



The City of

Barrie

TRANSPORTATION MASTER PLAN

Final Report | June 2019



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Water, Wastewater, Drainage, Transportation Master Plans

NOTICE OF COMPLETION

The City of Barrie has completed the six Master Plans under the Municipal Class Environmental Assessment Master Planning Process:

- Water Supply Master Plan
- Water Storage and Distribution Master Plan
- Wastewater Treatment Master Plan
- Wastewater Collection Master Plan
- Drainage Master Plan
- Transportation Master Plan

The Master Plans follow the planning process outlined in the Municipal Engineers Association Municipal Class Environmental Assessment document (October 2000, amended in 2007, 2011 and 2015). The Master Plans inform the City of Barrie of recommendations aimed at expanding and improving its water, wastewater, transportation and drainage infrastructure to meet the demands of the City's future population and employment. This was achieved through a combination of review of existing conditions, modeling, outreach, and collaboration to determine the long-term needs and priorities of the City.

The associated Schedule A, A+, B and C projects have been recommended as part of the study to accommodate the projected growth and are documented in the Master Plans and available on the City of Barrie website at barrie.ca → City Hall → Environmental Assessment Studies.

With Schedule A and A+ projects being pre-approved, this Notice of Completion only pertains to the Schedule B projects. Schedule C projects will have further public consultation components in the future associated with subsequent phases under the Municipal Class Environmental Assessment process.

The Master Plans have been conducted under Approach #2 of the Municipal Class Environmental Assessment process. The project included Public Information Centres where the public and stakeholders could provide comments on the project details and recommendations. Public and review agency comments received have been considered in the development of the recommended networks and infrastructure improvements. The Master Plans and a list of the Schedule A, A+, B and C projects have been placed in the public record for review and the documents are available during regular business hours on the City of Barrie website at barrie.ca → City Hall → Environmental Assessment Studies. If you wish to view a paper copy, please make an appointment with Tom Reeve using the contact information below.

Questions or concerns related to the above noted Master Plans or recommendations may be directed to Tom Reeve, within thirty (30) calendar days from the date of this notice:

Tom Reeve, P. Eng.
Senior Infrastructure Planning Program Coordinator
City of Barrie
70 Collier Street, 6th Floor
Barrie, ON L4M 4T5
Tel: (705) 739-4220 Ext. 4465
Email: Tom.Reeve@barrie.ca

If concerns arise that cannot be resolved with the City of Barrie, a person or party may request that the Minister of the Environment, Conservation and Parks make an Order for the project to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order), which addresses individual environmental assessments. Part II Orders cannot be submitted in respect of the Master Plan itself, but must be made in respect to individual Schedule B projects listed in association with this notice. Requests must be received by the Minister at the address provided below within thirty (30) calendar days of this notice being issued. More information on making a Part II Order request, including the Part II Order request form, can be found at: <https://www.ontario.ca/page/class-environmental-assessments-part-ii-order>.

If no requests are received, the City of Barrie, upon receipt of necessary approvals from the provincial ministry, plans to proceed to the implementation of the recommended Schedule A, A+ and B projects identified in the Master Plan through a phased approach, dependent on future budget approvals. Schedule C projects will require further study.

This notice issued June 6, 2019 and June 13, 2019.

Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of public record.

Wendy Cooke
City Clerk

Bala Araniyasundaran, P. Eng.
Director of Engineering

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June 12, 2019

CITY OF BARRIE
1st Floor, City Hall
70 Collier Street
Barrie, Ontario L4M 4T5

Attention: Tom Reeve

Subject: City of Barrie 2019 Transportation Master Plan, Final Report

Dear Mr. Reeve:

On behalf of WSP, we are pleased to provide you with the City of Barrie 2019 Transportation Master Plan (TMP) Final Report that has been endorsed by City Council on May 13, 2019.

The Study commenced in August 2017 and completed in June 2019 (see the Notice of Study Completion). This TMP was informed by the study team's expertise as well as information and guidance from city staff, the public and stakeholders. A Final Draft Report dated April 8, 2019 was provided to the City for review.

The attached Final Report includes:

- A review of existing conditions and the City's current policies, guidelines and standards;
- A review of future development and growth plans, as well as current city planned capital projects;
- Proposed future network plans for transit, active transportation and trails, roads and railway crossings;
- Recommended policies and programs to promote inclusive multimodal mobility and safety; and
- An implementation plan including financial estimates for the proposed recommendations.

The development of this TMP is supported by the following nine appendices:

1. Appendix A: Transit Technical Memorandum
2. Appendix B: Active Transportation Strategy
3. Appendix C: Trails Master Plan
4. Appendix D: Railway Crossings Assessment Technical Memorandum
5. Appendix E: Emme Macro Modelling and Improvements Rationale Technical Memorandum
6. Appendix F: 2014 MMATMP Transportation Network Alternatives
7. Appendix G: Consultation
8. Appendix H: Roadway and Transit Costing Technical Memorandum
9. Appendix I: Class EA Process and Identification of Project Schedules

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F: +1 905 882-0055
wsp.com



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

Yours sincerely,

A handwritten signature in black ink, appearing to read 'S. Sterling'.

Sharon Sterling, MCIP, RPP
Manager, Traffic Management and Parking



Thomas You, M.A.Sc, P.Eng.
Project Manager

WSP ref.: 171-08853-00

EXECUTIVE SUMMARY

The Barrie Transportation Master Plan (TMP) will serve as the City's roadmap in developing a well-balanced transportation network to serve its future needs and development.

The City of Barrie, located along the western shores of Lake Simcoe, has been one of the fastest-growing communities in all of Canada. With the addition of the secondary plan areas to the southern portion of the City, the current population is expected to grow from approximately 145,800 to **253,000 PERSONS** by 2041. Employment within Barrie is set to increase from the current 73,800 to **129,000 JOBS** by 2041.

The City's first Multi-Modal Active Transportation Master Plan (MMATMP) was developed in 2014, in accordance with the Municipal Class Environmental Assessment (EA) process. The 2014 MMATMP assessed and recommended improvements to the active transportation, transit, and roadway networks to meet the projected future travel demand, accommodate development outside the existing built boundary, and intensification within the built boundary by 2031.

Since the 2014 MMATMP, the 2017 Growth Plan identified the following changes in density allocations and growth locations:

- 1 A minimum density target of **80 RESIDENTS AND JOBS COMBINED PER HECTARE**, an increase from 50 residents and jobs combined per hectare, was identified for Greenfield Areas.
- 2 The growth allocation was changed from the 2006 allocation of 60 percent in the Greenfield Area and 40 percent in the Intensification Area to **40 PERCENT IN THE GREENFIELD AREA** and **60 PERCENT IN THE INTENSIFICATION AREA**.

Given the changes of density and growth allocations by 2031, and additional growth to 2041, the transportation network and infrastructure within Barrie was re-assessed and updated to accommodate the future population and employment growth, and changes to mobility forms and travel patterns.

The TMP examined the current natural and social environment of the City of Barrie, as well as the economic environment of the City. It also accounted for the following transportation infrastructures within the City of Barrie:

- active transportation
- public transportation
- motorized transportation
- railway crossings

An inventory of all transportation infrastructure currently serving the City of Barrie was undertaken. This included examining cycling infrastructure, sidewalks, paths, trails, the fixed-route network, bus terminals, train stations, Barrie Specialized Transit Service, current road network (City, County and MTO) and railway crossings. Current deficiencies were identified, which included areas of current traffic congestion and missing links in the active transportation network.

The City of Barrie needs a transportation system that will accommodate growth to 2041. The opportunity exists to plan a transportation system which:

- is safe, efficient and accessible with choices in mobility;
- fosters the use and development of a sustainable transportation network;
- provides a public transit system that can offer a real alternative to private automobile use; and
- provides a network of on-road and off-road pedestrian and cycling facilities that allow the use of active transportation modes as an alternative to the automobile.

The Master Plan considers other planned transportation projects that will have an impact on the City of Barrie's transportation network, including:

- improvements to the Highway 400 corridor;
- improvements to the GO Train and Bus services to Barrie; and
- improvements to the Simcoe County road network.

To analyze the impact of growth on the City's road network, traffic models were developed to assist in determining where improvements to the transportation network need to occur. A key model was a travel demand forecasting macroscopic model of the entire City in Emme.

Development of Transportation Networks

Multi-modal transportation network alternatives were established based on future mode share targets of seven percent transit and 12 percent active transportation for the 2041 horizon year. These targets were based on existing provincial policy and a review of modal shares in comparable cities and municipalities.

Proposed Transit Improvements

The TMP proposes the following measures to increase the transit mode share from the current two percent to the targeted seven percent in 2041:

- Improving frequencies and routing;
- Prioritizing the secondary plan areas;
- Introducing a U-Pass to provide reduced transit fare to students (implemented in September 2018);
- Introducing transit service high school programs;
- Providing express services to major destinations;
- Marketing and coordination with large employment zones; and
- Introducing TDM measure to encourage regular transit usage.

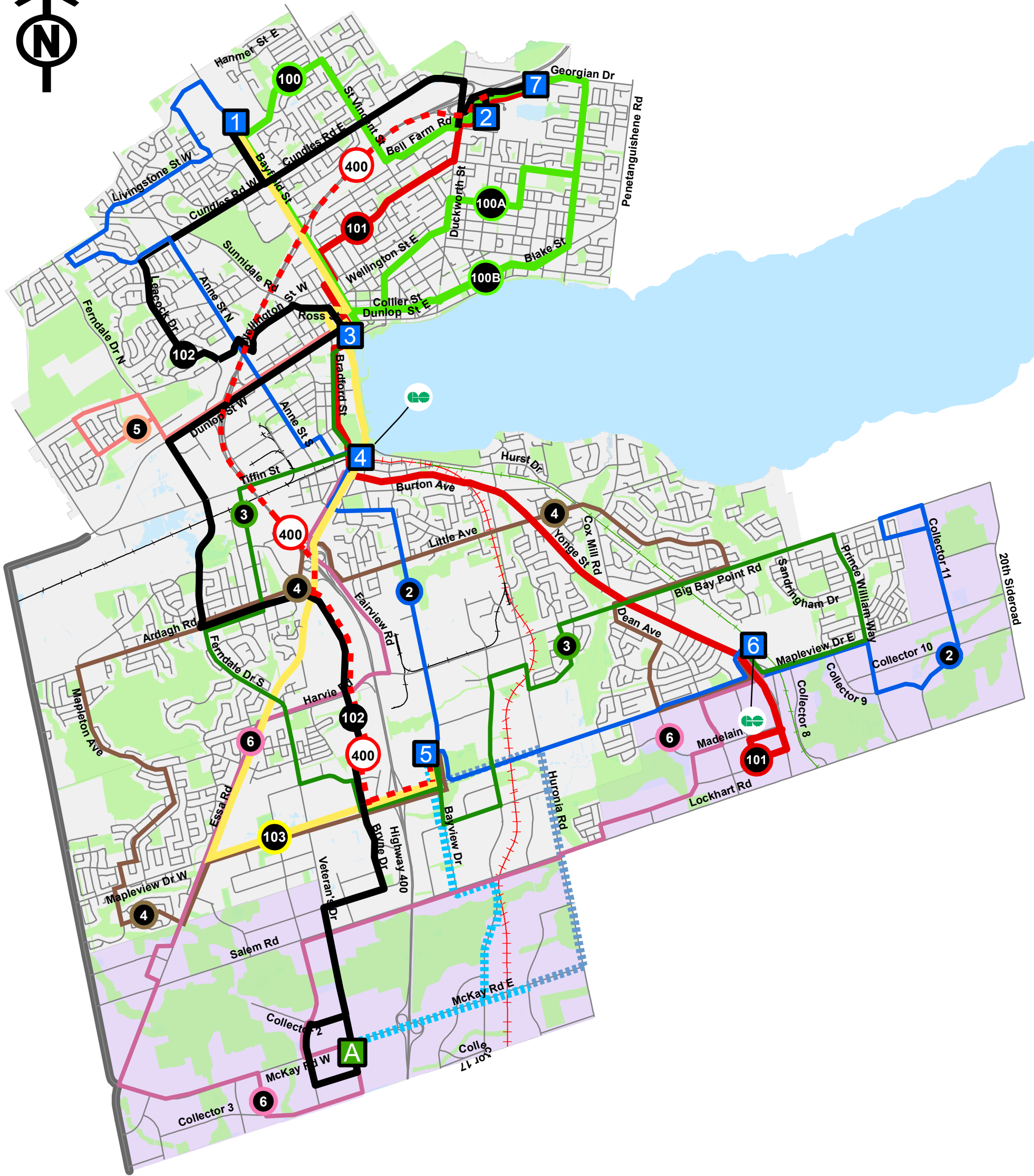
Additionally, an emphasis was put on the development of frequent routes along the major corridors based on the following transit service principles:

- 1 Core Frequency: 10-minute service
 - Direct connection between significant landmarks (attractions)
- 2 Supporting Network: 20-minute service
 - Connection to core routes and minimization of walking transit access (coverage)
- 3 Transfer
 - Minimum transfers, only where required

The development of a Core and Supporting Transit system will provide more reliable connections to the residential areas. Ten and 20-minute frequencies are recommended during the peak commuter periods (morning and afternoon), with longer frequencies during off-peak periods. Overall, the main purpose of implementing a hierarchical route network is to decrease overall travel time, which includes walking access, waiting for boarding, riding on-board, and transfers.

The 2041 preferred transit network is illustrated in Figure ES-1 and includes the core network, denoted by the 100-series routes, and the supporting route network.

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Transit Routes

- Core Routes
- Support Routes
- Business Service
- Optional Business Service (2041)
- Highway 400 Express Route

Existing Transit Hub

- 1 Georgian Mall
- 2 Georgian College
- 3 Downtown Terminal
- 4 Allandale/Waterfront GO Station
- 5 Park Place
- 6 Barrie South GO Station
- 7 Royal Victoria Hospital

New Transit Hub

- A Salem Transit Hub

Transportation Features

- BCRY Railway
- GO Transit Railway
- Protection for Active Transportation and / or Transit Corridor
- GO Station

Natural Features

- Park / Open Space
- Water

Other Features

- Secondary Plan Areas
- Under Jurisdiction of Simcoe County

Data Sources: City of Barrie
 Date Updated: Wednesday, June 12, 2019
 Project: 171-08853-00
 Map Created By: WSP Thornhill

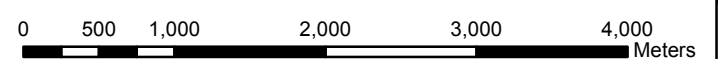


Figure ES-1
 Proposed 2041 Transit Route Network Concept
 City of Barrie Transportation Master Plan



Proposed Active Transportation Improvements

The updated AT Strategy is guided by a vision as well as a set of principles and objectives. The vision was identified in the previous plan and was reviewed by the team during the study process. The vision is supported by **10 GUIDING PRINCIPLES** which provide more specific outcomes which the AT Strategy is intended to achieve as the TMP is implemented. They include:

- 1** Provide direct connections throughout the City and to connect to key destinations
- 2** Support users of all ages and abilities
- 3** Establish a connected and continuous network of different AT options
- 4** Develop a balanced network of on and off-road facilities
- 5** Provide multi-modal routes and connections to key destinations and transit
- 6** Enhance opportunities for people to walk and bike for short trips and to key
- 7** Allocate an appropriate maintenance budgets to maintain AT infrastructure
- 8** Establish a winter maintained network to support walking and cycling year-round
- 9** Identify a core network of direct north-south and east-west connectivity in Barrie
- 10** Encourage a cultural shift through education and promotion

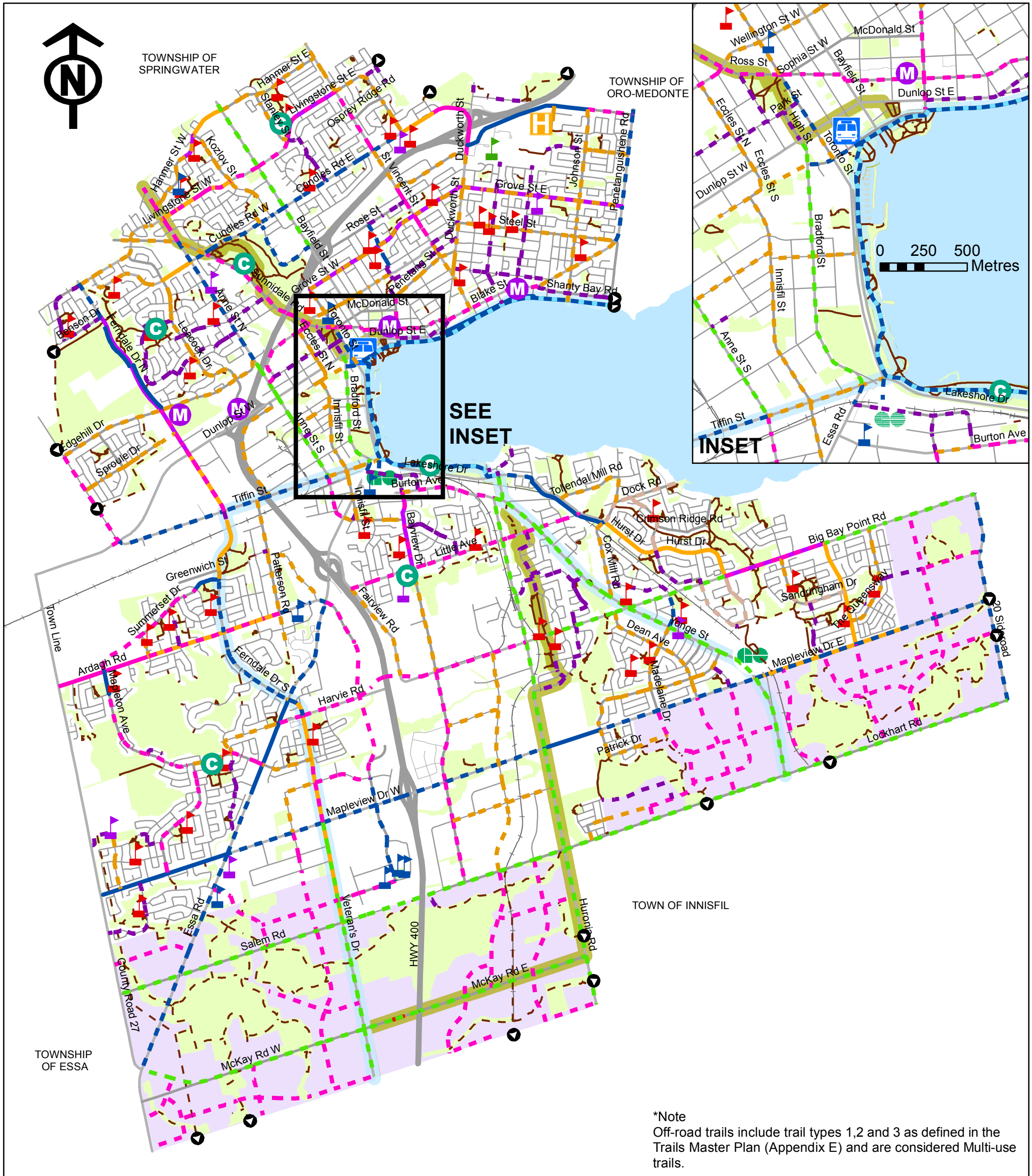
The City of Barrie's active transportation network includes 973 kilometres of existing facilities and 484.7 kilometres of new facilities are proposed. A summary of the existing and proposed facility types included in Barrie's preferred active transportation network is provided in Table ES-1.

Table ES-1 Existing and Proposed Active Transportation Facility Types

Facility Type	Existing KM	Length of Proposed New Facilities KM
Sidewalk	827.9	142.5
Signed Routes	10.8	36.2
Urban Shoulders	0	4.3
Bike Lanes	16.8	70.3
Buffered Bike Lanes	2.3	80.2
Cycle Tracks	0	45.1
Off-Road Trails	99.3	69.8
In-Boulevard Pathways	16.3	36.3
Total	973.3	484.7

The proposed active transportation network by facility type is presented in Figure ES-2 and the proposed pedestrian network by facility type is presented in Figure ES-3.

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*Note
Off-road trails include trail types 1, 2 and 3 as defined in the Trails Master Plan (Appendix E) and are considered Multi-use trails.

<p>Existing Facilities</p> <ul style="list-style-type: none"> Waterfront Multi-use Trail In-Boulevard Pathway Buffered Bike Lane Bike Lane Paved Shoulder Signed Bike Route Off-road Trail 	<p>Proposed Facilities</p> <ul style="list-style-type: none"> In-Boulevard Pathway Cycle Track Buffered Bike Lane Bike Lane Paved Shoulder Urban Shoulder Signed Bike Route Off-road Trail 	<p>Trail Systems</p> <ul style="list-style-type: none"> Province-Wide Cycling Network The Great Trail <p>Transportation Features</p> <ul style="list-style-type: none"> GO Station Barrie Bus Terminal <p>Other Features</p> <ul style="list-style-type: none"> Secondary Plan Area Park / Open Space Connection to Surrounding Municipality 	<p>Points of Interest</p> <ul style="list-style-type: none"> Royal Victoria Hospital Municipal Facility Community Centre Elementary School High School Private School College
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Data Sources: City of Barrie
Date Updated: April, 2019
Project: 171-08853-00
Map Created By: WSP Thornhill

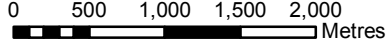
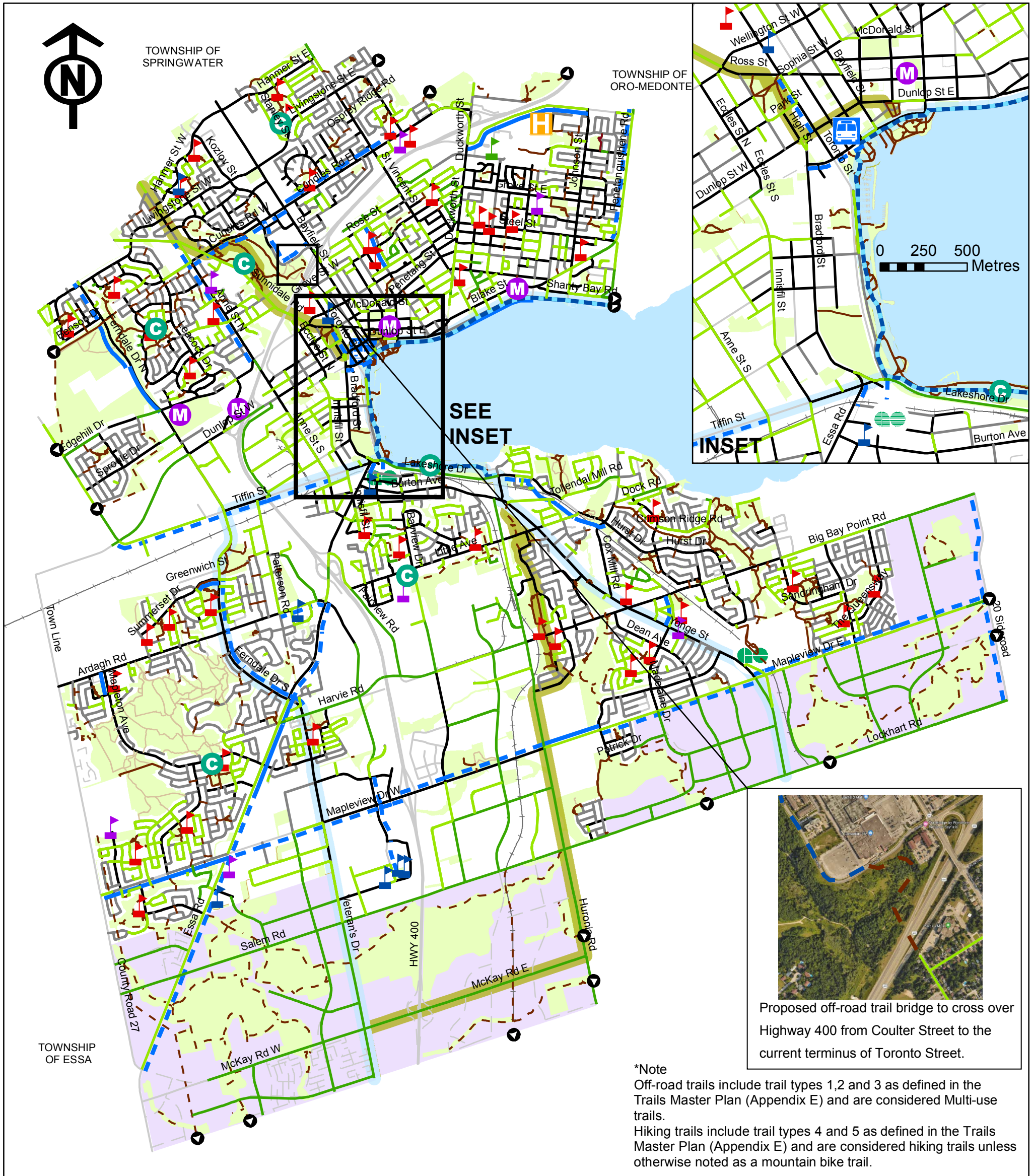


Figure ES-2
Cycling and Multi-Use Trail Network
City of Barrie Transportation Master Plan





Existing Facilities	Proposed Facilities	Trail Systems	Points of Interest
Waterfront Multi-use Trail	In-Boulevard Pathway	Province-Wide Cycling Network	Royal Victoria Hospital
In-Boulevard Pathway	Off-road Trail	The Great Trail	Municipal Facility
Off-road Trail	Add sidewalk on one side	Transportation Features	Community Centre
Hiking Trail	Add Sidewalk on both sides	GO Station	Elementary School
Sidewalk Network		Barrie Bus Terminal	High School
Sidewalks on both sides		Other Features	Private School
Sidewalks on one side		Secondary Plan Area	College
		Park / Open Space	
		Connection to Surrounding Municipality	

Data Sources: City of Barrie
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Figure ES-3
Sidewalk and Multi-Use Trail Network
City of Barrie Transportation Master Plan



Proposed Road Network Improvements

PROPOSED ROAD NETWORKS

In many areas within the City, the existing road network will not be able to accommodate future traffic flows. Future roadway capacity constraints will not only hinder vehicle trips, but will also slow down transit trips and possibly obstruct active transportation users. Considering the projected growth in Barrie, numerous road network improvements are required. The improvements were identified based on a systematic analysis of road deficiencies for horizon year 2041. The network analyses followed the methodology of Phases 1 and 2 of the Municipal Class EA process and examined various network alternatives.

As per the traffic demand forecasts from the Emme model, roads with a volume-to-capacity (V/C) ratio equal to or greater than 0.85 (the threshold developed in conjunction with City staff) were identified as candidates for improvements. Road segments having a high V/C ratio were reviewed to examine for right-of-way constraints that may prevent roadway expansion. To capture traffic variations during the time of day, the modelling analysis was complemented by a review of currently observed and future estimated average daily traffic volumes against the roadway generalized service volumes corresponding to a level of service D (LOS D).

The proposed road network for the 2041 planning horizon includes a set of road improvements and is consistent with improvements planned by adjacent municipalities and the MTO. Figure ES-4 illustrates the total number of vehicle lanes of the proposed 2041 road network.

In addition, the required road improvements by 2031 are proposed. Figure ES-5 illustrates the total number of vehicle lanes of the proposed 2031 road network.

PROPOSED HOV LANES AND TRANSIT PRIORITY

Considering the current and future forecasted roadway traffic volumes and the initiatives of reducing transit travel times to promote transit usage and achieve the identified future transit modal share target, HOV corridors are proposed along Bayfield Street, Bradford Street, Essa Road, Burton Avenue, Yonge Street, and Mapleview Drive, as illustrated in Figure ES-6. The proposed HOV corridors will provide connections between transit hubs. As well, transit priority measures are proposed to connect and complement the HOV networks.

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Notes:

- ① Diverging Diamond Interchange (DDI) (MTO 2017 TESR)
- ② New Parclo A3 Interchange
- ③ Further study to evaluate improvements on Bradford Street and at Tiffin Street intersections at Bradford/Essa and Lakeshore
- ④ Further study to assess the need for disconnection of Little Avenue from Hurst Drive

- A TWLTL or median is counted as one lane in the City of Barrie TMP.
- The number of lanes for a ramp indicates the lanes where a ramp merges with or diverges from Highway 400.
- Existing and future potentially required exclusive turn lanes at intersections are not shown.
- Local streets in the Salem and Hewitt's Secondary Plan Areas are not shown.
- One-way streets are not shown.

Transportation Features

- 10 Lanes with Continuous Median (MTO 2017 TESR)
- 8 Lanes with Continuous Median (MTO 2017 TESR)
- 7 Lanes (including TWLTL or Median)
- 6 Lanes
- 5 Lanes (including TWLTL or Median)
- 4 Lanes
- 3 Lanes (including TWLTL or Median)
- 2 Lanes
- 2 Lanes (Ramp)
- 1 Lane (Ramp)

- Existing Grade Separation
- New Grade Separation
- New Grade Separation Initiated by Metrolinx
- GO Station
- GO Transit Railway
- BCRY Railway

Natural Features

Park / Open Space

Other Features

Secondary Plan Areas

0 500 1,000 2,000 3,000 4,000 Metres

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Figure ES-4
Total Number of Vehicle Lanes, Proposed Preferred Network – 2041
City of Barrie Transportation Master Plan





TOWNSHIP OF SPRINGWATER



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Meters

Notes:

- ① Diverging Diamond Interchange (DDI) (MTO 2017 TESR)
- ② New Parclo A3 Interchange
- ③ Further study to evaluate improvements on Bradford Street and at Tiffin Street intersections at Bradford/Essa and Lakeshore
- ④ Further study to assess the need for disconnection of Little Avenue from Hurst Drive
- ⑤ Highway 400 is assumed to remain the current 6 lanes. The timeframe for future widening needs to be confirmed by MTO

- A TWLTL or median is counted as one lane in the City of Barrie TMP.
- The number of lanes for a ramp indicates the lanes where a ramp merges with or diverges from Highway 400.
- Existing and future potentially required exclusive turn lanes at intersections are not shown.
- Local streets in the Salem and Hewitt's Secondary Plan Areas are not shown.
- One-way streets are not shown.

