unspecified coordinates. Other statistics from these collisions were still included in the analysis. Details provided in Appendix A.

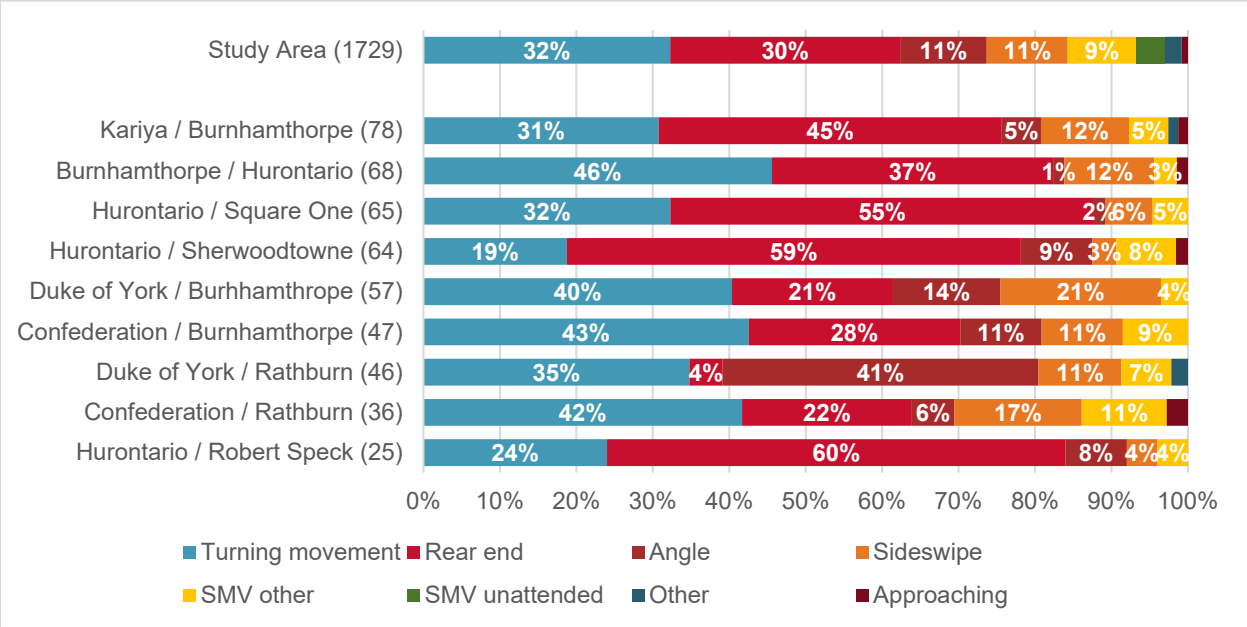
Figure 3-22: Key Collision Statistics for the Study Area (2014 – 2018)



Note: “SMV” refers to Single Motor Vehicle; “P.D. only” refers to collisions resulting in Property Damage only.

A summary of collisions by impact type at intersections is shown in **Figure 3-23**. In general, the trends observed overall within the study area are similar to those at each intersection. Detailed descriptions of the various impact types and collisions at each intersection are included in **Appendix A**.

Figure 3-23: Summary of Collisions by Impact Type at Intersections (2014 – 2018)



Note: The number of collisions between 2014 and 2018 is shown in () for each intersection. SMV refers to Single Motor Vehicle collisions.

COLLISIONS WITH VULNERABLE ROAD USERS

Further analysis to focus on the 118 collisions that involve vulnerable road users such as pedestrians and cyclists was conducted. Pedestrians and cyclists are highly vulnerable in collisions. As shown in the data, 96% of collisions involving pedestrians resulted in injuries and 48% of the cyclist collisions resulted in injury. These rates are significantly higher than the 9% observed involving vehicle-vehicle collisions. Two fatal collision occurred between 2014 to 2018. The first one occurred in April 2016 at the intersection of Duke of York Boulevard and Rathburn Road, and the second one occurred in September 2017 with the location unspecified. Details are of the two fatal collisions are provided in **Appendix A**.

Pedestrian collisions observed in the study area for the five years showed similar hotspots as the overall collision patterns, including major intersections of arterial roads and collector roads. There were additional hotspots located

by the City Centre Transit Terminal and around Mississauga Celebration Square where there are high pedestrian volumes.

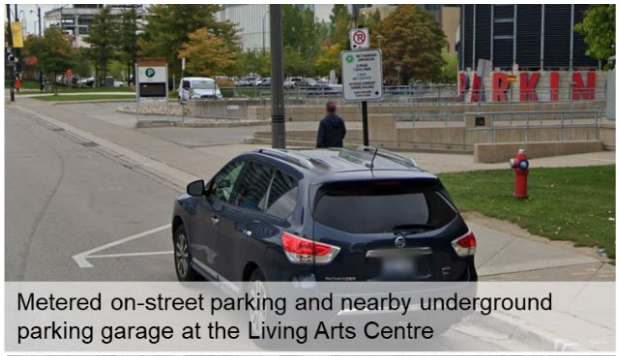
3.3.4 Parking

PARKING FACILITIES

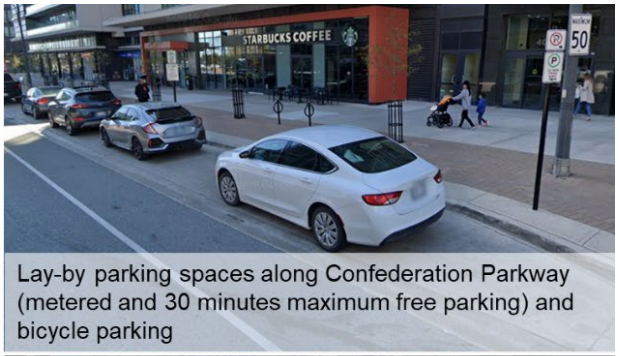
Shared parking facilities are provided throughout the study area in various forms from vehicle to bicycle parking, underground to on-street parking, and free to metered (paid) parking. The different types of parking facilities in the study area are shown in **Figure 3-24** and summarized below:

- Lay-by parking along various streets (including Burnhamthorpe Road, Confederation Parkway, Living Arts Drive, etc.) offer metered on-street parking spaces administered through pay-and-display machines installed along the curb. Various signs establish parking limits such as 2 hours of paid parking ($1.00 per hour), 15 to 30 minutes maximum of free parking, and/or overnight parking with a permit. Daily and monthly permits are also available for purchase.
- There are three below grade off-street parking lots and paid off-street surface lots within the study area and generally service the Civic Centre, Central Library, Living Arts Centre, and Sheridan College.
- Multilevel above ground parking facilities are also provided at Square One. The shopping centre reports real-time parking availability for each lot on its website.
- Mixed use developments throughout the Downtown Core also provide for parking and retail, office, commercial, and visitor parking within surface parking lots and parking structures. Some of these are private/paid parking.
- Car sharing services are provided within the study area.
- Short-term bicycle parking is provided at various facilities including Sheridan College, Transit Terminal, Civic Centre, and Square One. Bicycle parking can also be found near mixed-use developments with first-floor retail along streets such as Living Arts Drive and Confederation Parkway.

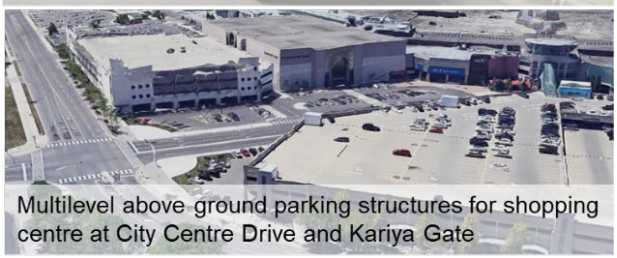
Figure 3-24: Various Types of Parking Facilities within Study Area



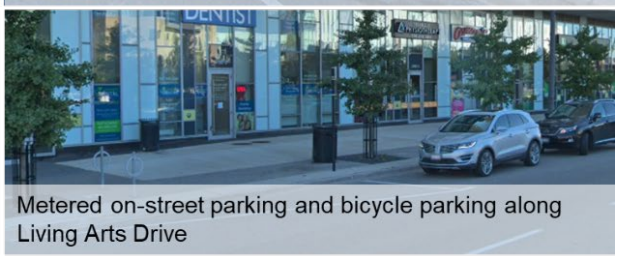
Metered on-street parking and nearby underground parking garage at the Living Arts Centre



Lay-by parking spaces along Confederation Parkway (metered and 30 minutes maximum free parking) and bicycle parking



Multilevel above ground parking structures for shopping centre at City Centre Drive and Kariya Gate



Metered on-street parking and bicycle parking along Living Arts Drive

Source: Google Maps and Google Streetview

BY-LAWS AND PARKING UTILIZATION

The existing by-law rates and shared parking factors are summarized in **Table 3-1** and **Table 3-2**, respectively.

Table 3-1: Minimum Parking Supply Rate Requirements Specific to City Centre

Land Use	Zoning By-Law 0225-2007
CC1 Retail Core Commercial	4.57 spaces per 100 m^2 GFA
Retail Store - CC2 to CC4 zones	4.30 spaces per 100 m^2 GFA
Apartment Dwelling	1.00 resident spaces per unit 0.15 visitor spaces per unit

Source: City of Mississauga Zoning By-Law 0225-2007

Table 3-2: Recommended Shared Parking Factors

Land Use	Morning Percentage of Peak Period	Noon Percentage of Peak Period	Afternoon Percentage of Peak Period	Evening Percentage of Peak Period
Office/Medical Office/Financial Institution	100 (10)	90 (10)	95 (10)	10 (10)
Retail Centre/Store	80 (80)	90 (100)	90 (100)	90 (70)
Restaurant	20 (20)	100 (100)	30 (50)	100 (100)
Overnight Accommodation	70 (70)	70 (70)	70 (70)	100 (100)

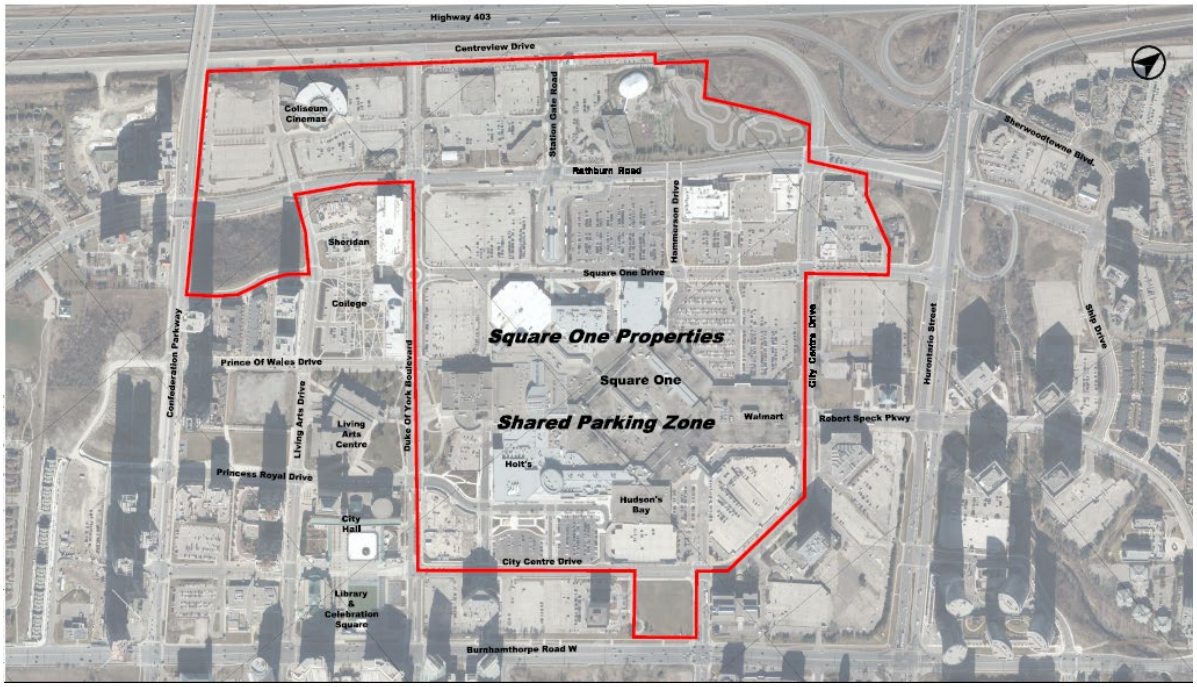
Land Use	Morning Percentage of Peak Period	Noon Percentage of Peak Period	Afternoon Percentage of Peak Period	Evening Percentage of Peak Period
Residential – Resident	90 (90)	65 (65)	90 (90)	100 (100)
Residential – Visitor	20 (20)	20 (20)	60 (60)	100 (100)

Note: Non-bracketed numbers represent the weekday shared parking factor. Bracketed numbers represent the weekend shared parking factor.
Source: City of Mississauga Zoning By-Law 0225-2007

In 2019, a Parking Management Strategy (2019) for the Square One Properties was developed by BA Group that included parking surveys for the Square One parking area (shown in **Figure 3-25**) to identify the existing parking utilization at the shopping centre. The surveys reported parking utilization by time of day, day of week, and seasonal trends.

Square One provides 7,438 parking spaces for approximately 177,000 m^2 of retail, personal service, restaurant, and entertainment space (4.2 spaces per 100 m^2 GFA). The parking surveys indicated that 3.80 spaces per 100 m^2 GFA is expected to accommodate demand for 95% of the hours in the year. Allowing shared parking and shifting shopping times to the shoulder hours were noted to address the excess demand.

Figure 3-25: Square One Properties Parking Management Strategy



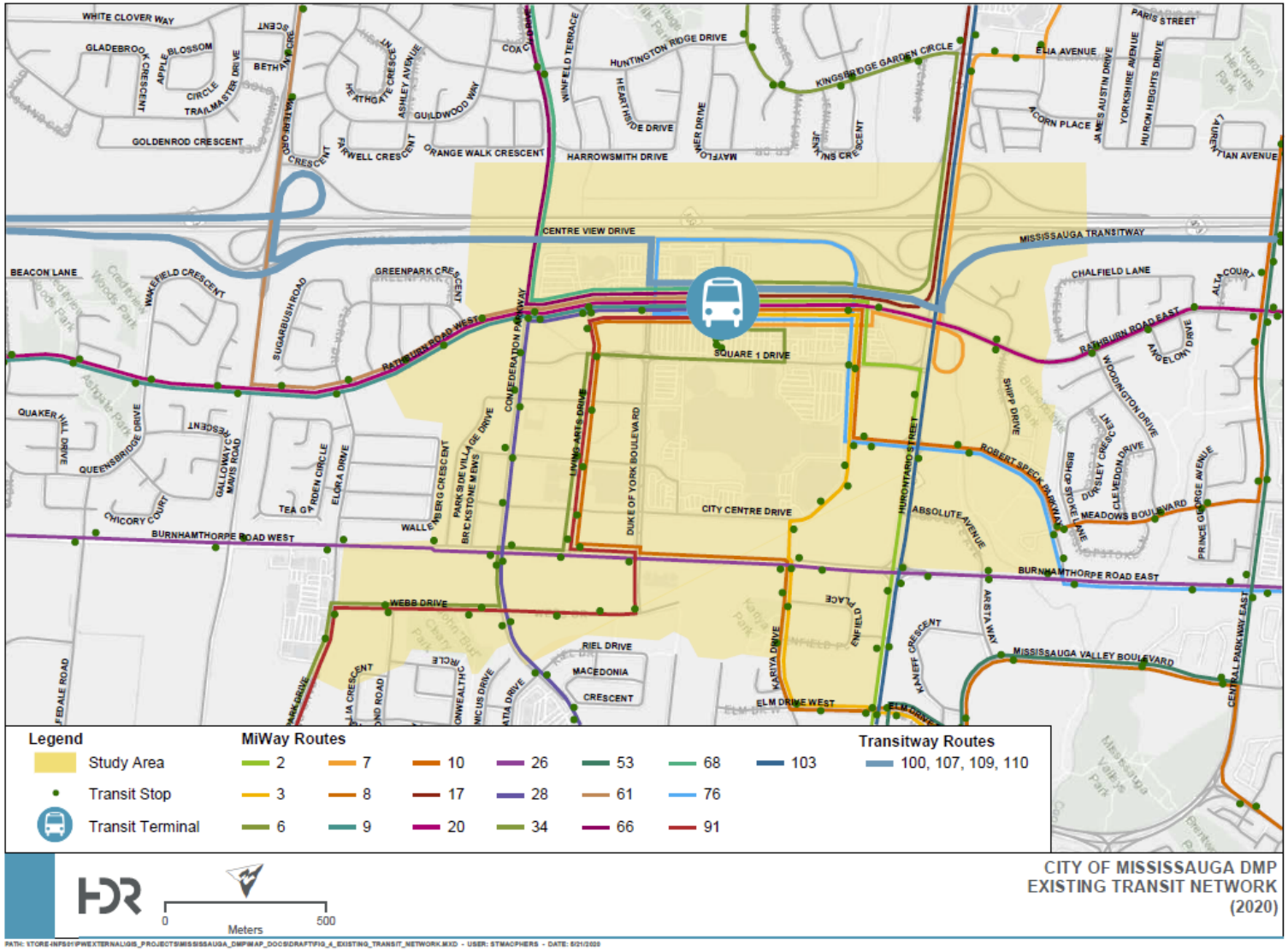
Source: Parking Management Strategy – Square One Properties (Revised September 2019), BA Group

3.4 Transit Network

The following sections describe the existing transit services that serve the Downtown Core, connections to the local and regional transit networks and transit demand.

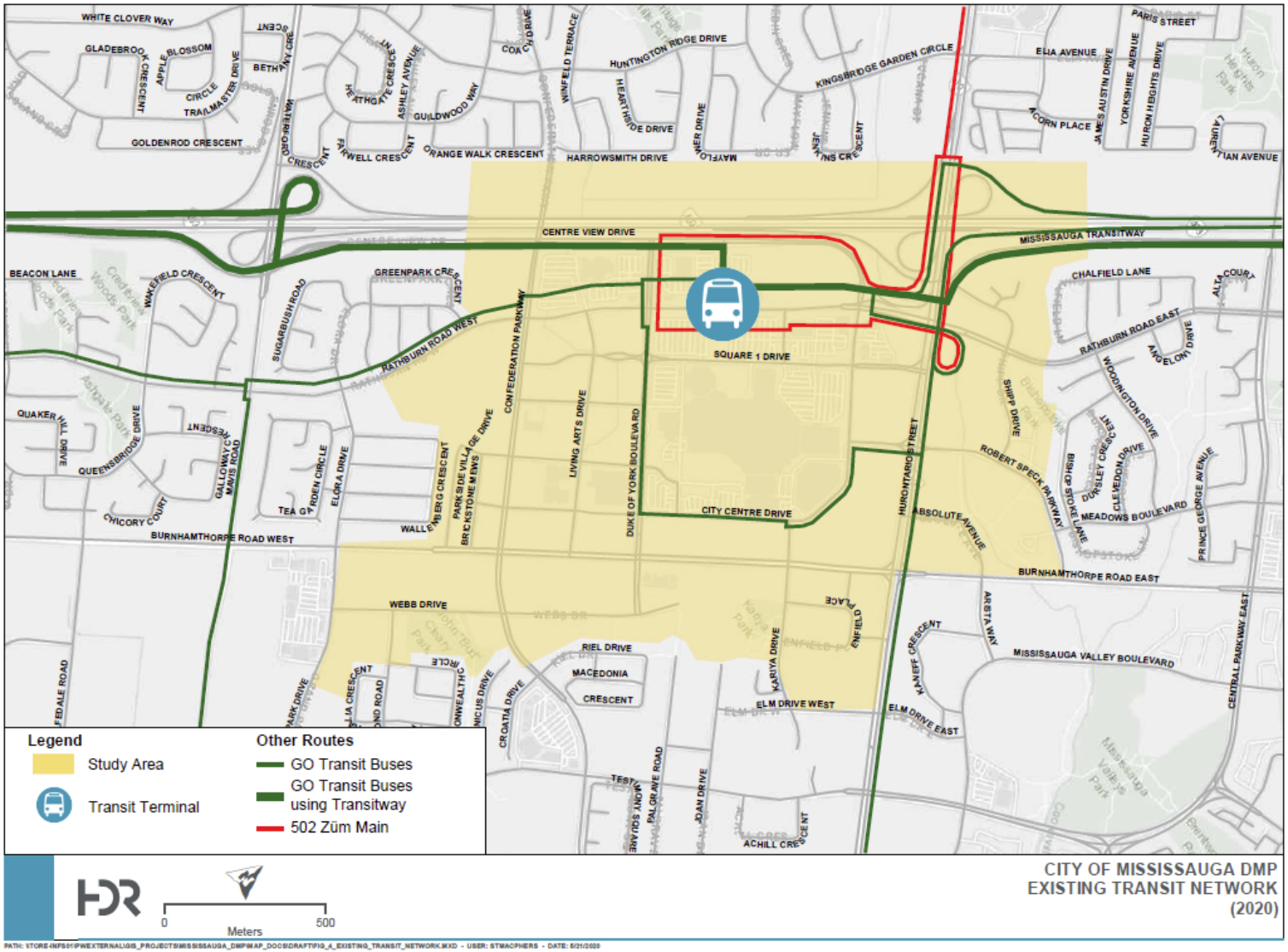
Three transit systems served the study area: MiWay (Mississauga Transit), Brampton Transit (Züm), and GO Transit. These transit systems provide connectivity for local residents and businesses to other routes in Peel Region and Toronto. The existing (2020) MiWay, Züm, and GO routes prior to COVID-19 service and route changes are illustrated in **Figure 3-26** and **Figure 3-27.**

Figure 3-26: Existing MiWay Transit Services



Source: City of Mississauga (2020)

Figure 3-27: Existing GO Transit and Brampton Transit (Züm) Services



Note: Cooksville GO Station is approximately 1.5 km south of the study area.

3.4.1 Regional Transit

SQUARE ONE GO BUS TERMINAL

The Square One GO Bus Terminal is Mississauga's main inter-regional transit hub and bus station. The station is located north of Square One Shopping Centre, generally along Station Gate Road north of Rathburn Road, and services eight GO transit routes as described in **Table 3-3**.

Square One GO Station provides the following services and facilities:

- Public washrooms
- Indoor waiting room
- Pay phones
- Shelters
- Heated shelters
- Public and free Wifi

Table 3-3: GO Transit Routes

Route	From	To	Major Connections
40 - Hamilton / Richmond Hill	Hamilton GO Station	Richmond Hill GO Station	Square One Dixie Transitway Station Pearson Airport Hwy 407 Bus Terminal
45 - Mississauga / Hwy 407 Terminal	Streetsville GO Station	Hwy 407 Bus Terminal	Erin Mills Transitway Square One
46 - Oakville / Hwy 407 Terminal	Oakville GO Station	Hwy 407 Bus Terminal	Sheridan College Erin Mills Transitway Station Square One
19 Mississauga / North York	Square One	Finch GO Station	Dixie Transitway Station Renforth Transitway Station Yorkdale Bus Terminal
47 - Hamilton / Hwy 407 Terminal	Hamilton Go Centre	Hwy 407 Bus Terminal	McMaster University Erin Mills Transitway Station Square One
21H Milton	Union GO Station	Milton GO	Dixie GO Cooksville GO Station Platform A Square One Erindale GO Streetsville GO Meadowvale GO
29 Guelph / Mississauga	Guelph Centre GO Bus	Square One	University of Guelph Winston Churchill Transitway Station Erin Mills Transitway Station
25 Waterloo / Mississauga	University of Waterloo	Square One	Wilfred Laurier University Cambridge Smart Centre Winston Churchill Transitway Station Erin Mills Transitway Station
Milton GO Train Service	Milton GO Station	Union GO Station	Lisgar GO Station Meadowvale GO Station Streetsville GO Station Streetsville GO Station Erindale GO Station Cooksville GO Station Dixie GO Station Kipling GO Station

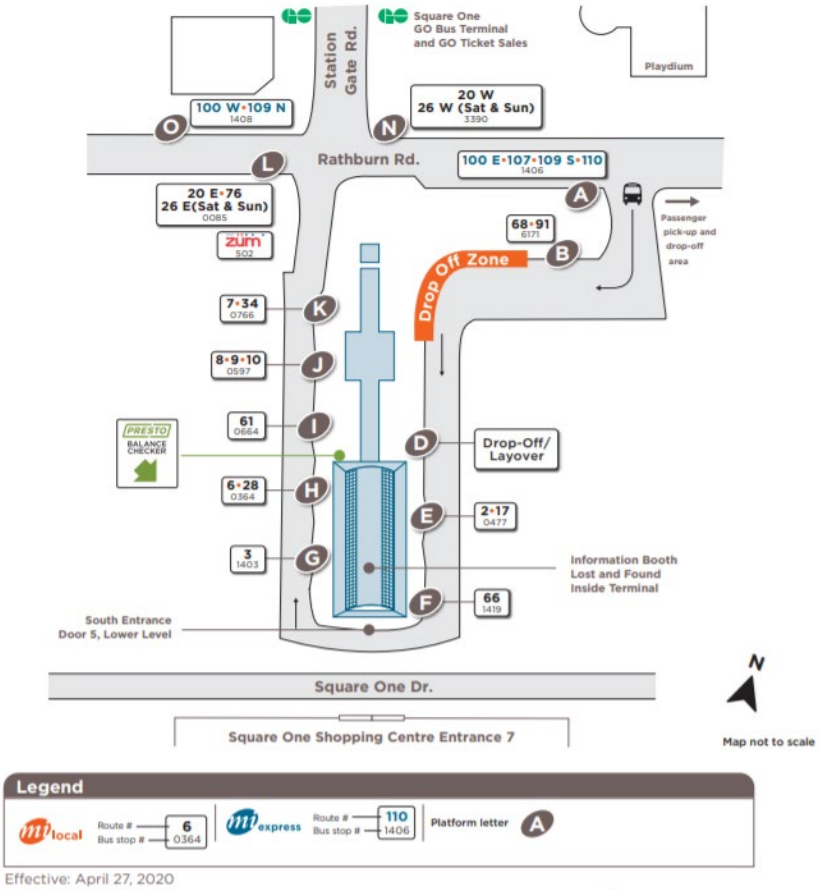
3.4.2 Local Transit

CITY CENTRE TRANSIT TERMINAL

The City Centre Transit Terminal (CCTT) is Mississauga's main transit hub and bus station. The station is located north of Square One Shopping Centre on the south side of Rathburn Road and across the street from the Square One GO Bus Terminal platforms. It provides 13 platforms and services 14 MiLocal routes, four MiExpress routes that use the Mississauga Transitway and one Brampton Transit (Züm) bus route. **Figure 3-28** illustrates the CCTT Platform locations. The DMMP particularly noted the conflicts between cyclists and pedestrians at the CCTT and proposed cyclists will be required to dismount from their bike and walk through the CCTT area.

There is an ongoing project to renovate the interior of the City Centre Terminal with an expected completion by Fall 2021.

Figure 3-28: City Centre Transit Terminal



Source: City of Mississauga

The City Centre Transit Terminal provides the following services and facilities:

- 200 parking spaces
- Pick up and drop off areas
- Heated/Enclosed Waiting Areas
- Accessible elevator
- Electronic signage
- Bicycle lock up area
- Public washrooms
- Public and free Wifi

Table 3-4 describes the MiWay bus routes that have stops within the study area. The 502 Züm bus route (Brampton Transit) travels between the Mississauga City Centre Terminal and Sandalwood Loop to the north.

Table 3-4: MiWay Transit Route Descriptions within Study Area

No.	Route Name	Type	Service	Directions to	Directions to
2	Hurontario	Local	Monday to Sunday	Northbound to City Centre Transit Terminal	Southbound to Port Credit GO Station
3	Bloor	Local	Monday to Sunday	Eastbound to Islington Subway	Westbound to City Centre Transit Terminal
6	Credit Woodlands	Local	Monday to Sunday	Eastbound to City Centre Transit Terminal	Westbound to Westdale Mall
7	Airport	Local	Monday to Sunday	Northbound to Westwood Square	Southbound to City Centre Transit Terminal
8	Cawthra	Local	Monday to Saturday	Northbound to City Centre Transit Terminal	Southbound to Port Credit GO Station
9	Rathburn-Thomas	Local	Monday to Sunday	Eastbound to City Centre Transit Terminal	Westbound to Erin Centre Blvd/Ninth Line
10	Bristol-Britannia	Local	Monday to Sunday	Northbound to Meadowvale Town Centre	Southbound to City Centre Transit Terminal
17	Hurontario	Local	Monday to Sunday	Northbound to Highway 407 Park and Ride	Southbound to City Centre Transit Terminal
20	Rathburn	Local	Monday to Sunday	Eastbound to Islington Subway	Westbound to Erindale GO Station
26	Burnhamthorpe	Local	Monday to Sunday	Eastbound to Islington Subway	Westbound to South Common Centre
28	Confederation	Local	Monday to Sunday	Northbound to City Centre Transit Terminal	Southbound to Trillium Health Centre
34	Credit Valley	Local	Monday to Sunday	Eastbound to City Centre Transit Terminal	Westbound to Erin Mills Town Centre
61	Mavis	Local	Monday to Sunday	Northbound to Sheridan College Brampton Campus	Southbound to City Centre Transit Terminal
66	McLaughlin	Local	Monday to Sunday	Northbound to Sheridan College Brampton Campus	Southbound to City Centre Transit Terminal

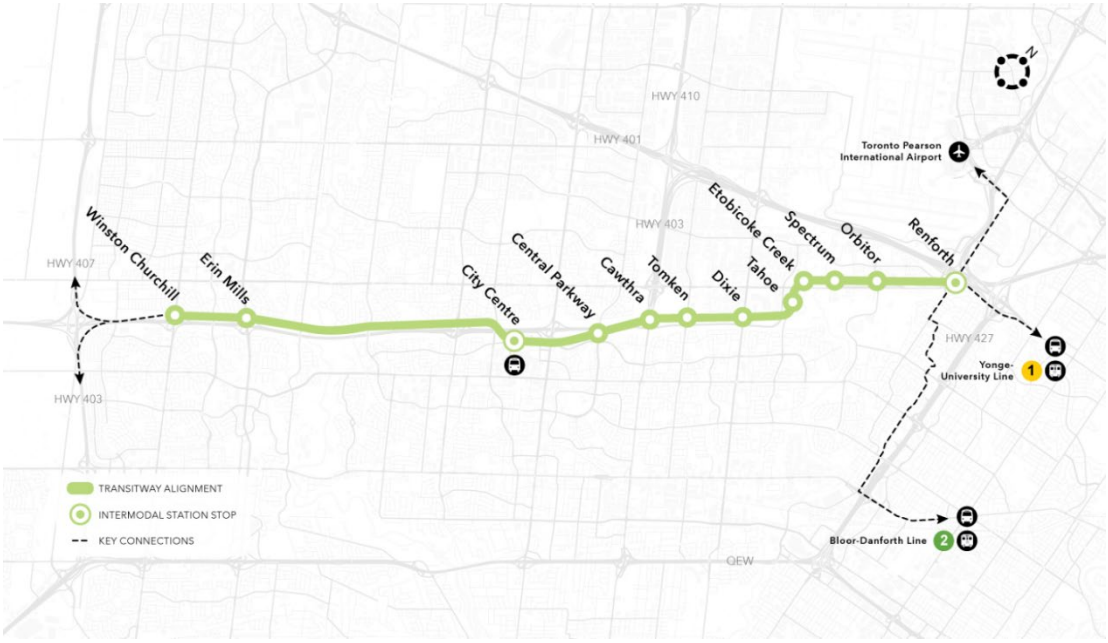
No.	Route Name	Type	Service	Directions to	Directions to
68	Terry Fox	Local	Monday to Sunday	Northbound to Britannia Rd	Southbound to City Centre Transit Terminal
76	City Centre-Subway	Local	Monday to Friday	Eastbound to Islington Subway	Westbound to City Centre Transit Terminal
91	Hillcrest-Cooksville GO	Local	Monday to Friday	Northbound to City Centre Transit Terminal	Southbound to Cooksville GO Station
100	Airport Express	Express	Monday to Friday	Eastbound to Toronto Pearson Airport Terminal 3	Westbound to Winston Churchill Station
107	Malton Express	Express	Monday to Sunday	Northbound to Humber College	Southbound to City Centre Transit Terminal
109	Meadowvale Express	Express	Monday to Sunday	Northbound to Meadowvale Town Centre	Southbound to Islington Station
110	University Express	Express	Monday to Sunday	Northbound to City Centre Transit Terminal	Southbound to Clarkson GO Station
19*	Hurontario	Local	Monday to Sunday	Northbound to Highway 407 Park and Ride	Southbound to Port Credit GO Station

Note: Route 19 is no longer in service. Route 19 has been divided into two separate routes – Routes 2 and 17. Route 19 is included in this table for information only.

MISSISSAUGA TRANSITWAY

The Mississauga Transitway is a dedicated east-west bus corridor with 12 stations across the City. The 18 km transitway begins at Winston Churchill Boulevard and ends at Renforth Drive as illustrated in **Figure 3-29**. Note that the connection through the Downtown Core is not complete.

Figure 3-29: Mississauga Transitway Route



Source: Metrolinx Website

PEEL TRANSHELP

The Region of Peel (including Brampton, Mississauga and Caledon) offers a door-to-door transportation service for individuals who face barriers when boarding conventional transit services. This service, TransHelp, is a shared ride service where demand-responsive routes are designed to maximize efficiency so that a single TransHelp trip may pick-up and drop-off multiple users.

3.4.3 Transit Demand

MIWAY RIDERSHIP

Table 3-4 in the previous section describes the MiWay bus routes that stop within the study area. The City provided ridership data for routes within the study area from weekday, Saturday, and Sunday counts conducted in 2015, 2016, or 2018.

Figure 3-30 and **Figure 3-31** show the weekday and weekend boardings and alightings at the City Centre Transit Terminal Stop. The terminal experiences higher ridership on weekdays than weekends; weekend ridership is still high with Saturday peak ridership being similar to the weekday mid-day peak ridership. Sunday ridership is lower than Saturday with similar hourly trends.

There are morning and afternoon peaks in weekday boardings and alightings indicating use of the terminal for commuter purposes; however, mid-day passengers differ by less than 50% of the peak periods, which reflects the mixed-use development in the area. Weekend boardings and alightings are relatively consistent between 11:00 am and 7:00 pm similar to the typical operating hours of Square One.

Other stops are located throughout the study area and all routes stop at the City Centre Transit Terminal (except Route 26 which only stops at the transit terminal on weekends). Of all the MiWay Routes, only four routes (20 Rathburn, 26 Burnhamthorpe, 100 Airport, and 109 Meadowvale) do not terminate at the City Centre transit terminal. Since most routes begin at the City Centre, boardings and alightings are counted for transfers between routes.

Figure 3-30: Weekday MiWay Boarding and Alighting at City Centre Terminal Station

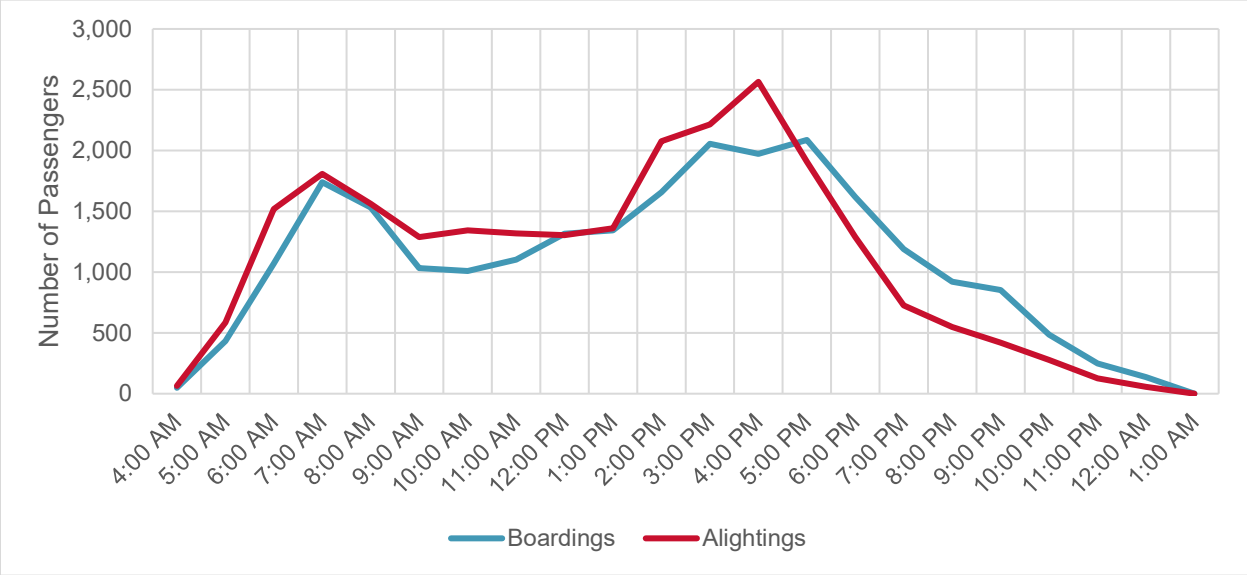
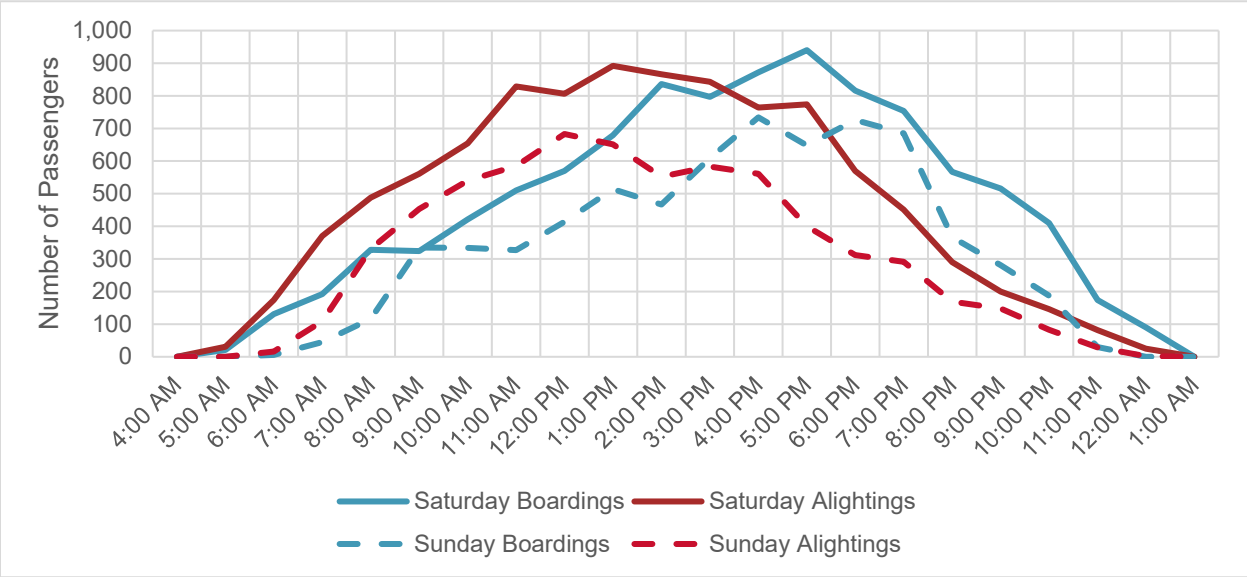


Figure 3-31: Weekend MiWay Boarding and Alighting at City Centre Terminal Station



GO BUS RIDERSHIP

The City provided ridership data collected between October 21 and 27, 2018 for GO Bus routes in the study area. **Figure 3-32** and **Figure 3-31** show the weekday and Saturday boardings and alightings at the Square One GO Station. The terminal experiences higher ridership on weekdays than weekends; however, weekend ridership is still high with Saturday peak ridership being similar to the weekday mid-day peak ridership. Sunday ridership is lower than Saturday with similar hourly trends.