Transportation Features

- 6 Lanes with Continuous Median (MTO)
- 7 Lanes (including TWLTL or Median)
- 6 Lanes
- 5 Lanes (including TWLTL or Median)
- 4 Lanes
- 3 Lanes (including TWLTL or Median)
- 2 Lanes
- 2 Lanes (Ramp)
- 1 Lane (Ramp)

- Existing Grade Separation
- New Grade Separation
- GO Station
- GO Transit Railway
- BCRY Railway

Natural Features

- Park / Open Space
- Other Features
- Secondary Plan Areas

0 500 1,000 2,000 3,000 4,000
Metres

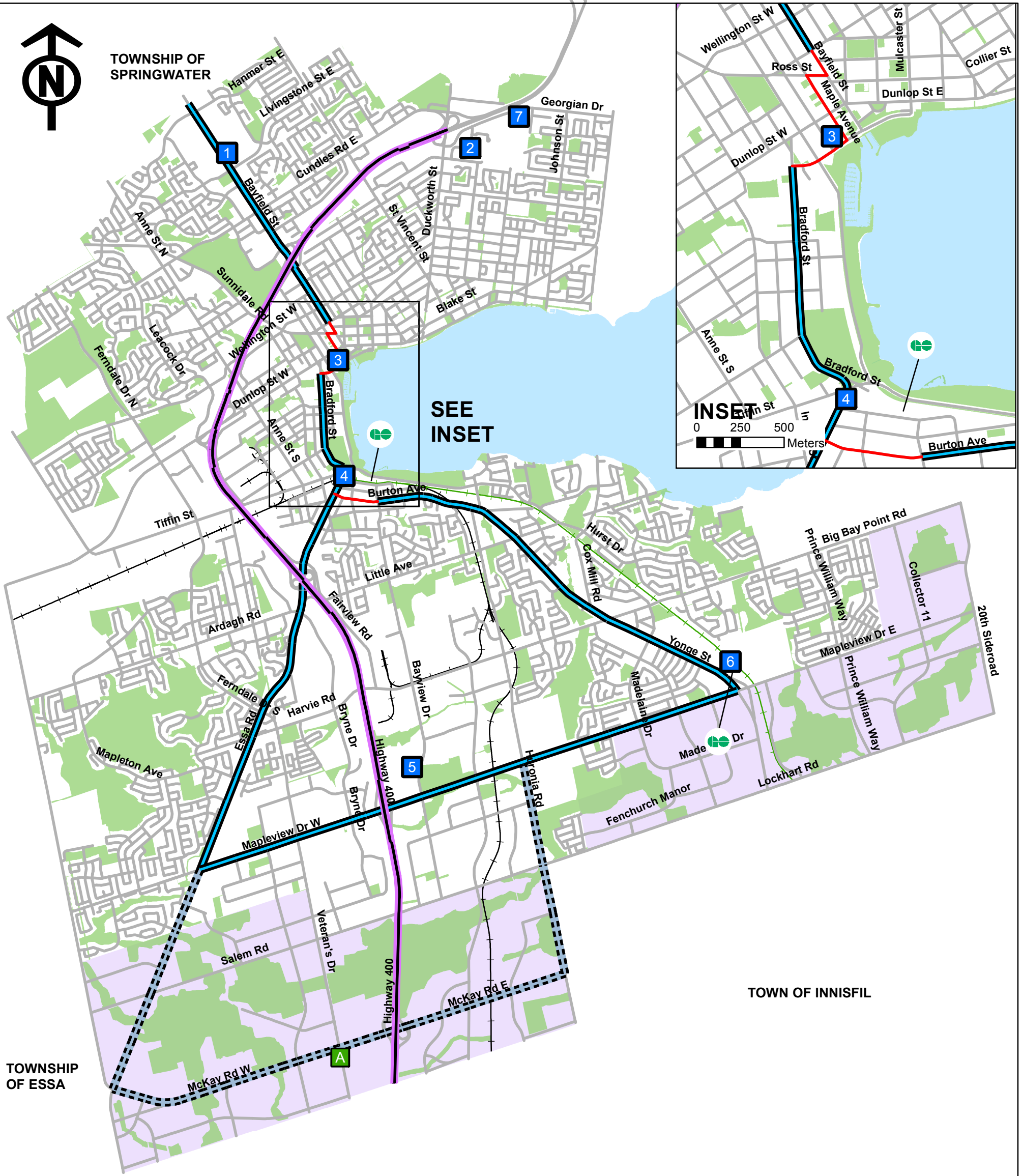
Date Updated: Friday, April 05, 2019
Project: 171-08853-00
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Figure ES-5
Total Number of Vehicle Lanes, Proposed Preferred Network – 2031
City of Barrie Transportation Master Plan

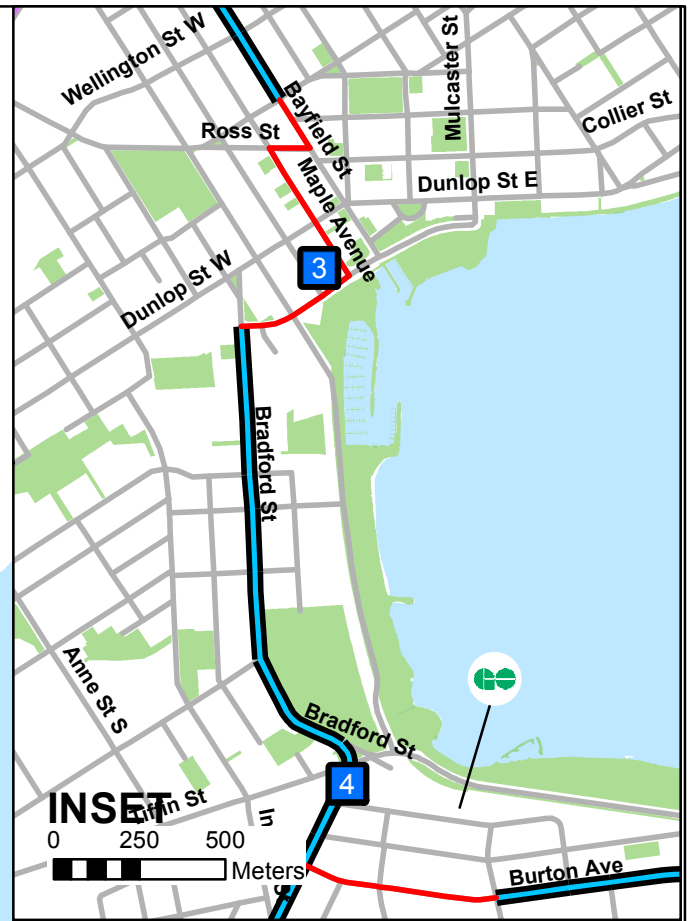




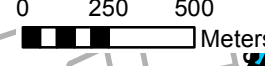
TOWNSHIP OF SPRINGWATER



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Existing Transit Hub

- 1** Georgian Mall
- 2** Georgian College
- 3** Downtown Terminal
- 4** Allandale/Waterfront GO Station
- 5** Park Place
- 6** Barrie South GO Station
- 7** Royal Victoria Hospital

New Transit Hub

- A** Salem Transit Hub
- Transit Priority Features

Transportation Features

- HOV (Leftmost Lane) (MTO 2017 TESR)
- HOV (Rightmost Lane)
- Protected HOV beyond 2041 (Rightmost Lane)
- Roads without HOV
- GO Transit Railway
- BCRY Railway
- GO Station

Natural Features

- Park / Open Space

Other Features

- Secondary Plan Areas

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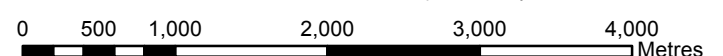


Figure ES-6
Proposed HOV Lanes and Transit Priority Features
City of Barrie Transportation Master Plan



Transportation Policy Initiatives

The provision of municipal transportation services today goes far beyond constructing, maintaining and operating road networks and planning for infrastructure improvements. To complement the proposed transportation networks, it is imperative to have supportive transportation policies to promote inclusive multimodal mobility and enhance safety for all transportation users. The success of these policies is dependent on the collaborative efforts of all stakeholders and the continuous promotion of the programs through educational and communicational campaigns.

COMPLETE STREETS

Complete streets are streets that are planned, designed, constructed, operated and maintained for all modes of transportation and all street users. Traditionally, roads have been designed to primarily accommodate automobile traffic. However, modern day planning recognizes the importance of integrating various features such as widened sidewalks, street furniture, intersection treatments and separated AT facilities, to enhance mobility and accessibility for various road users, as well as the overall sense of livability and safety in the streetscape. Some associated benefits to implementing Complete Streets include:

- Increased health benefits through walking and cycling;
- Enhanced safety;
- Lower transportation costs;
- Greater opportunities for social interaction; and
- Reduce road congestion and pollution.

The City of Barrie should consider developing a Complete Streets Guideline document and elements of the guide can be incorporate into future amendment of the Official Plan or Design Standards.

TRAFFIC CALMING

Traffic calming is a series of design, engineering, educational, and/or enforcement measures to reduce the negative impacts of high motor-vehicle speeds and traffic volumes in local and collector streets, with the end goal of improving the liveability and safety conditions of neighbourhoods for all road users.

The City currently has a Traffic Calming policy contained within Staff Report ENG003-11, dated January 10, 2011, which is actively being implemented as required. The City should update their current policy based on the Canadian Guide to Traffic Calming Second Edition, which was released in March 2018, and continue applying the updated Traffic Calming Policy as needed.

Road Diets

Road diets are one approach to traffic calming. A road diet is characterized by reallocating space on the roadway to other modes, such as cycling or transit. Implementing road diets have become common practice in many of Ontario's communities, to enhance road safety for all users, improve traffic conditions and speed management, implement active transportation networks and improve livability through streetscape revitalization.

Ten road were recommended for road diets to implement active transportation infrastructure, as outlined in Table ES-2. These locations were considered favourable to encourage mode shift through active transportation facilities to improve road safety, connectivity and promote multi-modal developments.

Table ES-2 2041 Proposed Road Diet Locations

Candidate Roadway	Approximate Length (km)	Existing Facility	Proposed Facility
St. Vincent St from Grove Street East to Bell Farm Road	0.5	4 Lanes	2 Lanes + TWLT + Buffered Bike Lanes
St. Vincent St from Cundles Rd to Livingstone Rd	1.0	4 Lanes	2 Lanes + TWLT + Buffered Bike Lanes
Hanmer St West from Anne St to Finlay Rd	1.0	2 Lanes	2 Lanes + Bike Lanes
Hanmer St East from Stanley St to Bayfield St	0.5	4 Lanes	2 Lanes + TWLT + Bike Lanes
Livingstone St East from Stanley St to St. Vincent St	1.0	4 Lanes	2 Lanes + TWLT + Buffered Bike Lanes
Big Bay Point Rd from Prince William Way to Hurst Dr	1.5	4 Lanes + TWLT	4 Lanes + Buffered Bike Lanes
Dean Ave from Big Bay Point Rd to Madelaine Dr	1.0	4 Lanes	2 Lanes + TWLT + Bike Lanes
Madelaine Dr from Yonge St to Mapleview Dr	1.2	4 Lanes	2 Lanes + TWLT + Buffered Bike Lanes
Collier St from Bayfield St to Blake St	1.2	2 Lanes	2 Lanes + Buffered Bike Lanes
Wellington St from Anne St to Ross St	1.0	4 Lanes	2 Lanes + TWLT + Buffered Bike Lanes

TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) refers to the application of policies, programs and initiatives that are intended to diversify the existing travel mode share by reducing dependency on motor vehicle travel and encouraging alternate modes of travel including walking, cycling, transit and carpooling. A comprehensive TDM strategy should outline options which support walking, cycling, transit and other non- single occupancy vehicles, as viable travel options through a set of incentive programs, policies and measures. To provide a non-auto supportive environment, encourage and promote the use of alternative modes of travel, it is recommended that:

- 1 City staff develop TDM guidelines which collect, document and implement appropriate TDM measures.

- 2 City staff assemble a matrix to outline TDM measures considered appropriate for implementation and follows the City of Barrie's community vision and TDM guidelines.

- 3 The development approval process should require new developments and redevelopments to include a TDM plan which implements suitable TDM measures.

- 4 City staff establish a parking pricing strategy, where appropriate.

- 5 The City should review current parking requirements within the Zoning By-law.

INTELLIGENT TRANSPORTATION SYSTEMS

Intelligent transportation systems (ITS) encompass any technology application to transportation infrastructure design and operation to enhance the efficiency, safety, quality and intelligence of a service for travelers. Cities across Canada are implementing ITS infrastructure and applications to collect valuable transportation data to assess performance and monitor hot spots, leading to more informed decision making at the city staff level, and to communicate traveler information to their residents, leading to more informed route and mode choice decision making. Some examples include:

- Smart signals at key intersections;
- Incident detection and monitoring;
- Traveler information systems; and
- Mid-block speed and volume collection devices.

It is recommended that city staff develop an ITS strategy to establish a vision for infrastructure technologies. This strategy should consider and assess any existing ITS implemented by the city and research any emerging technology applications for traveler information, data analytics and operations such as parking reservation and payment, as well as to consider both current and future traveler information needs for route and mode choice decision making.

Costing

The timing and phasing of the proposed transportation improvements in this TMP are based on the current land use development phasing and associated employment and population growth projections. The costs of the TMP are estimated at \$2.04 Billion (2019 dollars) based on a high-level assessment of the transportation infrastructure requirements identified in this plan. The total costs, which are outlined in Table ES-2, are categorized into the following projects: roadway, transit, active transportation and trails.

Table ES-2 Cost Estimate and Breakdown by Phase

Phase	Roadway	Transit	Active Transportation & Trails	Total
2019-2023	\$676.7	\$31.1	\$28.2	\$736.0
2024-2041	\$987.0	\$199.2	\$122.0	\$1,308.2
Total	\$1,663.7	\$230.3	\$150.2	\$2,044.2

Notes:

1. Costs are in millions of dollars.
2. Where applicable, the following factors were applied to each capital project's cost: construction contingency (30%), design/engineering allowance (15%), city project management (5%), contract administration and site inspection (10%), outreach (\$50,000 per year), and HST (1.76%).

Implementation

The implementation of the TMP is intended to be undertaken as a collaborative and coordinated effort between City staff and its partners. A clearly documented process and set of tools are needed to ensure that implementation is consistent and maintained on an on-going / annual basis. Identifying timelines of when projects will take place and identifying priorities is a critical component to successfully achieving the goals and outcomes of the TMP.

TRANSIT

The implementation of the Core and Supporting Transit Network should be phased to proactively respond to intensification and changing travel demands within the City of Barrie. To influence change in travel behaviour and make transit a convenient and attractive alternative to auto travel, many of the proposed changes could be implemented in phases. However, to achieve the targeted 2041 mode share, significant changes from the existing network should occur by 2031.

The following items are key component for the successful implementation of the recommended Transit System:

- Improved service frequency during peak hours, especially to and from critical destination points within the City.
- Technology improvements such as contactless payment methods and integration of automation in the transit fleet.
- Non-Peak Service through the implementation of less frequent fixed routes or switching to either rideshare integration or on-demand transit.
- Coordination with Metrolinx and surrounding Regional Transit Agencies.

ACTIVE TRANSPORTATION AND TRAILS

The AT network timelines are meant to be flexible and used to inform future decision-making and prioritization for active transportation projects. The phasing timeline for AT projects is organized into three phases:

- Short Term – 2019-2023
- Medium Term – 2024-2031
- Long Term – 2032-2041

Table ES-3 provides an overview of the proposed facility types by phase. The exact timing of projects should be determined by City staff and Council as they move forward with the implementation of active transportation and trails infrastructure. It is recommended that the implementation plan identified in the AT Strategy (Appendix B) and the Trails Master Plan (Appendix C) be updated on an annual basis to ensure the projects identified are feasible based on available budgets and resources, and where possible coordinated with other capital infrastructure projects.

Table ES-3 Proposed Phasing Plan

Facility Type	Short Term KM	Medium Term KM	Long Term KM	Total (KM)
	2019-2023	2024-2031	2032-2041	
Sidewalk	24.8	47.4	70.3	142.5
Signed Routes	34.8	1.1	0.3	36.2
Urban Shoulders	4.3	0	0	4.3
Bike Lanes	33.4	35.7	1.2	70.3
Buffered Bike Lanes	30.5	24.4	25.2	80.2
Cycle Tracks	10	8.2	26.8	45.1
Off-Road Trails	1.6	33.9	34.1	69.6
Types 1-3	1.4	31.5	30.5	63.4
Types 4-5	0.2	2.4	3.6	6.3
Trail Bridge over Hwy. 400	0	0	0.2	0.2
In-Boulevard Pathways	11.9	15.4	9	36.3
Total	151.3	166	167.3	484.7

ROAD IMPROVEMENTS

The following major improvements are critical to address capacity needs and are required for prioritization:

- By 2031:
 - St. Vincent Street crossing widening from Sperling Drive to south of Bell Farm Road
 - Tiffin Street widening from Ferndale Drive North to Bradford Street
 - Lakeshore Drive widening from Bradford Street to Bay Lane
 - Essa Road widening from Tiffin Street to Ardagh Road
 - Salem Road / Lockhart Road Crossing, from Veterans Drive to Huronia Road
 - Wellington Street widening from Sunnidale Road to Bayfield Street
 - Dunlop Street widening from west of Cedar Pointe Drive to Anne Street
 - Bayfield Street widening from Cundles Road to Grove Street
 - Harvie Road / Big Bay Point Road widening from Bryne Drive to Bayview Drive
 - Mapleview Drive widening from Huronia Road to east of Prince William Way
 - McKay Road widening from Veterans Drive to Welham Road
 - Huronia Road widening from Big Bay Point Road to City south limits
- Post 2031:
 - Dunlop Street widening from Ferndale Drive North to Anne Street
 - Big Bay Point widening from Bryne Drive to Huronia Road
 - McKay Road widening from Veterans Drive to Huronia Road
 - Mapleview Drive widening from Huronia Road to Prince William Way

- Lockhart Road widening from Huronia Road to Prince William Way
- Huronia Road widening from Big Bay Point Road to City South Limits

SUMMARY

The implementation of the recommended improvements of the TMP will be dependent on the timing of necessary approvals, the identification of available funding, and the prioritization of these initiatives relative to other departmental and corporate needs. In some cases, additional approvals may be required from the County or the Province if the proposed improvements could affect their infrastructure and operations.

Table of Contents

EXECUTIVE SUMMARY	1
1. SETTING THE CONTEXT: THE NEED FOR THE TRANSPORTATION MASTER PLAN... 1	1
1.1 Changes in Growth Projection and Allocation	2
1.2 Study Purpose	7
1.3 Project Team	7
1.4 Study Area	8
1.5 Environmental Assessment Process	11
2. SUPPORTING POLICIES	15
2.1 Province of Ontario	15
2.1.1 Growth Plan	15
2.1.2 Ministry of Transportation, Ontario	16
2.2 City of Barrie	17
2.2.1 Barrie Official Plan, 2018	18
2.2.2 Background Studies	18
2.3 County of Simcoe	22
2.3.1 County of Simcoe Transportation Master Plan Update, 2014	22
2.3.2 County of Simcoe Official Plan, 2017	22
2.4 Metrolinx	23
3. THE CITY OF BARRIE TODAY	25
3.1 Travel Patterns	25
3.1.1 Trip Distribution	25
3.1.2 Travel Modes	26
3.2 Transit Network	29
3.2.1 Barrie Transit	29
3.2.2 GO Transit	33
3.3 Active Transportation and Trails Network	35
3.4 Road Network	41
3.4.1 Roadway Classification	41
3.4.2 Highway 400 Interchanges	47
3.5 Railway Crossings	48
4. TRANSPORTATION FORECASTING	51
4.1 Implemented Improvements from 2014 MMATMP	51

4.2	Future Planned Transportation Projects.....	52
4.2.1	Barrie Transit	52
4.2.2	Metrolinx / GO Transit.....	52
4.2.3	Planned Road Network Improvements.....	53
4.3	Modelling Approach	60
4.3.1	Emme Macro Modelling	60
4.3.2	Aimsun Micro Modelling.....	62
4.3.3	Synchro Traffic Operations Assessment	63
5.	DEVELOPMENT OF TRANSPORTATION NETWORKS	65
5.1	Selection of the Preferred Alternative (2014 MMATMP).....	65
5.2	Consultation.....	67
5.2.1	Background – 2014 MMATMP	67
5.2.2	Current Transportation Master Plan.....	67
5.2.3	Consultation Approach.....	67
5.2.4	Consultation Summary.....	72
5.2.5	Notice of Study Completion and Staff Report.....	72
5.3	Transit Network.....	73
5.3.1	Future Service Development.....	73
5.3.2	2041 Preferred Transit Network	73
5.3.3	Changes Between 2031 And 2041 Networks.....	77
5.3.4	Barrie Transit – Future Ready.....	77
5.3.5	Integrating Active Transportation and Transit.....	78
5.4	Active Transportation and Trails Network.....	79
5.4.1	Developing the Network.....	79
5.4.2	Network Users	86
5.5	Road Network.....	87
5.5.1	Development of Future Road Network	87
5.5.2	Creation of Road Network Alternatives	89
5.5.3	2041 Preferred Road Network	90
5.5.4	Proposed HOV Lanes and Transit Priority	113
5.5.5	Phasing Road Networks by 2031	117
5.6	Railway Crossings	129
6.	ROADWAY RIGHT-OF-WAY	135
6.1	Standard Cross-Section Designs	135
6.2	Future 2041 Right-Of-Way.....	135

6.3	Protection for Future Right-of-Way beyond 2041	139
7.	TRANSPORTATION POLICY RECOMMENDATIONS	141
7.1	Complete Streets	141
7.2	Traffic Calming.....	142
7.2.1	Road Diets	142
7.3	Transportation Demand Management.....	144
7.3.1	Develop TDM Guidelines	145
7.3.2	Potential TDM Measures	145
7.3.3	Development Approval Process.....	146
7.3.4	Parking Pricing.....	147
7.3.5	TDM Policy Recommendations.....	147
7.4	Intelligent Transportation Systems	148
8.	IMPLEMENTATION AND PHASING.....	149
8.1	Transit Network.....	149
8.2	Active Transportation and Trails.....	150
8.3	Road Improvement Projects.....	152
8.4	Financial Investment.....	154

LIST OF APPENDICES

- A Transit Technical Memorandum
- B Active Transportation Strategy
- C Trails Master Plan
- D Railway Crossings Assessment Technical Memorandum
- E Emme Macro Modelling and Improvements Rationale Technical Memorandum
- F 2014 MMATMP Transportation Network Alternatives
- G Consultation
- H Roadway and Transit Costing Technical Memorandum
- I Class EA Process and Identification of Project Schedules

LIST OF TABLES

Table 1-1	Intensification Areas.....	3
Table 1-2	Five Phases of the Municipal Class Environmental Assessment Process.....	11
Table 1-3	Four Schedules of the Class EA Process.....	13
Table 3-1	Summary of AM Peak Period Travel Patterns.....	26
Table 3-2	Summary of Barrie's Existing Active Transportation Network.....	35
Table 3-3	Existing Highway 400 Interchanges and Crossings within the City of Barrie.....	47
Table 3-4	Existing Railway Crossings.....	48
Table 4-1	Completed Road Widening Improvements, as of 2017.....	51
Table 4-2	Road Capacity and Network Improvements on Highway 400 Corridor and Interchanges, Recommended in MTO 2017 TESR Update.....	54
Table 4-3	Changes in MTO-Recommended Improvements.....	55
Table 4-4	Road Improvements Recommended in Simcoe County 2014 TMP.....	58
Table 4-5	Planned Road Improvements from 2019 to 2028, City of Barrie Capital Plan.....	59
Table 4-6	Category and Source of Population and Employment Forecast Inputs.....	61
Table 5-1	2014 MMATMP Alternatives with Target Modal Shares.....	66
Table 5-2	Future 2041 Modal Share Targets.....	66
Table 5-3	Barrie Active Transportation Network Development Process.....	79
Table 5-4	Overview of the Proposed AT Network.....	85
Table 5-5	Summary of User Systems.....	86
Table 5-6	Criteria and Rationale for Identifying Roadway Improvements.....	88
Table 5-7	Proposed Road Classification Criteria.....	91
Table 5-8	Changes of Road Classification from 2014 MMATMP.....	92
Table 5-9	Proposed Improvements to Highway 400 Interchange Ramps and Crossings, Horizon 2041.....	103
Table 5-10	Proposed Improvements to City Roads, Horizon 2041.....	106
Table 5-11	Proposed HOV Lanes, 2041.....	114
Table 5-12	Prioritization and Timings of Proposed 2031 Road Improvements.....	124
Table 5-13	GCS Specified Crossing Protections.....	129
Table 5-14	Warranted Railway Protection for 2031 and 2041.....	130
Table 5-15	Prioritization of crossings for grade separation in 2041.....	131
Table 6-1	Future Roadway ROW Protection.....	139
Table 7-1	2041 Proposed Road Diet Locations.....	144
Table 7-2	Example of TDM Measures Matrix.....	146
Table 7-3	Transportation Costs.....	147
Table 8-1	Proposed Phasing Plan.....	151
Table 8-2	EA Schedule B Projects.....	153
Table 8-3	TMP Capital Cost Estimates.....	154

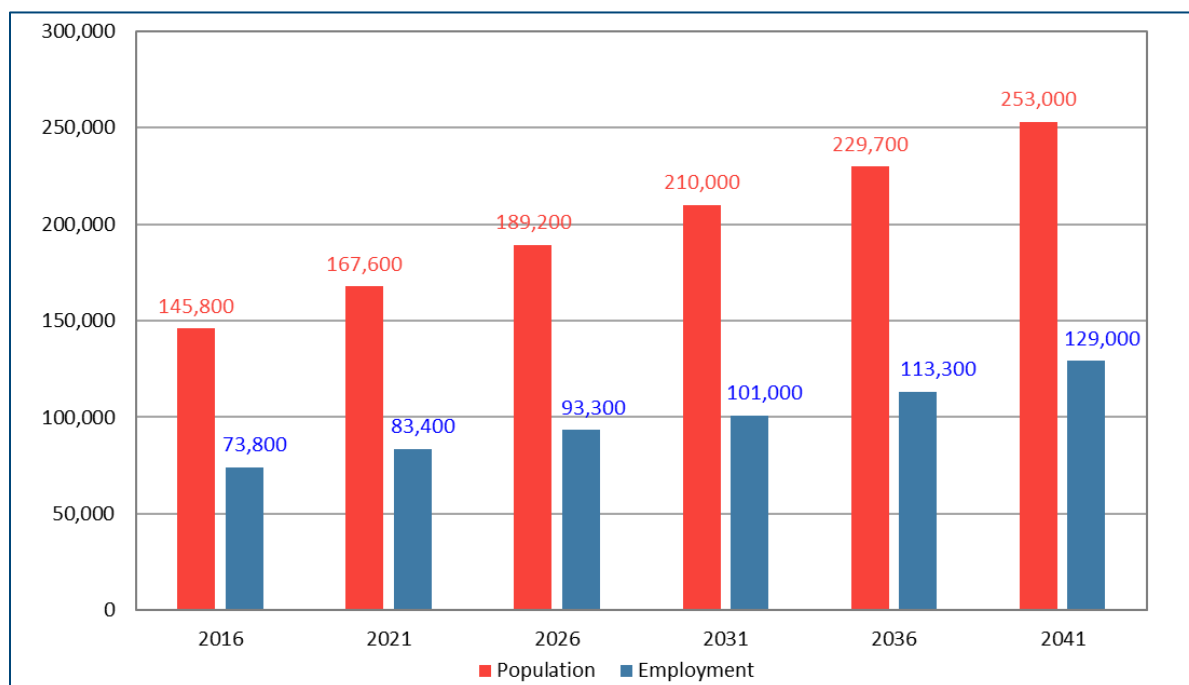
LIST OF FIGURES

Figure 1-1	Barrie Population and Employment Forecasts to 2041.....	1
Figure 1-2	Future Planned Growth Areas.....	5
Figure 1-3	Study Area.....	9
Figure 1-4	Municipal Class Environmental Assessment Process.....	12
Figure 3-1	Existing (2016) Mode Share of All Trips to or from Barrie.....	27
Figure 3-2	Existing (2016) Mode Share of York Region and Toronto Trips to or from Barrie.....	27
Figure 3-3	Historical (2006) Mode Share of York Region and Toronto Trips to or from Barrie.....	28
Figure 3-4	Existing Barrie Transit System Map.....	31
Figure 3-5	GO Transit System Map (GO Transit, 2018).....	34
Figure 3-6	Existing and Previously Proposed Cycling and Multi-Use Trail Network.....	37
Figure 3-7	Existing and Previously Proposed Sidewalk and Multi-Use Pathways Network.....	39
Figure 3-8	Existing Roadway Classifications.....	43
Figure 3-9	Existing (2016) Total Number of Lanes.....	45
Figure 3-10	Existing Railway Crossings.....	49
Figure 4-1	Future Planned GO Rail Service in the City of Barrie.....	53
Figure 4-2	Concept of Mapleview Drive Diverging Diamond Interchange.....	56
Figure 5-1	2041 Proposed Transit Network.....	75
Figure 5-2	Cycling and Multi-Use Trail Network.....	81
Figure 5-3	Sidewalk and Multi-Use Trail Network.....	83
Figure 5-4	Road Classification, Proposed Preferred Network - 2041.....	93
Figure 5-5	Total Number of Vehicle Lanes, Proposed Preferred Network - 2041.....	97
Figure 5-6	Change in Vehicle Lanes from 2016, Proposed Preferred Network – 2041.....	99
Figure 5-7	Changes in Proposed Vehicle Lanes from 2014 MMATMP.....	101
Figure 5-8	Proposed HOV Lanes and Transit Priority Features.....	115
Figure 5-9	Total Number of Vehicle Lanes, Proposed Preferred Network – 2031.....	119
Figure 5-10	Changes in Vehicle Lanes from 2016, Proposed Preferred Network – 2031.....	121
Figure 5-11	2041 Warranted Protection at Railway Crossings.....	133
Figure 6-1	Future 2041 Right-Of-Way.....	137
Figure 7-1	Hurst Drive Road Diet Implementation.....	143

1. SETTING THE CONTEXT: THE NEED FOR THE TRANSPORTATION MASTER PLAN

The City of Barrie, located along the western shores of Lake Simcoe, has been one of the fastest-growing communities in all of Canada. With the addition of the secondary plan areas to the southern portion of the City, the current population is expected to grow from approximately 145,800 to **253,000 PERSONS** by 2041, which is illustrated in Figure 1-1. This increase will meet the growth targets identified in the 2017 Growth Plan for the Greater Golden Horseshoe (GGH) area. The expanded City boundary primarily consists of agricultural land uses to be urbanized into future residential and employment uses.