In the morning, there is a higher demand on Regional GO transit leaving the study area than arriving at the Square One GO Station (higher boardings than alightings) suggesting that longer-distance trips originating outside of the Downtown Core are using other travel modes to travel to the City Centre. This also suggests that local residents are using the GO service to commute to work in areas outside of the City and return in the evening with GO service. Similar to the MiWay ridership, the weekend boardings and alightings are relatively consistent between 11:00 am and 7:00 pm.

Figure 3-32: Weekday GO Bus Boarding and Alighting at Square One GO Station

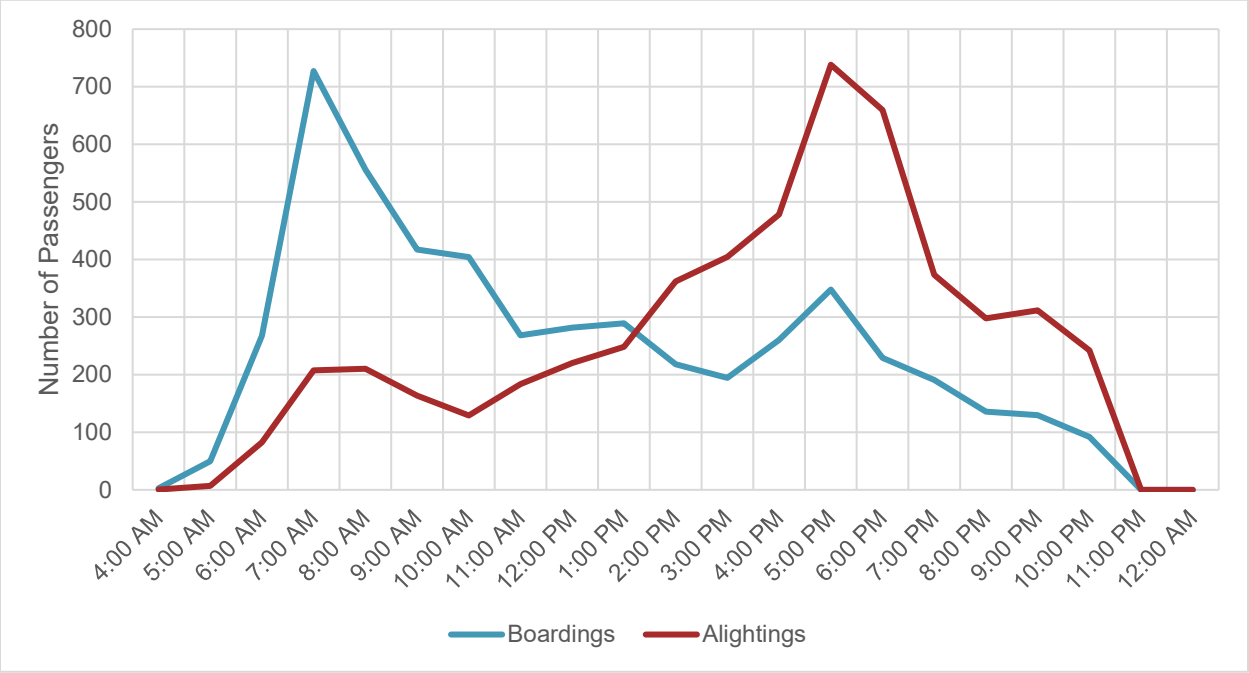
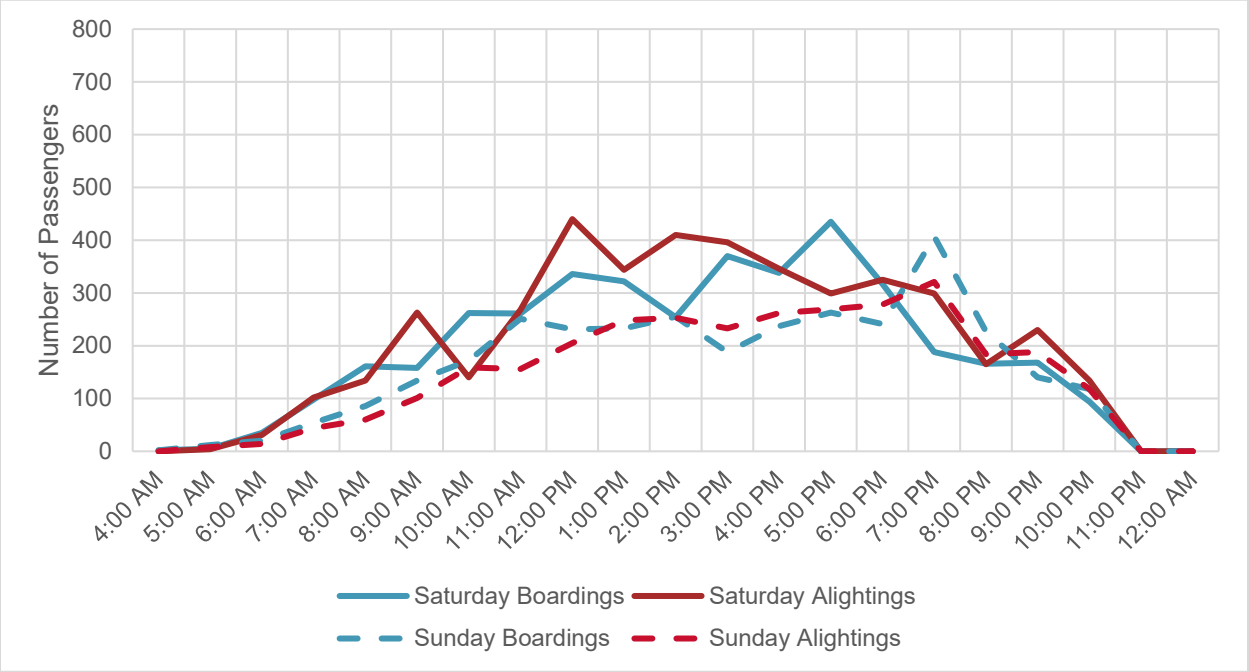


Figure 3-33: Weekend GO Bus Boarding and Alighting at Square One GO Station



BRAMPTON TRANSIT RIDERSHIP

The 502 Züm Main has its terminus at the City Centre Transit Terminal. **Table 3-5** summarizes the daily ridership for the 502 Züm Main bus at this location. The service runs approximately every 10 to 12 minutes during peak hours. The similar boarding and alighting counts suggest return trips using Brampton Transit. The higher alightings during the AM peak suggests that the service is primarily used by Brampton residents going to the study area, with some non-work trips in the evening.

Table 3-5: Brampton Daily Ridership at City Centre Terminal Stop (Weekday - Fall 2018)

Route 502 – Züm Main	Boardings	Alightings
AM Peak (5:00 am to 9:00 am)	192	412
PM Peak (3:00 pm to 7:00 pm)	713	469
Daily Total	1,812	1,792

PEEL TRANSHELP DEMAND

TransHelp is a door-to-door public transit service provided by Peel Region. This service is available to eligible users who experience barriers to using conventional public service.[1] TransHelp is a shared ride service which will carry multiple passengers to different destinations in a single trip.

Trips can be booked as early as a week in advance. To arrive at a destination for a specific time, trips must be booked by 6:00 pm the previous day. Otherwise, pick-up will be within 2 hours of a requested pick-up time. For example, a call at 9:00 am for a trip at 1:00 pm will result in a call from TransHelp by 11 am to provide the available pick-up times (a 30-minute window).

The City provided information regarding TransHelp ridership from 2016 to 2018 which included date, time, and location of the pick-up/drop-off. **Figure 3-34** shows the number of pick-ups and drop-offs by month. There has been an increasing demand for Peel TransHelp between 2016 and 2018. There are slight differences in demand month-to-month but usage remains relatively consistent throughout the year.

Figure 3-35 shows distribution of TransHelp trips throughout the day. The TransHelp trips peak during the typical off peak hours (9:00 as to 4:00 pm) with higher number of drop-offs around 4:00 pm. There is also only a single peak whereas typical transit has morning and afternoon peak periods. This

[1] https://www.peelregion.ca/transhelp/about/

can be attributed to the users and purpose of the service. For example, the elderly may face barriers with conventional transit and choose TransHelp for uses such as grocery shopping and medical appointments (during off peak times) whereas the conventional peak periods occur due to work and school commuting.

Figure 3-34: Historical Monthly Demand of Peel TransHelp within Study Area

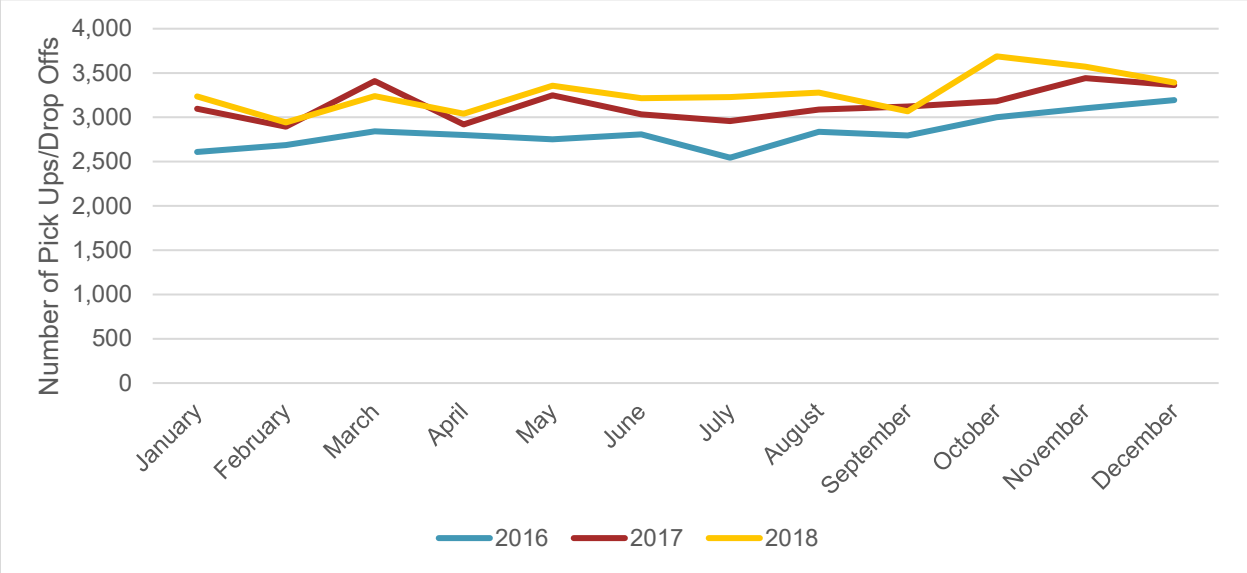


Figure 3-35: Distribution of TransHelp Trips by Time of Day within Study Area

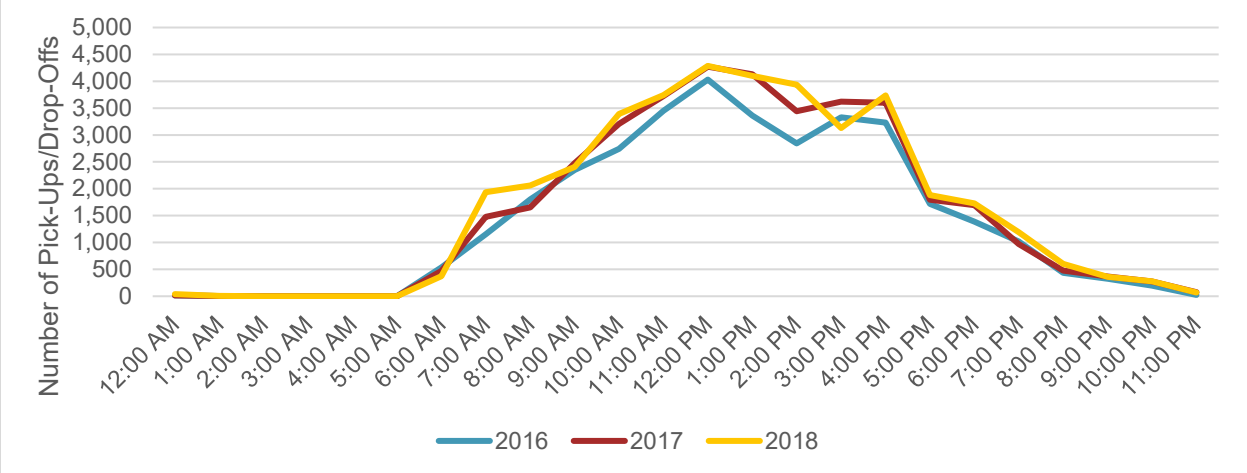
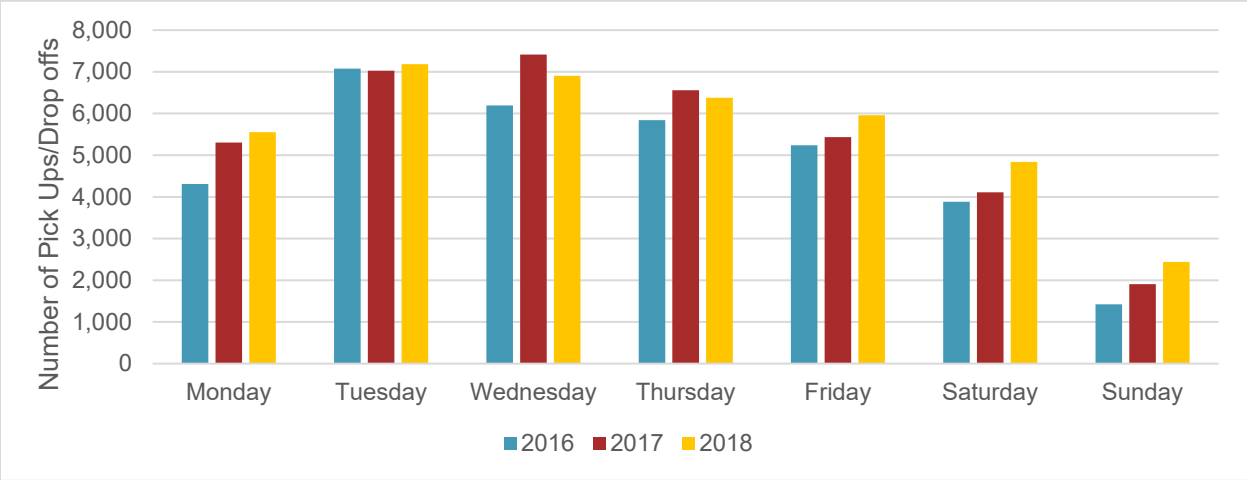


Figure 3-36 shows the distribution of TransHelp trips by the day of week. The demand on weekdays are highest between Tuesday and Thursday. Saturday demand is 700 to 2,400 less than the weekday demand for the year, and Sunday demand is less than half of any other day.

Figure 3-36: Distribution of TransHelp Trips by Day of Week within Study Area

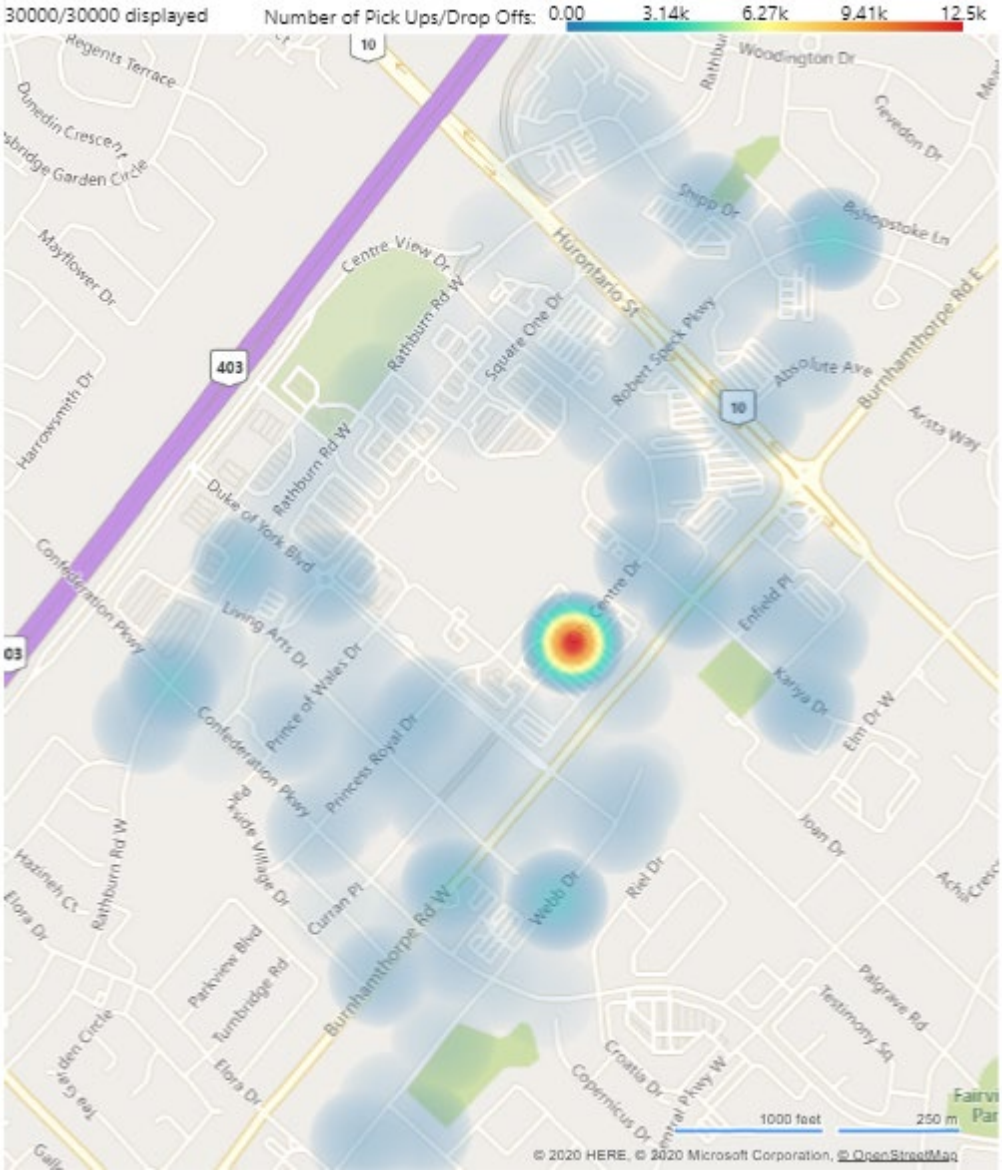


The top 10 addresses that were used for pick-up/drop-off locations is shown in **Table 3-6** and **Figure 3-37** shows the heat map of the pick-ups and drop-offs within the study area. The location with the highest pick-up/drop-off demand is Square One with more than 4 times the demand of the location with the second highest demand.

Table 3-6: TransHelp Top 10 Locations of Pick-Ups and Drop-Offs within Study Area (2018)

Ranking	Address	Number of Pick-Ups / Drop-Offs
1	Square One	14,099
2	90 Burnhamthorpe Road (Mixed-Use)	3,218
3	325 Burnhamthorpe Road (YMCA)	2,182
4	309 Rathburn Road (Cineplex)	967
5	4180 Duke of York (Sheridan College)	790
6	33 City Centre Drive (Medical Clinics)	613
7	301 Burnhamthorpe Road (Library)	492
8	300 City Centre Drive (City Hall)	438
9	151 City Centre Drive (Mixed-Use)	431
10	50 Burnhamthorpe Road (Mixed Use)	280

Figure 3-37: Heat Map of Pick-Up and Drop-Off Locations within the Study Area (2018)

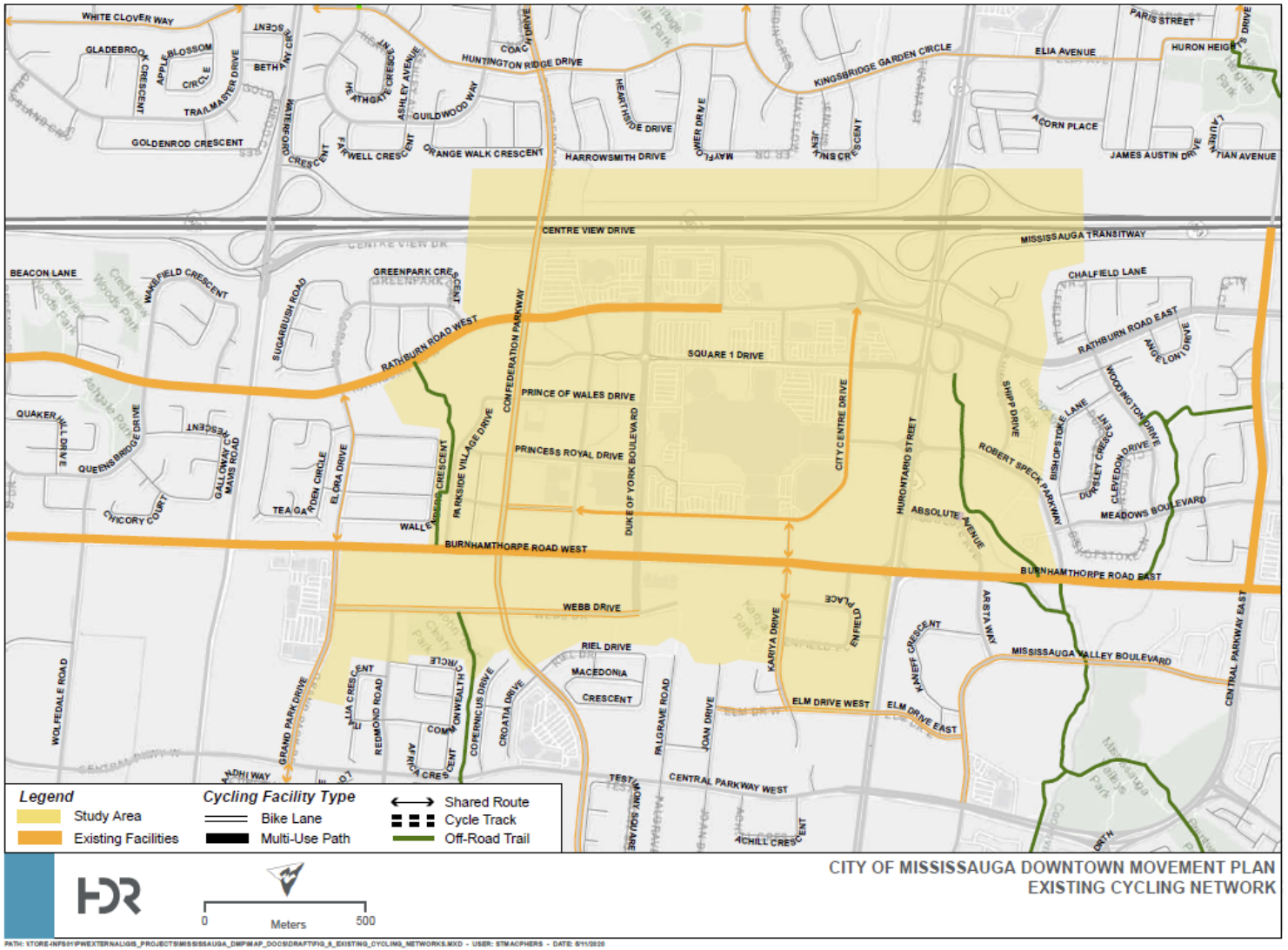


3.5 Cycling Network

3.5.1 Cycling Network

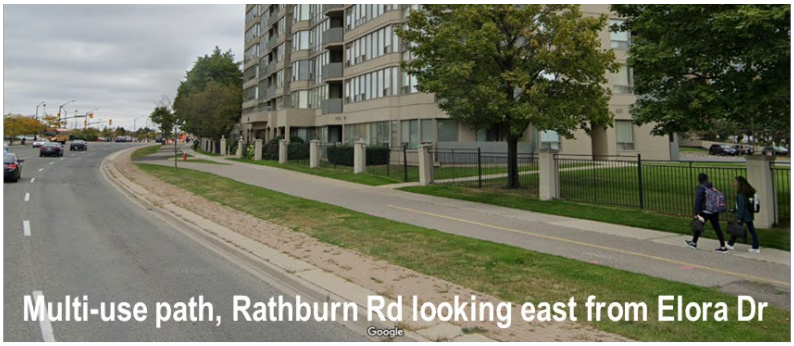
The study area has a variety of cycling facilities available within the study area as illustrated in **Figure 3-38**. Multi-use paths run east-west along the south side of Rathburn Road and along the north side of Burnhamthorpe Road, connecting to the greater trail network at the Zonta Meadows Park and at Absolute Avenue / Arista Way. On-road bike lanes are provided along Confederation Parkway, Webb Drive, Grand Park Drive, Elm Drive, Kariya Drive and the western portion of City Centre Drive.

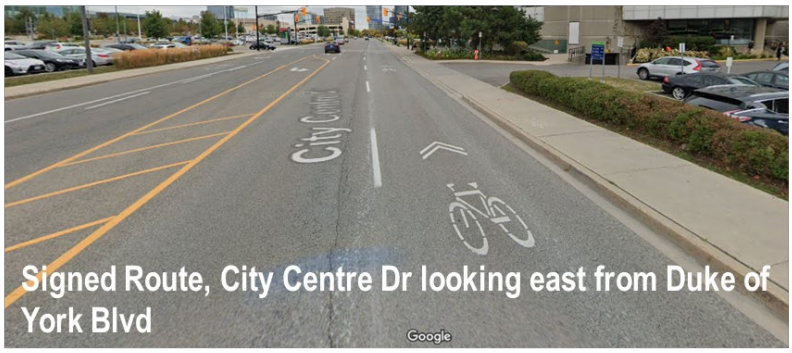
Figure 3-38: Existing Cycling Network



There are no existing physically-separated cycling facilities that provide direct access to the Square One Shopping Centre. However, signed bike routes circle the south and east side of the mall along City Centre Drive and Kariya Gate. Examples of the different types of available cycling facilities in the study area are presented in **Figure 3-39.**

Figure 3-39: Available Cycling Facilities in the Study Area

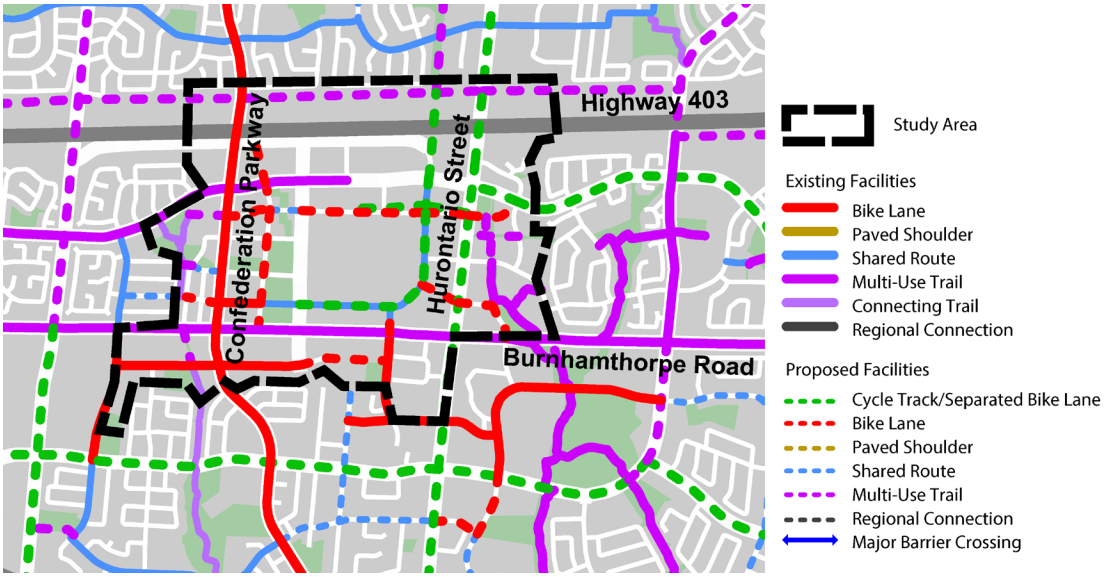




Source: Google Streetview

The City of Mississauga Cycling Master Plan (2018) recommended several improvements to the cycling network, as shown in **Figure 3-40**.

Figure 3-40: Proposed Future Cycling Network



Source: City of Mississauga Cycling Master Plan (2018)

To address the observed deficiencies in east-west cycling infrastructure, bike lanes were proposed along Square One Drive and Absolute Avenue. The City of Mississauga Cycling Master Plan (2018) also recommended extending bike lanes on Webb Drive to Kariya Drive which has been confirmed through the recent Webb Drive extension EA and the cycle track on City Centre Drive to Elora Drive. Cycle tracks were proposed along City Centre Drive and along Rathburn Road east of Hurontario Street.

To improve north-south travel, bike lanes were proposed for Living Arts Drive and cycle tracks for Hurontario Street and City Centre Drive.

3.5.2 Bicycling Level of Service Methodology

The City of Ottawa Multi-Modal Level of Service (MMLOS) Guidelines (2015) was used to evaluate the cycling conditions in the study area. The MMLOS approach considers multi-modal users of the roadway, including a cyclist's comfort, safety, and convenience, which are subjective measures.

Bicycling Level of Service (BLOS) is calculated at intersection and mid-block locations recognizing that a cyclist's experience is determined by conditions between crossings and at the crossing itself.

The **intersection BLOS** evaluation takes into consideration the left and right-turning conditions for cyclists at the intersection. Intersection BLOS is affected by vehicular turning volumes and operating speeds, the presence of dual vehicular turning lanes, and bike boxes. Other impediments to cyclists seeking to turn right or left (such as right-turn lane length and crossing

distances) are also assessed. The average score of all approaches (north, south, west, and east) is then used to determine the overall intersection BLOS. Only signalized intersections were assessed for intersection BLOS.

The mid-block **segment BLOS** evaluation takes into consideration the roadway characteristics, cycling facility type, and quality of the facility. The score is also influenced by factors such as street width, vehicular operating speed, and on-street parking characteristics. Segment BLOS is most sensitive to cycling facility type, with physically separated bikeways such as cycle tracks, protected bike lanes, and multi-use paths receiving higher scores ('A' to 'C') while cycling in mixed traffic conditions, with varying operating speeds and street widths generally scoring lower – 'D' to 'F'. It must be noted that for mixed traffic conditions, the total number of lanes is understood to affect the cycling experience. Conversely, when dedicated space has been made available for cycling, only the number of vehicle lanes in the same direction is considered in the analysis.

The scoring for intersection and segment BLOS ranges as follows:

BLOS 'A' to 'B' – Physically separated facilities such as cycle tracks, protected bike lanes, and multi-use paths are attractive to most cyclists and typically result in scores within this range. Other situations include designated bike lanes that are wider than 1.5m, or ones adjacent to roads with low speeds or with raised medians separating two lanes of traffic in each direction. Shared roadways may receive scores in this range if they are low volume residential streets with low speeds (50 km/h and lower), no marked centerline and with less than three lanes of traffic in all directions. At intersections, continuous cycling facilities are provided and separated from vehicles and pedestrians.

BLOS 'C' to 'D' – Designated bike lanes adjacent to roads with high speeds or high number of lanes or ones that are narrower than 1.5 m may result in scores in this range. Shared facilities on low volume, low speed streets with wide curb lanes provide some comfort but the majority of cyclists typically will not cycle. Greater conflicts at intersections with turning vehicles are experienced.

BLOS 'E' to 'F' – Scores in this range are generally achieved due to non-separated, shared roadways with high traffic volumes and speeds. Intersections have large turning radii, long turning lanes creating conflicts between cyclists and vehicles.

The complete, detailed BLOS methodology is provided in **Appendix B.** Representative examples of segment BLOS are shown in **Figure 3-41**.

Figure 3-41: BLOS Examples in the City of Mississauga

BLOS A: Burnhampthorpe Road, west of Robert Speck Parkway, City of Mississauga

BLOS D: Confederation Parkway, north of Dundas Street, City of Mississauga

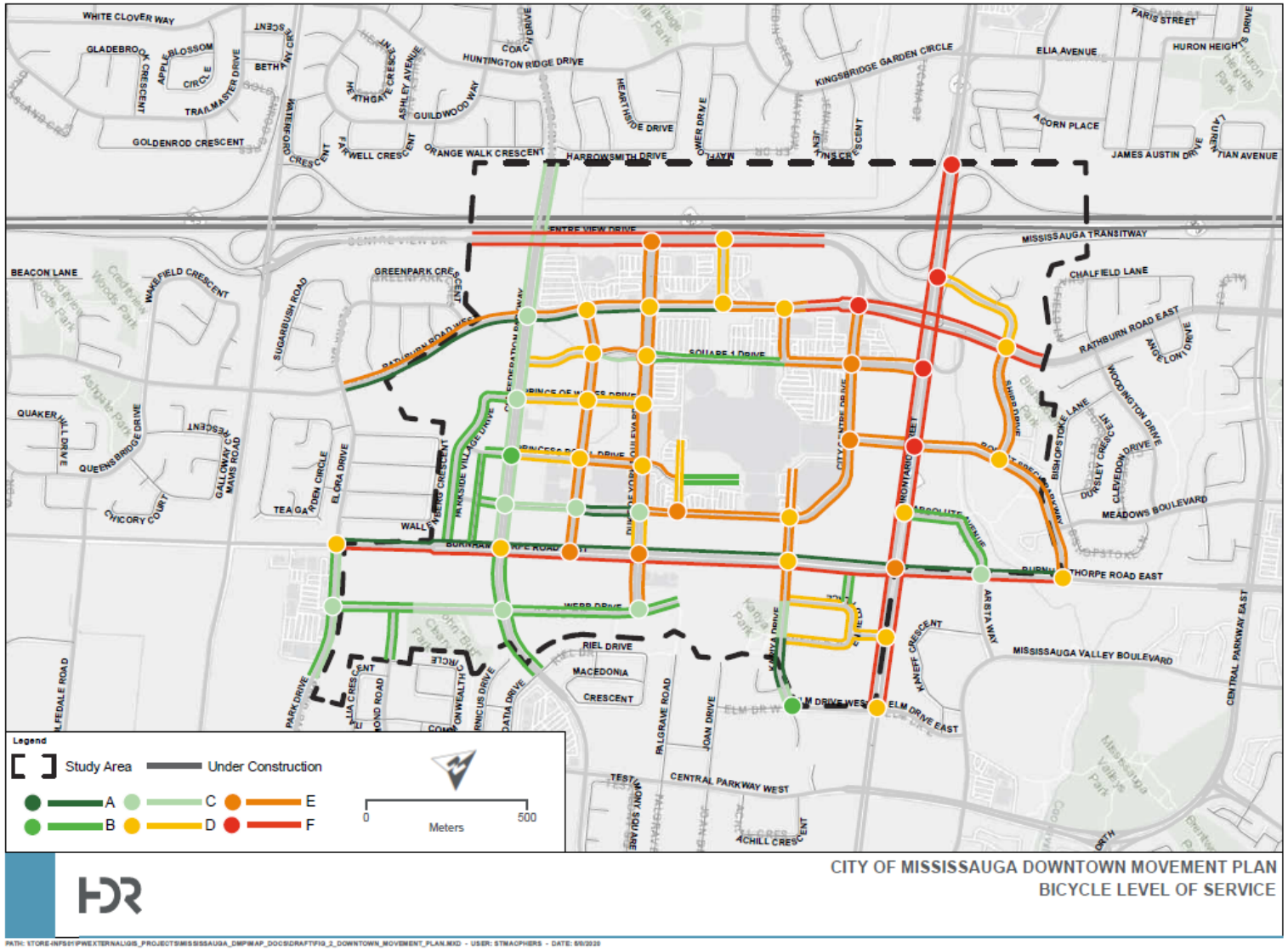
BLOS F: Dundas Street, west of Proudfoot Street, City of Mississauga

Source: Google Streetview

3.5.3 BLOS Results

The cycling conditions vary widely within the study area due to the differing nature and characteristics of the streets in the Downtown Core and depending on the available cycling infrastructure. The BLOS results are illustrated in **Figure 3-42.**

Figure 3-42: Bicycle Level of Service



Note: Burnhamthorpe Road between Duke of York Boulevard and Hurontario Street is currently under construction, but it is assumed the existing multi-use trail will be restored at these segments.