Figure 1-1 Barrie Population and Employment Forecasts to 2041



Source: City of Barrie

The provincial government designated the City as an Urban Growth Centre (UGC); employment within Barrie is set to reach **129,000 JOBS** by 2041. UGCs are areas that will be focal points for investment in institutional and region-wide public services, as well as commercial, recreational, cultural and entertainment uses. In addition, they will serve as major employment centres, support major transit infrastructure and accommodate a significant share of population and employment growth.

The City's first Multi-Modal Active Transportation Master Plan (MMATMP) was developed in 2014, in accordance with the Municipal Class Environmental Assessment (EA) process. The 2014 MMATMP assessed and recommended improvements to the active transportation, transit, and roadway networks to meet the projected future travel demand, accommodate development outside the existing built boundary, and promote intensification within the built boundary by 2031.

1.1 Changes in Growth Projection and Allocation

The City has experienced rapid development and expansion in the past 20 years with land uses generally segregated in different parts of the City. The commercial areas are mostly concentrated along Bayfield Street, portions of Yonge Street, and near the Dunlop Street and Mapleview Drive interchanges. The industrial areas are mainly clustered near Highway 400 south of the Dunlop Street 400 interchange. The rest of the City is mostly comprised of residential areas, most of which are single-family and low-density developments.

The 2014 MMATMP planned for significant growth in Barrie's population and employment, including 210,000 residents and 100,000 jobs by 2031. Most of the projected population growth was expected within the secondary plan areas and greenfield areas, as specified by the 2006 Growth Plan for the Greater Golden Horseshoe and Simcoe Area.

The 2017 Growth Plan identified the following changes in density allocations and growth locations:

- 1 A minimum density target of **80 RESIDENTS AND JOBS COMBINED PER HECTARE**, an increase from 50 residents and jobs combined per hectare, was identified for Greenfield Areas.
- 2 The growth allocation was changed from the 2006 allocation of 60 percent in the Greenfield Area and 40 percent in the Intensification Area to **40 PERCENT IN THE GREENFIELD AREA** and **60 PERCENT IN THE INTENSIFICATION AREA**.

The above changes have also resulted in changes to the allocation of future population and employment forecasts within the City for the 2031 horizon year.

Several areas have been designated for intensification to create mixed-use communities that support the higher population and employment densities within a more transit-supportive development and reduce the reliance on automobiles. The future planned growth areas are categorized based on the associated development densities as per the City's Official Plan Schedule I – Intensification Areas, dated January 2018; the future growth areas are summarized in Table 1-1 and illustrated in Figure 1-2.

Table 1-1 Intensification Areas

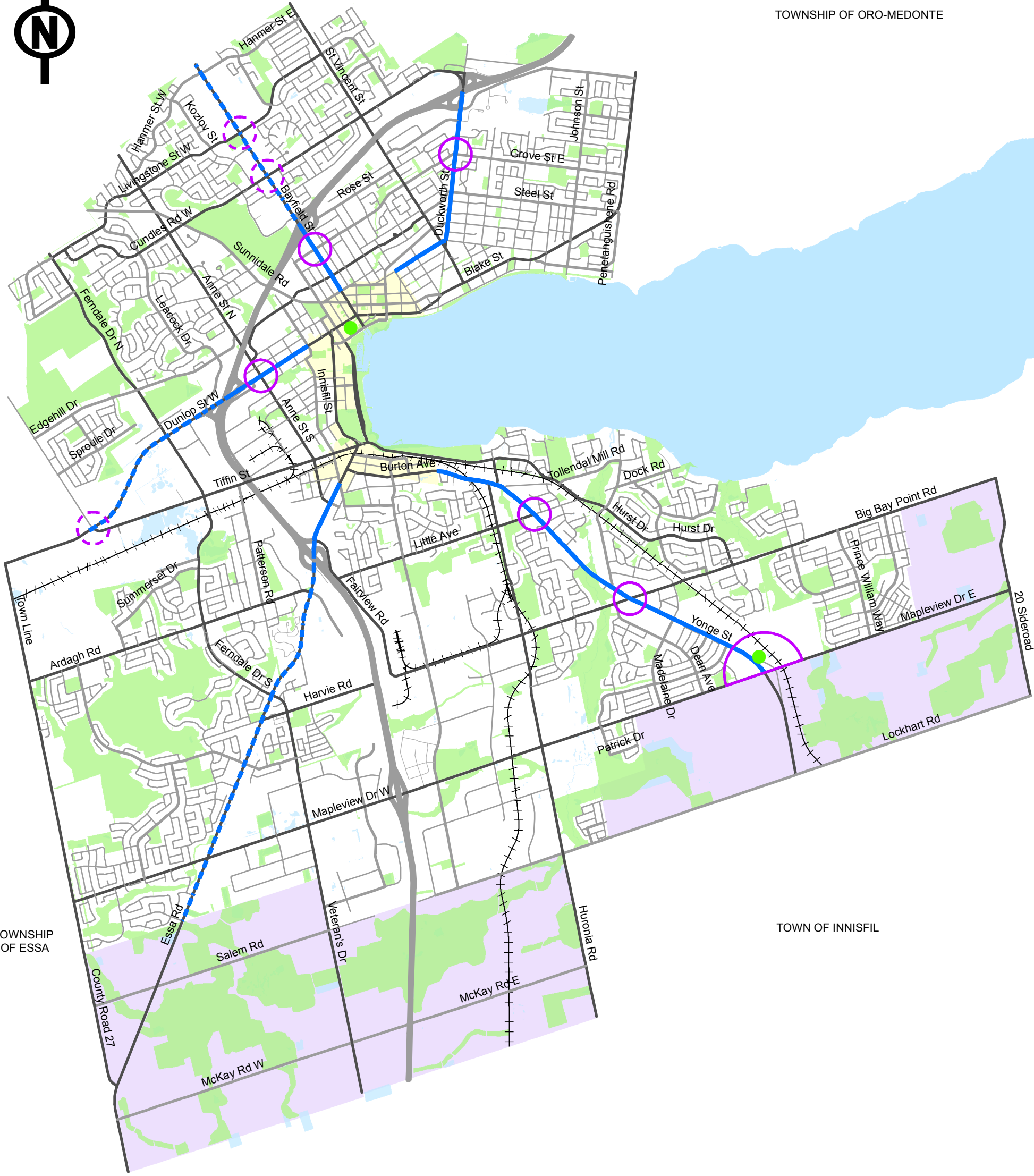
Intensification Category	Location	From/To
Major Transit Stations	Barrie South and Allandale Stations	-
Primary Corridor	Yonge Street	Mapleview/Burton
	Essa Road	Highway 400/Innisfil
	Dunlop Street West	Highway 400/Eccles
	Bayfield Street	Highway 400/Sophia
	Duckworth Street	Highway 400/Penetang
Secondary Corridor	Essa Road	Salem Lands/ Highway 400
	Dunlop Street West	Western Limits/ Highway 400
	Bayfield Street	Northern Limits/ Highway 400
Primary Node	Barrie South GO	-
	Yonge/Big Bay Point	-
	Yonge/Little	-
	Dunlop/Anne	-
	Bayfield/Grove	-
	Duckworth/Grove	-
Secondary Node	Miller/Tiffin	-
	Bayfield/Cundles	-
	Bayfield/Livingstone	-
Urban Growth Centre	Downtown / Allandale	-

Source: Barrie OP Schedule I – Intensification Areas, March 2017

Given the changes of density and growth allocations by 2031 discussed in the section above, and additional growth to 2041, the transportation network and infrastructure within Barrie will need to be re-assessed and updated to accommodate the future population and employment growth, changes to mobility forms and travel patterns, and the City's transportation vision within the Official Plan:

“To maintain and enhance transportation links within the City and beyond which are vital to the economic strength and well-being of our community. Provide public transportation systems that are safe, accessible and convenient, and continue to work with our Provincial and Federal partners to ensure transit options are available for seamless inter-municipal transportation of both people and goods.

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Intensification Corridor

- Primary Corridor (50 Units per ha)
- - - Secondary Corridor (50 Units per ha)

Intensification Node

- Major Transit Stations (50-120 Units per ha)
- Primary Node/Major Transit Node (50-120 Units per ha)
- Secondary Node (50-120 Units per ha)

Growth Area

- Urban Growth Centre (150 persons/jobs per ha)
- Secondary Plan Areas

Transportation Features

- Provincial Highway
- Arterial Road
- Collector Road
- Local Road
- Private Road
- Railway

Other Features

- Park / Open Space
- Water

Data Sources: City of Barrie Official Plan Schedule I Intensification Areas, January 2018
 Date Updated: April, 2019
 Project: 171-08853-00
 Map Created By: WSP Thornhill

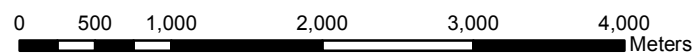


Figure 1-2
 Future Planned Growth Areas
 City of Barrie Transportation Master Plan



1.2 Study Purpose

The TMP is a comprehensive document that reviews the City's Vision for all modes of transportation, identifies existing gaps and needs related to growth, assesses various network alternatives, and proposes a recommended plan of action for all modes of transportation. The primary goal of this study is to produce a "multi-modal vision for the City of Barrie" that is influenced by the movement of people rather than vehicles, which in turn will support the economy of the City. The purpose of the study is not to provide innovation for the sake of innovation alone, but to achieve safe, sustainable (environment and finance), healthy and affordable transportation choices that support economic drivers.

As previously noted, the 2014 MMATMP was completed to assess the existing and future transportation needs to the 2031 horizon year. For this TMP, the main objectives will be to:

- 1 Document the current transportation conditions.
- 2 Update the 2014 MMATMP assessment for 2031.
- 3 Assess and recommend transportation requirements for the 2041 horizon year.
- 4 Prioritize the transportation improvements for the 2036 horizon year.

New initiatives, such as the Regional Express Rail Project, are also to be accounted for in this study.

1.3 Project Team

The Project Team met regularly over the course of the study to provide opportunities to identified agencies and City departments to provide input throughout the Master Plan process. The Project Team includes the following participants:

- City of Barrie Project Coordinator
- City of Barrie Engineering
- City of Barrie Traffic/Parking
- City of Barrie Parks Planning (Active Transportation)
- City of Barrie Transit
- WSP Canada Group Ltd. (Project Consulting Firm)
- Ontario Ministry of Transportation (MTO)
- Metrolinx
- Watson & Associates Economists Limited (Watson)

Watson has provided the Growth Projection & Financial Policy Review, which analyzed long-term population and employment growth forecasts to ensure planning assumptions and outputs are in alignment with engineering benchmarks. Watson has also provided information and inputs regarding the costing of proposed improvements. Additionally, Watson has reviewed and assessed capital works to assess the transportation outcomes related to the results of the recommended transportation demand management (TDM) and active transportation policies, and

implementation measures. The capital works are assessed based on growth versus non-growth components.

1.4 Study Area

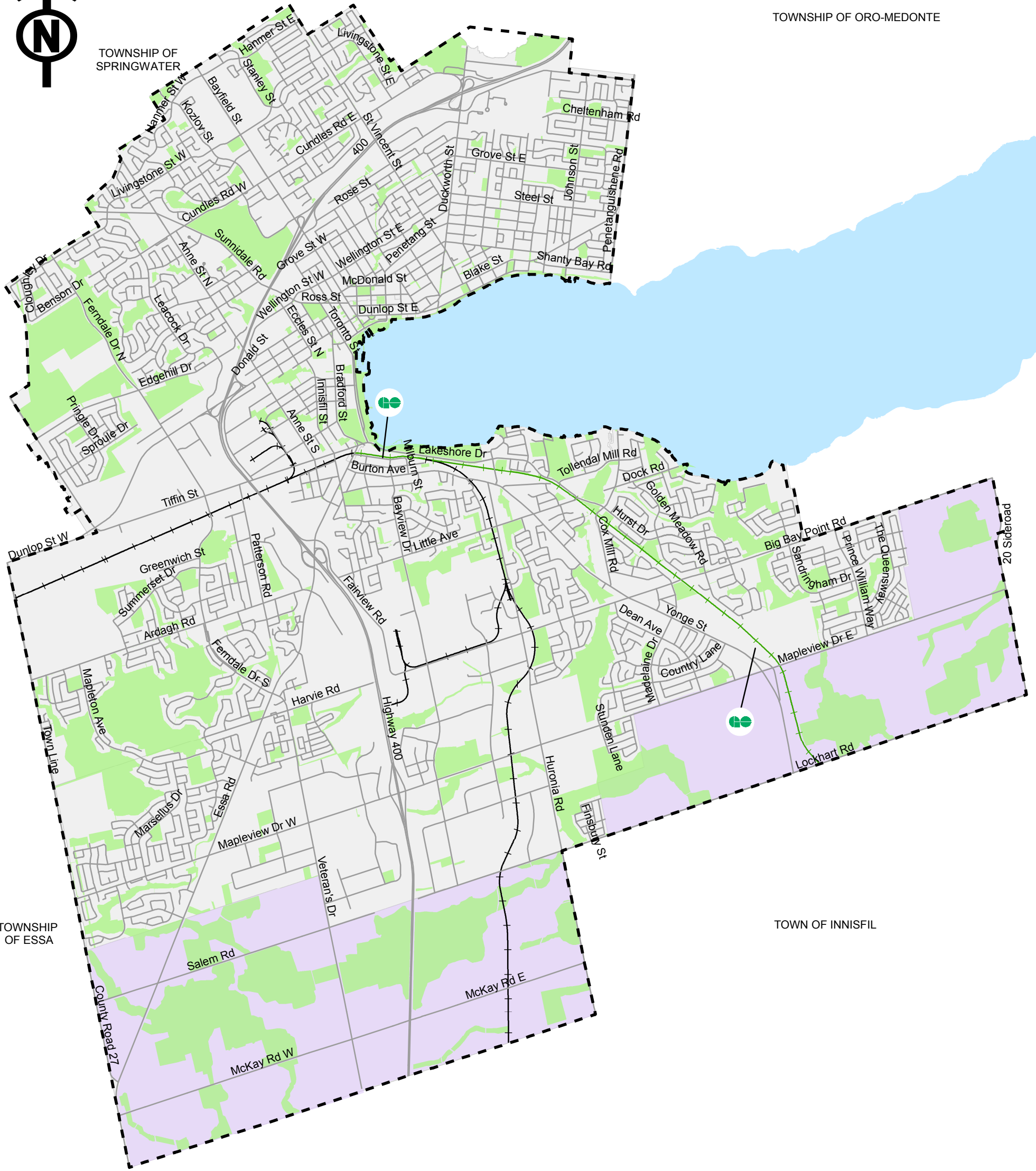
The study area is the entire City of Barrie, which was expanded to include approximately 2,300 hectares of land to the south in January 2010. Barrie sits on the west shore of Lake Simcoe, surrounded by several smaller townships. The Township of Oro-Medonte is located to the northeast, the Township of Springwater is located to the northwest, the Township of Essa is located to the southwest and the Township of Innisfil is located to the southeast. The study area and location is illustrated in Figure 1-3. Most of the growth in Barrie will occur in the expanded City boundary.

This study has reviewed the local area and identified areas of concern such as the growing congestion near the Highway 400 interchanges due to the accelerated population and employment growth. As such, focus will be on intersections and roadways along or near Highway 400 interchanges and crossings, the railway crossings, the secondary plan areas, and the City's transit and active transportation networks.



TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE



TOWNSHIP OF ESSA

TOWN OF INNISFIL

Transportation Features

- Roads
- GO Station
- GO Transit Railway
- BCRY Railway

Natural Features

- Park / Open Space
- Water

Other Features

- Secondary Plan Areas
- Study Area

Date Updated: Monday, April 08, 2019
Project: 171-08853-00
Map Created By: WSP Thornhill

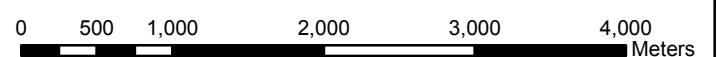


Figure 1-3
Study Area
City of Barrie Transportation Master Plan



1.5 Environmental Assessment Process

The TMP has been prepared in accordance with the Municipal Class Environmental Assessment (MCEA) process, as prescribed in the “Class Environmental Assessment for Municipal Road projects, October 2000, as amended in 2007 and 2011” document. The Study was completed with a coordinated approach with the City’s planning process, ensuring that the principles and public input was considered for future transportation infrastructure assessments.

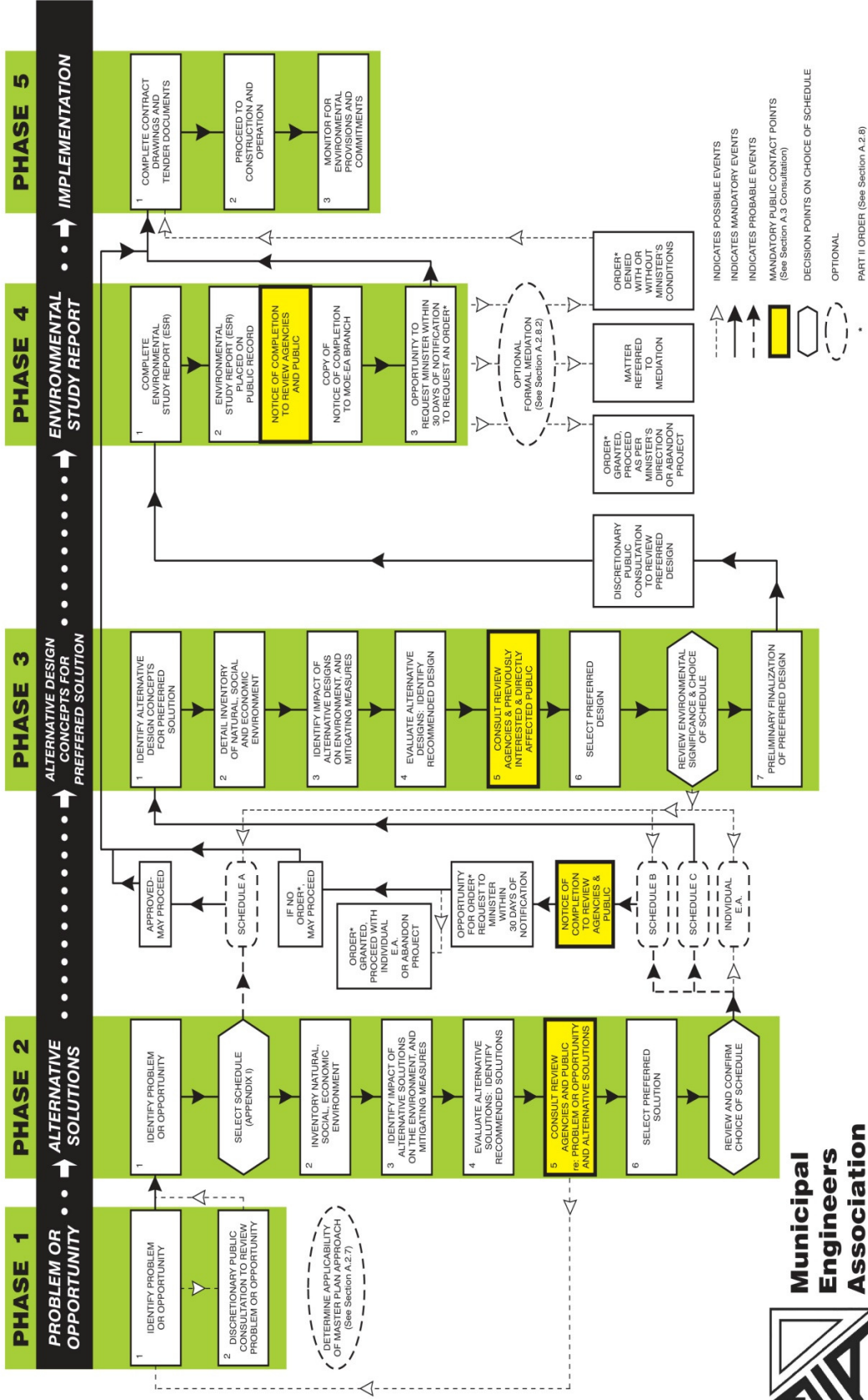
A Transportation Master Plan (TMP) is a long-range strategic plan that integrates transportation infrastructure in a large study area, scheduled to be implemented over a set period. A long-term plan is defined as “a document that identifies the needs for transportation infrastructure, services or programmes for an urban area, commonly over a horizon of 10-plus years or even longer” by the Transportation Association of Canada’s “Best Practices for Technical Delivery of Long-Term Transportation Planning Studies in Canada”. It is a plan developed based on an estimation of forecasted traffic or travel, the identification of needs in transportation capacity or services, the assessment of alternate scenarios to meet these needs, and the selection of a recommended Transportation Plan according to an established set of evaluation criteria.

The MCEA process, as described in Table 1-2 and illustrated in Figure 1-4, includes five phases: problem or opportunity, alternative solutions, alternative design concepts for preferred solution, environmental study report, and implementation. The first two phases are addressed in this TMP.

Table 1-2 Five Phases of the Municipal Class Environmental Assessment Process

Phase	Description of Phase
1	<u>Problem or Opportunity</u> : Identify the problem or opportunity.
2	<u>Alternative Solutions</u> : Identify alternative solutions to the problem, by taking into consideration the existing environment, and establish the preferred solution providing for public and agency review and input. At this point, determine the appropriate Schedule for undertaking and/or identify the approval requirements; proceed through the following Phases for Schedule C projects.
3	<u>Alternative Design Concepts for Preferred Solution</u> : Examine alternative methods of implementing the preferred solution, based upon the existing environment, public and government agency input, anticipated environmental effects and methods of minimizing negative impacts and maximizing positive effects.
4	<u>Environment Study Report</u> : Document, in an Environment Study Report a summary of the rationale, planning, design and consultation process of the project as established through the above Phases and make such documentation available for scrutiny by review agencies and the public.
5	<u>Implementation</u> : Complete contract drawings and documents, and proceed to construction and operation; monitor construction for adherence to environmental provision and commitments. Where special conditions dictate, also monitor the operation of the complete facilities.

MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS



A Class EA for a Master Plan requires the completion of Phase 1 (Problem Identification) and Phase 2 (Alternative Solutions) of the five phases of the MCEA process. Depending on the scope and level of analysis in a Master Plan, the requirements of Phases 1 and 2 may be satisfied for projects identified through this process. The Class EA process addresses projects by classifying them into four different “schedules” according to their environmental significance: Schedule A, A+, B and C. The level of complexity and the potential effects of a project will determine the appropriate schedule that in turn will determine which phases will need to be addressed. Table 1-3 details the four schedules of the Class EA process.

Table 1-3 Four Schedules of the Class EA Process

Schedule	Summary
A	<u>Schedule A</u> : Projects are limited in scale, have minimal adverse environmental effects and include many municipal maintenance and operational activities. These projects are pre-approved and may proceed to implementation without following the full Class EA planning process. Schedule A projects generally include normal or emergency operational and maintenance activities.
	<u>Schedule A +</u> : The purpose of Schedule A+ is to ensure some type of public notification for certain projects that are pre-approved under the Municipal Class EA, it is appropriate to inform the public of municipal infrastructure project(s) being constructed or implemented in their area. There, however, would be no ability for the public to request a Part 2 Order. If the public has any comments, they should be directed to the municipal council where they would be more appropriately addressed.
B (<\$2.4M)	The proponent is required to undertake a screening process, involving mandatory contact with directly affected public and with relevant government agencies to ensure that they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation. Schedule B projects generally include improvements and minor expansions to existing facilities. However, if the screening process raises a concern which cannot be resolved, a Part II Order may be invoked; alternatively, the proponent may elect voluntarily to plan the project as a Schedule C undertaking.
C (>\$2.4M)	Such projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Class EA document. Schedule C projects require that an Environmental Study Report (ESR) be prepared and filed for review by the public and review agencies. Schedule C projects generally include the construction of new facilities and major expansions to existing facilities.

Source: Municipal Class Environmental Assessment, October 2000, as amended in 2007, 2011 & 2015

The schedules increase according to the potential impact and level of environmental effects. A Master Plan fulfills the requirements of Phases 1 and 2 of the Class EA process for any identified Schedule B or C projects. Schedule B and C projects would have to fulfill Phases 3 and 4 of the MCEA process prior to filing an ESR for public review. This involves a 30-day public review period with a Part II Order appeal mechanism, where an individual can request the Minister of the Environment to require the project to undergo a more detailed EA investigation.

This TMP was conducted under Approach #2 of the MCEA process, which will serve to fulfil Phases 1 and 2 of the Municipal Class EA process with a level of consultation and documentation sufficient to fulfil the requirements for Schedule B projects. The final public notice for the study would also be the Notice of Completion for all the Schedule B projects within it. The TMP will provide the basis for future investigations for the specific Schedule C projects identified within it.

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2. SUPPORTING POLICIES

The Barrie TMP is shaped by numerous principles, practices and inputs that influence the development, outcomes and recommendations contained in this document. This section provides an overview of the policies that inform land use and transportation planning within Barrie.

2.1 Province of Ontario

2.1.1 Growth Plan

The Growth Plan for the GGH area, dated May 2017, which was prepared and approved under the Places to Grow Act, sets out a vision for the GGH to become a great place to live by 2041, supported by a strong economy, a clean and healthy environment, and social equity. The Plan guides decisions on a wide range of issues such as transportation, infrastructure planning, land-use planning, urban form, housing, natural heritage, and resource protection. The Growth Plan seeks to support and foster complete communities, a thriving economy, a clean and healthy environment, and social equity in the GGH area.

The Plan provides policy objectives to guide the planning and development of an integrated and efficient transportation system that supports a vibrant economy and high quality of life in the GGH region. These objectives detail the following:

- Economic development and competitiveness in the GGH will be promoted through planning for employment, surface parking will be minimized, and the development of active transportation networks and transit-supportive built form will be facilitated.
- New development taking place in designated greenfield areas will be planned, zoned and designed in a manner that supports transit and active transportation.
- The transportation system within the GGH area will be planned and managed to offer a balance of transportation choices that reduces reliance on the automobile and promotes transit and active transportation.
- Municipalities will develop and implement TDM policies in OPs or other planning documents or programs to prioritize active transportation, transit, and goods movement over single-occupant automobiles.
- Municipalities will work with the province, transportation services and relevant agencies to provide:
 - A co-ordinated approach to improving goods movement corridors and ensuring the long-term viability of major goods movement facilities when moving goods across the GGH.
 - A transportation system planning approach which will prioritize and support multimodal goods movement for freight supportive land use.
 - Priority routes for goods movement, which facilitate the movement of goods into and out of municipal employment areas, and other areas of significant commercial activity and to provide alternate routes connecting to the provincial network.
- Municipalities will ensure that active transportation networks are comprehensive and integrated into the transportation planning process to provide:
 - Safe, comfortable travel for pedestrians, cyclists, and other users of active transportation.

- Continuous linkages between strategic growth areas, adjacent neighbourhoods, major trip generators, and transit stations, including dedicated lane space for cyclists on the major street network, or other safe and convenient alternatives.
- New public service facilities, including hospitals and schools, should be in settlement areas. Preference should be given to sites that are easily accessible by active transportation and transit, where service is available.
- Single-tier municipalities will develop policies in their OPs to identify actions that will reduce greenhouse gas emissions and address climate change adaptation goals, aligned with the 2015 Ontario Climate Change Strategy, and the 2015 Climate Change Action Plan, that will include reducing dependence on the automobile, and supporting existing and planned transit and active transportation.
- Municipalities with primary settlement areas will, in their OPs and other supporting documents, ensure the development of high quality urban form and public open spaces within primary settlement areas through site design and urban design standards which create attractive and vibrant places that support walking, and cycling for everyday activities.

2.1.2 Ministry of Transportation, Ontario

The Transportation Environmental Study Report (TESR) Addendum for the Highway 400 Improvements from 1km South of Highway 89 to Highway 11 is a Class EA and Preliminary Design Study Update conducted by the MTO that is currently underway. This Addendum is a study update to the approved 2004 TESR, incorporating future (2031) traffic projections and addressing associated capacity, operational and safety needs.

The 2017 TESR examines the nature of improvements required to address traffic operations, capacity, and safety needs along the 30-km section of Highway 400 from 1 km south of Innisfil Beach Road to Highway 11. A set of alternatives to address the widening and improvements were developed and evaluated in the 2017 TESR. These alternatives were generated and evaluated based on technical and environmental factors, consultation with the public, stakeholders, municipalities, and government agencies. This led to a preferred alternative and a recommended plan for the Highway 400 corridor.

The recommendation was to widen Highway 400 to 10 lanes (four general purpose lanes and one High Occupancy Vehicle (HOV) lane in each direction), transitioning to eight general purpose lanes at the junction of Highway 11 in the long term beyond 2031. The addition of lanes to the Highway 400 mainline will require the widening and replacement of bridges, culverts, and other structures that cross the highway within the study limits. Additionally, improvements will be required at the current interchanges to accommodate the proposed widening and provide adequate traffic operations.

The following interchanges were recommended for improvements:

- Bayfield Street
- Dunlop Street
- Essa Road
- Mapleview Drive (conversion to a Divergent Diamond Interchange)
- Innisfil Beach Road (south of Barrie)

2.2 City of Barrie

The City of Barrie is guided by a community vision that provides the foundation for the future of community development. This will ensure that the City's viability can be maintained in the future; the vision promotes sustainable economic development, community growth and a healthy environment. Barrie is guided by the following principles, as per the City's Official Plan:

Community Safety and Security

Develop quality comprehensive services, facilities and programs for Barrie residents and communities, through effective delivery and cost-efficient protection.

Economic Development for a Prosperous Future

Emphasise the strong economic link between the waterfront and the downtown to promote a diversified economy, which supports existing businesses and encourages opportunities for new businesses.

Waterfront Excellence

Further develop the waterfront to promote public ownership, recreation, tourism, downtown revitalization, and community access.

Clean and Healthy Environment

Encourage sustainable use of Barrie's land, air, and water resources to promote an ecologically sensitive community.

Governance Service and Excellence

Sustain Barrie's single-tier government structure through cost-effective, accountable and efficient government. Develop the consultation process to allow residents to have direct access to Council and promote financial innovation through new opportunities and public private partnerships.

Maintain Barrie's Premier Lifestyle

Develop civic pride through cultural, recreational, and special events that encourage community identification.

Transportation

Further develop the transportation links within the City and beyond to promote the economic strength and well-being of the community. Provide safe and efficient services, which are cost-effective and continue to work with provincial and federal partners on future regional transit plans.

2.2.1 Barrie Official Plan, 2018

The current Barrie Official Plan (OP), dated January 2018, contains several considerations and policies related to the development of a sustainable transportation system. Section 5.4 of the OP details the strategies and prevailing policies dictating how Barrie's future transportation network goals will be achieved. The goals identified in the 2018 OP are:

- to provide a sustainable transportation system for the safe, efficient, and convenient, movement of people and goods including linkages to the overall Provincial and County transportation system.
- to provide a transportation system that supports the maximum economic development of the City with minimum social, health and environmental impacts.
- to promote healthy communities, active living and energy efficiency; public transit, carpooling, all forms of active transportation, safe integration and connectivity between these various modes of transportation will be encouraged. Public transit would be a priority for transportation infrastructure planning and major transportation investments where financially feasible.
- to develop the Intensification Areas at densities that are transit supportive and provide linkages to major transportation hubs and routes such as the major transit stations.

The City encourages the use of existing and new public transit routes where possible, with requirements for each land use to locate and link to public transit stops. The City will also be responsible for linking GO Transit to local transit services, and expanding transit services to support development in the Downtown Barrie UGC and other designated intensification areas. Additionally, improving existing active transportation networks to include barrier-free and route linkages will be encouraged and considered for new developments and redevelopments. This will include developing design standards for providing safe and comfortable multi-modal facilities, multi-use trails, parking and transit infrastructure interface.

Existing and potential freight rail connections will be protected by the City in the interest of economical development, public safety and environmental protection. Any industrial developments will be encouraged to locate near or adjacent to freight rail infrastructure to support regional, provincial and international goods movement.

2.2.2 Background Studies

A review of background transportation planning studies was conducted to identify the contemplated, funded or recommended transportation network improvements. These improvements were incorporated into this TMP.

2.2.2.1 2014 INFRASTRUCTURE MASTER PLAN UPDATES

In October 2014, the City completed the Infrastructure Master Plan Updates, providing guidance to future infrastructure development within the City of Barrie and the expanded City boundary. The Infrastructure Master Plan Updates were comprised of the Drainage & Stormwater Management, Wastewater Collection, Wastewater Treatment, Water Supply, Water Storage & Distribution and Multi-Modal Active Transportation Master Plans. Each policy provides community approved guidance for successful development of existing lands and the secondary plan areas. Each facet of the 2014 Infrastructure Master Plans is currently being updated as part of the MCEA process.

2.2.2.2 BAYVIEW DRIVE & BIG BAY POINT ROAD TRANSPORTATION IMPROVEMENTS

In December 2016 the City of Barrie approved the preferred design alternative recommended by the Bayview Drive & Big Bay Point Road Municipal Class EA. The City's 2014 MMATMP identified and recommended improvements to Bayview Drive and Big Bay Point Road as part of the 2031 preferred road network. The 2014 MMATMP identified Bayview Drive and Big Bay Point Road as key transportation corridors and recommended the following transportation infrastructure improvements for each respective road:

- Bayview Drive (Little Avenue to Big Bay Point Road) – widen to three-lanes with bicycle lanes; and
- Big Bay Point Road (Bayview Drive to Huronia Road) – widen to seven-lanes with buffered bicycle lanes.

The adopted design alternative was developed to mitigate impacts of the road widenings, by reducing the lane widths, providing a sidewalk on one side only, reducing the boulevard widths and altering the centreline of the road. The Bayview Drive & Big Bay Point Road Municipal Class EA recommendations are to be completed by 2021, according to the City of Barrie's 2019 Capital Plan.

2.2.2.3 BELL FARM ROAD MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

In June 2017, the City of Barrie approved the preferred design alternative within the urban area along Bell Farm Road (from Duckworth Street westerly to St. Vincent Street). The recommended plan for the Bell Farm EA consists of the following three elements:

- Underground municipal services;
- Widening the road platform to 3 lanes to accommodate turning vehicles; and
- Provision of cycling and pedestrian facilities to accommodate active modes of transportation.

The preferred design alternative reflected a cross section that was developed to mitigate impacts of road widenings by reducing the lane widths, providing a sidewalk on one side only, reducing the boulevard widths and altering the centreline of the road. The Bell Farm Road Municipal Class EA recommendations are expected to be completed by 2021, according to the City of Barrie's 2019 Capital Plan.

2.2.2.4 HARVIE ROAD, ESSA ROAD AND BRYNE DRIVE CLASS EA STUDY

Completed in October 2017, the Harvie Road, Essa Road and Bryne Drive Class EA Study identified the roadways of Harvie Road, Essa Road, and Bryne Drive lacked sufficient capacity to accommodate projected 2031 traffic volumes. Harvie Road from Essa Road to Bryne Drive are to be widened, intersections must be reconfigured, and signal timing must be installed to support efficient traffic flow. The preferred alternative design additionally incorporated the implementation of active transportation facilities along the three Study Area corridors. The preferred designs were as follows:

- Harvie Road includes a three-lane cross-section between Essa Road and Veterans Drive, transitioning to a five-lane cross-section with a two-way left-turn lane, between Veterans Drive and Bryne Drive, including buffered bike lanes and sidewalks;
- Essa Road includes a 5-lane cross-section with a two-way left-turn lane. The cross-section has a 30m right-of-way, with a 3.0m multi-use trail on the west side and a 2.0m sidewalk on the east-side; and

- Bryne Drive includes a 5-lane cross-section with a two-way left-turn lane. The cross-section is a 34m right-of-way, with a 2.0m sidewalk and 1.5m bike lane on both sides of the road.

The Harvie Road, Essa Road and Bryne Drive Class EA Study recommendations are expected to be implemented by 2021, according to the City of Barrie's 2019 Capital Plan.

2.2.2.5 HARVEY ROAD, BIG BAY POINT ROAD HIGHWAY 400 IMPROVEMENTS PHASE 3 & 4 CLASS EA

A Class EA Study was completed in November 2015 for the Harvey Road, Big Bay Point Road Crossing at Highway 400; providing a direct connection between Harvie Road and Big Bay Point Road. The recommended design alternative proposes the removal of the existing railway crossing on Big Bay Point Road between Bayview Drive and Fairview Drive, and to allow for the following facilities:

- Buffered bike lanes and sidewalks on both sides;
- Five (5) lanes in the interim and ultimate seven (7) lanes between Bryne Drive and Bayview Drive;
- Harvie Road ROW Expansion;
- Replacement of the existing sanitary sewer;
- Replacement of sanitary service laterals from the new sewer to property line; and
- Replacement of the existing watermain including replacement of water services from the new watermain to property line.

The crossing is currently under construction and is estimated to be completed by 2021, and is being implemented to allow for widening in the future.

2.2.2.6 ROSS/COLLIER/BAYFIELD STREETS CLASS EA

The EA was completed in August 2017 and completed phases 3 and 4 of the Municipal Class EA Process for the proposed widening and realignment of Ross Street; from two lanes to three lanes with buffered bicycle lanes and sidewalks on both sides at Toronto Street to Bayfield Street. The need for this improvement was identified in the City of Barrie's 2014 MMATMP. The recommended improvements identified for the sections of Ross Street, Collier Street and Bayfield Street include the following:

- The construction of a roundabout at intersection of Ross Street, Collier Street and Bayfield Street;
- Ross Street includes continuous two-way left turn lane (CTWLTL) with the inclusion of a buffered bike lanes;
- Bayfield Street includes buffered bike lanes; and
- Collier Street includes continuous two-way left turn lane (CTWLTL) and buffered bike lanes.

2.2.2.7 HEWITTS SECONDARY PLAN - ENVIRONMENTAL SAFETY REPORT

Finalized in October 2017, the Hewitts Secondary Plan ESR detailed phases 3 and 4 of the Municipal Class EA Process to identify roadway improvements in the Hewitts secondary plan area. Four roadways were assessed including Mapleview Drive East from Huronia Road to 20th Sideroad; Lockhart Road from Huronia Road to just west of 20th Sideroad; Yonge Street from Lockhart Road to Mapleview Drive East; and Big Bay Point Road from just east of Prince William Way to just west of 20th Sideroad. The ESR further develops the preferred Alternative with considerations to widen Mapleview Drive, Lockhart Road, Yonge Street and Big Bay Point Road, including the provision of additional travel lanes, and turning lanes at intersections to address the

traffic requirements. The ESR provides additional design considerations related to the ROW, intersection geometry, active transportation infrastructure, drainage and SWM, lighting, landscaping, noise, construction staging, utilities and property requirements.

2.2.2.8 SALEM SECONDARY PLAN AREA TRANSPORTATION IMPROVEMENTS

The Salem Secondary Plan, completed in October 2017, considers the recommended improvements to transportation infrastructure along the arterial road sections situated within the Salem Secondary Plan development area. Based on the evaluation of the alternative design concepts, the preferred design comprises a multi-modal arterial road corridor, integrating active transportation, vehicle and transit use. The following key elements were identified:

- 3.5 m vehicle lanes;
- 1.2 m – 4.2 m raised median, painted median, or two-way left turn lane (TWLT);
- 1.5 m on-road bicycle lanes plus 0.5m buffer on both sides of the roadway;
- 2 m wide sidewalks on both sides of roadway;
- 2.9 m boulevards;
- LID SWN features;
- Roundabouts and signalized intersection arrangements; and
- Streetscape Design/LID.

The Salem Secondary Plan transportation improvements are expected to be implemented by 2021, according to the City of Barrie's 2019 Capital Plan.

2.2.2.9 MCKAY ROAD INTERCHANGE AND SALEM ROAD / LOCKHART ROAD CROSSING CLASS EA

A Class EA Study was completed in December 2017 for the McKay Road Interchange and Salem Road / Lockhart Road Crossing at Highway 400 to implement the recommendations of the 2014 MMATMP and continue the City's infrastructure planning process for the secondary plan areas. The EA identified Alternative B as the preferred alternative. Alternative B supports the installation of an interchange at McKay Road and a crossing at Salem Road / Lockhart Road to minimize the impact on the existing network. With the addition of the interchange, McKay Road was recommended to be widened over Highway 400 to four lanes and include a centre median with buffered bike lanes and sidewalks on both sides.

2.2.2.10 DRAINAGE & WATER AND WASTEWATER MASTER PLANS

The Transportation Master Plan was developed in coordination with Drainage Master Plan and the Water and Wastewater Master Plan. The development of the TMP was coordinated concurrently with both Master Plans to ensure that all the identified TMP recommendations and phasing schedule were integrated with the Drainage Master Plan and the Water and Wastewater Master Plan.

2.3 County of Simcoe

At the County level, the County of Simcoe Transportation Master Plan Update and Official Plan were identified as relevant to the preparation of this update. Details of the two documents are provided in the following sections.

2.3.1 County of Simcoe Transportation Master Plan Update, 2014

The key objective of the 2014 County of Simcoe TMP Update was to create a future vision for transportation in Simcoe County, including a vision for the roles that pedestrian, cycling, transit, and road components can play in servicing future transportation needs. The TMP provided the County with long-term transportation strategies, policies and tools to support existing and future travel demand. The TMP goals were to:

- balance growth and the environment.
- meet the County’s vision and goals.
- create cost effective solutions.
- capitalize on the County’s planned growth.

The 2014 County TMP applied a comprehensive approach to multi-modal transportation options with several multi-modal policies and actions for implementation. This update was required due to the growth in employment, tourism, and residents in Simcoe County. These new multi-modal strategies could help to establish better connected communities, as well as create greater tourism and economic benefits. These multi-modal strategies included a complete streets policy to ensure that roadways are planned, designed, constructed, operated, and maintained to provide safety for all road users, including motorists, cyclists, pedestrians, and transit users. The updated TMP includes developing and adopting policies and plans regarding:

- County Transit and Mobility Plans.
- County Complete Streets and Context-sensitive Design Guidelines and Standards.
- Barrie-Collingwood Railway (BCRY) Viability and Management Plan.
- Active Transportation Master Plan (ATMP) and County TDM Plan.

Simcoe County includes Highway 400, CN and CP rail lines, and many other major highways that create an effective network for the movement of goods and traffic within and through the County. The TMP Update included 2011 cordon count data that presented updated traffic patterns, including traffic patterns in the County and the high utilization of Highway 400. The County is advocating extending GO Rail and Bus service to Highway 400 and beyond to function under Simcoe County. With the mentioned plans and policies, the County will be able to proactively guide future transportation growth and development.

2.3.2 County of Simcoe Official Plan, 2017

The County of Simcoe OP details the direction of transportation at a regional level, providing many regional policies supportive of improved intersection control, long-term active transportation plans, pedestrian consideration and TDM strategies. Regarding development, the OP calls for minimum density requirements and the development of more compact communities that are transit supportive through a hierarchical transportation system facilitating pedestrian and cycling

opportunities. The OP supports collaboration between neighbouring municipalities and the province in supporting the County Mobility Plan, including:

- connections between communities with a priority on active transportation and transit.
- integration of alternative transportation networks.
- partnerships with local municipalities for internal systems of pedestrian and cycling facilities that facilitate linkages and provides opportunities for multimodal transportation uses within a community.
- supporting local municipalities in developing active transportation system maps that identify existing and planned facilities.
- providing guidelines for clearly signed or marked cycling facilities where cyclists may be accommodated within existing cross-sections to enhance a presence and sense of permanence.
- liaising with local municipalities regarding planned or future transportation nodes and transit corridors (the County will consider amendments to this Plan as required).
- collaborating with local municipalities to ensure the provision of sidewalk and trail facilities, where planned.

2.4 Metrolinx

The Metrolinx Act was recently updated in 2018 with the express purpose of expanding the Regional Transportation Plan (RTP) to include the City of Barrie, as part of the Greater Golden Horseshoe. The 2018 update and inclusion of Barrie in the RTP, detailed the development of the rail infrastructure and the following upgrades to existing infrastructure:

- a second track between Lansdowne Avenue in the City of Toronto to Allandale Waterfront GO Station.
- upgrades at existing GO Stations along the corridor, including Rutherford, Maple, King City, Aurora, Newmarket, East Gwillimbury, Bradford, Barrie South, and Allandale Waterfront.
- upgrades to existing structures within the Barrie Rail corridor, including bridges and culverts.
- a new layover facility within the Town of Bradford and West Gwillimbury for overnight storage of trains.

The Barrie Rail Corridor Expansion Project (BRCEP) outlined the services that will be provided by Metrolinx to communities along the Barrie GO rail line. The result of the first phase of the BRCEP will be to establish:

- 15-minute service between Aurora GO Station and Union Station (during the weekday peak periods);
- 30-minute service between Allandale Waterfront GO Station and Union Station (during the weekday peak periods);
- Off-peak 60-minute service between Allandale Waterfront GO Station and Union Station; and
- Electrification of the Barrie Rail line.

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3. THE CITY OF BARRIE TODAY

The City of Barrie provides a vast transportation network that supports various transportation modes and trip types. The road network includes a Provincial freeway (or highway), and City arterial, collector, and local roads. Highway 400 runs north-south throughout the City, splitting the City in half and providing automotive access to areas beyond the City. Additionally, the City is serviced by Barrie Transit, which provides bus circulation throughout the City, and by GO Transit system, which connects Barrie to Toronto and other cities in the Greater Toronto Area (GTA). Aside from roadways and transit, the City also provides a variety of active transportation infrastructure such as sidewalks, trails, and cycling routes. This section will provide a detailed review of the City's existing transportation behaviour and determine if any significant changes have occurred in travel patterns, specifically how people travel and where they are going since the 2014 MMATMP. The existing transit, active transportation and road networks will also be discussed.

3.1 Travel Patterns

One of the key aspects of transportation planning is to understand how people travel to ensure that adequate transportation networks are provided to meet demand. Travel behaviour is captured in the Transportation Tomorrow Survey (TTS), which is a comprehensive travel survey conducted in the GTHA every five years since 1986. The data collected during the survey is maintained in a database and utilized to make transportation planning and investment decisions within local, regional, provincial and transit agencies, among others.

The travel behaviour analyses discussed below are informed by TTS data, firstly to obtain an understanding of the origins and destinations of people who are travelling from and to Barrie. The subsequent discussion will look at how people travel within and surrounding Barrie to establish how travel behaviours have changed over time and what can be done to further shift the mindset to more sustainable modes of transportation.

3.1.1 Trip Distribution

To determine where people are going, origin-destination surveys from the 2016 TTS were analyzed. The morning peak period was chosen for review as this is most likely to represent commuter trips travelling from home to work. In most cases, commuters taking one mode of transportation in the morning peak period will take the same mode of transportation for the return trip in the afternoon peak period.

The percentages of trips to and from Barrie for the various regions and municipalities within the GTHA, and for the 2016, 2011 and 2006 horizon years are summarized in Table 3-1. It should be noted that these trips include all forms of travel such as auto, transit, active transportation and other modes.

Table 3-1 Summary of AM Peak Period Travel Patterns

Region/Municipality	Existing (2016)		2011		2006	
	To	From	To	From	To	From
Barrie (Internal)	74%	68%	76%	69%	74%	71%
Simcoe	13%	24%	12%	26%	12%	24%
Orillia	2%	2%	1%	1%	1%	1%
York	6%	2%	5%	2%	5%	1%
Toronto	3%	1%	3%	1%	4%	1%
Dufferin	0%	0%	0%	0%	0%	0%
Peel	1%	1%	2%	0%	2%	1%
Halton	0%	0%	0%	0%	0%	0%
Durham	0%	0%	0%	0%	0%	0%
Kawartha Lakes	0%	0%	0%	0%	0%	0%
Others	1%	1%	1%	0%	1%	0%
Total	100%	100%	100%	100%	100%	100%

Source: 2016, 2011 and 2006 TTS data.

Note: - Trip distribution accounts for trips of all travel modes.

- 0% noted above accounts for anything less than 0.5%, due to rounding.

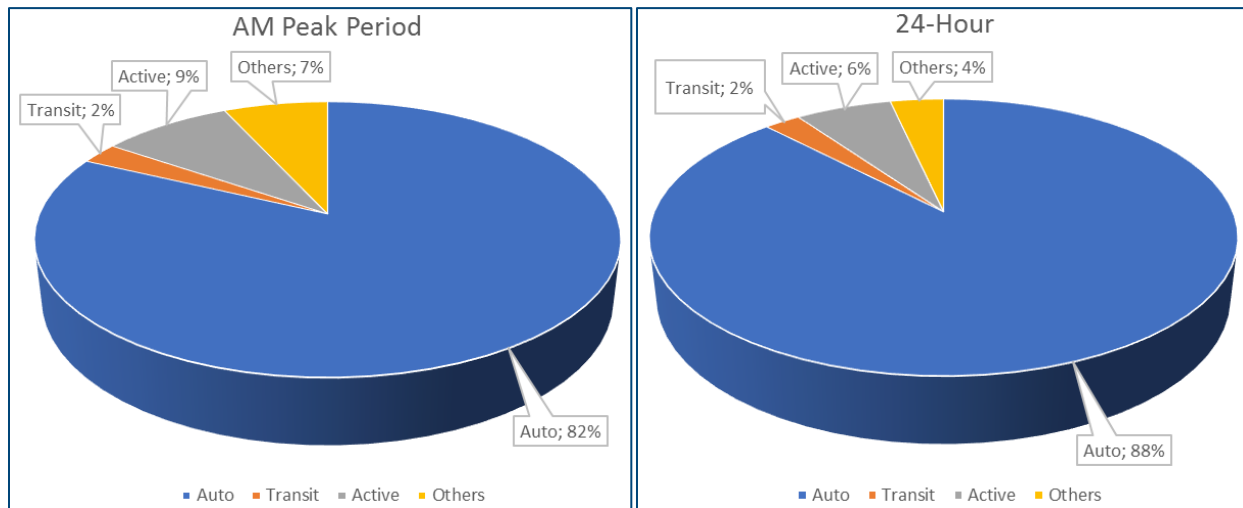
Out of all the trips entering and exiting Barrie, approximately 70 percent are internal. This signifies that most people working in Barrie also live in Barrie. It should be noted that the distribution of trips over the three horizon years have remained consistent.

3.1.2 Travel Modes

As established in the section above, most trips are internal Barrie trips, which impact the travel demand on the City transportation networks. As such, a review of the mode share was undertaken to further understand travel behaviour. Once again, morning (AM) peak period data was analyzed because travelers taking one mode of transportation in the morning peak period will typically take the same mode of transportation for the return trip in the afternoon peak period. Additionally, all-day or 24-hour data was also analyzed to understand the daily mode share for Barrie.

Based on the 2016 TTS data, most trips made into and out of Barrie were made via automobile (either as a driver or passenger), with two percent utilizing transit, nine percent using active transportation, and seven percent utilizing another mode in the AM peak period, as illustrated in Figure 3-1. The figure illustrates both the morning peak period and 24-hour mode shares, both indicating similar mode share splits. It should be noted that additional Barrie Line GO rail service improvements have been implemented since the 2016 TTS; additional future planned services are discussed in Section 4.2.2.

Figure 3-1 Existing (2016) Mode Share of All Trips to or from Barrie

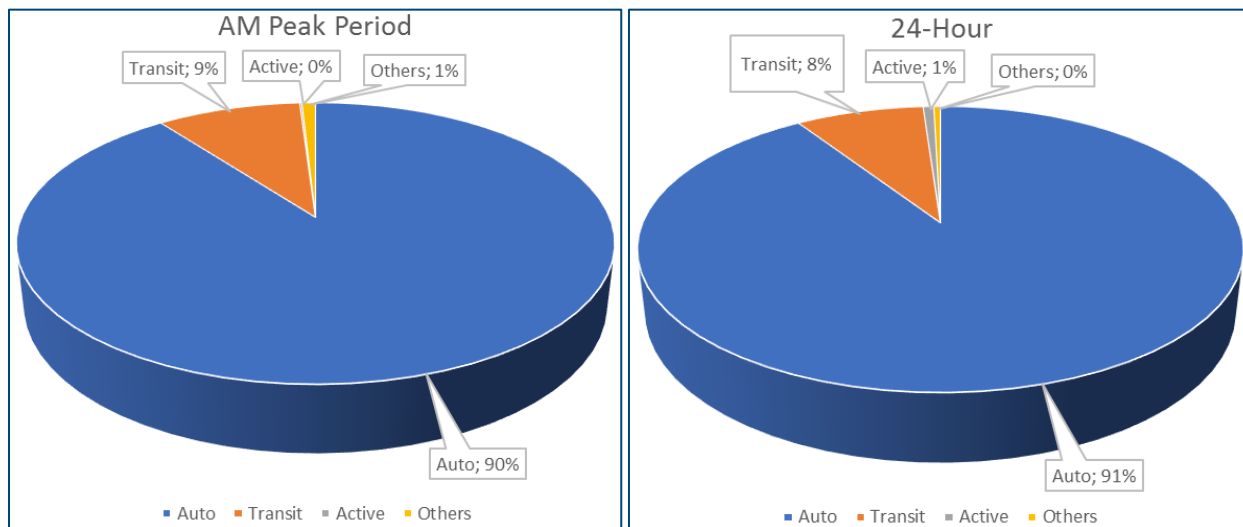


Source: 2016 TTS data.

Note: - 'Auto' includes auto-driver and auto-passenger trips
 - 'Other' includes motorcycle, school bus, taxi passenger, paid rideshare, and others.

Considering the recent improvement in access to the Barrie GO Rail line within Barrie, a more detailed review of the mode share was undertaken to examine the travel mode shares for trips destined to or originated from York Region and Toronto areas, which is illustrated in Figure 3-2. Once again, the figure illustrates both the morning peak period and 24-hour mode shares, both indicating similar mode share splits.

Figure 3-2 Existing (2016) Mode Share of York Region and Toronto Trips to or from Barrie

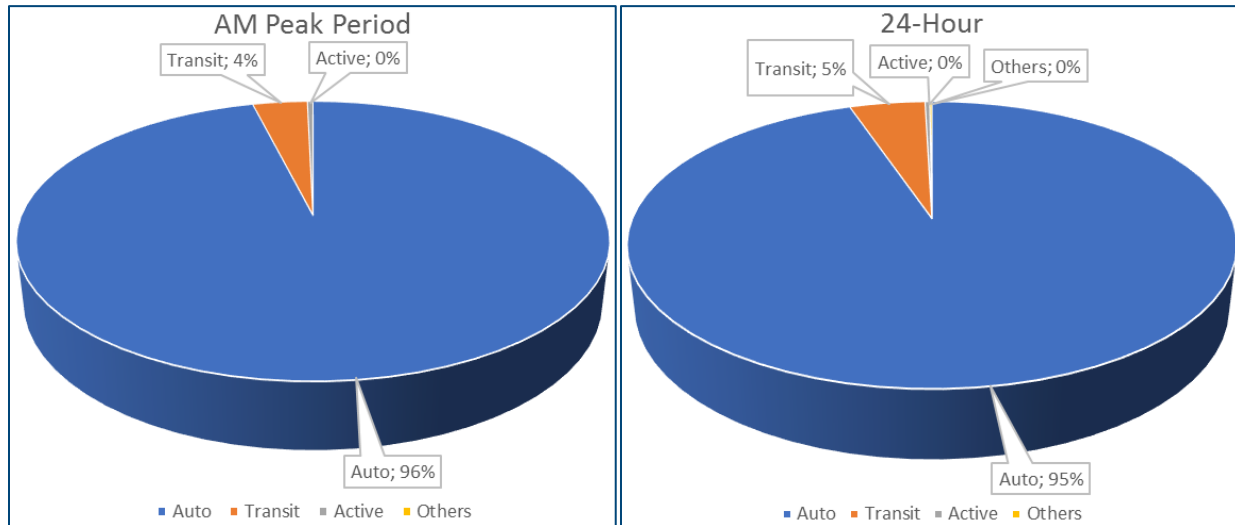


Source: 2016 TTS data.

Note: - 'Auto' includes auto-driver and auto-passenger trips
 - 'Other' includes motorcycle, school bus, taxi passenger, paid rideshare, and others.

While the overall transit mode share is two percent, approximately 10 percent of the trips destined to York Region and Toronto are made via transit during the morning peak period, as illustrated above. This is a significant increase from the approximately five percent in 2006, as illustrated in Figure 3-3 below. This can be attested to the implemented GO Train service improvements, including the opening of the Allandale Waterfront GO Station in January 2012.