Generally speaking, streets with physically-separated facilities performed best. Where City Centre Drive crosses Mississauga Celebration Square, the segment achieves a BLOS “A” as the threat of vehicles is eliminated. Streets with multi-use paths such as sections of Burnhamthorpe Road and Rathburn Road achieved high scores only on the side where the facility is present. Though multi-use paths are bi-directional, for the purposes of the analysis, it was assumed that cyclists will cycle in the same direction as vehicular traffic. This assumption helps to emphasize the gaps in available infrastructure, showcase potential for improvement and set a higher standard for the provision of facilities on both sides of a street. During the existing conditions review, construction along the north side Burnhamthorpe Road was noted, blocking the cycling route and impacting the overall cycling experience.

Cycling conditions were also observed to be favourable on streets where dedicated bike lanes are provided, including:

- Grand Park Drive
- Confederation Parkway
- Kariya Drive
- Webb Drive
- Elm Drive
- City Centre Drive (Confederation Parkway to Duke of York Boulevard)

Bike lanes in the study area are typically located along residential collectors and offer a comfortable cycling environment due to their width, moderate adjacent vehicle speeds (50km/h), low bike lane blockage from driveways and the modest cross-sectional width of those roads. In situations where bike lanes are located next to parking lanes, the total available space between the bike lane and curb was considered to determine the BLOS score, per the Ottawa MMLOS methodology.

Local residential streets lacking cycling facilities also performed well due to lower vehicular speeds and fewer vehicular lanes despite being mixed traffic routes. These include:

- Parkside Village Drive
- Redmond Road
- Brickstone Mews
- Sussex Gate
- Absolute Avenue
- Webb Drive
- Curran Place
- Arbutus Way

Where cyclists had to share the road, the wider and busier the street and the higher the vehicular speeds, the worse the cycling experience. Suboptimal

cycling conditions along the following streets indicate the opportunity for infrastructure improvements to address these deficiencies:

- Living Arts Drive
- Duke of York Boulevard
- Mercer Street
- Station Gate Road
- Hammerson Drive
- Kariya Gate / Drive (Square One entrance to Enfield Place)
- Hurontario Street
- Shipp Drive
- Robert Speck Parkway
- City Centre Drive (Duke of York Boulevard to Rathburn Drive)
- Enfield Place
- Princess Royal Drive
- Prince of Wales Drive
- Square One Drive
- Rathburn Road
- Centre View Drive
- Sherwoodtowne Boulevard

At the intersection level, BLOS scores are observed to be similar where cross-sectional characteristics are consistent and cycling facilities are alike. As the study area includes different road typologies and different accommodations for cyclists, intersection BLOS result diverge depending on the intersection in question. The intersection BLOS results are shown in **Figure 3-42**.

Overall, intersections where bike lanes or multi-use paths are present along most approaches perform better than others because the effect of right-turning vehicles is minimized since cyclists have their own dedicated space at the intersection approach. Moreover, smaller intersections typically also perform better than larger ones because fewer lanes are required to be crossed by cyclists aiming to complete a left-turn. Intersections along Hurontario Street have a tendency to perform poorly in particular, due to the lack of cycling accommodation at intersections, large turning radii, higher posted speed along the street and a wide cross-section configuration exacerbated by channelized turning lanes and construction activities (namely at Burnhamthorpe Road and Hurontario Street).

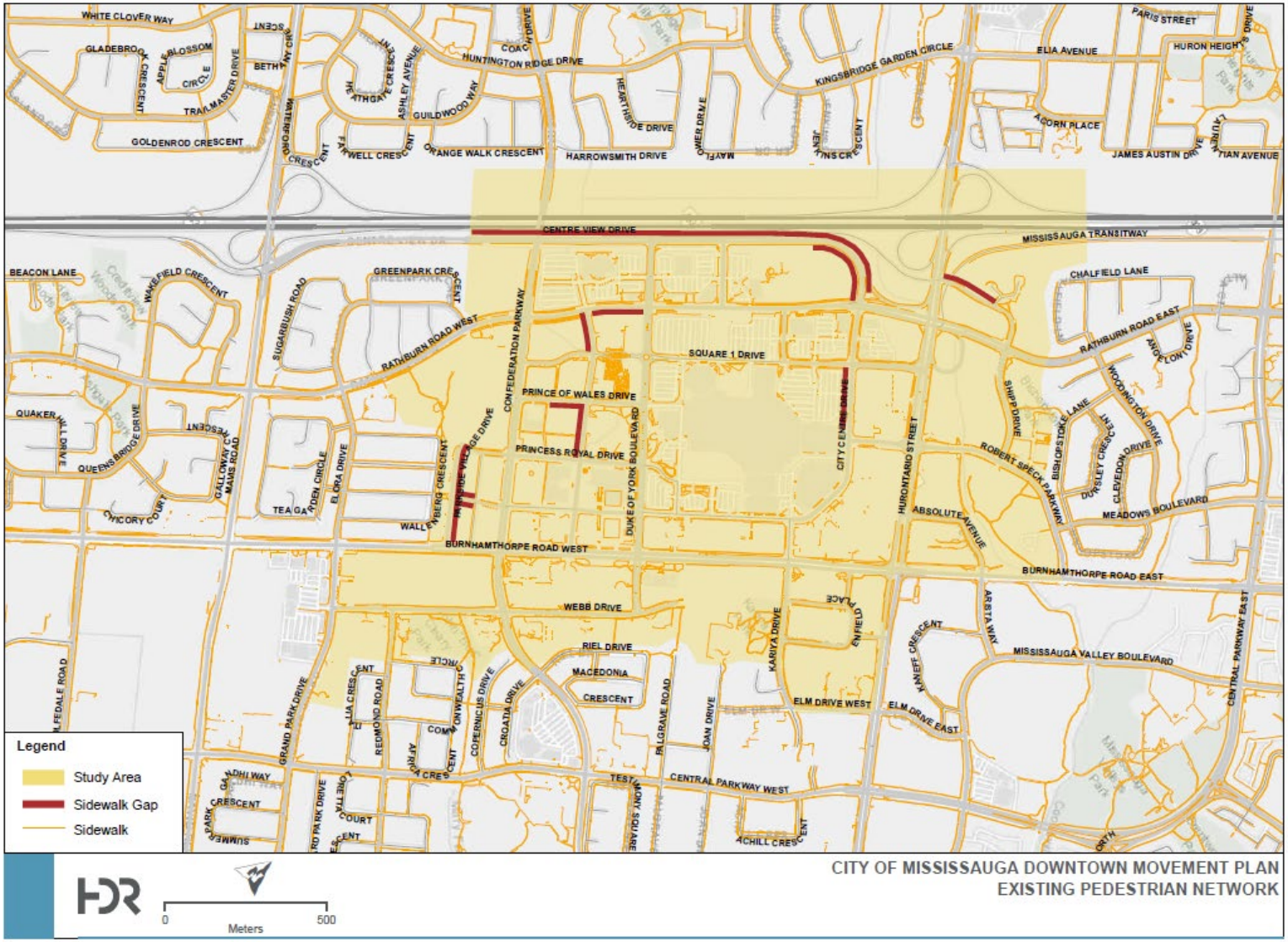
Roundabouts require special consideration for cyclists. Where Square One Drive and Duke of York Boulevard intersect, cyclists have two options to cross the roundabout safely: they may dismount and cross each street as a pedestrian, or they can take the centre of their lane and behave as a motor vehicle (the latter requiring the cyclist to have a degree of experience and confidence). Because the roundabout in the study area has only one circling lane, there appears to be little chance for confusion between cyclists and drivers. A low risk of conflict is anticipated at this location and the roundabout effectively accommodates both modes.

3.6 Pedestrian Network

3.6.1 Pedestrian Environment

Figure 3-43 illustrates the pedestrian network for the study area.

Figure 3-43: Existing Sidewalk Network and Sidewalk Gaps



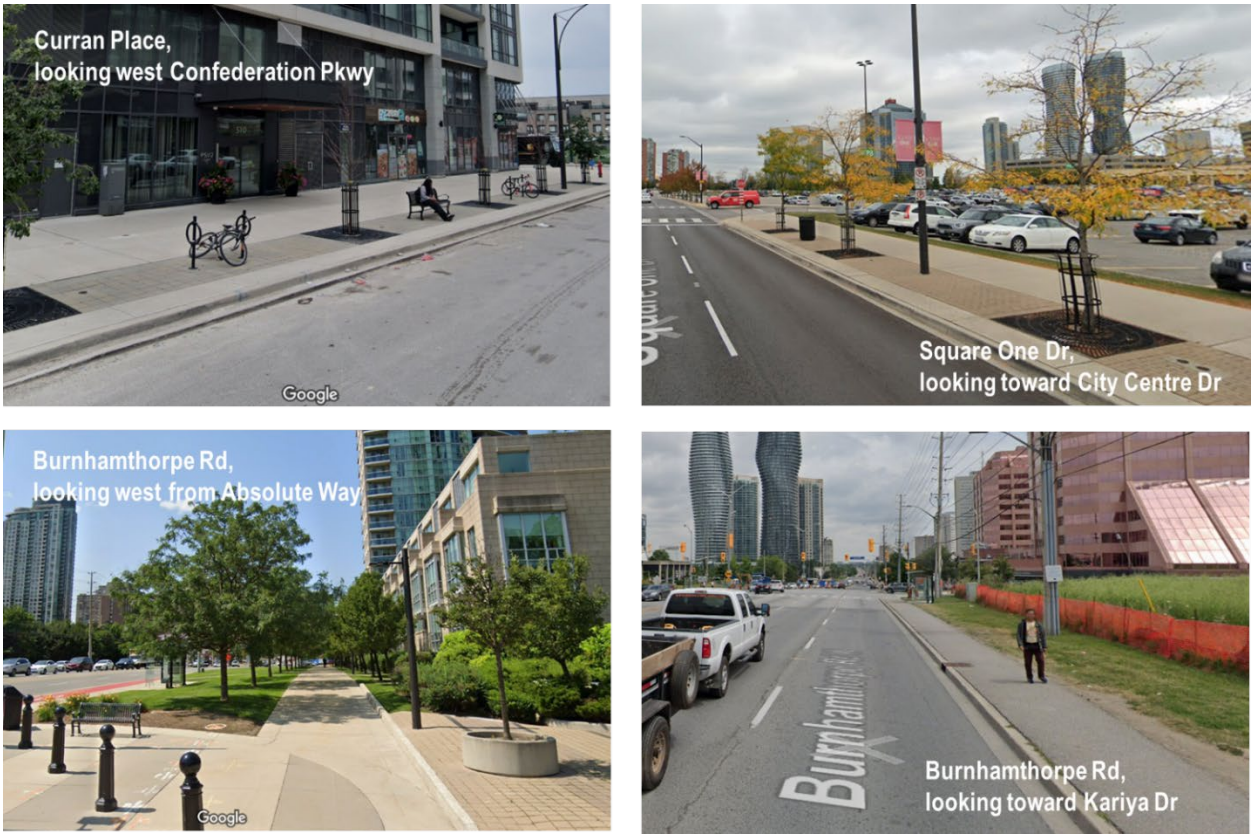
Overall, the study area is well-served by pedestrian infrastructure, with collector roads, major arterials and even local streets generally having sidewalks on both sides. Interestingly, the parking lots surrounding Square One Shopping Centre consistently incorporate sidewalks, which improves access to the mall for those on foot, as shown in **Figure 3-44**.

Figure 3-44: Sidewalks surrounding Square One Shopping Centre

Source: Google Earth (2018)

Where the available right-of-way permits, sidewalks are offset from the roadway often by grass boulevards. In other areas, paving, planters, trees and street furniture was used to buffer the pedestrian environment from adjacent vehicular traffic. Square One drive west of Duke of York Boulevard has sidewalks on both sides that are flush with the pavement (i.e. no curb) with a large median (curving the vehicle roadway to slow vehicular traffic) that can serve as a pedestrian refuge. Elsewhere, under less ideal conditions, no separation was provided between the travel modes. **Figure 3-45** show examples of the pedestrian environment in the study area.

Figure 3-45: Different Roadway Setbacks Impacting the Pedestrian Environment



Source: Google Streetview

Gaps in the study area's sidewalk network were also identified, including:

- The west side of Living Arts Drive, from Rathburn Road to Square One Drive and from Prince of Wales Drive to mid block to Princess Royal Drive
- Both sides of Duke of York Boulevard, from Centre View Drive to Mid-Block Access
- The east side of Parkside Village Drive, from Burnhamthorpe Road to Confederation Parkway
- The west side of City Centre Drive, from Square One Drive south to Robert Speck Parkway
- The south side of Prince of Wales Drive, from 100m east of Confederation Parkway to Living Arts Drive and east of Duke of York Boulevard
- The north side of Centre View Drive, from west of Confederation Parkway to east of Station Gate Road

The missing sidewalks in the study area are generally due to the large, undeveloped or greenfield lots as well as surface parking. Examples are shown in **Figure 3-46**.

Figure 3-46: Missing Sections of Sidewalks in the Study Area

Source: Google Streetview

At intersections, it was observed that different crosswalk markings, as shown in **Figure 3-47**, are used throughout the study area, presumably to instill a sense of character or specific identity to different locations. From a pedestrian perspective, some treatments are more desirable than others due to the higher visibility they provide to pedestrians crossing the intersections. Coloured and textured markings are preferred as well as those that are more easily discernible for drivers.

Figure 3-47: Crosswalk Markings at Intersections

Source: Google Streetview

Median islands are also commonly featured in the study area. Medians are located along stretches of Confederation Parkway, Duke of York Boulevard and Hurontario Street. Commonly intended for pedestrian refuge, the wider medians in the study area do not appear to have been designed with that particular purpose in mind as seen in **Figure 3-48**. Opportunities to facilitate pedestrian refuge should be considered where crossing distances are large to improve walkability for people of all ages and abilities.

Figure 3-48: Median Islands

Source: Google Streetview

Finally, it must be acknowledged that atypical intersection configurations may have an impact on the pedestrian experience (**Figure 3-49**). Intersections with channelized right-turn lanes for vehicles for example, increase pedestrian crossing distance and curb radii creating an additional impediment for pedestrians as they must now cross the street in multiple stages (through the corner islands).

Other atypical configurations also include roundabouts. The one roundabout in the study area is located at Square One Drive and Duke of York Boulevard and is illustrated in **Figure 3-49**. To cross a roundabout safely, pedestrians are instructed to use the crosswalks, just like at any other intersection, and cross each adjoining street one at a time. Pedestrians never need to enter the circle of traffic. Sidewalks approach the circle from all directions, and clearly marked crosswalks on adjoining roads are punctuated by islands that enable pedestrians to cross one direction of traffic, pause on the island until traffic is

clear, then cross the second direction. As it is a lower-capacity roundabout with only one entering and exiting lane at each approach, the likelihood for confusion between modes appears to be low and concerns for pedestrians are minimal at this location. Additionally, vehicles must also reduce speeds as they approach the roundabout and yield to crossing pedestrians when entering and exiting the roundabout as per existing signage.

Figure 3-49: Atypical Intersection Configurations in the Study Area

Source: Google Streetview

3.6.2 Pedestrian Demand

Based on the TMCs provided by the City of Mississauga, the surface pedestrian crossings for all approaches at the intersection were summarized for morning and afternoon peak hours, as seen in **Figure 3-50** and **Figure 3-51**. Note that not all intersections had TMCs, and only the labelled intersections had counts provided.

Figure 3-50: Pedestrian Crossings during Morning Vehicular Peak Hour (2017 – 2019 Turning Movements Counts)

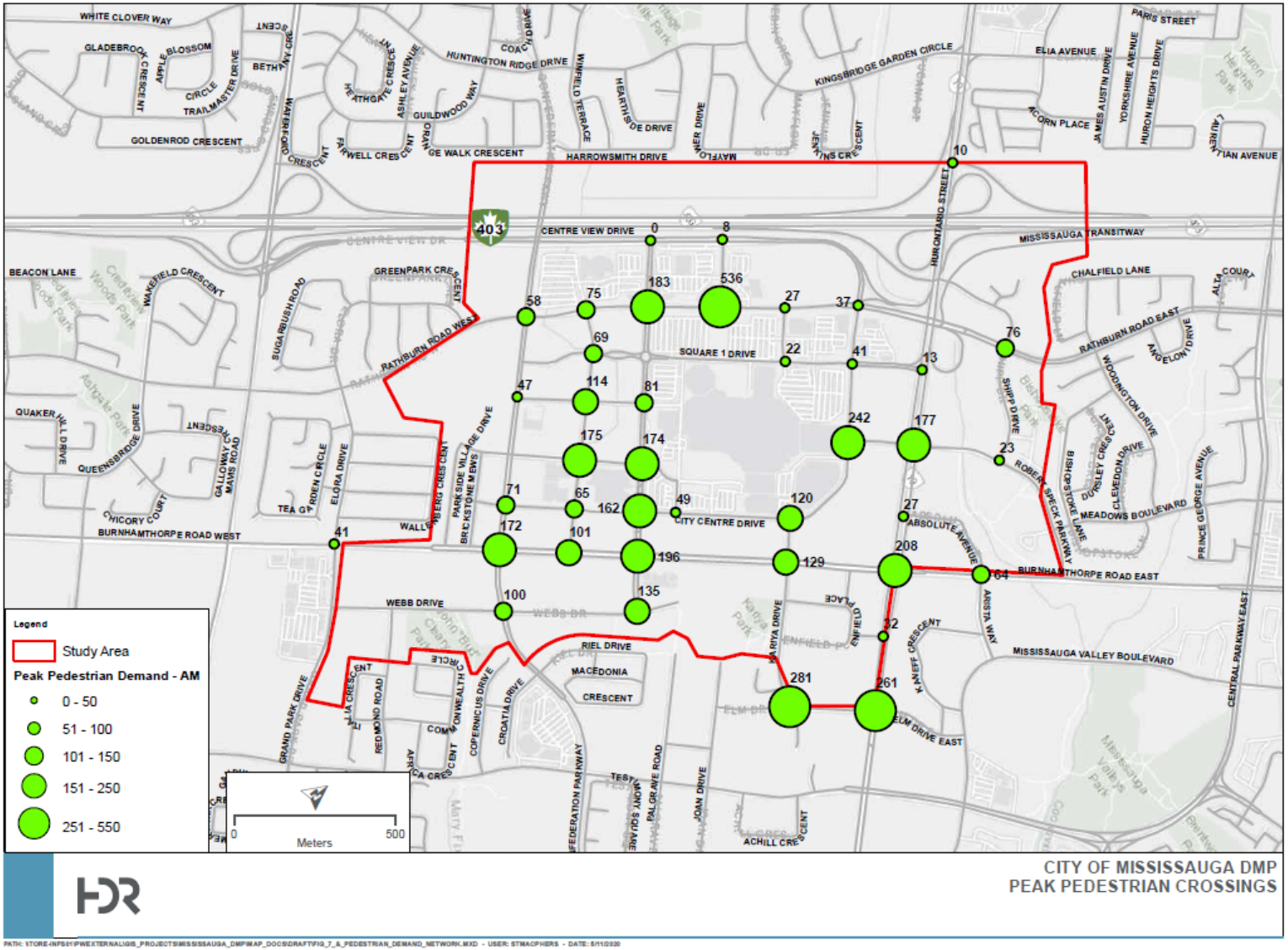
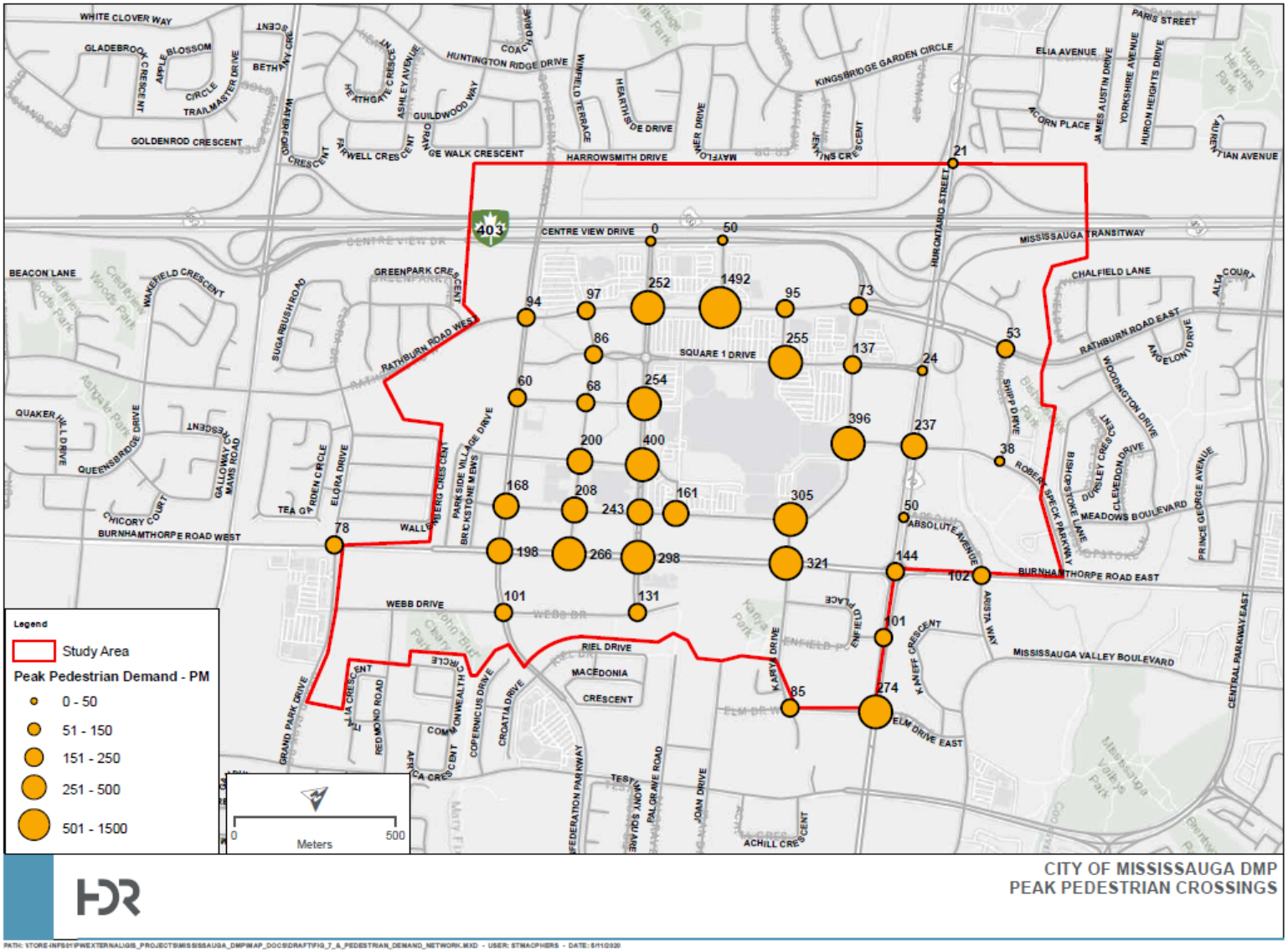


Figure 3-51: Pedestrian Crossings during Afternoon Vehicular Peak Hour (2017 - 2019 Turning Movements Counts)



Study area intersections generally experienced higher pedestrian volumes during the afternoon peak hour, with the top five busiest locations being:

1. **Rathburn Road at Station Gate (1492 pedestrians).** The high number of crossings at this location may be attributed to the Mississauga City Centre Transit Terminal.
2. **Duke of York Boulevard at Princess Royal Drive (400 pedestrians).** This intersection is located between the Living Arts Centre, Mississauga City Hall and Art Gallery and the southwestern entrance to the Square One Shopping Centre.
3. **City Centre Drive at Robert Speck Parkway (396 pedestrians).** The high instance of pedestrian crossings at this location may be due to the multiple services housed in the 33 City Centre Drive office tower, including AppleOne Employment Services, CDI College Mississauga and Mississauga Secondary Academy. This intersection also facilitates access between the eastern entrance to Square One Shopping Centre and the surface parking lot on the northeast quadrant.
4. **Burnhamthorpe Road at Kariya Gate & Drive (321 pedestrians).** Though lands west of Kariya Gate & Drive remain undeveloped as of the writing of this report, high pedestrian volumes at this intersection may be the result of the established high-density neighbourhoods and office building to the east and south of the intersection. It is also possible that, where possible, pedestrians prefer using this intersection to access Square One Shopping Centre instead of crossing Burnhamthorpe Road at Hurontario Street.
5. **City Centre Drive at Kariya Gate (305 pedestrians)**. This intersection provides south access to Square One Shopping Centre as well as to surface parking lots in the vicinity.

3.6.3 Pedestrian Level of Service Methodology

Similarly to the BLOS methodology in **Section 3.5.2**, the City of Ottawa MMLOS includes a methodology to evaluate the Pedestrian Level of Service (PLOS). PLOS is also calculated at the intersections and at mid-block segments, acknowledging that a pedestrian's experience is determined by the conditions between crossings and at the crossing itself.

Intersection PLOS uses the Pedestrian Exposure to Traffic at Signalized Intersections (PETSI) method that assigns points based on a number of crossing characteristics (e.g. crossing distance, presence of a median,

presence of a crossing refuge, turning restrictions, right hand turn characteristics, curb radii, right-turn on red). The average score of each intersection approach is averaged to determine the overall intersection PLOS. The City of Ottawa MMLOS guidelines only give directions regarding the evaluation of signalized intersections.

Segment PLOS is evaluated based on cross-section and roadway characteristics. The segment PLOS score is influenced by sidewalk and boulevard widths, traffic volumes, the presence of on street parking, and posted speeds. Higher segment scores are characterized by locations where lower vehicle speeds and volumes, wider sidewalks (greater than 2 m for main streets and 1.8 m for local roads), and larger boulevards with ample separation from moving traffic are present. Lower segment scores are observed in locations where high vehicle speeds, narrow sidewalks, and minimal separation from traffic are present.

Scoring ranges as follows:

PLOS 'A' to 'C' – Attractive to most pedestrians, including locations where lower speeds and volumes, wider sidewalks (greater than 2.1 m for main streets and 1.8 m for local roads), and larger boulevards with ample separation from moving traffic are present. Crosswalks are provided on all four legs of the intersections and with shorter crossing distances at intersections.

PLOS 'D' to 'E' – Elements may not appeal to pedestrians due to narrow sidewalks, lack of separation from traffic, longer crossing distances, etc.

PLOS 'F' – Not adequate – locations without any facility or where no buffer is provided adjacent to high speed and high volume traffic. No crosswalks provided and long crossing distances at intersections.

The detailed MMLOS methodology and analysis are provided in **Appendix C.** Representative examples of Pedestrian LOS scores are shown in **Figure 3-52**.

Figure 3-52: PLOS Examples in the City of Mississauga

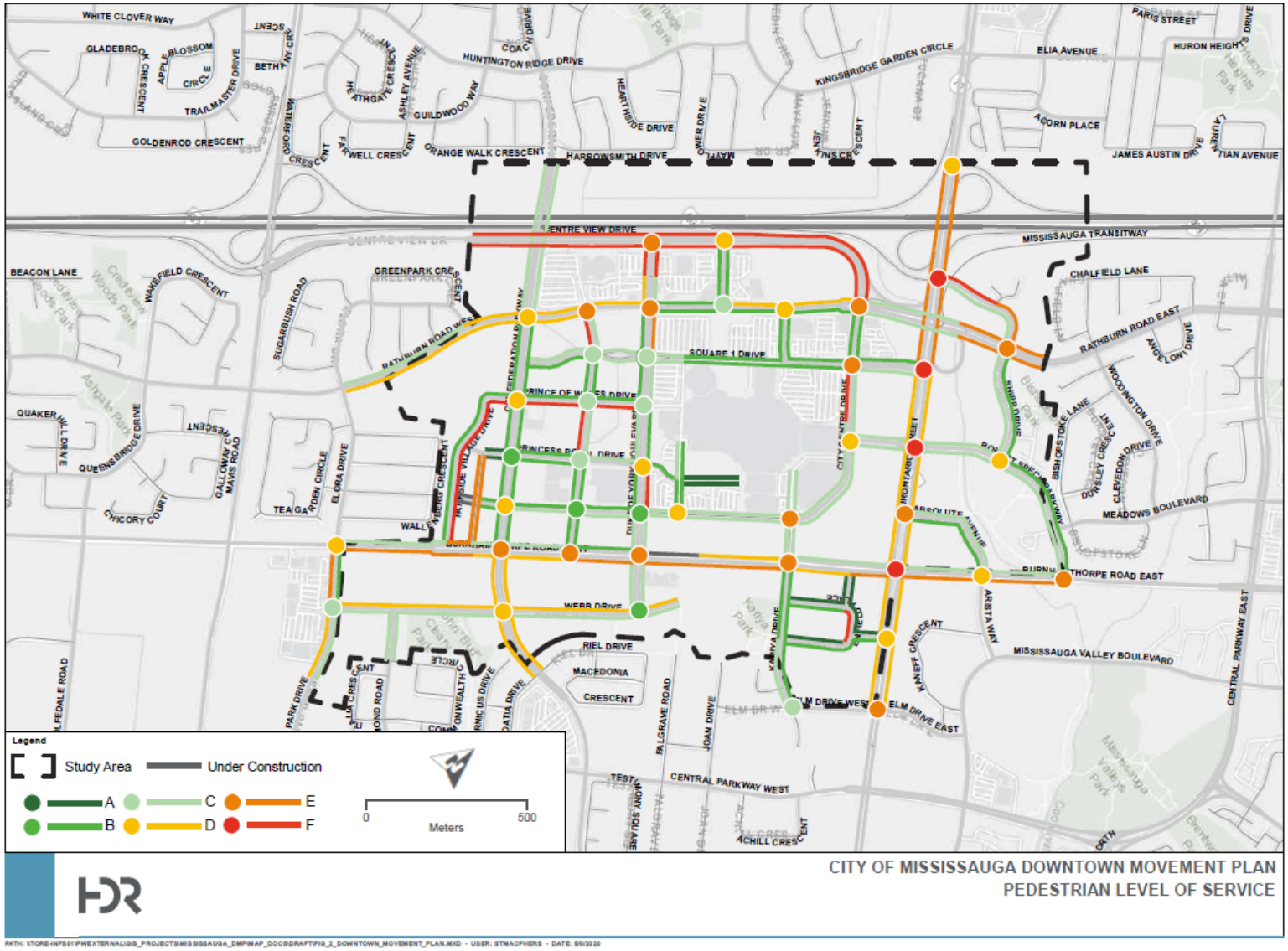
Source: Google Streetview

3.6.4 PLOS Results

The PLOS results are illustrated in **Figure 3-53**.

At the segment level, pedestrian conditions are generally acceptable in the study area. Sidewalks were often observed to be wider than 2 m while boulevards and on-street parking further helped buffer pedestrians from adjacent vehicular traffic. Streets with PLOS scores of ‘D’, ‘E’ and ‘F’ indicate a need for improvements to the pedestrian environment such as wider facilities, larger buffers or lower speeds.

Figure 3-53: Pedestrian Level of Service Results



Intersections in the study area present opportunities for improvement, with the majority of intersections scoring a PLOS ‘D’ or lower. Because intersection PLOS in the Ottawa MMLOS methodology relies heavily on the crossing distance of each approach, smaller intersections tend to perform better while major intersections, such as those along Hurontario Street and Burnhamthorpe Road, experience lower scores.

Eliminating vehicular lanes to reduce crossing distances has the largest potential to enhance the pedestrian experience. Examples of minor modifications that could be considered for incremental improvements in intersection PLOS are:

- the provision of wider medians offering pedestrian refuge,
- tightening of curb radii,
- incorporating protected turning movements, and
- raised crosswalks and coloured / textured paving at intersections, among others.

3.7 Traffic Modelling

3.7.1 Intersection Operations Analysis

Synchro software was used to assess existing intersection operations for the weekday AM and PM peak hours. The purpose of the existing Synchro analysis is to confirm that the PM peak hour is more critical than the AM, and to identify any potential capacity constraints under existing conditions. The Synchro analysis in the context of the larger modelling work flow is illustrated in **Figure 3-54**.

Due to the preliminary nature of the existing conditions assessment, only a subset of the larger microsimulation area was studied using Synchro. The Synchro model area is bounded by Highway 403 to the north, Hurontario Street to the east, Burnhamthorpe Road to the south, and Mavis Road to the west as shown in **Figure 3-55**.

Figure 3-54: Modelling Workflow

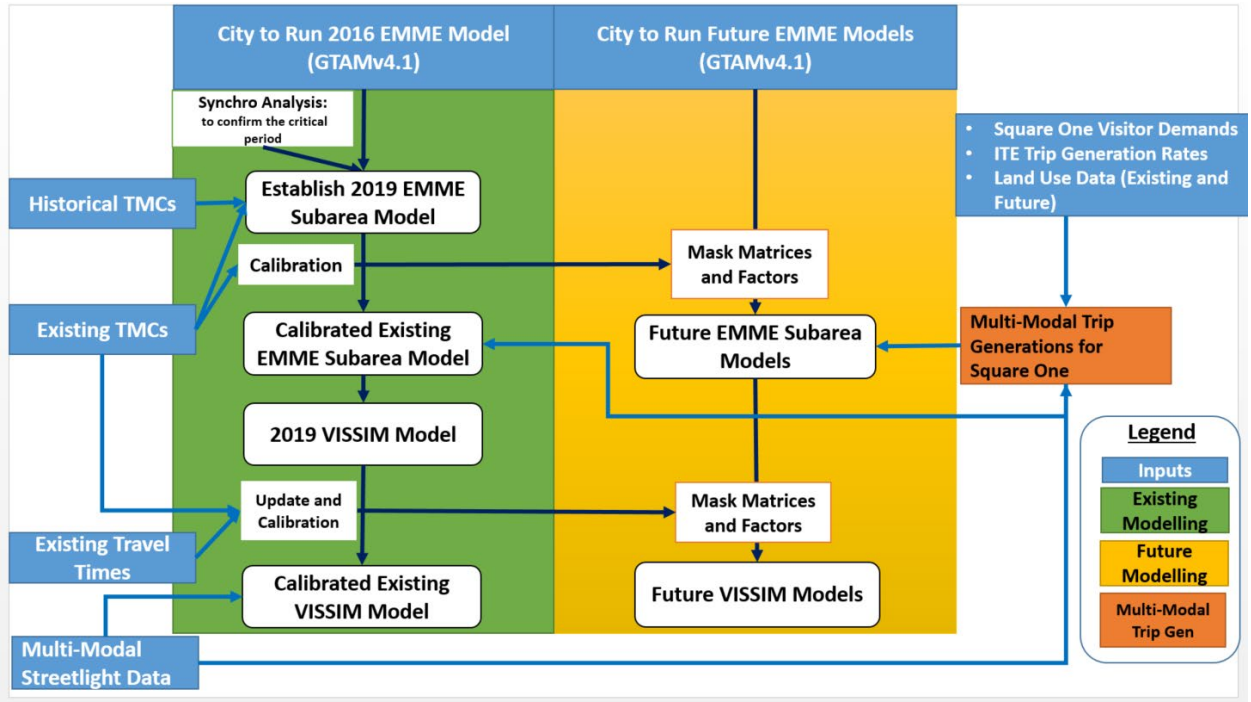
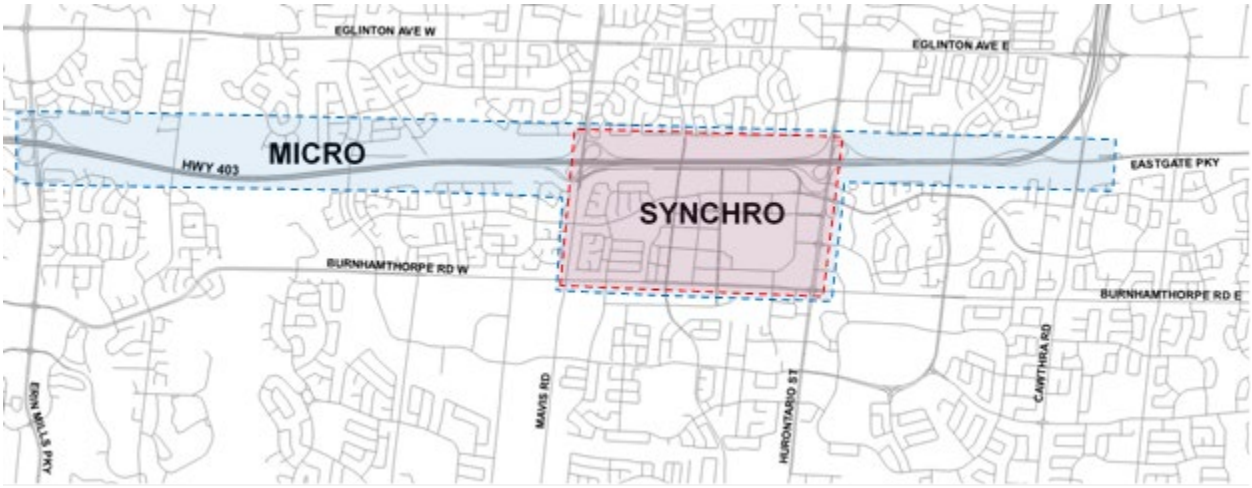


Figure 3-55: Synchro Study Area within Micro Model area



The Synchro model includes 11 key signalized intersections as shown in **Figure 3-56**. These intersections include:

1. Highway 403 westbound off-ramp at Mavis Road.
2. Highway 403 eastbound off-ramp at Mavis Road and Centre View Drive;
3. Burnhamthorpe Road West at Mavis Road;
4. Mavis Road at Rathburn Road West;
5. Confederation Parkway at Rathburn Road West;
6. Burnhamthorpe Road West at Confederation Parkway;
7. Highway 403 westbound off-ramp at Hurontario Street;
8. Highway 403 eastbound off-ramp at Hurontario Street and Sherwoodtowne Boulevard;
9. Hurontario Street at Square One Drive;
10. Hurontario Street at Robert Speck Parkway; and
11. Hurontario Street at Burnhamthorpe Road.