Figure 3-3 Historical (2006) Mode Share of York Region and Toronto Trips to or from Barrie



Note: - 'Auto' includes auto-driver and auto-passenger trips
 - 'Other' includes motorcycle, school bus, taxi passenger, paid rideshare, and others.

It should be noted that while the City is working towards improving their transit services, travel patterns still demonstrate a heavy reliance on auto for the daily commute.

3.2 Transit Network

The City of Barrie is accessible by a regional transit service, namely GO Transit, and a local network providing conventional and specialized transit services, Barrie Transit. The conventional service, Barrie Transit, is the municipally-owned local service currently operating fixed bus routes throughout Barrie and Borden. Barrie also provides specialized transit service for users with mobility restrictions. A summary of each transit service is provided below with detailed analysis of existing conditions is contained within the 'Transit Technical Memorandum' provided in Appendix A.

3.2.1 Barrie Transit

Barrie Transit currently operates 11 two-directional fixed bus routes throughout Barrie and Borden, with five transit hubs within the City. The existing transit routes are illustrated in Figure 3-4. The system operates a 30-minute peak and a 60-minute off-peak service on several direct north-south routes. The current network also provides direct services to all GO Trains, including early morning departures. The transit system operates a fleet of 48 conventional transit buses and has an estimated system ridership of approximately 2.7 million annual passenger trips.

Transit ridership data was obtained from the City's online database for the 2016 horizon year, which was analyzed to determine current ridership trends and distribution of transit users. The average weekday ridership on local transit is approximately 8,700 boardings, with an additional 925 boardings at the two GO stations for a total of 9,625 daily ridership.

The analysis also identified the daily peak transit ridership occurs during the midday period, between 1:00 p.m. and 4:00 p.m. This trend does not reflect peaking characteristics typically exhibited during early morning (AM peak) and late afternoon (PM peak) periods. Therefore, there is an opportunity to increase ridership during the underutilized morning and afternoon peak periods.

BARRIE SPECIALIZED TRANSIT SERVICE

Barrie's Specialized Transit is the municipally-owned specialized door-to-door transit service offered to people with limited mobility. The service spans from 4:15 a.m. to 12:30 a.m. on weekdays, 6:45 a.m. to 12:30 a.m. on Saturdays and 8:30 a.m. to 10:30 p.m. on Sundays. The service is operated on an on-demand basis, with users calling ahead; the fare structure is equivalent to that of conventional service. This service is operated by 15 vehicles varying from mini-buses to specialized vans.

The service operates on a 30-minute scheduling window; passengers are required to call up to one week in advance for service. Trip confirmation is available 24 hours daily, on all days of the week by calling the specialized booking agents. On the day of the trip, the vehicle arrives at the passenger's pick-up location and the passenger has a five-minute window to board the vehicle. Travel times are expected to be up to 60 minutes, as the service also serves multiple passengers on one trip to improve vehicle utilization.

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Transit Routes

- 8** RVH / Yonge - Crosstown / Essa
- 8 SS** Bear Creek (Special Service)
- 3** Georgian / Painswick
- 6** Letitia / College
- 5** Blake / Edgehill
- 7** Bell Farm / Bear Creek

- 100** Express to G.C. / G.M. / D.T.
- 1** Georgian Mall / Welham
- 4** East Bayfield / South GO
- 4 LS** East Bayfield / South GO (Limited Service)
- 2** Dunlop / Park Place
- 11** Lockhart

Existing Transit Hub

- 1** Georgian Mall
- 2** Georgian College
- 3** Downtown Terminal
- 4** Allandale/Waterfront GO Station
- 5** Park Place
- 6** Barrie South GO Station
- 7** Royal Victoria Hospital

Transportation Features

- GO Station
- BCRY Railway
- GO Transit Railway

Natural Features

- Park / Open Space
- Water

Other Features

- Secondary Plan

Date Updated: April 5, 2019
 Project: 171-08853-00
 Map Created By: WSP Thornhill

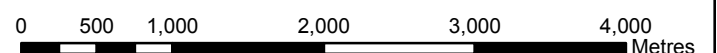


Figure 3-4
 Existing Barrie Transit System Map
 City of Barrie Transportation Master Plan



3.2.2 GO Transit

GO Transit, a division of Metrolinx, is a provincially owned and operated interregional transit system serving the Greater Golden Horseshoe Area with over 3,000 kilometers of rail and bus routes. It operates the largest commuter rail network in Canada, and all seven lines feed into Toronto Union Station. The transit system owns over 80 locomotives, 750 double-decker passenger railcars, and over 500 buses, all of which are wheelchair accessible. The GO Transit system map is illustrated in Figure 3-5.

Barrie is currently served by two GO Rail stations along the Barrie Line (GO Newmarket Subdivision). The first station, Barrie South GO, is located at the southern limit of the town in the northeast corner of Maplevue Drive East and Yonge Street. This station is well served by Barrie Transit, connecting to three local routes, with five bus bays available to accommodate these services. A single platform and single track is available for the Barrie Line service.

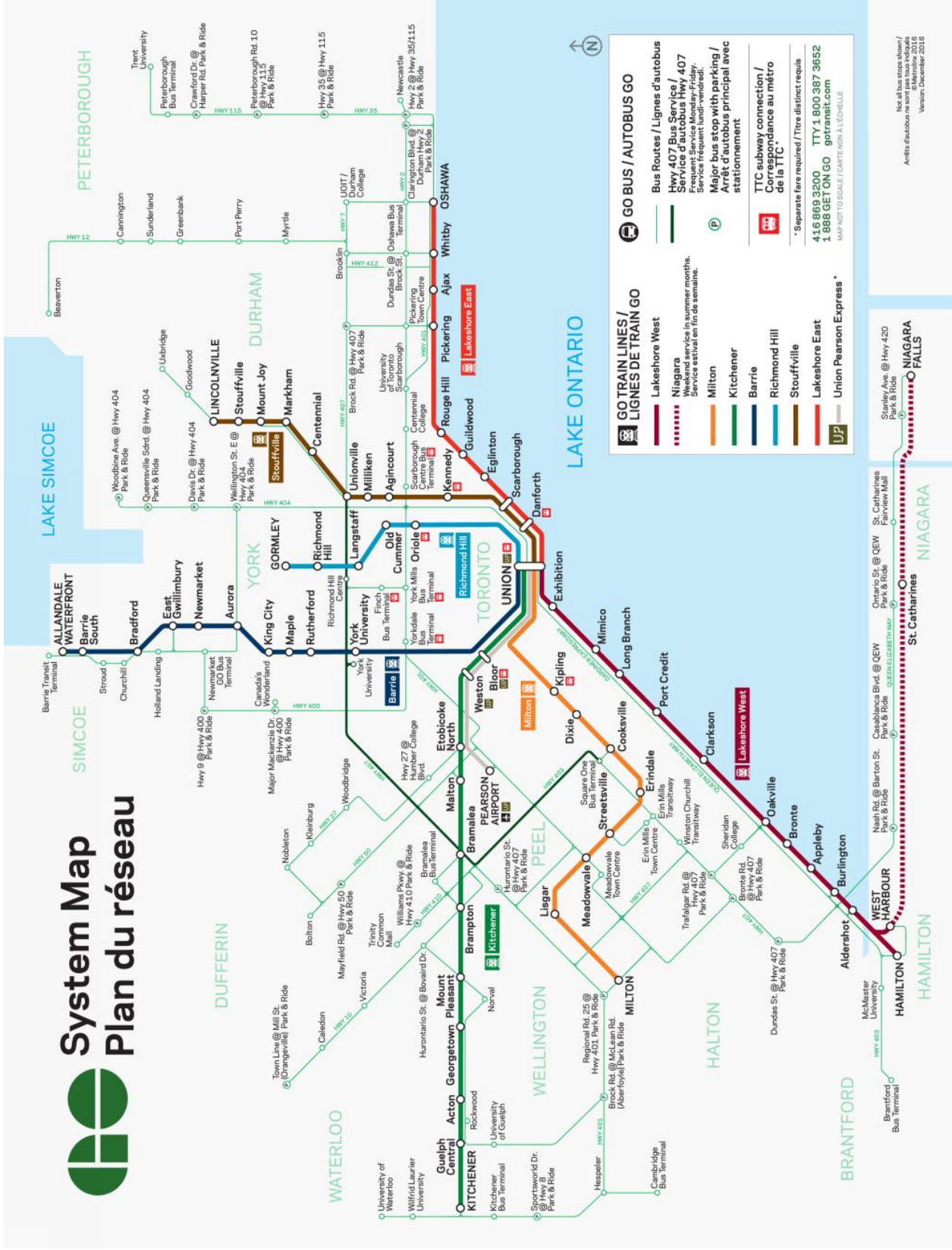
The second station within Barrie, Allandale Waterfront GO, acts as the terminus for the Barrie Line located in the center of Barrie, in the southeast corner of Lakeshore Drive and Bradford Street. This station is served by five Barrie Transit routes with six available bus bays. Like the Barrie South Station, a single platform and track serves the station, while a secondary track is available for freight services.

Both GO stations are wheelchair accessible; the platform is level with adjacent parking spaces, bus bays and existing pick-up drop-off locations.

Currently, both stations are served by seven trains during the weekday a.m. and p.m. peak periods respectively, providing unidirectional direct rail service to and from Toronto Union Station. The trains make station stops in Bradford, East Gwillimbury, Newmarket, Aurora, King City, Vaughan, and Toronto. Two-way hourly weekday rail service is available on the Barrie Line during off-peak hours terminating at Aurora Station, while bidirectional bus service carries passengers north to Barrie, from Aurora.

On weekends, three trains service both Allandale Waterfront and Barrie South GO station in the southbound direction only during the morning, and the northbound direction during the afternoon. Like the weekday off-peak service arrangement, trains serve Aurora Station hourly in both directions, supplemented by all-day coach bus service to Newmarket GO, Bradford GO and both Barrie stations.

System Map Plan du réseau



Source: GO Transit System Map



FIGURE 3-5
GO Transit System Map (GO Transit, 2018)

3.3 Active Transportation and Trails Network

The City's existing active transportation (AT) network includes a variety of facility types intended for pedestrians and cyclists. The existing network consists of on and off-road routes that link to key destinations in the City, including Georgian College, elementary and secondary schools, commercial / retail areas, Kempenfelt Bay and parks / open spaces. The existing active transportation network forms part of the City's overall transportation system and provides opportunities for residents and visitors to engage in multi-modal travel for a variety of purposes, including commuter / utilitarian, leisure and touring trips.

The existing active transportation network includes shared-use facilities on low volume roads, whereby cyclists share the same roadway space with motorists (e.g. signed bike route); designated facilities on roads with low-to-moderate volumes and speeds, whereby cyclists operate within an exclusive space (e.g. bike lane); and separated facilities along roads with moderate-to-high volumes and speeds, whereby cyclists and pedestrians are provided with a physically separated space from motorists (e.g. in-boulevard pathway). The City's active transportation network also includes an extensive system of off-road trails, including the Nine Mile Portage Heritage Trail, North Shore Trail, Trans Canada Trail, Waterfront Heritage Trail, and Ardagh Bluffs Natural Area trails. The existing active transportation network is further supported by sidewalks and localized trails located in The City of Barrie's parks and open spaces.

Figure 3-6 illustrates the existing cycling routes and facility types in Barrie. Figure 3-7 illustrates the existing pedestrian routes and facility types in Barrie. Together, these routes and facility types form the City's active transportation network. In total, there are approximately 973 of existing active transportation facilities in Barrie. Table 3-2 provides a summary of the length for existing facility types in the City of Barrie.

Table 3-2 Summary of Barrie's Existing Active Transportation Network

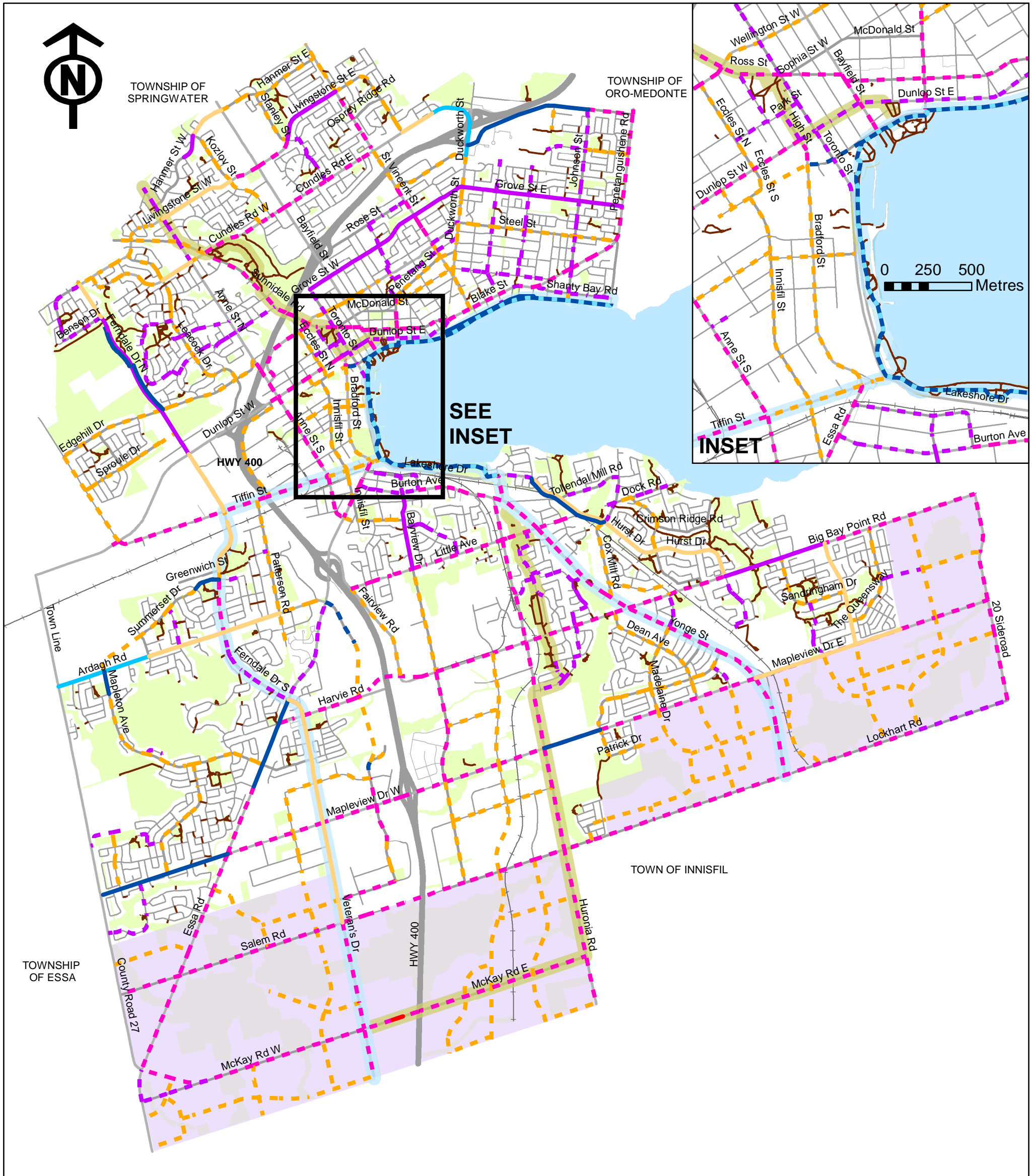
Facility Type	Existing (km)	Previously Proposed (km)
Off-Road Trails ¹	99.3	n/a ²
In-Boulevard Pathway	16.3	2
Buffered Bike Lanes	2.3	92
Bike Lanes	16.8	118
Signed Bike Routes	10.8	46
Sidewalks	827.9	314.9
Total	973.3	572.9

Note: 1. Off-Road Trails include: Types 1-5. Refer to Trails Master Plan (Appendix C) for additional details on the types of trails in the City of Barrie.

2. The total proposed length of off-road trails and sidewalks is not documented in the 2014 MMATMP.

A detailed assessment of the existing active transportation and trails conditions are contained within the 'Active Transportation Strategy' and 'Trails Master Plan' provided in Appendix B and Appendix C, respectively.

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Existing Facilities

- Waterfront Multi-use Trail
- In-Boulevard Pathway
- Buffered Bike Lane
- Bike Lane
- Paved Shoulder
- Signed Bike Route
- Off-road Trail

Previously Proposed Facilities

- In-Boulevard Pathway
- Buffered Bike Lane
- Bike Lane
- Signed Bike Route

Trail Systems

- Province-Wide Cycling Network
- The Great Trail

Other Features

- Secondary Plan Area
- Park / Open Space

Data Sources: City of Barrie
 Date Updated: February, 2019
 Project: 171-08853-00
 Map Created By: WSP Thornhill

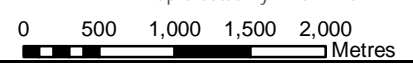
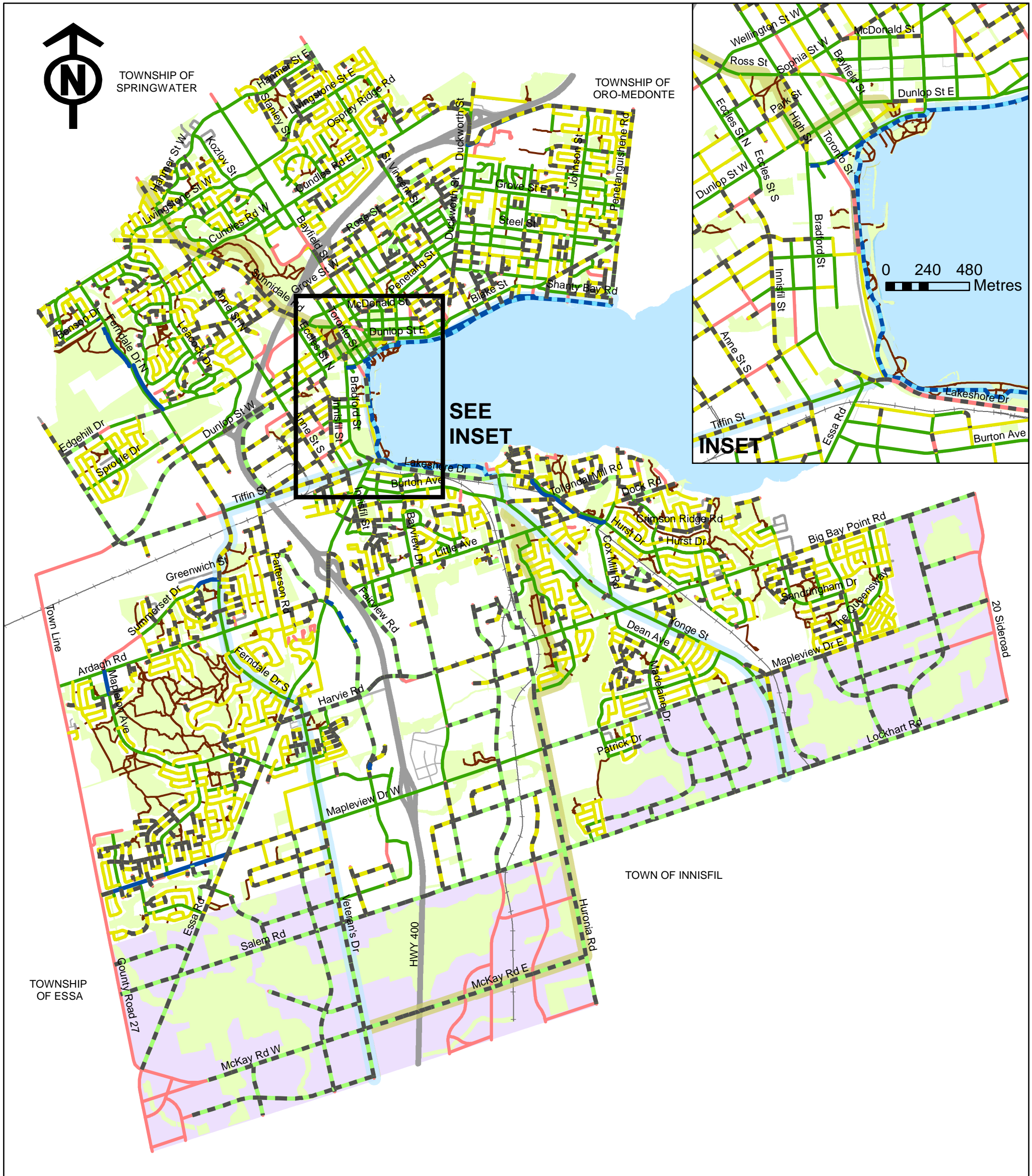


Figure 3-6
 Existing Cycling Network
 City of Barrie Transportation Master Plan





Pedestrian Network

- Waterfront Multi-use Trail
- In-Boulevard Pathway
- Paved Shoulder
- Off-road Trail

Sidewalk Network

- No Sidewalks
- Sidewalks on one side
- Sidewalks on both sides

Previously Proposed

- In-Boulevard Pathway
- Add sidewalk on one side
- Add Sidewalk on both sides

Trail Systems

- Province-Wide Cycling Network
- The Great Trail

Other Features

- Secondary Plan Area
- Park / Open Space

Data Sources: City of Barrie
 Date Updated: February, 2019
 Project: 171-08853-00
 Map Created By: WSP Thornhill

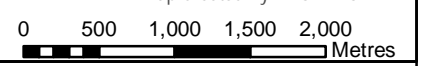


Figure 3-7
 Existing Sidewalks and Trails Network
 City of Barrie Transportation Master Plan



3.4 Road Network

The review of the City's road network was undertaken to evaluate existing road conditions. City staff were also consulted for local observations of the road network, as well as public feedback and opinions of the existing infrastructure. A summary of the road network is provided below.

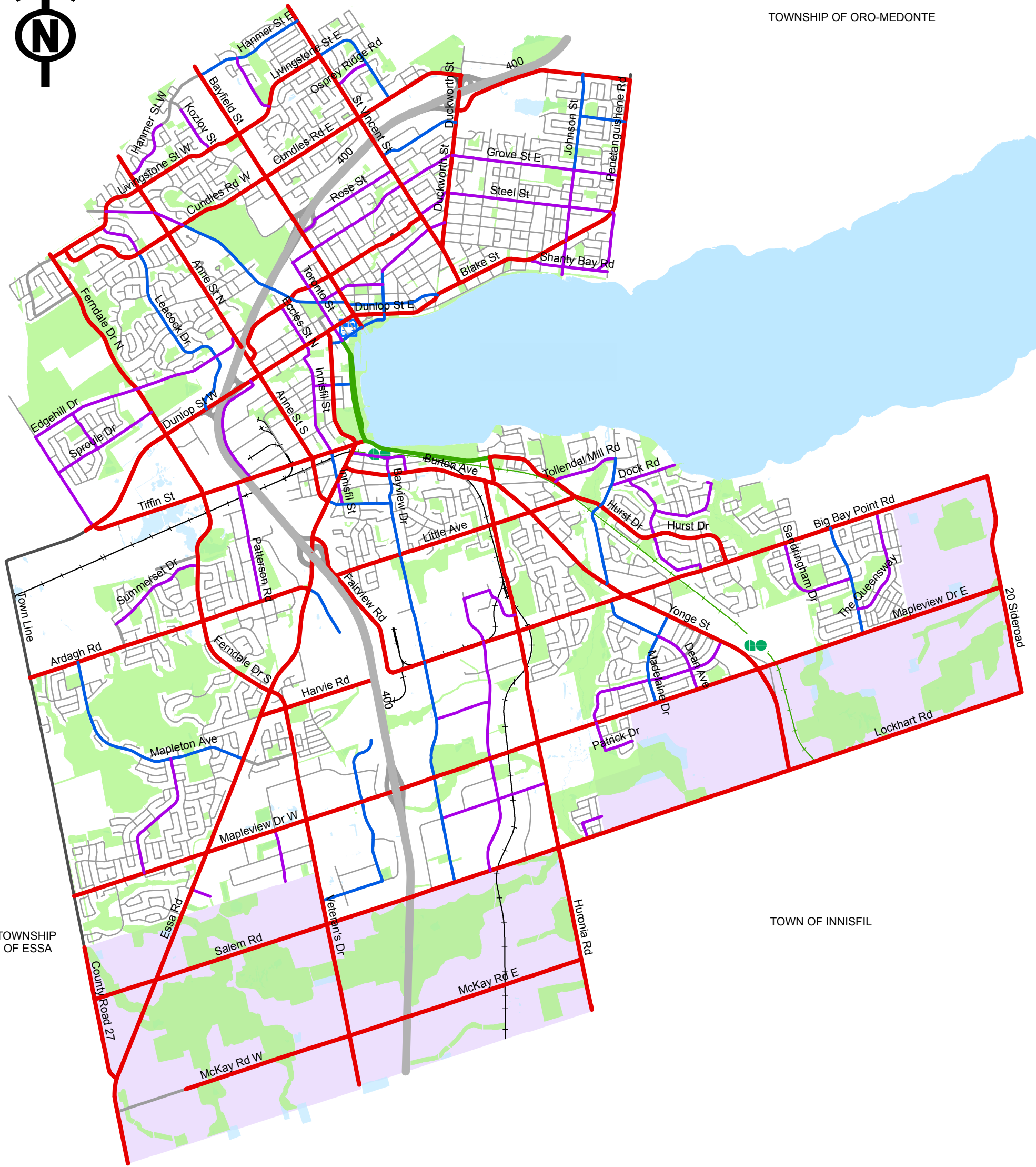
3.4.1 Roadway Classification

The road network in the City of Barrie comprises a hierarchy of roadways classified as Provincial Highways, Arterials, Parkways, Collectors (Major Collectors and Minor Collectors), and Local Roads, based on the March 2017 Official Plan. Two tiers of government have jurisdictions within the City boundary; the provincial highway is under the jurisdiction of MTO and all other roads are governed by the City. A description of the recognized roadway classifications within Barrie is provided below.

- **Provincial Freeways (or Highways)** fall under the jurisdiction of the MTO and include Highway 400. Freeways are limited-access high-capacity roads where traffic movement is the primary function.
- **Arterials** are primarily traffic-carrying facilities, providing through routes across and within the City. Arterials may have some access restrictions.
- **Parkways** are major facilities that can carry significant volumes of traffic but have restricted access and special design considerations due to their park settings. Lakeshore Boulevard is the only parkway in Barrie.
- **Major Collectors** carry traffic between arterials and local roads. They may also be used to service adjacent properties as moving traffic and serving properties are equally important under this classification.
- **Minor Collectors** connect traffic between neighbourhoods and local roads. Minor collectors may support active transportation connections and are prime for transit supportive development.
- **Local Roads** provide access to abutting properties and are designed to restrict major volumes of through traffic.

The arterial roadways converge towards the downtown core and Highway 400, and have five interchanges and five crossings, providing direct access to Highway 400 and east-west connection within Barrie. The functional classifications and total number of lanes of the existing roadways within the City are illustrated in Figure 3-8 and Figure 3-9, respectively.

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Classification Types

- Arterial
- Major Collector
- Minor Collector
- Parkway
- Provincial Highway

Transportation Facilities

- GO Station
- Barrie Bus Terminal
- BCRY Railway
- GO Transit Railway

Natural Features

- Park / Open Space
- Water

Other Features

- Secondary Plan Areas

Data Sources: City of Barrie
 Date Updated: February 15, 2019
 Project: 171-08853-00
 Map Created By: WSP Thornhill

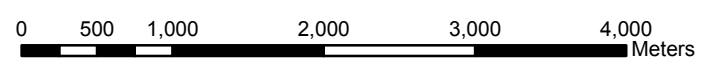


Figure 3-8
 Existing Roadway Classifications
 City of Barrie Transportation Master Plan





TOWNSHIP OF
SPRINGWATER



SEE
INSET

INSET

0 260 520
Metres

TOWNSHIP
OF ESSA

TOWN OF
INNISFIL

- Notes:
- A TWLTL or median is counted as one lane in the City of Barrie TMP.
 - The number of lanes for a ramp indicates the lanes where a ramp merges with or diverges from Highway 400.
 - Exclusive turn lanes at intersections are not shown.
 - Local streets in the Salem and Hewitt's Secondary Plan Areas are not shown.

Transportation Features

- 6 Lanes with Continuous Median (MTO)
- 7 Lanes (including TWLTL or Median)
- 5 Lanes (including TWLTL or Median)
- 4 Lanes
- 3 Lanes (including TWLTL or Median)
- 2 Lanes
- 2 Lanes (Ramp)
- 1 Lane (Ramp)

- GO Station
- GO Transit Railway
- BCRY Railway

Natural Features

- Park / Open Space
- Other Features
- Secondary Plan Areas

Date Updated: Friday, April 05, 2019
Project: 171-08853-00
Map Created By: WSP Thornhill

0 500 1,000 2,000 3,000 4,000
Metres

Figure 3-9
Existing (2016) Total Number of Lanes
City of Barrie Transportation Master Plan



3.4.2 Highway 400 Interchanges

A more focused traffic assessment was conducted at all the current Highway 400 interchange ramp terminals and adjacent major intersections within the City as these are the focal points of connectivity within and surrounding the City. Currently there are five interchanges and five crossings providing direct access to Highway 400 and east-west/north-south connections within Barrie. Details of the existing Highway 400 interchanges and crossings are provided in Table 3-3.