Figure 3-56: Synchro Study Intersections

METHDOLOGY

Existing intersection operations were assessed for the signalized intersections along the corridor, based on methodology consistent with Peel Regional Guidelines for Using Synchro dated December 2010.[2] The impact of transit on traffic was considered in Synchro using MiWay's Generic Transit Feed Specification (GTFS) data from 2019 to include bus blockages into the models.

The intersection turning movement counts (TMC) were provided by the City, Region and MTO and represented the hourly traffic volumes during the busiest hour for each individual intersection of the AM and PM peak periods. The data includes cars, trucks, and pedestrians. The dates of the TMCs range from 2014 to 2019. In general, volumes from earlier years were adjusted to balance with counts from recent years to ensure that there are no unexplained losses or gains in traffic between intersections. The balanced volumes are provided in **Appendix D.**

Signal timing plans were provided by the City. The corresponding timing plans have been adopted for AM and PM peak hours. However, split adjustments were made to the following intersections to achieve a more reasonable green time allocation:

- Burnhamthorpe Road / Mavis Road
- Burnhamthorpe Road / Confederation Parkway

The analysis was conducted using the software program Synchro 9. Synchro can analyze both signalized and unsignalized intersections in a road corridor or network taking into account the spacing, interaction, queues and operations between intersections. The intersection analysis considers two main measures of effectiveness (MOEs):

- The capacity of all intersection movements, which is based on a volume to capacity ratio (v/c); and
- The level of service (LOS) for all intersection movements, which is based on the average control delay per vehicle for each of various movements through the intersection, and for the overall intersection.

The v/c ratio is a measure of the degree of capacity utilized at an intersection. Where the Level of Service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to

[2] https://www.peelregion.ca/pw/transportation/_media/synchro-guidelines.pdf

complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay. Delays and corresponding letter grades derived from Highway Capacity Manual (HCM) are shown below in **Table 3-7**.

Table 3-7: Signalized Intersection level of Service Definitions

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

Lost time adjustments were applied to tuning movement with v/c ratio greater than 1.0 for more reasonable/realistic results.

INTERSECTION CAPACITY ANALYSIS

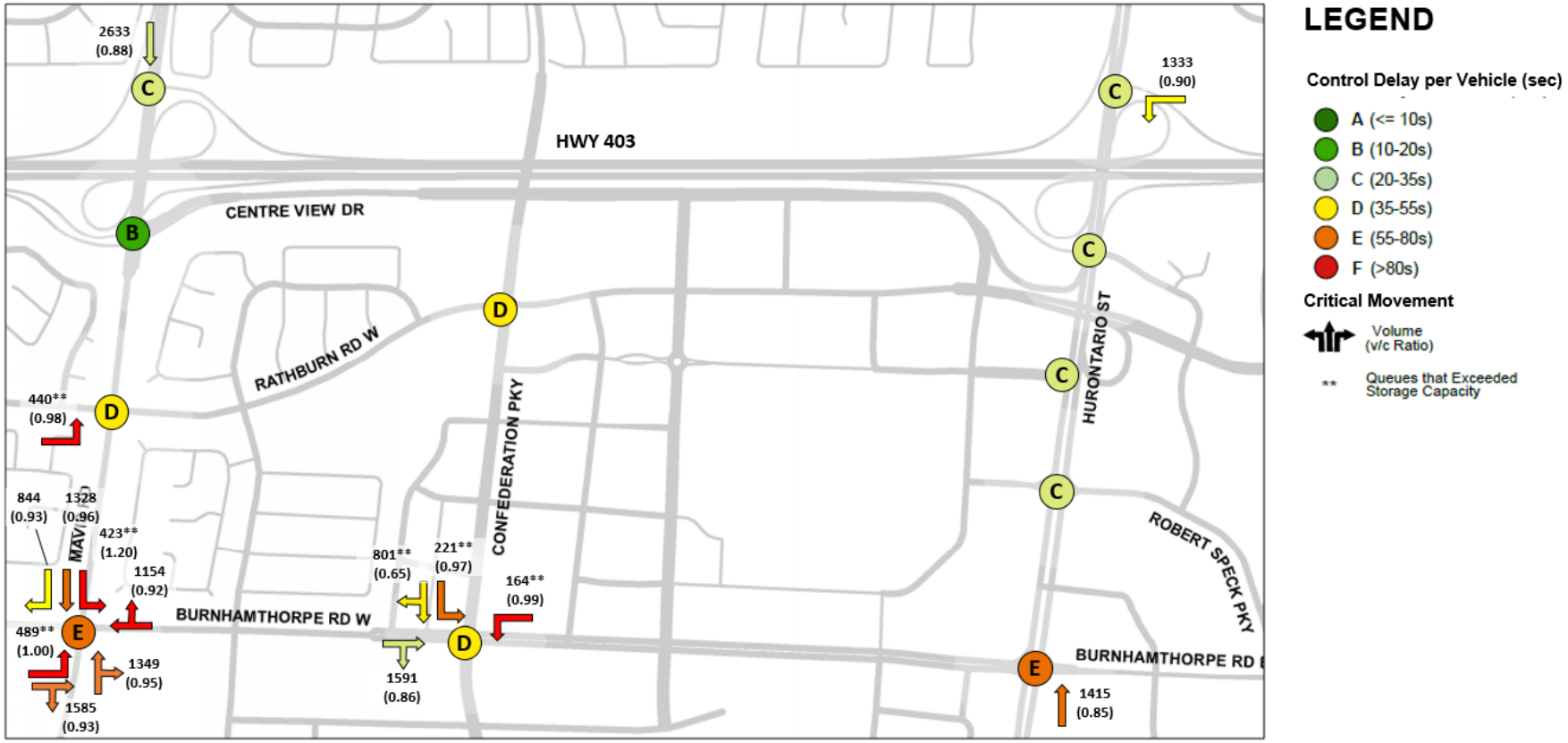
Figure 3-57 to **Figure 3-58** illustrate the intersection LOS as well as critical movements at the study intersections.

A turning movement is considered a critical movement if any of below criteria is met:

- Shared through-right and through-left movements exceed a v/c of 0.85;
- Exclusive left or right turn lanes exceed v/c of 0.90; and/or,
- Any movement whose 95th percentile queue exceeds its storage length.

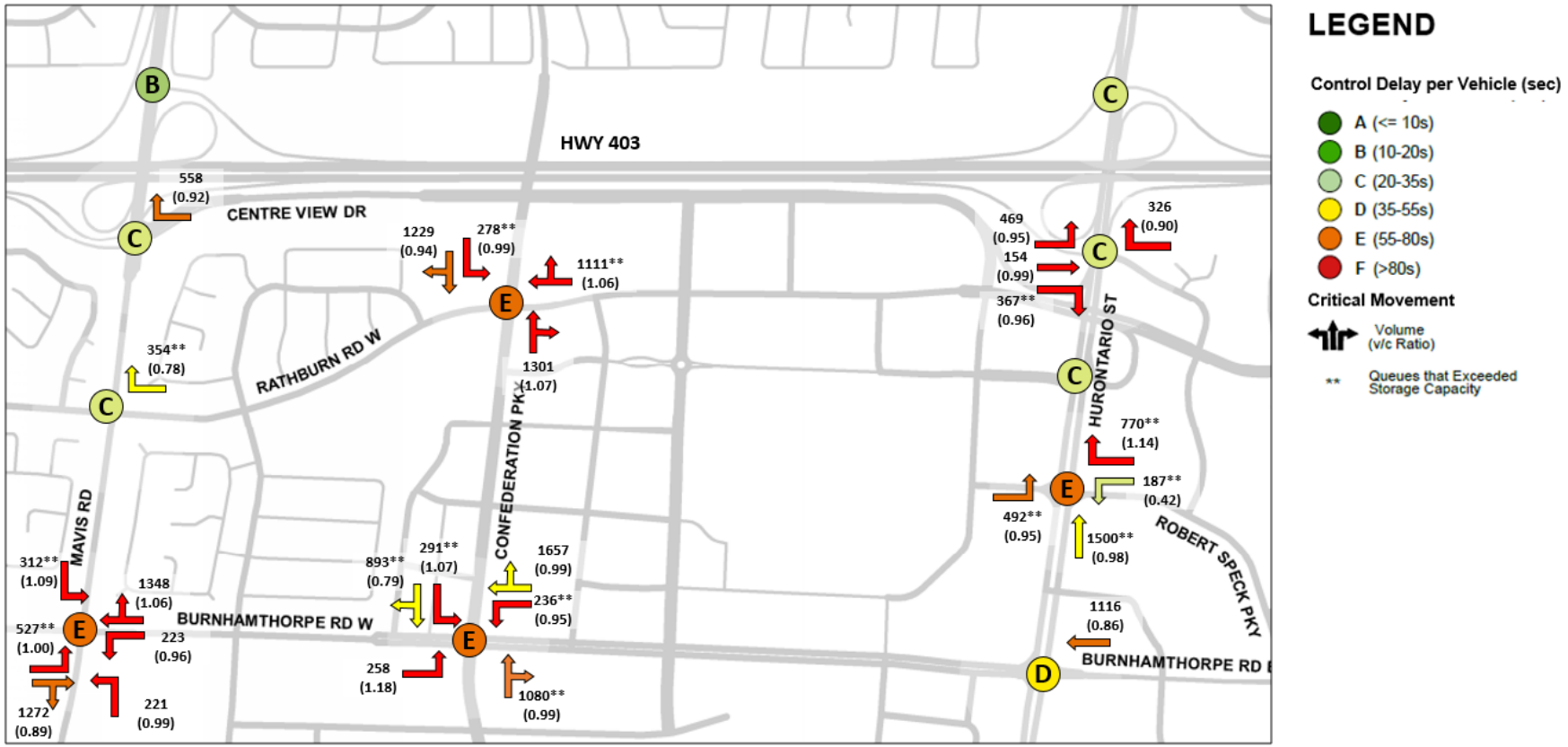
Detailed Synchro parameters and results are provided in **Appendix E**.

Figure 3-57: Critical Movements – Synchro Study Area – Weekday AM Peak Hour



Note: Storage length for through movements were measured from stop bar to the upstream signalized intersection.

Figure 3-58: Critical Movements – Synchro Study Area – Weekday PM Peak Hour



Note: Storage length for through movements were measured from stop bar to the upstream signalized intersection.

It is notable that during the AM peak, intersections along Burnhamthorpe Road West are approaching or at capacity, particularly for Burnhamthorpe Road West / Mavis Road intersection where critical movements were flagged for all approaches. During the PM peak, in addition to the intersections along Burnhamthorpe Road West, most of the signalized intersections surrounding the Square One Shopping Centre are also approaching or at capacity due to high traffic demands.

The 95th percentile queue exceeds the available spacing between signalized intersections for the following through movements, indicating spill-back queue will most likely reach the upstream intersection:

- Southbound at Burnhamthorpe Road West / Mavis Road intersection;
- Westbound at Rathburn Road West / Confederation Parkway intersection; and
- Northbound at Burnhamthorpe Road / Hurontario Street intersection.

For highway off-ramp intersections, a few notable critical movements were flagged in the Synchro analysis. However, all off-ramp intersections are operating with residual capacities at LOS ‘C’ or better. This indicates that there are opportunities to improve critical movements by optimizing the current signal timing.

In the morning peak period, Hurontario Street and Mavis Road both serve high volumes of southbound traffic travelling inbound toward Downtown from Highway 403. Capacity deficiencies and congestion are more apparent along Mavis Road than along Hurontario Street. Hurontario Street has a number of routing options for traffic originating from Highway 403 to bypass red-light delays and access the Downtown area, including an unsignalized ramp connecting directly onto Centre View Drive, as well as a number of right-turn channels. Conversely, inbound traffic from Highway 403 via southbound Mavis Road must execute southbound left-turns at Rathburn Road West or Burnhamthorpe Road West. Having to turn left at these signalized intersections increase delays.

In the afternoon peak period, outbound traffic volumes from Downtown destined to Highway 403 and to the north substantially increases. This is evident by the considerably higher eastbound left-turn volumes on to northbound Hurontario Street, as well as higher westbound right-turn volumes onto northbound Mavis Road. While the egressing traffic onto Mavis Road have the advantage of executing right-turns-on-red, the increase of

eastbound left-turn volumes onto Hurontario Street places additional strain on movements that are already capacity-constrained. Compared to the morning peak period where capacity deficiencies tend to be limited toward the western half of the downtown area, capacity deficiencies prevail along both Mavis Road and Hurontario Street during the afternoon peak period.

Overall, the Synchro traffic analysis confirms that the afternoon peak hour is the more critical time of day, due to the higher number of critical movements as well as lower levels of service as shown in **Figure 3-57** to **Figure 3-58**. The micro-simulation modelling in VISSIM will focus on the afternoon peak hour and will examine traffic conditions and queuing in more detail.

3.7.2 Subarea Travel Demand Modelling

A subarea model was developed for the EMME Subarea using the EMME platform and the 2016 City of Mississauga travel demand model provided by the City. The purpose of the subarea model is to generate traversal matrices for input into the VISSIM model for the Micro Model Area. The subarea model was calibrated to 2019 based on Cordon Counts and traffic data provided by the City and details of the calibration methodology is provided in **Appendix F**.

MULTI-MODAL TRIP GENERATION

As noted in **Section 3.2**, TTS data, which is the main source of data for model development, is known to under-estimate discretionary trips. As Square One is such a major component of the downtown, a multi-modal trip generation analysis was conducted to assess whether the City's model also under-represent trips to this major commercial area.

Trip generation rates for Square One come from a variety of sources were compared, including customer data (from Oxford Properties, owners of Square One), employment data (from City of Mississauga), Institute for Transportation Engineers (ITE) Trip Generation Manual, StreetLight data, and TTS data.

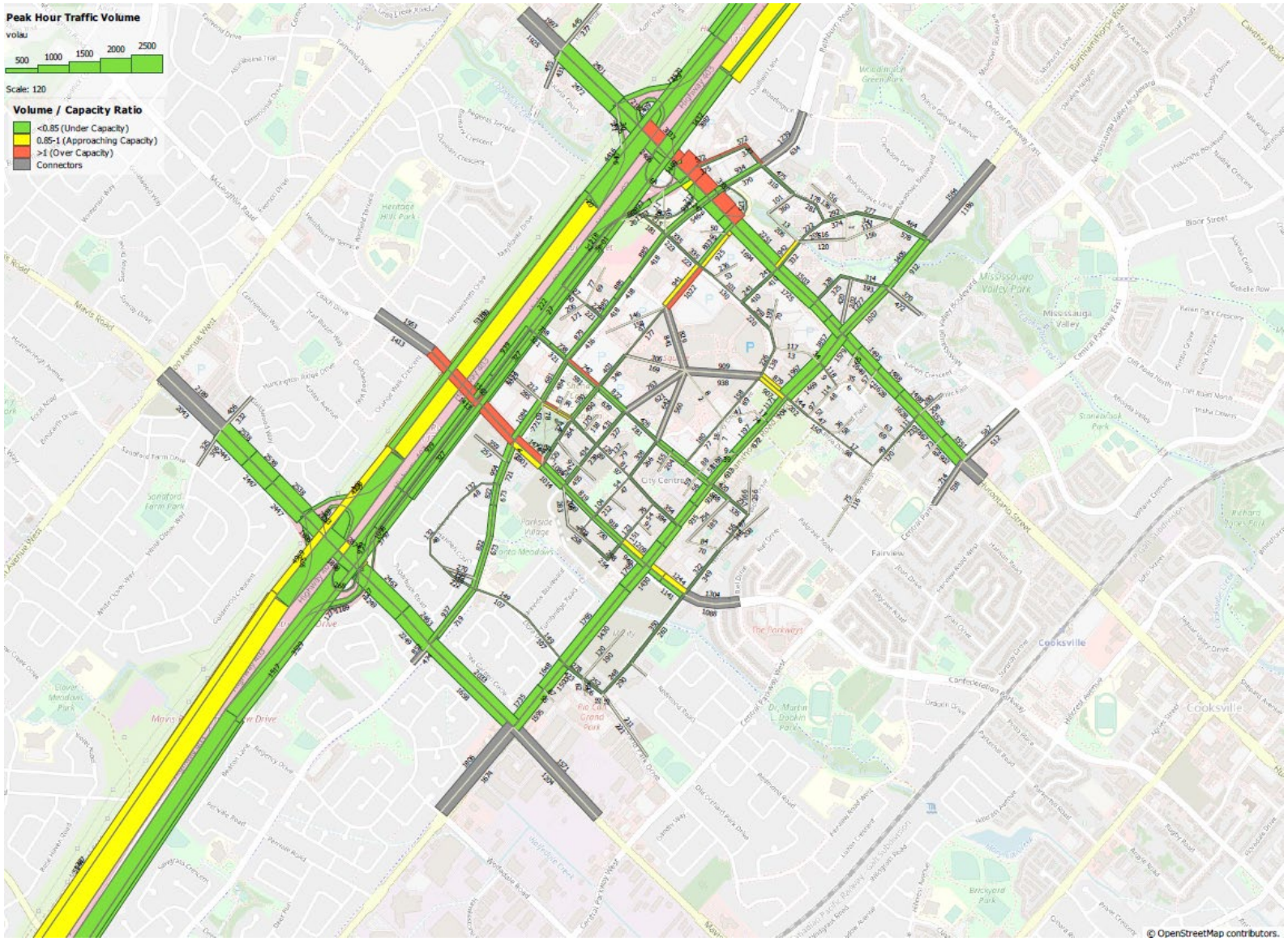
A comparison of the afternoon peak hour vehicle trips generated by the model for Square One and the other sources is shown in **Table 3-8**. Total auto volumes from TTS and the 2016 City of Mississauga model are lower than all other sources, suggesting there is an underestimation of retail trips. Customer/employment data, ITE, and StreetLight sources all estimate afternoon peak hour vehicle volumes with an average around 6,600 auto trips. As auto volumes calculated from customer/employment data is both close to the average value and the only source that comes from first

principles, the trip generation estimated from customer/employment data was carried forward and incorporated into the subarea model. The EMME subarea model with the PM peak hour volumes and volume-to-capacity (v/c) ratios are shown in **Figure 3-59**. Full results are provided in **Appendix E**.

Table 3-8: PM Peak Hour Vehicle Trips to/from Square One

Source	Origin	Destination	Total
2016 Model EMME Auto matrix	2,009	1,594	3,603
2016 Model EMME Trucks matrix	25	25	50
2016 TTS	1,801	1,215	3,016
Estimates based on Customer/Employment Data	3,560	3,155	6,716
ITE Trip Generation	2,931	2,633	5,564
StreetLight Data	3,794	3,883	7,677

Figure 3-59: Downtown Core Traffic Volumes (2019 PM Peak Hour)



3.7.3 Microsimulation Modelling

The Vissim model is part of the multi-tiered model that is being developed to assess the existing conditions and to help identify transportation infrastructure needs in the future. Details of the model development approach, calibration/validation methodology, and existing simulated conditions are provided in **Appendix G.**

The Vissim base model is calibrated to existing conditions for the PM peak period based on existing geometry, signal timing, transit lines and City of Mississauga EMME Model's traffic zone system.

The demand loading process during the PM peak period was completed in a four-step process that involved macro assignment, static origin-destination matrix adjustment, dynamic route choice adjustment, and path and cost file generation.

The intent of the microsimulation model was created to:

- Simulate traffic patterns for existing and future conditions, based on OD traffic forecasts from the subarea EMME model and to reflect network constraints, operations, and congestion that cannot be reliably assessed at the macro level or from Synchro.
- Analyze traffic delays and queues amongst signalized and unsignalized intersections for auto traffic, transit, trucks, and pedestrians explicitly, which is not possible in Synchro;
- Analyze person delays based on vehicle occupancy for each mode; and
- Analyze impacts to each mode for infrastructure configurations such as highway interchange reconfiguration, transit priority measures, revised connectivity, etc.

Traffic volumes were calibrated for highway, arterial, and local links and turning movements at intersections. Travel time for all simulated segments have been validated against observed travel time. The travel time results for the PM peak hour fall within a ± 15% or 1 minute difference for 90% of the network segments compared to MTO surveyed travel times and/or Google travel times.

Based on the calibrated and validated models, a summary of the existing conditions results obtained from the Vissim model is presented to illustrate the hotspots and congested areas. The HCM-based intersection Levels of

Services are shown in **Figure 3-60**, the link segment speeds are shown in **Figure 3-61**, and the maximum queues recorded are shown in **Figure 3-62.**

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Figure 3-60: Vissim Intersection Levels of Service (PM Peak Hour)

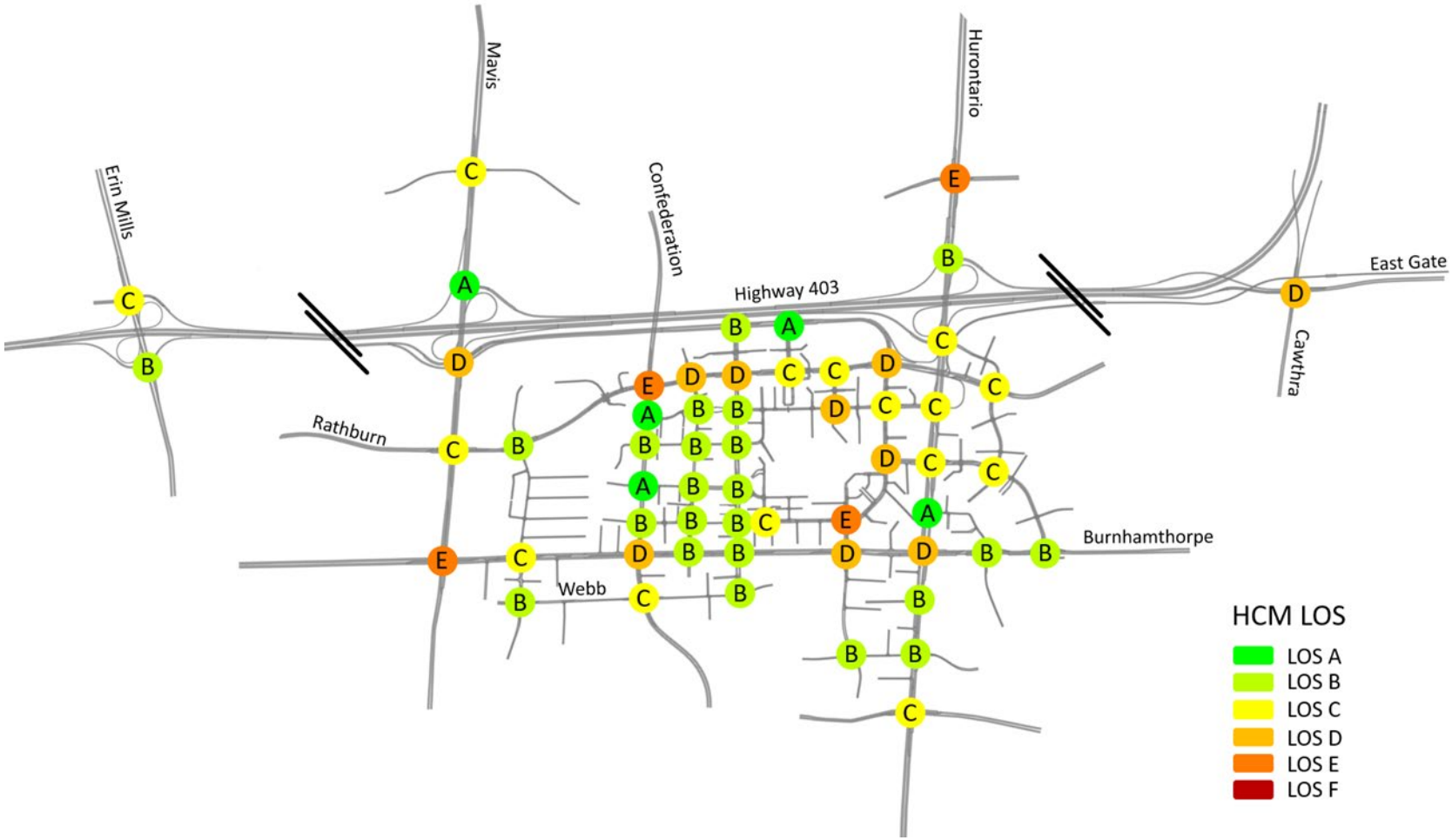

Figure 3-61: Vissim Simulated Speed Profile (PM Peak Hour)

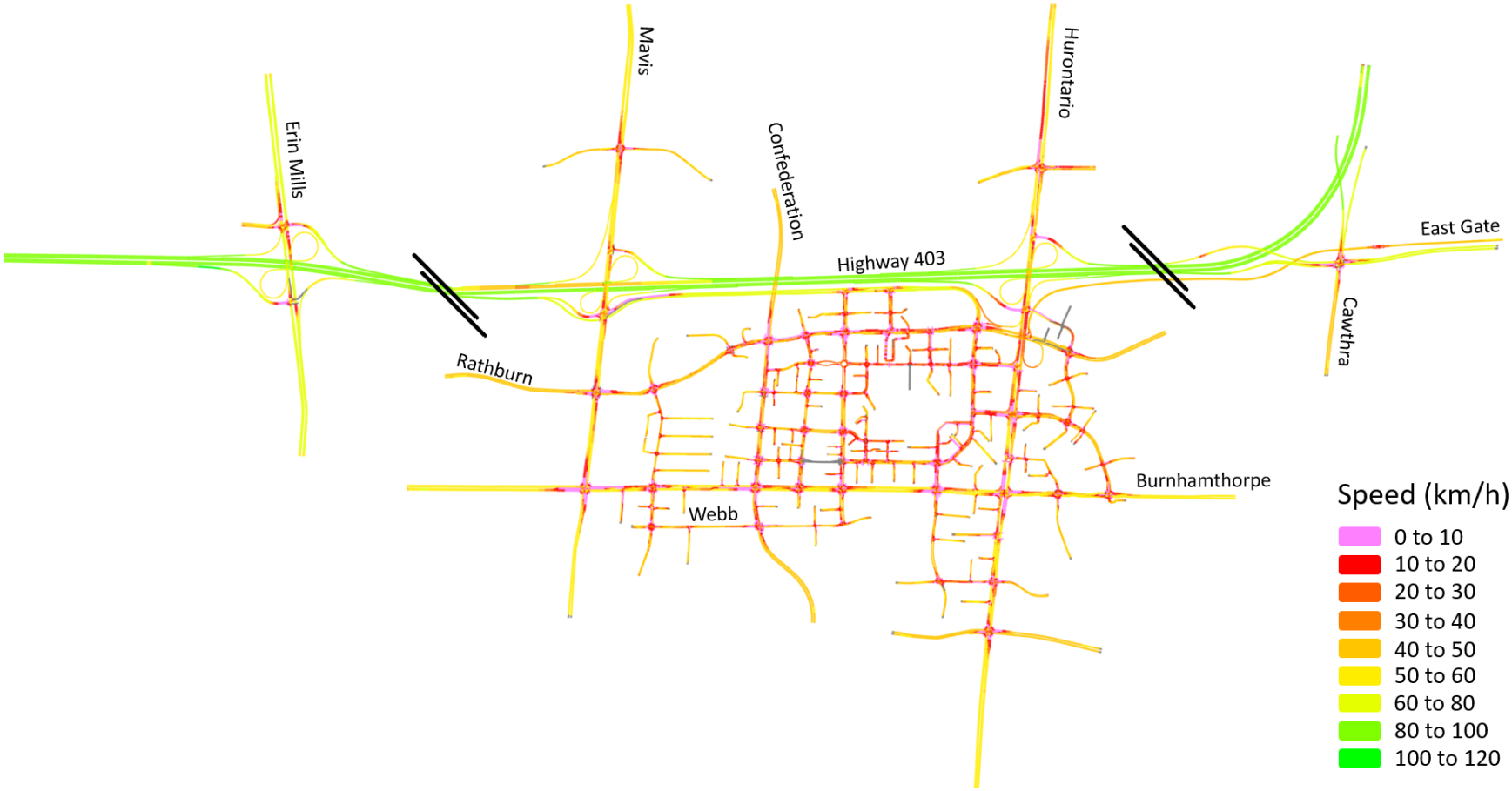

Figure 3-62: Vissim Maximum Queue (PM Peak Hour)

3.8 Existing Natural, Cultural Heritage and Archaeological Environment

3.8.1 Natural Heritage Characterization

A natural heritage characterization study was completed, which summarized background information of natural heritage features within the study area to characterize the existing natural heritage features. The detailed characterization was used to inform an analysis of the significance and sensitivity of natural features and the identification of any natural feature constraints in association with land use policy designations. Details of the natural heritage characterization study can be found in **Appendix H.**

The majority of the study area consists of highly anthropogenic and urban land uses. Lands are dominated by commercial, recreational, and mixed-use buildings, as well as impermeable road and parking infrastructure as is located in a highly dense urban area, with few natural areas remaining. Several unevaluated wetlands are located in the northern portion of the study area. Cooksville Creek is the primary and sole watercourse feature located in the study area. Habitat for 8 Species of Conservation Concern (SCC) and 7 regulated Species at Risk (SAR) is potentially present within the study area. The majority of suitable habitat for these species is present, or potentially present, in close or direct proximity to natural areas adjacent to Cooksville Creek and the remaining woodland areas in the study area.

Regard for the remaining natural areas should be a priority for the City of Mississauga and the Downtown Movement Plan, going forward.

3.8.2 Cultural Heritage Resource Assessment

A Phase 1 Desktop Cultural Heritage Resource Assessment (CHRA) was conducted by Archaeological Services Inc. (ASI), which presented an inventory of known built heritage resources and cultural heritage landscapes. Details can be found in **Appendix I.**

The results of background historical research and a review of secondary source material, including historical mapping, revealed a study area with a rural land use history dating back to the nineteenth century. A review of federal, provincial, and municipal registers, inventories, and databases

revealed that there are five previously identified features of potential cultural heritage value within DMP study area.

Key Findings:

- A total of five cultural heritage resources were identified within the study area; and,
- Two cultural heritage resources are built heritage resources listed by the City of Mississauga in the Heritage Register for Mississauga (City of Mississauga 2018), two are cultural heritage landscapes identified in the Mississauga Cultural Heritage Landscapes Inventory (City of Mississauga 2005), and one cultural heritage resource was identified during a previous assessment (ASI 2015a).

3.8.3 Archaeological Assessment

The existing conditions for archaeological resources were reviewed by ASI in advance of a Stage 1 Archaeological Assessment report. Details can be found in **Appendix J**.

Three sources of information were consulted to provide information about previous archaeological research: the site record forms for registered sites available online from the Ministry of Heritage, Sport, Tourism and Culture Industries through “Ontario’s Past Portal”; published and unpublished documentary sources; and the files of ASI.

The Study Area meets the following criteria indicative of archaeological potential:

- Previously identified archaeological sites;
- Water sources: primary, secondary, or past water source (Cooksville Creek);
- Early historic transportation routes (Hurontario Street, Burnhamthrope Road); and
- Well-drained soils (Brockport clay loam, Oneida clay loam).

4 Summary of Existing Problems and Opportunities

Based on the City's TMP, the vision for the Downtown Core is to transform from a local focal point to a regional centre with the Hurontario LRT providing higher order transit connectivity north-south and the Mississauga BRT connecting people east-west. These significant investments in transit improvements combined with the proposed redevelopment at Square One creates an important opportunity to continue the evolution of Mississauga's Downtown transportation network. Building on the concepts of 'freedom to move' for all travellers and prioritizing active transportation and transit, the Downtown Movement Plan will be a blueprint for capitalizing on these transit investments and ultimately create a vibrant place to live, work, learn, be entertained, raise a family and most of all, choose to be. Implementing Complete Streets and improving road connectivity within the Downtown Core and with the surrounding road network are key features of the DMP to support a finer grid network and the planned growth.

The analysis conducted throughout this report has identified a number of problems and opportunities which will inform the identification of alternative solutions in the next phase of this study.

ENHANCE CONNECTIVITY THROUGH LARGE LAND PARCELS

Within the Downtown Core, surface parking lots occupy about 27% of the land area. Pedestrians will often take the shortest path to reach their destination, and large parking lots present difficulties and safety issues to pedestrians, cyclists and transit users to access their destinations. As redevelopment occurs, these parking lots should be redeveloped in a manner which allows for connectivity through large land parcels to promote walking and cycling as the primary choice for short trips.

ALIGN PARKING MANAGEMENT WITH INFRASTRUCTURE AND TDM

While trips to the Downtown Core have been shifting over time to transit and active modes, auto-based trips (driving and passenger) still dominate with 79% of the mode share in 2016. Easy access to free or low-cost parking will continue to encourage automobile usage. Thus as the surface parking lots redevelop and as redevelopment and transit and active transportation infrastructure are implemented over time, the Downtown's parking management policies should align with infrastructure and travel demand

management initiatives to continue to facilitate the shift towards transit and active travel.

BUILD OUT THE FINE-GRID STREET NETWORK

The City has largely built-out the framework of a fine-grid street network. However there remain a number of discontinuous roads as illustrated in **Figure 3-17**. These discontinuities firstly limit connections and access to/from the broader area resulting in congestion at major intersections that do provide connectivity. Secondly there remain barriers to the active transportation network to provide direct connectivity for pedestrians, cyclists, or transit users.

The study area's intersection density of 0.26 (intersections per hectare) is low due to the Square One Shopping Centre, large areas dedicated to surface parking, and Highway 403.

SAFETY FOR ALL ROAD USERS

Severe collisions (vehicles and vulnerable road users) causing injury are a major issue. Though the total number of collisions within the study area decrease from 2015 to 2018, the number of non-fatal injuries do not show a decreasing trend, and 2017 observed the highest number among the years from 2014 to 2018. The top five intersections with the highest number of collisions are:

- Kariya Drive and Burnhamthorpe Road
- Burnhamthorpe and Hurontario Street
- Hurontario Street and Square One
- Hurontario Street and Sherwoodtowne Boulevard
- Duke of York Boulevard and Burnhamthorpe Road

These top five intersections are also the top intersections for collisions with vulnerable road users. In addition to these, vulnerable road user collisions are been noted at the intersections adjacent to City Centre Transit Terminal and Celebration Square. The Downtown Movement Plan must emphasize the need to prioritize safe and comfortable movements particularly for vulnerable road users, and at the higher collision intersections noted.

PRIORITIZE TRANSIT

Similar to the street network, there are gaps in the transit infrastructure in the Downtown Core. This includes the continuation of the Mississauga Transitway within the downtown, the lack of transit priority measures such as dedicated bus only infrastructure to help improve travel times within the downtown, the lack of an easy transfer between the GO Transit Terminal and the Mississauga City Centre Transit Terminal, and gaps in service coverage which need to be addressed to make transit the mode of choice over the automobile.

Also, per the *Downtown Strategy* Online survey, there is a need for improved transit services, including increased frequency, extended service hours (i.e. after 6 pm, on weekends, during major events), better transit connectivity, improved transit/direct transit from the outskirts of Mississauga to the Downtown, affordable transit payment options, and better connection to Toronto and Oakville, improved and/or additional bus stops and shelters.

ACTIVE TRANSPORTATION FOR ALL AGES AND ABILITIES

Active transportation access to the Downtown is facilitated today particularly well to and from the south by a network of off-road trails and on-street bike lanes. A corresponding large proportion of active trips (65%) which access the Downtown today come from south of Burnhamthorpe Road. The City should continue to build an active transportation network for people of all ages and abilities, including addressing major barriers to active travel:

- Highway 403 forms a barrier to active travel along the north side of the downtown. Limited crossing opportunities and the need to cross free-flow freeway ramps are barriers for active trips to/from the north.
- The Hurontario Street bridge over Rathburn Road is a physical barrier for active transportation, as there is only limited sidewalk access between Hurontario Street and Rathburn Road.
- Intersections with channelized right-turn lanes for vehicles increase pedestrian crossing distance and curb radii creating an additional impediment for pedestrians as they must now cross the street in multiple stages (through the corner islands).
- Gaps in existing pedestrian and cycling network are identified and should be addressed to provide better network connections for the active transportation users.

BALANCING VEHICULAR MOVEMENT WITH PEOPLE MOVEMENT

During the AM peak and PM peaks, intersections along Burnhamthorpe Road West and most of the signalized intersections surrounding the Square One Shopping Centre are approaching or at capacity due to high traffic demands. The Downtown Movement Plan however must be careful when providing extra traffic capacity. Any vehicular improvements should not sacrifice the safety and comfort of vulnerable road users.

Appendix A – Collision Analysis Memo

City of Mississauga
Downtown Movement Plan – Existing Conditions

Appendix B – Bicycling Level of Service Methodology

City of Mississauga
Downtown Movement Plan – Existing Conditions

Appendix C – Pedestrian Level of Service Methodology

City of Mississauga
Downtown Movement Plan – Existing Conditions

Appendix D – Balanced Traffic Volumes

City of Mississauga
Downtown Movement Plan – Existing Conditions

Appendix E – Synchro Model Results

City of Mississauga
Downtown Movement Plan – Existing Conditions

Appendix F – EMME Subarea Development Memo

City of Mississauga
Downtown Movement Plan – Existing Conditions

Appendix G – VISSIM Model Development and Calibration Memo

City of Mississauga
Downtown Movement Plan – Existing Conditions

Appendix H – Natural Heritage Characterization Study Report

City of Mississauga
Downtown Movement Plan – Existing Conditions

Appendix I – Phase 1 Desktop Cultural Heritage Resource Assessment Memo

City of Mississauga
Downtown Movement Plan – Existing Conditions

Appendix J – Archaeological Resources Existing Conditions Memo

City of Mississauga
Downtown Movement Plan – Existing Conditions