Table 3-3 Existing Highway 400 Interchanges and Crossings within the City of Barrie

Arterial Roadway	Facility Type	Right-of-Way	Number of Travel Lanes
Duckworth Street	Interchange	41	6
Bayfield Street	Interchange	41	4
Dunlop Street	Interchange	41	2
Essa Road	Interchange	41	4
Mapleview Drive	Interchange	41	6
St. Vincent Street	Crossing	34	2
Ross Street/Sunnidale Road	Crossing	20	2
Anne Street North	Crossing	34	4
Tiffin Street	Crossing	34	2
McKay Road	Crossing	20	2

Note: 1. Source: Barrie online interactive Map.

2. Source: McKay Road and Salem/Lockhart Road Class EA ESR, dated December 2017, page 5-4.

The assessment included intersection capacity analysis using Synchro and SimTraffic software. The results indicated that most intersections are operating at acceptable levels of service; however, the following intersections are currently experiencing some capacity constraints:

- Bayfield:
 - Bayfield Street and Ferris Lane
 - Bayfield Street and Coulter Street/Highway 400 southbound off-ramp
 - Bayfield Street and Highway 400 northbound ramp
- Dunlop:
 - Dunlop Street West and Cedar Pointe Drive/Highway 400 southbound off-ramp
 - Dunlop Street West and Highway 400 northbound off-ramp
- Essa:
 - Essa Road and Bryne Drive/Adargh Road
 - Essa Road and Fairview Road/Highway 400 northbound on-ramp
- Mapleview:
 - Between Bryne Drive and Park Place Boulevard

3.5 Railway Crossings

There are currently 27 road-rail crossings within Barrie, of which five are grade separated. The road-rail crossings are located on the Barrie-Collingwood Railway (BCRY)'s Meaford and Beeton railway subdivisions and GO Transit's Newmarket subdivision. The existing railway crossing locations, railway operators and existing crossing protection are summarized in Table 3-4 and illustrated in Figure 3-10. Detailed field assessment results for each crossing are discussed within the 'Railway Crossings Assessment Technical Memorandum' provided in Appendix D.

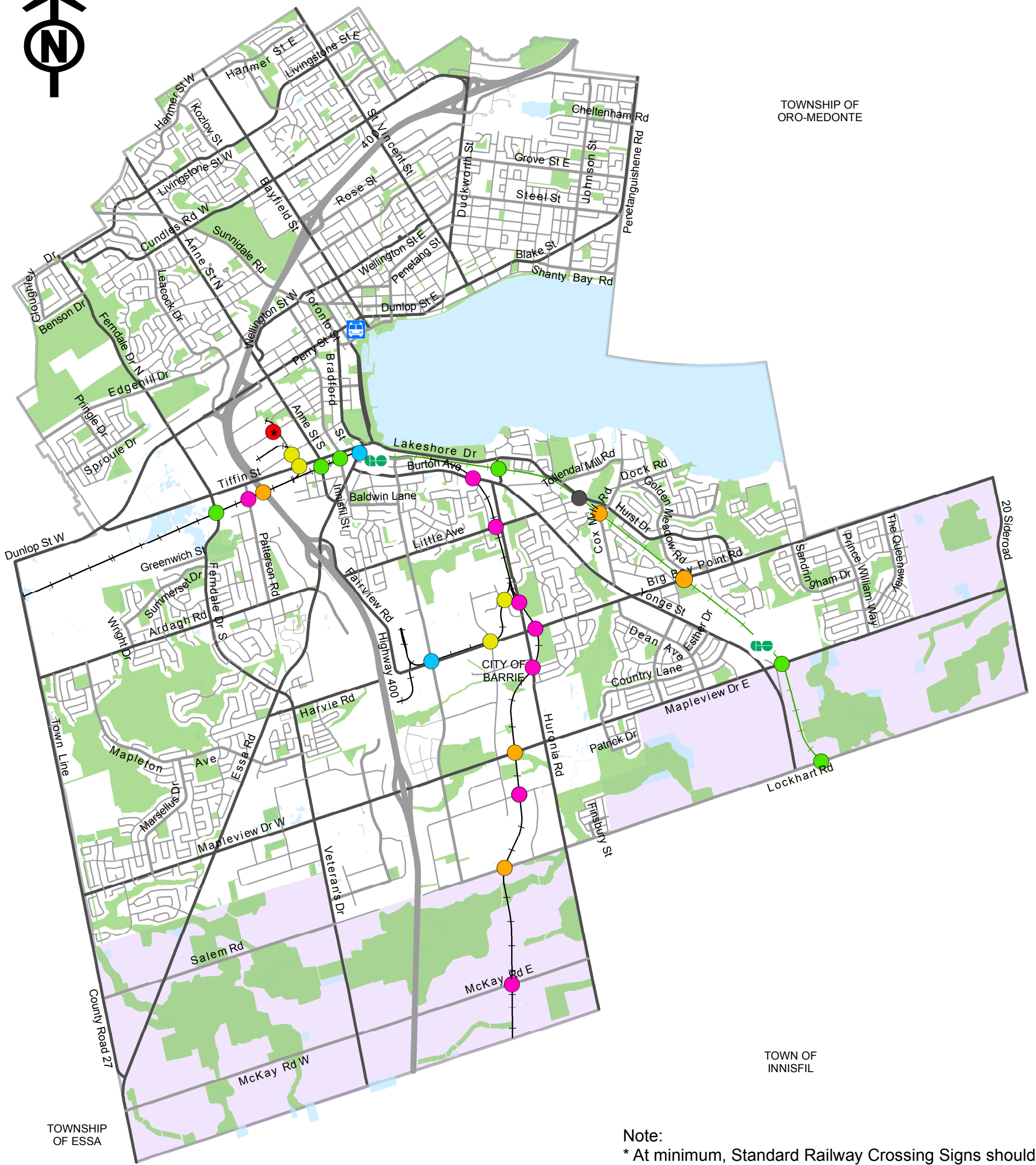
Table 3-4 Existing Railway Crossings

No.	Location	Railway Company	Existing Crossing Protection
1	Lockhart Road	GO Transit	FLBG
2	Mapleview Drive	GO Transit	FLBG
3	Little Avenue	GO Transit	FLBG +Traffic Signal Interconnection
4	Minet's Point Road	GO Transit	FLBG
5	Big Bay Point Road (East of Yonge Street)	GO Transit	GS
6	Cox Mill Road	GO Transit	GS
7	Truman Road	BCRY	SRCS
8	Welham Road	BCRY	SRCS
9	Bayview Drive	BCRY	SRCS +Traffic Signal Interconnection ^{1,2}
10	McKay Road	BCRY	FLB
11	Saunders Road	BCRY	FLB ²
12	Huron Road (South of Ellis Drive)	BCRY	FLB ²
13	Big Bay Point Road (West of Yonge Street)	BCRY	FLB ²
14	Huron Road (South of Herrell Avenue)	BCRY	FLB ²
15	Burton Avenue	BCRY	FLB
16	Little Avenue	BCRY	FLB ²
17	Essa Road	BCRY	SRCS +Traffic Signal Interconnection ^{1,2}
18	Innisfil Street	BCRY	FLBG ^{1,2}
19	Anne Street South	BCRY	FLBG ^{1,2}
20	Patterson Road	BCRY	FLB ²
21	Ferndale Drive	BCRY	FLBG
22	Tiffin Street	BCRY	SRCS
23	Brock Street	BCRY	SRCS
24	John Street	BCRY	No signs installed
25	Mapleview Drive	BCRY	GS
26	Lockhart Road	BCRY	GS
27	Highway 400	BCRY	GS

Note: - FLB = Flashing Lights and Bell - BCRY = Barrie Collingwood Railway
 - SRCS = Standard Railway Crossing Sign - GS = Existing Grade Separation
 - FLBG = Flashing Lights, Bells and Gates

¹Information provided by City of Barrie via e-mail dated February 22, 2019

²Information is not currently captured in the Transport Canada Grade Crossing Inventory



TOWNSHIP OF ORO-MEDONTE

TOWN OF INNISFIL

TOWNSHIP OF ESSA

Note:
* At minimum, Standard Railway Crossing Signs should be installed at the John Street grade crossing now.

Rail Crossings

- Flashing Lights and Bell (FLB)
- Flashing Lights, Bell and Gates (FLBG)
- Flashing Lights, Bell and Gate + Traffic Signal Interconnection
- Crossing Without Signs Installed
- Standard Railway Crossing Sign (SRCS)
- Grade Separated
- Standard Railway Crossing Sign (SRCS) + Traffic Signal Interconnection

Transportation Features

- Provincial Highway
- Arterial Road
- Collector Road
- Local Road
- Private Road

- GO Station
- Barrie Bus Terminal
- GO Transit Railway
- BCRY Railway

Park / Open Space

- Park / Open Space
- Water

Other Features

- Secondary Plan

Data Sources: City of Barrie
Date Updated: Monday, April 08, 2019
Project: 171-08853-00
Map Created By: WSP Thornhill

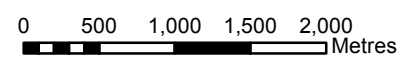


Figure 3-10
Existing Railway Crossings
City of Barrie Transportation Master Plan Update



4. TRANSPORTATION FORECASTING

This section outlines the approach utilized to update the analysis and develop a roadway network for the horizon years in this TMP. A demand forecasting Emme model at the macro level has been developed and applied to identify the roadway capacity deficiencies and future required roadway improvements. The approach is complemented by an Aimsun microsimulation simulation and a traffic operations analysis for the Highway 400 corridor and its ramp terminals and adjacent intersections (up to 30 major intersections), which further confirm and refine the required improvements.

All the analyses are based on the future population and employment forecasts and meet the Provincial Growth Plan, dated 2017 as discussed earlier. Future transportation projects planned by the City of Barrie, Simcoe County and MTO are presented because of their influence on projected transportation conditions.

4.1 Implemented Improvements from 2014 MMATMP

Since 2014 the City has started implementing road network improvements from the 2014 MMATMP recommendations; the completed road widening improvements from 2011 to 2017 are listed in Table 4-1.

Table 4-1 Completed Road Widening Improvements, as of 2017

Roadway	From	To	Completed Road Improvements
Mapleview Drive	Welham Road	Huronia Road	Widened to 7 lanes
	Huronia Road	Country Lane	Widened to 5 lanes
Ferndale Drive	Dunlop Street	Tiffin Street	Widened to 4 lanes
Cundles Road	Livingston Street	J. C. Massie Way	Widened to 5 lanes, including bicycle and exclusive left-turn lanes
Duckworth Street	J. C. Massie Way	Bell Farm Road	Widened to 7 lanes, including bicycle lanes and exclusive left-turn lanes
	Bell Farm Road	Rose Street	Widened to 5 lanes, including bicycle and exclusive left-turn lanes
Duckworth Street Interchange			Re-configuration and improvements
Essa Road	Coughlin Road	Ferndale Drive	Widened to 5 lanes plus multi-use path

4.2 Future Planned Transportation Projects

A summary of all future transit and road network improvements planned by the City, MTO and Simcoe County are discussed below. These improvements are based on a review of completed and on-going background studies in Barrie, as well as the recommended improvements from the City 2014 MMATMP that have been programmed in the City's 2019 Capital Plan.

4.2.1 Barrie Transit

In 2018, the City of Barrie developed a vision for investing in its historic downtown waterfront and accommodating growth through intensification within its Urban Growth Centre. Part of this vision includes the potential of creating an event hall and permanent home for the City's Farmer's Market. Facilitating this would require the relocation of the current downtown transit hub to the Allandale GO Station area.

A Mobility Hub Study was conducted to study the feasibility of shifting the main Barrie Transit Terminal from its current location on Maple Avenue in Downtown to an expanded facility immediately adjacent to the Allandale Waterfront GO Station. The study examined several factors to assess the potential impacts of relocating the bus terminal including the planning context, traffic impact, planned GO transit service expansion, operational safety and financial impacts.

The Mobility Hub Study determined that the relocation of the Downtown Transit Hub function to the Allandale Waterfront GO Station site is feasible, with several recommended Terminal and Transit Access modifications. The Study was completed and has been tabled for a future decision. Detailed information on the study and outcomes are included in the 'Transit Technical Memorandum' provided in Appendix A.

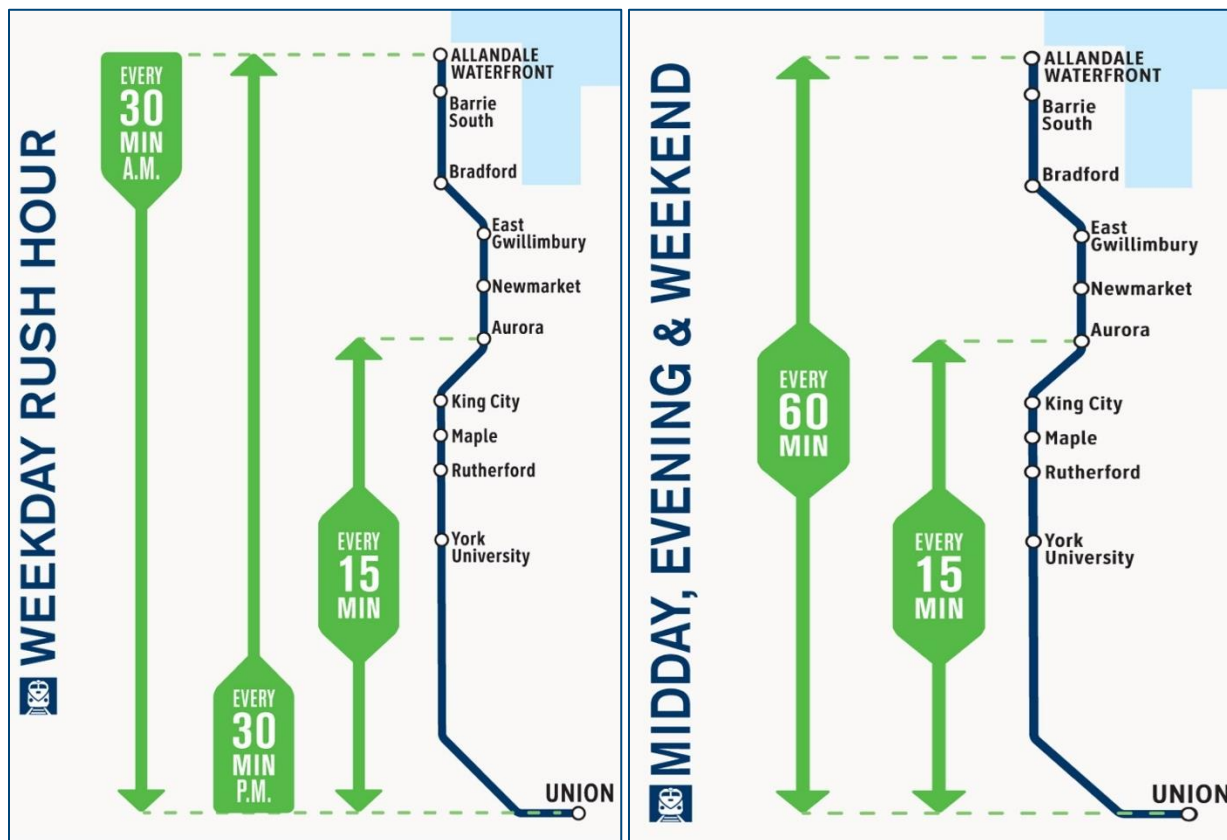
4.2.2 Metrolinx / GO Transit

Under GO Transit's Regional Express Rail (RER) program, rail service along the Barrie line will be upgraded to be a two-way, all-day rail service during peak and non-peak periods. According to the RER program, this service will operate along the entire length of the Barrie line from Toronto Union Station to Allandale Waterfront GO Station, which is illustrated in Figure 4-1.

Weekday rush hour services will operate at a minimum frequency of 30 minutes in the peak direction between the Toronto Union and Allandale Waterfront stations; two-way 15-minute service during this period will operate between the Toronto Union and Aurora stations. Midday, evening and weekend two-way services are planned to operate at 60-minute frequencies between the Toronto Union and Allandale Waterfront Stations. Construction is currently underway to improve the infrastructure on the line to facilitate these operations.

Further, a future rail station is proposed south of Barrie in Innisfil, with an estimated daily ridership of 2,800 patrons. This station is expected to alleviate some of the existing parking demand at both Barrie South GO and Bradford GO Stations.

Figure 4-1 Future Planned GO Rail Service in the City of Barrie



Source: Metrolinx Barrie Line Website (http://www.metrolinx.com/en/regionalplanning/rer/rer_barrie.aspx)

4.2.3 Planned Road Network Improvements

Several road infrastructure improvements have been identified within and surrounding the City by the MTO TESR Update and Simcoe County TMP, as well as the City’s 2019 Capital Plan. These planned road network improvements are discussed in the following sections.

4.2.3.1 HIGHWAY 400 CORRIDOR AND INTERCHANGES

A TESR Update was completed by the MTO for Highway 400 from 1 km south of Highway 89 to Highway 11. This Update identified improvements to the Highway 400 corridor and interchanges. The road capacity and network improvements are summarized in Table 4-2.

Table 4-2 Road Capacity and Network Improvements on Highway 400 Corridor and Interchanges, Recommended in MTO 2017 TESR Update

Location	Improvements
Highway 400 Mainline	Widen to 10 lanes with HOV, from Highway 89 to Duckworth Street; Widen to 8 lanes, from Duckworth Street to Highway 11
Duckworth Interchange	No additional improvements
Bayfield Interchange	(1) A modified Parclo A / Diamond with geometric improvements
	(2) Eliminate connection from Rose Street to the NB On-Ramp and Bayfield Street
	(3) Widen Bayfield Street to 6 lanes
Dunlop Interchange	(1) Relocate E/W-N On-Ramp to the Hart Drive intersection
	(2) Provide an exclusive WB left-turn lane, an exclusive EB left-turn lane and an exclusive right-turn lane at the east ramp terminal
	(3) Geometric improvements to the S-W Off-Ramp
	(4) Widen to a 2-lane exit at the N-E/W Off-Ramp
	(5) Relocate the west ramp terminal and provide a 3-lane approach on the N-E/W Off-Ramp
	(6) Provide an exclusive EB right-turn lane, dual WB left-turn lanes, dual EB left-turn lanes, an exclusive SB right-turn lane and dual NB left-turn lanes at the west ramp terminal
	(7) Widen Dunlop Street to 4 lanes plus 2 speed change lanes at crossing
Essa Interchange	Provide an exclusive EB right-turn lane at the Essa Road / Fairview Road intersection
	(1) Reconfigure the current interchange with geometric improvements to existing ramps
	(2) Propose a separate W-S On-Ramp
	(3) Widen to two lanes at the NB and SB Off-Ramps
	(4) Provide 3 lanes at the approach of the NB Off-Ramp
	(5) Widen Essa Road to 6 lanes
Mapleview Interchange	Reconfigure to a Diverging Diamond interchange configuration
Innisfil Beach Interchange	(1) Widen to a 2-lane exit at both the N-E/W and S-E/W Off-Ramps
	(2) Geometric improvements to all ramps
	Widen Innisfil Beach Road to four lanes

It should be noted that the projects listed in Table 4-2 have not been programmed in the MTO budget plans during the TMP study. When compared to the 2004 TESR recommendations, several changes are identified in Table 4-3.

Table 4-3 Changes in MTO-Recommended Improvements

Highway 400 Corridor	Location	Changes in Improvements
Bayfield Interchange	Bayfield Street (and bridge structure)	2 additional lanes
Dunlop Interchange	N-E/W Off-Ramp	1 additional lane
Mapleview Interchange	Interchange layout	Re-configure to a Diverging Diamond interchange
Highway 400 Mainline	Duckworth Interchange to Bayfield Interchange	2 new HOV lanes
	Bayfield Interchange to Essa Interchange	Change 2 lanes to HOV lanes
	Essa Interchange to Highway 89 Interchange	2 new HOV lanes

Source: 2017 MTO TESR Update.

Note: HOV = High Occupancy Vehicle.

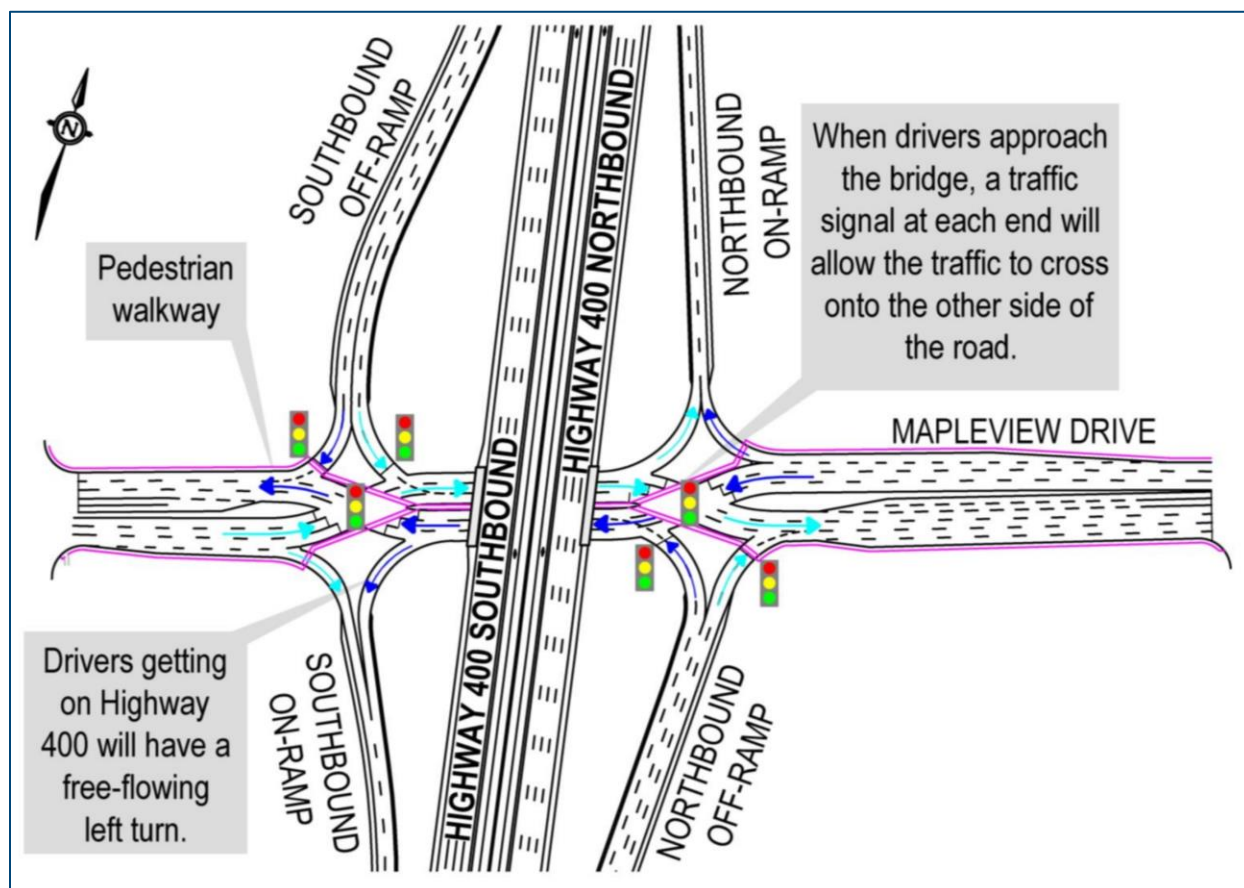
4.2.3.2 MAPLEVIEW DRIVE DIVERGING DIAMOND INTERCHANGE

Based on the MTO 2017 TESR Update, the current diamond interchange at Mapleview Drive will be re-configured to be a diverging diamond interchange (DDI), which is illustrated in Figure 4-2.

The future DDI has the following advantages:

- 1 Ideal for high-volume interchanges:** The DDI will mitigate capacity deficiencies by operating as a 2-phase traffic signal system, as opposed to the existing three-phase traffic signal system, reducing delays at traffic signals.
- 2 Improved safety:** The geometrics of the DDI will slow vehicle travel speed which would increase safety.
- 3 Cost effective:** DDI is cost effective to be implemented as the existing structure is wide enough to accommodate the required number of lanes.
- 4 Free-flow operations on Highway 400 on-ramps:** The DDI will eliminate delays for left-turn movements entering Highway 400 as it creates free-flow operations for all movements entering the highway. Thus, the existing three-phase traffic signal system will be reduced to two phases.

Figure 4-2 Concept of Maplevue Drive Diverging Diamond Interchange



Source: Diverging Diamond Interchange Fact Sheet, MTO 2017 TESR Update.

4.2.3.3 HARVIE ROAD / BIG BAY POINT ROAD CROSSING

After the completion of the 2014 MMATMP Study, an EA study was conducted in 2015 for the proposed Harvie Road / Big Bay Point Road new interchange. The Notice of Completion was filed for the Harvie Road / Big Bay Point Road Crossing, and has been approved by MTO.

However, the Notice of Completion did not include the proposed partial interchange. Therefore, the new partial interchange recommended in the 2014 MMATMP will not be carried forward for this study.

Construction of a new five-lane crossing with buffered bike lanes at the first phase was programmed in the City's 2019 Capital Plan. The bridge structure was designed to protect for the future widening to seven lanes by 2041 or a potential interchange beyond 2041.

4.2.3.4 NEW MCKAY ROAD INTERCHANGE

An EA study was conducted in 2017 for the McKay Road Interchange per the 2014 MMATMP recommendations. The 2017 EA Environmental Study Report (ESR) recommended a Parclo-A3 interchange to reduce the impacts to the adjacent significant archeological site. The new Parclo-A3 interchange included two lanes on both the N-E/W Southbound Off-Ramp and the S-E/W Northbound Off-Ramp.

The new interchange is expected to be built by the City of Barrie by 2023. McKay Road will be widened to four through lanes with medians. The speed-change lanes for ramps are intended to be designed and constructed so that they can be converted to direct tapers in the future. In the ultimate conditions, McKay Road from Veterans Drive to Welham Road will have six through lanes.

4.2.3.5 NEW BARRIE BYPASS

Based on the Simcoe Area Multi-Modal Transportation Strategy Needs Assessment that was commissioned by MTO, dated March 2014, a new Barrie Bypass connecting Highway 11 to the proposed Highway 427 extension was examined as an alternative to address congestion issues on Highway 400 within Barrie. Based on this study, the new Barrie Bypass would divert trips away from Barrie and provide relief along the congested Highway 400 corridor in Barrie. However, the proposed new Bypass is not an MTO recommended project and has not been approved by MTO. Therefore, it is not assumed in the City TMP analyses.

4.2.3.6 COUNTY ROADS

As previously discussed in Section 2.3.1, the 2014 Update of the Simcoe County TMP provided the County with long-term transportation strategies, policies and tools to support existing and future travel demand. Table 4-4 summarizes the road widening improvements recommended in County TMP that would impact the development of the City of Barrie's future road networks, including the proposed road widening and roadway right-of-way protection for the City of Barrie roads.

City roads that connects directly to County roads with widening improvements include:

- Penetanguishene Road: connecting to CR-93 (Barrie north boundaries)
- Bayfield Street / Highway 26: connecting to CR-27 (Barrie northwest boundaries)
- Sunnidale Road: connecting to CR-40 (Barrie northwest boundaries)
- Ferndale Drive: connecting to CR-53 / Wilson Drive (Barrie northwest boundaries)
- Dunlop Street: connecting to CR-90 (Barrie west boundaries)
- Veterans Drive: connecting to CR – 53 / 5 Sideroad (Barrie south boundaries)
- Huronia Road: connecting to CR-54 / 10 Sideroad (Barrie south boundaries)
- Yonge Street: connecting to CR-4 (Barrie south boundaries)

Table 4-4 Road Improvements Recommended in Simcoe County 2014 TMP

Description			Existing 2016	Planned Road Widening Improvements	
Road Name	From	To		Timing	Details
CR-21 / Innisfil Beach Road	CR-27	20th Sideroad / CR-39	2 lanes	short-term	+2 lanes
CR-27, Innisfil	CR-21	CR-90 / Dunlop Street	2 lanes	short-term	+2 lanes
CR-43 / Snow Valley Road, Springwater	CR-28 / George Johnston Road	Highway 26	2 lanes	short-term	+2 lanes
CR-53 / 5 Sideroad, Innisfil	CR-21	Barrie South Limits	2 lanes	short-term	+2 lanes
CR-4 / Yonge Street	CR-89	Barrie South Limits	2 lanes	by 2031	+2 lanes
CR-10, Clearview	Highway 26	27/28 Sideroad / 12 Concession	2 lanes	by 2031	+2 lanes
CR-53 / Wilson Drive	Ferndale Drive	Highway 26	2 lanes	by 2031	+2 lanes
CR-93	Highway 12	CR-25	2 lanes	by 2031	+2 lanes
CR-93 / Penetanguishene Road, Oro-Medonte	CR-11 / Old Barrie Road	Barrie Northeast Limits	2 lanes	by 2031	+2 lanes
CR-27, Springwater	Highway 26	CR-22	2 lanes	Post 2031	+2 lanes
CR-40 / Sunnidale Road	Dobson Rd.	Barrie North Limits	2 lanes	Post 2031	+2 lanes
CR-54 / 10 Sideroad	CR-21	Barrie South Limits	2 lanes	Post 2031	+2 lanes

Source: Simcoe County 2014 TMP Update.

4.2.3.7 CITY ROADS

The 2014 MMATMP identified several strategic infrastructure improvements by 2031 to support future planned growth. Some of the recommended improvements were already implemented; others are included in the City's 2019 Capital Plan to address current and future roadway capacity deficiencies. The major roadway improvements listed in the City's Capital Plan from 2019 to 2028 are summarized in Table 4-5. They were incorporated into this study.

Table 4-5 Planned Road Improvements from 2019 to 2028, City of Barrie 2019 Capital Plan

Description			Existing 2018	Planned Road Widening Project	
Road Name	From	To		Timing	Details
Anne Street	Edgehill Drive	Donald Street / Wellington Street	4 lanes	2023	+ 1 lane (intersection improvements at two ends of the section)
Bell Farm Road	St. Vincent Street	Duckworth Street	2 lanes	2021	+ 1 lane
Big Bay Point Road	Fairview Road	Huronia Road	2 lanes	2022	+ 3 lanes
Big Bay Point Road	Prince William Way	Collector 11	2 lanes	2020	+ 3 lanes
Bryne Drive Extension	South of Essa Road	North of Caplan Avenue	Not existing	2022	+ 5 lanes
Dunlop Street	Sarjeant Drive	Cedar Pointe Drive	4 lanes	2021	+ 1 lane
Dunlop Street	Cedar Pointe Drive	Hart Drive	2 lanes	2021	+ 3 lanes
Dunlop Street	Hart Drive	Anne Street	4 lanes	2021	+ 1 lane
Essa Road	Bryne Drive	West Ramp Terminal	5 lanes	2021	+ 2 lanes
Essa Road	West Ramp Terminal	Fairview Road	4 lanes	2021	+ 3 lanes
Essa Road	Mapleview Drive	Athabaska Road	2 lanes	2023	+ 1 lane
Essa Road	Athabaska Road	South of Salem Road	2 lanes	2023	+ 1 lane
Harvie Road	Essa Road	Veterans Drive	2 lanes	2020	+ 1 lane
Harvie Road	Veterans Drive	Bryne Drive Extension	2 lanes	2020	+ 3 lanes
Harvie Road / Big Bay Point Road New Crossing	Bryne Drive Extension	Fairview Road	Not existing	2020	+ 5 lanes new crossing
Huronia Road	Yonge Street	Herrel Avenue	2 lanes	2026	Rebuild to urban standards
Huronia Road	Lockhart Road	McKay Road	2 lanes	2021	+ 1 lane
Lockhart Road New Crossing	Highway 400 Overpass (Structure)		Not existing	2025	+ 5 lanes new crossing
Lockhart Road	Highway 400	Bayview Drive	2 lanes	2025	+ 3 lanes
Lockhart Road	Bayview Drive	Huronia Road	2 lanes	2024	+ 3 lanes
Mapleview Drive	Country Lane	Yonge Street	2 lanes	2020	+ 3 lanes
Mapleview Drive	Yonge Street	Prince William Way	2 lanes	2023	+ 3 lanes
Mapleview Drive	Prince William Way	east of Collector 11	2 lanes	2023	+ 1 lane
McKay Road	County Road 27	Reid Drive	2 lanes	2027	+ 1 lane
McKay Road	Reid Drive	Highway 400	2 lanes	2027	+ 3 lanes
McKay Road	Highway 400 Overpass (Structure)		2 lanes	2023	+ 3 lanes
McKay Road	Highway 400	Huronia Road	2 lanes	2021	+ 3 lanes
McKay Road New Interchange			Not existing	2023	New interchange
Salem Road	County Road 27	Veterans Drive	2 lanes	2025	+ 1 lane
Salem Road	Veterans Drive	Highway 400	2 lanes	2025	+ 3 lanes
Veterans Drive	Salem Road	McKay Road	2 lanes	2021	+ 3 lanes
Veterans Drive	McKay Road	City South Limits	2 lanes	2021	+ 3 lanes
Yonge Street	Mapleview Drive	Lockhart Road	2 lanes	2025	+ 3 lanes

Source: The City of Barrie 2019 Capital Plan.

4.3 Modelling Approach

Transportation models have been developed to assess the future transportation demand needs for 2041. These models provide input into the decision-making process for identifying the needs for future transportation infrastructure requirements.

4.3.1 Emme Macro Modelling

An Emme 4 macro-level demand forecasting model (herein referred to as the 2014 Emme Model) was developed as part of the City's 2014 MMATMP by WSP. This Model has been updated to ensure that it reflects the projected population and employment forecasts identified in Schedule 7 of the 2017 Provincial Growth Plan for the City of Barrie.

The development and expansion of the Model applies the sequential four-step transportation planning methodology and consists of three major tasks: data collection, model expansion and analysis, and forecasting and results. The 2014 Emme Model was updated based on the most current travel data captured in the 2016 TTS. The Model was then re-calibrated and validated against the 2016/2017 traffic counts and updated based on new population and employment forecasts.

The updated Model simulates auto travel demand for the mid-week (Tuesday, Wednesday, and Thursday) AM and PM peak hours during the non-summer seasons for base year 2016 and horizon years 2031 and 2041. See Appendix E for the full Emme Macro Modelling documentation.

4.3.1.1 ROAD NETWORK

The road network in the Model is represented by roads of different classifications, including Highway 400, other provincial highways, arterial, collector and local roads. These roads, in the form of links and zone connectors in the model, have attributes such as link length, free-flow speed, capacity, number of lanes and volume-delay functions. The update also involves road network development, network validation and calibration, verification of the link attribute parameters, and parameter calibration.

The base year (2016) road network reflects the 2016 road network, which includes the road improvements completed. The future road network for the TMP final horizon year 2041 was developed and proposed based on the master plan environmental assessment process.

4.3.1.2 TRAVEL DEMAND

The land use inputs for the Model were collected from various data sources, as summarized in Table 4-6.

Table 4-6 Category and Source of Population and Employment Forecast Inputs

No	Municipality or Region	Source and Targets
1	City of Barrie (including former city boundaries and secondary plan areas)	2016, 2031, and 2041 forecasts were provided by City of Barrie / Watson & Associates Economists Ltd. on August 21, 2018.
		The forecasts meet the growth targets defined in the 2017 Provincial Growth Plan for the City of Barrie.
2	Town of Innisfil	Modelled Region
		2031 and 2041 forecasts were obtained from the Town of Innisfil 2017 TMP Update.
	The forecasts also included intensification on Innisfil Beach Road and new development in Friday Harbour.	
	Simcoe County	2031 forecasts were obtained from 2014 County TMP. The 2041 forecasts were obtained by applying the growth percentage reflected in the MTO GGH Model input between 2031 and 2041.
		The model input also reflects the most-current forecasts for the Midhurst secondary plan in the April 26, 2018 presentation prepared by Ainley & Associates.
Part of York Region	2016, 2031 and 2041 from SAFO / GGH Model input, dated May 15, 2018.	
3	Gateways	2016, 2031 and 2041 from SAFO / GGH Model input, dated May 15, 2018.

The four-step travel demand method was applied to obtain projected travel demand on Barrie's road network. The four steps are:

- **Trip generation** determines the total of origin and destination trips in each zone by relating the influencing factors such as land uses, household demographics, and other social-economic factors.
- **Trip distribution** matches origin trips with destination trips to generate an origin-destination travel demand matrix. The methodology of the Fratar model was applied. Staff of the System Analysis and Forecasting Office (SAFO) of the MTO confirmed this approach.
- **Mode choice** determines the proportion of trips by a travel mode such as auto and transit. The City's Model only generates and simulates the auto travel demand. The auto travel demand was adjusted based on the defined modal share targets to reflect the modal shifts to other modes such as transit.

The Emme Model accounts for the auto travel demand destined to the GO Train stations for such activities as parking and kiss-and-ride. In the future horizons, the GO Train travel forecasts were obtained from the Metrolinx *GO Rail Station Access Plan, Final Report, December 12, 2016*. The future travel demand by GO would be increased due to the future improved GO services. The auto demand is manually adjusted to account for the shift to GO trains.

- **Trip assignment** allocates trips by the mode of travel (auto in the case of the City's Model) to a route on a road network to determine the traffic volumes. Post-modelling analyses are conducted to obtain the total traffic volumes and average daily traffic (ADT) volumes during the future horizons.

4.3.1.3 EMME MODEL VALIDATION

Validation is the process of comparing modelled traffic volumes with observed traffic counts to assess how well the demand forecasting model fits. Extensive traffic data was provided by the City and the MTO for calibration purposes. Count data included automatic traffic recorder (ATR) and turning movement counts (TMC). Validation was completed for year 2016 for eight screenline locations, as well as segments on the Highway 400 mainline and the interchange ramps in the City of Barrie.

Overall, the mid-week AM and PM peak hour modelled traffic volumes at the screenline level accuracy are within a reasonable range of model errors of 15 percent compared to the observed traffic counts for all four internal screenlines and most external screenlines. The scatterplots of modelled volumes versus observed counts present a statistically sound goodness-of-fit. Therefore, validation results for the mid-week AM and PM peak hours indicate that the two models have been substantially calibrated, are reasonably good and are ready for future forecasting.

The 'Emme Macro Modelling and Improvements Rationale Technical Memorandum' documenting the base model calibration and validation as well as the future network forecasts is provided in Appendix E.

4.3.2 Aimsun Micro Modelling

As part of the City's 2014 MMATMP by WSP, an Aimsun microsimulation model (herein referred to as the 2014 Aimsun Model) was developed for the south end of Barrie using the Aimsun Advanced platform. This Model was expanded to cover areas starting from north of the Dunlop Interchange to north of the Duckworth interchange, as well as areas south of McKay to south of the Innisfil Beach Drive interchange.

The extended and updated Model has been substantially re-calibrated and validated for the base year of 2016. The updated Aimsun Model simulates the future traffic conditions during the AM and PM hours in horizon years 2031 and 2041. The updated model has the origin-destination travel demand inputs from the updated and re-calibrated Emme Model, which reflects the projected population and employment forecasts identified in Schedule 7 of the 2017 Provincial Growth Plan for the City of Barrie.

The updated Aimsun Model provides the planning tools to re-tune and prioritize transportation improvements required within the City of Barrie boundaries along the Highway 400 corridor.

4.3.3 Synchro Traffic Operations Assessment

A more focused traffic assessment was conducted at all the current and future Highway 400 interchange ramp terminals and adjacent major intersections within the City of Barrie for the existing and future 2031 and 2041 total traffic conditions based on the existing and future proposed City-wide road networks. The interchange ramp terminals and adjacent major intersections are located on Duckworth Street, Bayfield Street, Dunlop Street, Essa Road, Mapleview Drive, and McKay Road, which are the focal points of connectivity within and surrounding the City. The assessment included Synchro intersection capacity and SimTraffic queuing analyses for a total of approximately 30 signalized intersections.

The results of the Aimsun Micro Modelling and Synchro Traffic Operations Assessment will be provided as an addendum document under a separate cover.

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5. DEVELOPMENT OF TRANSPORTATION NETWORKS

The development of the transportation network recommendations within this TMP is built upon the foundation set out in the 2014 MMATMP. This section discusses the transportation network alternatives that were considered and the process of selecting the preferred alternative from the 2014 MMATMP. In addition to the 2014 MMATMP process, one Public Consultation was included in this TMP. This section outlines the consultation process and activities conducted during this TMP, along with the feedback received.

This section will also summarize how the preferred transportation network alternatives for transit, active transportation and road were developed for 2041 based on the identified modal share targets. It also includes highlights of the changes from the 2014 MMATMP network for 2031 horizon.

5.1 Selection of the Preferred Alternative (2014

MMATMP)

The 2014 MMATMP developed a comprehensive multi-modal transportation network to fit its growing needs. Following the MCEA process and guided by the principles that a transportation network:

- is safe, efficient and accessible with choices in mobility.
- fosters the use and development of a sustainable transportation network.
- provides a public transit system that can offer a real alternative to private automobile use.
- provides a network of on-road and off-road pedestrian and cycling facilities that allow the use of active transportation modes as an alternative to automobile.

Various intervention alternatives were developed for non-auto transportation modes, with a focus in the Intensification Areas and the secondary plan areas due to the expectation of significant population and employment growth resulting in more opportunities for non-auto travel behaviour.

The levels of intervention were developed to achieve different transit and active transportation modal shares (proportion of trips by mode) during the morning peak period. These alternatives were developed with input from the City and the technical subcommittee. The modal share targets for each alternative, which are summarized in Table 5-1, were based on 2006 Growth Plan for Simcoe County, Metrolinx Big Move for the GTHA Region, and a review of modal shares in comparable cities and municipalities. They also considered Barrie's location on the periphery of the GTHA, its existing low active transportation and transit modal shares, and its environment. Detailed information on each alternative with respect to land use, required transportation projects, active transportation facility provisions, transit facilities and road networks is provided in Appendix F.

Table 5-1 2014 MMATMP Alternatives with Target Modal Shares

	Alternative 1: “Do Nothing”	Alternative 2: Auto-Oriented “Business as Usual” Approach	Alternative 3: Increased Emphasis on Non-Auto Modes	Alternative 4: Strong Emphasis on Non-Auto Modes
Active Transportation Mode Share	Less than 6%	6%	12%	20%
Transit Mode Share	Less than 2.6%	2.6%	7%	12%

Detailed evaluation criteria were developed to assess the network alternatives within the 2014 MMATMP, which are also provided in Appendix F. The evaluation criteria were established through consultation with the City of Barrie and reflect all components of the environment in the study area including natural, social and cultural environments, transportation elements and cost considerations.

After the evaluation of the four network alternatives, Alternative 3 (Increased Emphasis on Non-Auto Modes) was identified as the preferred option. This alternative would greatly improve upon existing conditions for active transportation, while being able to serve the new developments mostly concentrated in the secondary plan areas and Intensification Areas. The evaluation matrix prepared to evaluate the four network alternatives is included in Appendix F.

The previous 2014 MMATMP identified a mode share target of 7% for transit and 12% for active transportation by horizon 2031. Considering the investment in transit services and active transportation infrastructure in the recent years and the current travel mode share changes, these modal share targets may not be achieved by horizon 2031. However, with the appropriate resources and changes it is believed the same mode share is achievable by 2041, as shown in Table 5-2.

Table 5-2 Future 2041 Modal Share Targets

	Transit	Active Transportation	Auto	Other
Mode Share Target	7%	12%	78%	3%

Note: - The modal share targets are the shares of daily person trips.
- ‘Other’ includes motorcycle, school bus, taxi passenger, paid rideshare, and others.

5.2 Consultation

A key success factor in the development and completion of a master plan project is a well thought out consultation strategy that engages stakeholders, and builds trust and credibility to the public.

5.2.1 Background – 2014 MMATMP

Recognizing the importance of an inclusive and engaging consultation process, a comprehensive public consultation program was undertaken during the development of the 2014 MMATMP. There was consultation with a Technical Advisory Committee and the public. There was also consultation with the Aboriginal groups, as advised by the Ministry of Aboriginal Affairs, and the Department of Indian and Northern Affairs. The comments and information provided by the public, interest groups and stakeholders broadened the information base and facilitated good decision making in the completion of the 2014 MMATMP.

5.2.2 Current Transportation Master Plan

Throughout this TMP, WSP, in collaboration with the City Project Manager, maintained contact with appropriate members/staff of key technical agencies, including Metrolinx, Ministry of Transportation Ontario and Simcoe County, to allow further input throughout the Master Plan process. Regular communication with affected technical agencies directly included these organizations as the TMP progressed. Details of the consultation approach and feedback received during the TMP are discussed in the following sections.

5.2.3 Consultation Approach

Communication is a core component to any master plan development process. Providing clear, consistent and interesting information was a priority for the project team when considering any communication tool or strategy. The following approaches were utilized to maintain public awareness and involvement throughout this TMP:

- Notice of Study Commencement
- Key Stakeholder Consultation
- Public Information Centre
- Project Website

The consultation and engagement approach included the provision of significant context on the study prior to asking detailed questions and gathering input. The following subsections provide a summary of the approach used to engage the various audiences and the input received.

5.2.3.1 NOTICE OF STUDY COMMENCEMENT

The Notice of Study Commencement, which is a statutory requirement as part of the EA process, was issued on August 31 and September 2, 2017 via the Barrie Examiner. The Notice was also posted on the project website, and it included the following information:

- a brief description of the project, study purpose and process, and the goals and objectives
- information on any consultation events
- the City Project Manager's contact information
- the link to the project website for further information

The article included in the Barrie Examiner and the Notice posted on the project website are provided in Appendix G.

5.2.3.2 KEY STAKEHOLDER CONSULTATION

Three separate meetings were held in January 2018 with key stakeholders to provide information on the project and obtain feedback; the meetings with stakeholders were held on the following dates:

- Ministry of Transportation, Ontario – January 11, 2018
- Metrolinx – January 25, 2018
- Simcoe County and Municipalities – January 26, 2018

Inputs received from these meetings, including current studies and planned improvements, population and employment forecasts, mode share targets, and other key modelling assumptions, were utilized in the development of the various transportation networks.

The agency email and mailing lists, presentation materials and meeting minutes are provided in Appendix G.

5.2.3.3 PUBLIC INFORMATION CENTRE

In addition to receiving feedback from key stakeholders, gaining public input through a public participation process that provides opportunities for learning, sharing and responses is paramount to the successful completion of Phases 1 and 2 of the Municipal Class EA process. Considering this study is an update to the previously prepared MMATMP, one Public Information Centre (PIC) was considered adequate to engage the public and receive feedback.

The PIC was held on November 13, 2018 from 4:00 p.m. to 7:00 p.m. at the Southshore Community Centre to introduce the update to the 2014 study, provide information on the existing conditions and seek input on identifying opportunities, challenges, and ideas for the future vision of transportation in the City. Since this was the only PIC for the study, it also presented the preliminary preferred transportation networks and offered opportunities to provide additional input to the study team. The Notice of PIC, provided in Appendix G, was issued on November 1 and 8, 2018.

The PIC was formatted as a drop-in open house session with a mix of information and interactive boards, and was divided into the following four sections:

- 1 Transit
- 2 Active Transportation and Trails
- 3 Road Network
- 4 Complete Streets and Transportation Demand Management



The session was attended by approximately 50 participants ranging from business owners to residents; the sign-in sheets for the PIC are provided in Appendix G. Project team members from WSP and the City of Barrie were on site to answer any questions and collect inputs, in addition to collecting feedback through the interactive boards. Comment sheets were also distributed and collected to gather any additional inputs from the attendees.

A summary of the information provided and feedback received for each of the above-mentioned sections is provided below. Detailed PIC boards and comment sheets are provided in Appendix G. All inputs received from the PIC were collected and incorporated into the analyses to help refine the proposed improvements and recommendations.

5.2.3.3.1 Transit

The information presented in the Transit section of the PIC included the existing transit network and facilities such as the number of routes and hubs, GO Transit stations, Barrie Transit frequencies, current special transit services, and the current transit mode share. This was accompanied by the City's future transit vision for 2041 illustrating the Core and Feeder transit system, location of new transit hubs, future transit mode share, and the major and minor connections within the City.

Based on the two boards of existing and future transit services, an interactive board was provided to gain feedback on the future vision, current usage of Barrie Transit and how to improve ridership.

The following comments were received from the public regarding existing and future transit within Barrie:

- Provide service to the Berson and Hanmer areas.
- Uber-type model of transit service has drawbacks. There are safety concerns for seniors/young families. It may be more acceptable if operated by city instead of private operators.
- Small buses may be preferable.
- Need a direct bus route (not via terminal/transfer) connecting the northwest corner to the southwest corner, perhaps via Ferndale Drive.
- Improve connection to hospitals and provide incentives for hospital workers to utilize transit.
- Provide more services in general and over the holidays, and more frequent services for the vulnerable users such as seniors and people with strollers.
- GO Train for inter-city travel would be preferable if two-way, all-day service is provided, and if electrified (faster travel).
- Lower fees for seniors and improved shelters for all bus stops would encourage regular transit use.



5.2.3.3.2 Active Transportation and Trails

The Active Transportation (AT) and Trails section provided a brief overview of why and how the network recommendations are being developed. A review of the existing network and facilities was also provided along with the future vision for AT and trails infrastructure in Barrie.

The following comments were received with respect to the proposed active transportation and trails network and facility types for the 2041 horizon year:

- Provide more pedestrian and cyclist crossings of Highway 400.
- Implement bicycle locking stations along active transportation infrastructure.
- Improve bike lane visibility such as using green painting.
- Address the safety issue regarding cycling on sidewalks.
- Separate trails with clear marks for pedestrians and cyclists at the Waterfront.
- Improve maintenance of trails and look-out points.












One of the Active Transportation interactive boards, illustrated below, was designed to gather attendees' preference on active transportation facility types for three facility classes: shared facility, designated facility, and separated facility. The facility types were ranked based on public feedback, and the top four preferred facilities are as follows:

- 1 In-boulevard trail (separated facility)
- 2 Cycle track (separated facility)
- 3 Buffered bike lane (designated facility)
- 4 Off-Road Trail

Input was also collected on trail amenities, of which the consensus was that lighting, washrooms, signage and waste collection should be improved or added to Barrie's trail network.

WHAT COULD THE NETWORK LOOK LIKE?

Please review the following active transportation facility types and for each facility class, paste one sticker next to the facility you feel most comfortable using.

SHARED FACILITIES			
Typically on low traffic volume, low speed roads whereby cyclists and motorists share the road space.			
Signed Bike Route	Signed Bike Route with Sharrow	Signed Bike Route with Edgeline	
			<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
DESIGNATED FACILITIES			
Typically on roads with low to moderate traffic volumes and speeds whereby cyclists have a designated space on the road.			
Bike Lane	Buffered Bike Lane	Buffered Paved Shoulder	
			<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
SEPARATED FACILITIES			
Typically along high volume, high speed roads whereby the cyclist is physically separated from the road. Separated facilities can include off-road routes, out of the road right-of-way.			
Cycle Track	In-Boulevard Trail	Off-Road Trail	
			<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>

5.2.3.3.3 Road Network

The information presented in the Road Network section of the PIC included the preliminary preferred road network for the 2041 horizon year, as well as the existing total number of vehicle lanes and the 2014 MMATMP-recommended road network.

A recap of the proposed improvements to Highway 400 and the interchanges within Barrie, which were obtained from the 2017 Highway 400 Transportation Environmental Study Report (TESR), were also included. A detailed description of the future Mapleview Drive Diverging Diamond Interchange (DDI) was presented along with a video demonstrating how to drive through a DDI.

The road network section was concluded with two maps illustrating the future 2041 preliminary preferred road network (total number of vehicle lanes) and the changes to the road network between 2031 and 2041. An interactive board was provided to gather feedback on the future 2041 preferred road network; the following comments were gathered:

- Implement noise barriers along the Highway 400 corridor.
- Widen Essa Road between Coughlin Road and Mapleview Drive West to accommodate potential high-density residential developments at the northeast corner of Essa Road and Mapleview Drive West intersection.
- Improve or realign the skewed intersections at Sunnidale Road and Anne Street North, and at Sunnidale Road and Cundles Road West.
- Concerns about the impacts of downgrading Patterson Road (between Morrow Road to Ardagh Road) from a collector to a local road with respect to City services, such as maintenance and transit.
- Implement signage to divert truck traffic from Patterson Road to Morrow Road (industrial area).
- Update the public with construction schedules on the Dunlop Interchange improvements.
- Potentially extend high occupancy vehicle (HOV) lanes on Bradford Street to Essa Road.
- Concerns on widening Burton Avenue, between Bayview Drive and Milburn Street, to four lanes in a century-home neighbourhood.
- Prioritize the improvements on Mapleview Drive.



5.2.3.3.4 Complete Streets and Transportation Demand Management

The last section of the PIC presented information on Complete Streets and Transportation Demand Management (TDM), what they are and how they are used.

Several TDM measures were proposed, including carpooling, parking pricing strategy, peak spreading, active transportation facilities, carshare, city-wide bikeshare, and transit priority. An interactive board was used to seek input from the public with respect to TDM priorities in Barrie.

The feedback collected determined that active transportation facilities and transit priority are very important to the public, specifically cycle tracks and buffered paved shoulders, as well as discounted employee transit passes and GO Meet, which is the coordination of Barrie Transit services to match that of the GO Transit schedule.



5.2.3.4 PROJECT WEBSITE

The City of Barrie developed a website (<https://www.barrie.ca/City%20Hall/environmental-assessment-studies/Pages/Multi-Modal-Active-Transportation-Master-Plan.aspx>) that was dedicated to providing audiences with updates and information and promoting project events and input opportunities. The following information was included and regularly updated on the project website:

- Project Status
- Study Purpose
- Study Scope
- Key Considerations
- Project Manager contact information
- Project-related reports, notices and documents

5.2.4 Consultation Summary

The feedback received from the various consultation activities was utilized to refine the recommended transportation networks, which are discussed in the following sections.

5.2.5 Notice of Study Completion and Staff Report

The Notice of Study Completion, which is a statutory requirement as part of the EA process, was issued on June 6 and 13, 2019. The notice was posted on the project website and is provided in Appendix G. The

TMP was endorsed by Barrie City Council on May 13, 2019; a copy of the Staff Report is provided in Appendix G.

5.3 Transit Network

The development of the future transit system accounted for various factors including the population and employment forecasts, future transit mode share targets, and the provision and enhancements of the conventional transit system under future conditions.

5.3.1 Future Service Development

The proposed increase in transit mode share translates to an increase from 9,625 current to 76,900 daily transit ridership (boardings) in 2041, after accounting for the population and employment growth. As such, achieving this increase of almost 70,000 daily boardings will require strategic planning and co-ordination of services and measures from multiple City departments, and partnerships with other agencies and stakeholders.

There are several transit initiatives that could be successfully implemented in Barrie to increase transit ridership, such as increasing bus frequencies, reduced transit fares, and special and express services. Considering an increase of almost 70,000 daily boardings is required by 2041, implementing a single transit initiative alone will not be sufficient to achieve this ridership increase; the most effective approach to achieve the target transit mode share would be to implement a combination of various transit initiatives. One combination of transit measures to increase ridership by 2041 could include investing financial and human resources into:

- Improving frequencies and routing;
- Prioritizing the secondary plan areas;
- Introducing a U-Pass to provide reduced transit fare to students (implemented in September 2018);
- Introducing transit service high school programs;
- Providing express services to major destinations;
- Marketing and coordination with large employment zones; and
- Introducing TDM measure to encourage regular transit usage.

The level of investment required for the above-mentioned initiatives will vary, and directly affect the associated impact on increasing ridership. In general, improving the frequency and routing of the transit network is expected to have the greatest potential in increased growth of transit ridership followed by prioritizing services to the secondary plan areas. Detailed information on the development of the transit initiatives and an estimated increase in ridership associated with each initiative is discussed in the 'Transit Technical Memorandum' provided in Appendix A.

5.3.2 2041 Preferred Transit Network

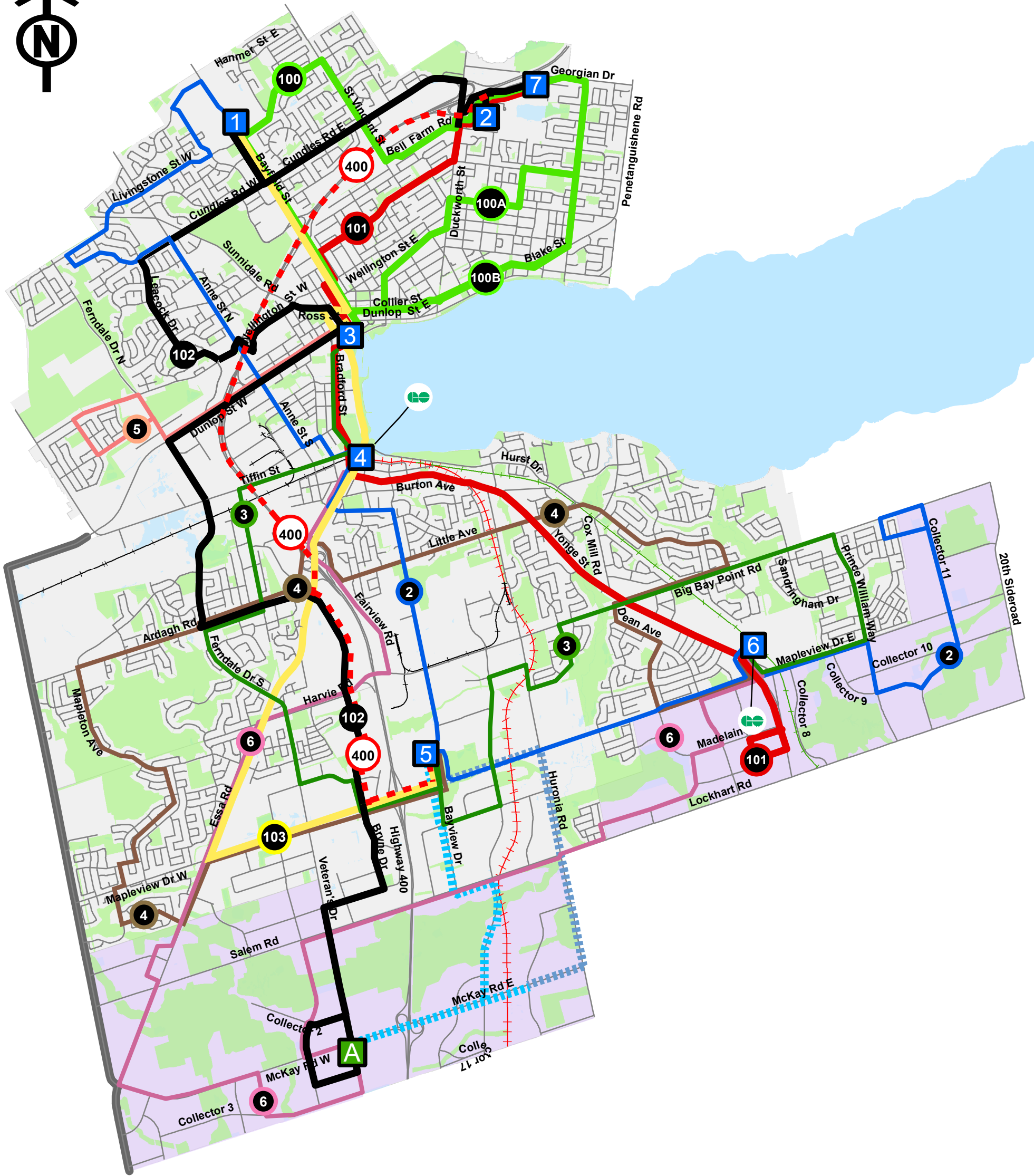
The 2031 preferred transit network, from the 2014 MMATMP, was utilized as a base to build upon for the 2041 horizon year. A key change between 2031 and 2041 is a new industrial zone within the secondary plan areas, specifically the lands enclosed between Lockhart Road and McKay Road, and Huronia Road and Highway 400. Considering these zones will account for approximately 5,250 jobs by 2041, this will provide a significant opportunity for new transit ridership. As such, the 2041 transit network will include service between the Salem and Park Place transit hubs to accommodate transit usage for these lands.

Additionally, an emphasis was put on the development of frequent routes along the major corridors based on the following transit service principles:

- 1 Core Frequency: 10-minute service
 - Direct connection between significant landmarks (attractions)
- 2 Supporting Network: 20-minute service
 - Connection to core routes and minimization of walking transit access (coverage)
- 3 Transfer
 - Minimum transfers, only where required

The development of a Core and Supporting Transit system will provide more reliable connections to the residential areas. Ten and 20-minute frequencies are recommended during the peak commuter periods (morning and afternoon), with longer frequencies during off-peak periods. Overall, the main purpose of implementing a hierarchical route network is to decrease overall travel time, which includes walking access, waiting for boarding, riding on-board, and transfers.

The 2041 preferred transit network is illustrated in Figure 5-1 and includes the core network, denoted by the 100-series routes, and the supporting route network.



Transit Routes

- Core Routes
- Support Routes
- Business Service
- Optional Business Service (2041)
- Highway 400 Express Route

Existing Transit Hub

- 1 Georgian Mall
- 2 Georgian College
- 3 Downtown Terminal
- 4 Allandale/Waterfront GO Station
- 5 Park Place
- 6 Barrie South GO Station
- 7 Royal Victoria Hospital

New Transit Hub

- A Salem Transit Hub

Transportation Features

- BCRY Railway
- GO Transit Railway
- Protection for Active Transportation and / or Transit Corridor
- GO Station

Natural Features

- Park / Open Space
- Water

Other Features

- Secondary Plan Areas
- Under Jurisdiction of Simcoe County

Data Sources: City of Barrie
 Date Updated: Wednesday, June 12, 2019
 Project: 171-08853-00
 Map Created By: WSP Thornhill

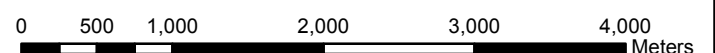


Figure 5-1
 Proposed 2041 Transit Route Network Concept
 City of Barrie Transportation Master Plan



5.3.3 Changes Between 2031 And 2041 Networks

While the preferred transportation network and transit mode share for the 2031 horizon year were utilized in the development of the 2041 transit network, several significant changes have been incorporated into the 2041 network, as noted below.

- 1 An important difference between the proposed 2031 Transit Network from the 2014 MMATMP and the proposed network for 2041 is the development of a Core and Supporting Transit System.
- 2 Implementation of Transit Priority network using proposed HOV lanes along the following corridors:
 - a Yonge Street.
 - b Bayfield Street.
 - c Essa Road.
 - d Mapleview Drive.
- 3 Service between the Salem and Park Place transit hubs to accommodate transit usage for the new industrial zones within the Salem Lands.
- 4 Consider transit signal priority in and around the Downtown Terminal and Allandale Waterfront GO Station to connect to the proposed HOV lanes.

5.3.4 Barrie Transit – Future Ready

Technology-driven increases in automation, connectivity and information sharing have enable more efficient use of resources in general, including transit services, making many aspects of our life easier and more convenient. From real-time tracking of transit service schedules, online multi-modal trip planners, integrating paid rideshare or taxi services within a transit system, and contactless payment systems such as PRESTO, utilizing transit has become increasingly more effortless. In a data-driven world with an increasing emphasis on connectivity and mobility, technology improvements will enhance safety and equity.

Detailed information for each Future Ready component discussed below is included in the 'Transit Technical Memorandum' provided in Appendix A.

5.3.4.1 COMPLEMENTARY TRANSIT STRATEGIES

The first and last mile prove to be a prevailing obstacle in attracting new riders to alternative travel options. Urban centres, such as Barrie, where densities are much lower and where the built environment lends itself to private automobile ownership, are having trouble in reaching transit mode share targets. The private automobile provides the highest level of mobility, allowing users to drive to and from any destination of their choosing, while transit users must travel to a focal pick-up/drop-off point. Potential solutions to the first and last mile issue are either integrating ridesharing into transit or providing transit on-demand.

The integration of ridesharing in transit utilizes private vehicles, which are requested from a specific point of pick-up, to and from a transit hub for seamless transition between travel modes. Implementing rideshare to facilitate the first and last mile trips would attract ridership while reducing transit costs to the City by limiting the number of buses required to mirror the rideshare impact. Ridesharing transit programs have been successfully implemented in several municipalities such as Innisfil (20km south of Barrie) and Milton (115 km south of Barrie).

On-demand transit is a form of alternative service delivery which achieves a high value for dollar while minimizing the number of trips with low passenger utilization. The transit vehicles, which range from taxis, vans to accessible transport vehicles, are dispatched by the control center to serve specific areas or stops when a rider calls in to complete a trip, and interfaces with other available nearby transit services. On-demand transit would be used for more rural areas, where it is unfeasible to operate a fixed route transit service on a set schedule. For example, York Region Transit (YRT) is a strong proponent of on-demand transit, as its service area is extremely large and consists of unevenly developed plots of land.

5.3.4.2 FUTURE RAPID TRANSIT

There are many benefits of rapid transit within a City, most of all being the decrease in transit travel time which in turn increases the attractiveness of transit. Additionally, rapid transit also limits urban sprawl through intensifying development in urban areas, protecting farmland and creating a more vibrant community¹. There are several approaches to providing future rapid transit within Barrie, including:

- Utilizing future HOV lanes to provide bus rapid transit.
- Utilizing Highway 400 for express services.
- Utilizing the City's railway corridors as potential light rail transit for inter-city travel.

5.3.4.3 TECHNOLOGY-DRIVEN IMPROVEMENTS

Implementing a contactless fare collection system such as PRESTO, Levels 1 and 2 of automation on the transit fleet, and mobility as a service (MaaS) mobile application are a few examples of technological improvements for consideration.

5.3.5 Integrating Active Transportation and Transit

The integration of active transportation infrastructure and transit is a key component of designing a multi-modal and accessible transportation system in the City of Barrie. Integrating active transportation and transit can help support first and last mile connections to transit, and increase transit ridership. This can be done through the development of high quality, accessible active transportation connections and the inclusion of amenities such as short- and long-term bike parking, washrooms and other end-of-trip facilities at transit terminals, stations and major stops. In addition, it is important that transit stops, terminals and stations are connected through continuous sidewalks, pathways and bicycle facilities to encourage more people to combine active modes and transit for the same trip. Providing viable options for people to walk and / or cycle as part of their daily trip will help to achieve the City's target for a 12% active transportation and 7% transit mode share.

¹ Region of Waterloo, The ION Story;
https://rapidtransit.regionofwaterloo.ca/en/resources/ION_Story_revised_R_0315.pdf

5.4 Active Transportation and Trails Network

A key component of the TMP is the recommended active transportation network, which has been identified using an iterative process that builds upon existing conditions, past successes and potential areas of improvement within the City. Developing an active transportation network is not a one size fits all approach and should be designed and developed with people of all ages and abilities in mind. The City's proposed active transportation network contains a system of routes and facilities that provides options to encourage residents and visitors to use active transportation for a range of trip types and purposes. The network is recommended to be supported by additional design enhancements that are meant to encourage more people to engage in active forms of travel by increasing a user's sense of safety and comfort.

Additionally, The AT strategy was also completed in parallel with on-going work as part of the City's Trails Master Plan. As such, the proposed off-road trail connections identified in the AT Strategy are further documented in the 'Trails Master Plan' provided in Appendix C.

5.4.1 Developing the Network

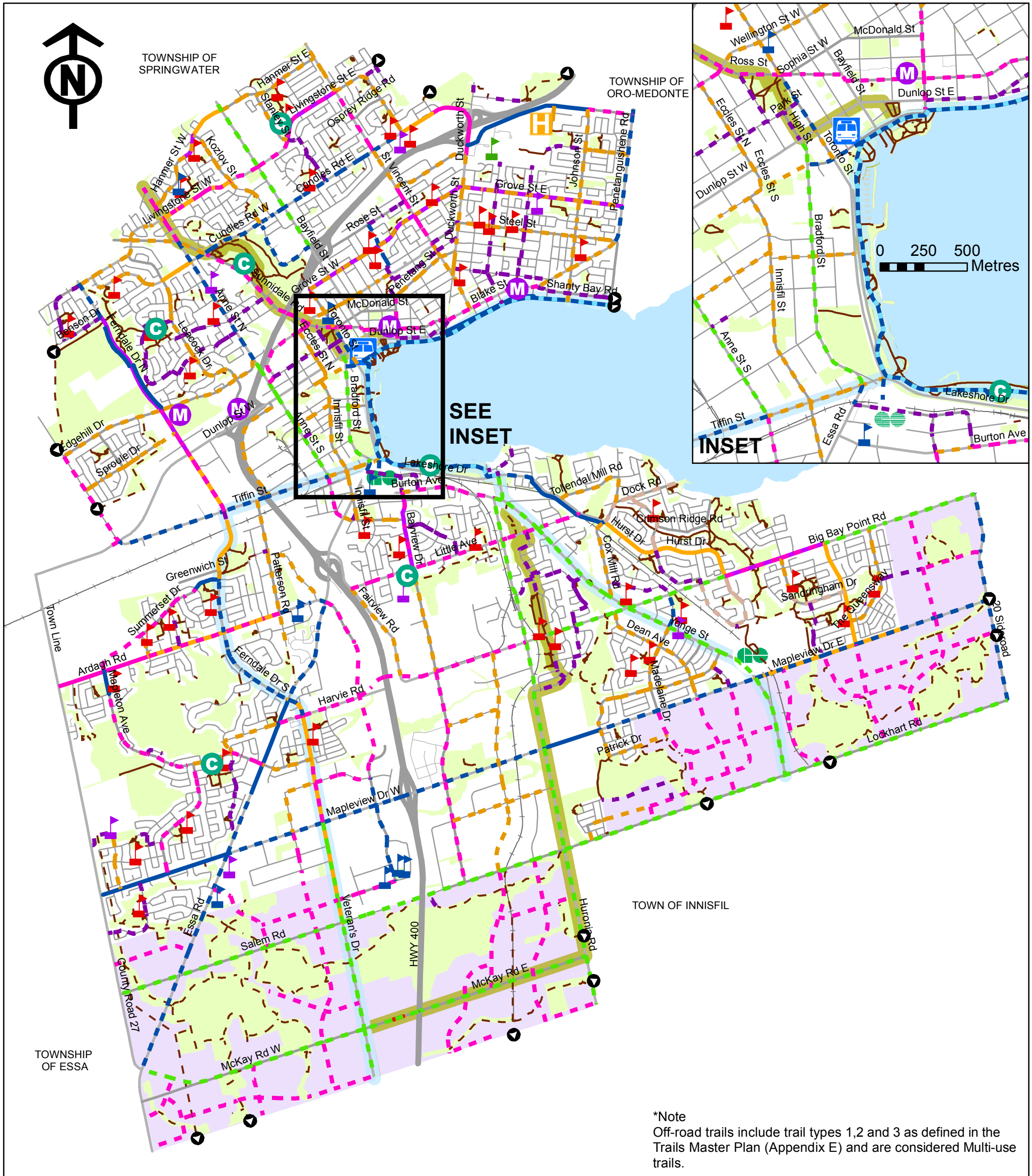
The process undertaken to develop the City's recommended active transportation network included six steps and was shaped by the input collected from members of the public, stakeholders, and City staff over the course of the study. An overview of the network development process is presented in Table 5-3 below.

Table 5-3 Barrie Active Transportation Network Development Process

1	Review existing conditions	Map existing and previously planned routes to develop an understanding on what is currently on the ground and the location of planned routes
2	Identify criteria and candidate routes	Develop a set of criteria that can be used to help select new connections that could form part of the active transportation network
3	Review existing and potential new routes	Undertake field investigations and a desktop analysis to understand factors that could inform the selection of preferred AT routes
4	Confirm preferred AT routes and network	Confirm the recommended routes to form part of the City's active transportation network
5	Confirm AT facility types	Review and identify the most appropriate facility type for each proposed route that forms part of the active transportation network
6	Identify phasing and priorities	Review and revise where necessary the proposed phasing for active transportation routes

The details and outcomes of each steps 1 through 4 are documented in the AT Strategy. The proposed active transportation network by facility type (the culmination of steps 1 through 5) is presented in Figure 5-2 and Figure 5-3, and summarized in Table 5-4.

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*Note
Off-road trails include trail types 1, 2 and 3 as defined in the Trails Master Plan (Appendix E) and are considered Multi-use trails.

Existing Facilities	Proposed Facilities	Trail Systems	Points of Interest
Waterfront Multi-use Trail	In-Boulevard Pathway	Province-Wide Cycling Network	Royal Victoria Hospital
In-Boulevard Pathway	Cycle Track	The Great Trail	Municipal Facility
Buffered Bike Lane	Buffered Bike Lane	Transportation Features	Community Centre
Bike Lane	Bike Lane	GO Station	Elementary School
Paved Shoulder	Paved Shoulder	Barrie Bus Terminal	High School
Signed Bike Route	Urban Shoulder	Other Features	Private School
Off-road Trail	Signed Bike Route	Secondary Plan Area	College
	Off-road Trail	Park / Open Space	
		Connection to Surrounding Municipality	

Data Sources: City of Barrie
Date Updated: April, 2019
Project: 171-08853-00
Map Created By: WSP Thornhill

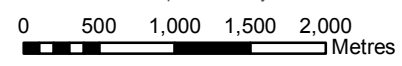
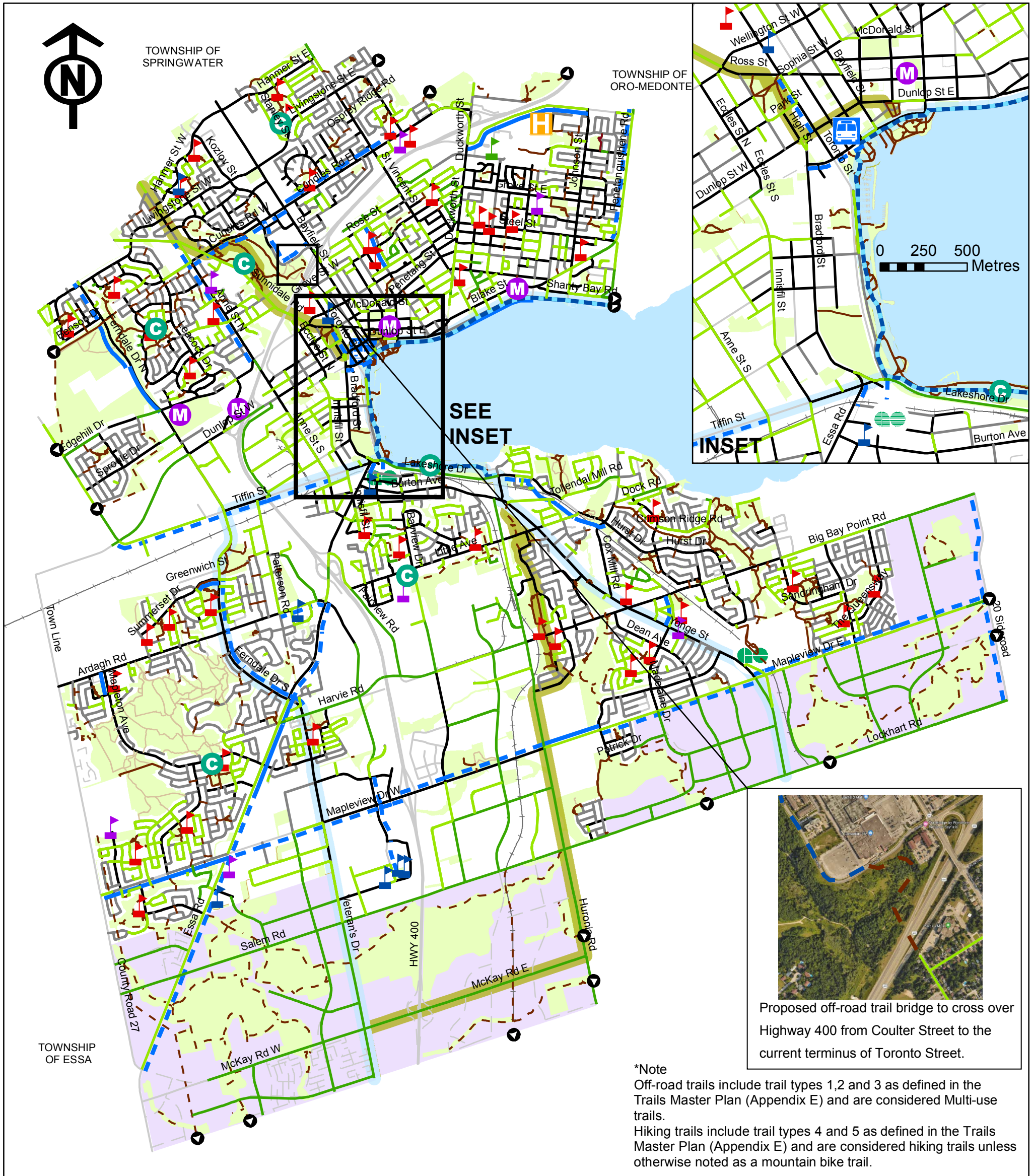


Figure 5-2
Cycling and Multi-Use Trail Network
City of Barrie Transportation Master Plan





Existing Facilities	Proposed Facilities	Trail Systems	Points of Interest
Waterfront Multi-use Trail	In-Boulevard Pathway	Province-Wide Cycling Network	Royal Victoria Hospital
In-Boulevard Pathway	Off-road Trail	The Great Trail	Municipal Facility
Off-road Trail	Add sidewalk on one side	Transportation Features	Community Centre
Hiking Trail	Add Sidewalk on both sides	GO Station	Elementary School
Sidewalk Network		Barrie Bus Terminal	High School
Sidewalks on both sides		Other Features	Private School
Sidewalks on one side		Secondary Plan Area	College
		Park / Open Space	
		Connection to Surrounding Municipality	

Data Sources: City of Barrie
 Date Updated: April, 2019
 Project: 171-08853-00
 Map Created By: WSP Thornhill

0 500 1,000 1,500 2,000 Metres







Figure 5-3
Sidewalk and Multi-Use Trail Network
 City of Barrie Transportation Master Plan



In total, there are **484.7 KILOMETERS** of proposed active transportation facilities in Barrie including routes intended for pedestrian, cycling and multi-use purposes. Lastly, the details of step 6 (identify phasing and priorities) are discussed in Section 0.

The City’s active transportation network includes different facility types indicated above, both existing and proposed. The ‘Active Transportation Strategy’ provided in Appendix B outlines key design considerations for each facility type included in the City’s active transportation network.

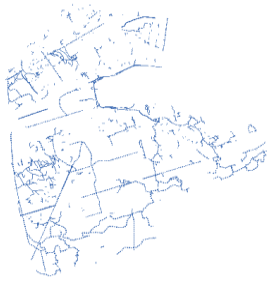


Table 5-4 Overview of the Proposed AT Network

Example	Facility Type	Length of Proposed New Facilities
	Off-Road Trails <ul style="list-style-type: none"> ▶ Multi-use (Type 1-3) ▶ Primarily pedestrian only (Type 4-5) 	69.8 KM 63.6 KM 6.3 KM
	In-Boulevard Pathways	36.3 KM
	Cycle Tracks	45.1 KM
	Buffered Bike Lanes	80.2 KM
	Bike Lanes	70.3 KM
	Signed Routes <i>Includes signed bike routes and urban shoulders (edge line markings)</i>	40.5 KM
	Sidewalks	142.5 KM
Total		484.7 KM

5.4.2 Network Users

Barrie's active transportation network is intended to accommodate a range of users with varying abilities and skills. Both pedestrians and cyclists are considered the most common user group, however, the assessment of routes included in the City's active transportation network considered other non-motorized forms of travel and recreation. Table 5-5 outlines the different user systems which collectively form a continuous and connected active transportation network for Barrie.

Table 5-5 Summary of User Systems

User System	Application	Considerations
 <p>Pedestrian System: Those who travel by foot including walkers, joggers, hikers and runners.</p>	<ul style="list-style-type: none"> ▶ Low travel speeds ▶ Minimum 1.5m operating space for pedestrians on sidewalks ▶ Pedestrian trips include commuter, recreational and touring / long distance purposes 	<p>A typical pedestrian trip is approximately 2 km or less making it possible for residents and visitors to access most key destinations and neighbourhoods in the City's urban areas and hamlets by foot.</p>
 <p>Multi-use System: Open to all forms of active transportation, ranging from users that require assistance to walkers, hikers and cycling.</p>	<ul style="list-style-type: none"> ▶ Typically require 3.0m width space at minimum for trail users ▶ Support a range of travel speeds and volumes ▶ Accommodate different trip purposes 	<p>Multi-use trails accommodate a variety of users and active modes of transportation and generally more conducive for recreational travel than commuter trips. In some instances, like in-boulevard pathways, they are easier to accommodate than on-road facilities since they require less space.</p>
 <p>Cycling System: Those who bike for commuting, recreational and touring / long-distance.</p>	<ul style="list-style-type: none"> ▶ Average speeds range from 10 to 20 km/h; may increase in excess of 30 km/h on downhill roads ▶ Typically require a minimum of 1.5m of horizontal operating space and 2.5m of vertical operating space 	<p>Intended to support those who cycle daily and potential new users who are interested in engaging in more active forms of travel and recreation. To support the needs of different types of cyclists including e-bike users, a variety of routes including shared, designated and separated facilities should be implemented.</p>

5.5 Road Network

In many places, the existing road network will not be able to accommodate future traffic demand, not only hindering vehicle trips but also slowing down transit trips and possibly obstructing active transportation. Considering the projected growth in Barrie, it is essential to propose solutions to address future roadway capacity constraints while looking to improve and increase other modes of transportation mobility choices, consistent with provincial and City policies.

5.5.1 Development of Future Road Network

To identify roadway capacity deficiencies and develop each road improvement alternative, several assumptions have been developed and are used throughout. The hypotheses were based on a review of planned improvements, consultation with the City, consultation with the MTO, and best professional practices. The hypotheses include:

- The 2041 planning horizon was used to explore and compare different road network alternatives. The mid-week AM and PM peak hours were used to determine infrastructure requirements.
- The population and employment forecasts that have an impact on transportation are used to generate future travel demand. It should be noted that the forecasts used for the Emme demand forecasting model represent those that impact the traffic demand on a road network.
- The future 2041 road network was developed based on the daily (24 hours) modal share targets for total person trips by 2041: **7% TRANSIT** and **12% ACTIVE TRANSPORTATION**. The daily (24 hours) modal share targets are translated to be approximately 78% for the auto travel mode.

5.5.1.1 CRITERIA AND RATIONALE FOR IDENTIFYING ROAD IMPROVEMENTS

The improvements were identified based on a systematic analysis of road deficiencies for 2041. To identify roadway capacity deficiencies and develop each road improvements, several assumptions were developed and used throughout. Table 5-6 summarizes the major criteria that were applied to the City's roads and the MTO Highway 400 interchange ramps.

Table 5-6 Criteria and Rationale for Identifying Roadway Improvements

Roadway Capacity Threshold of V/C	Rationale
<p>Before making major roadway network improvements, the road or roads in question should be analyzed to determine the appropriate level of service and design standards that match the need and character of the area being served. Level of service (LOS) is a term used to qualitatively describe the operating conditions of a roadway based on factors such as speed, travel time, maneuverability, delay and safety. The level of service of a facility is designated with a letter, A to F, with A representing the best operating conditions (free flow) and F the worst (congestion).</p> <p>Roads with an auto volume-to-capacity ratio (V/C) ratio greater than 0.85 are identified as being deficient as per the travel demand forecasts from the Emme model. The threshold for determining road capacity deficiencies was determined with the City and is defined as streets with traffic volumes over 85% of roadway capacity (this is represented by a volume to capacity ratio of 0.85). This ratio corresponds to a level of service (LOS) of "D", which denotes that there is some congestion on some movements at intersections and that intersections are generally functional.</p>	
City's Roads	
Target capacity threshold - 0.85 (V/C < 0.85)	Target capacity threshold of V/C of 0.85 is reviewed for links (roads) during the peak weekday hour (AM or PM). This ratio compares capacity with vehicular demand. This represents a use of approximately 85 percent of capacity during the weekday AM and PM peak hours. The capacity is determined based on the number of lanes and roadway classification, while the demand is based on projected traffic volumes. This V/C ratio corresponds to a level of service (LOS) of "D" where there is some congestion on some movements at intersections, but intersections are generally functional. LOS D is typically the roadway design target.
V/C between 0.85 and 0.92 (0.85 ≤ V/C < 0.92)	Roads with a V/C between 0.85 and 0.92 are examined individually to examine if significant constraints are present for roadway expansion (built or natural environments).
Maximum capacity threshold - 0.92 (V/C ≥ 0.92)	1) Under urban congestion conditions, a maximum capacity threshold of 0.92 can be tolerated. If significant constraints are present for roadway expansion, roads with a V/C between 0.85 and 0.92 will not be widened to maintain the current built or natural environments. 2) Individual road segments with a V/C greater than 0.92 will be reviewed to examine if there are specific right-of-way constraints that prevent from roadway expansion.
Special Cases	1) Arterial roads are limited to have a maximum capacity of seven through lanes (three lanes per direction). 2) If existing right-of-way constraints are present to prevent expansion, other alternative transportation modes can be considered.
MTO Highway 400 Interchange Ramps	
V/C ≥ 0.75	For Highway 400 ramps, a lower congestion threshold is used (0.75) in accordance with MTO methodology.
Flow of 1,500 pc/h	Based on MTO Geometric Design Guideline, a two-lane ramp is required where the flow exceeds 1,500 equivalent passenger cars per hour (pc/h).

In summary, roads with a V/C ratio equal to or greater than 0.85 were identified as candidates for potential improvements as per the travel demand forecasts from the Emme model (Appendix E). Road widening measures were limited to a maximum of seven lanes. And network connectivity and grids were also considered.

In addition, the modelling analyses were complemented by a review of currently observed and future estimated average daily traffic volumes against the roadway generalized service volumes corresponding to a level of service D (LOS D) to capture traffic variations during the time of a day. The identified road improvements were further justified.

5.5.2 Creation of Road Network Alternatives

One of the objectives of this TMP is to confirm the previously recommended road network improvements by 2031 and identify any additional improvements, if required, to accommodate the future growth to 2041. Three series of future road network alternatives were developed to test and assess the needs for road network improvements and are discussed briefly below:

Alternative 1A – Future 2041 Base Network No.1 (Do nothing):

This network scenario includes a) existing road network, b) programmed improvements in City's Capital Plan, and c) recommended improvements on County's roads. It represents the do-nothing network scenario to City's roads and Highway 400 mainline, crossings and interchanges.

Alternative 1B – Future 2041 Base Network No.2 (Only MTO improvements):

This network scenario includes a) existing road network, b) programmed improvements in City's Capital Plan, c) recommended improvements on County's roads, plus d) MTO TESR Update recommended improvements. It represents the future 2041 do-nothing network scenario to City's roads. This scenario resembles the MTO TESR Update network scenario.

Alternative 2 – Future 2041 Network with 2014 MMATMP Recommended Network, excluding Harvie / Big Bay Point Interchange:

This network scenario includes the future 2041 base network No.2 (Alt.1B) plus the 2014 MMATMP recommended improvements, excluding the new Harvie Road / Big Bay Point Road Interchange. This alternative is to justify the extra improvements and the changes to the previous TMP recommendations.

Alternative 3 – Future 2041 Network (Updated 2014 MMATMP plus enhancements):

This network scenario includes the future 2041 base network No.2 (Alt.1B) plus the 2041 improvements proposed in this TMP. Compared to Alternative 2, additional improvements and changes to the previous 2014 MMATMP network are included in Alternative 3.

Each of the above City road network alternatives includes road widening alternatives for an individual road with improvements. An example of Dunlop Street at the Highway 400 Interchange: In Alt.1A it has two lanes; Alt.1B assumes five lanes; Alt.2 and Alt.3 assumes seven lanes.

5.5.3 2041 Preferred Road Network

A series of analyses was conducted based on the hypotheses, criteria, and rationale defined in Section 5.5.1. The proposed recommendations for the future 2041 preferred road network are discussed in the following sections as shown in Figure 5-4.

5.5.3.1 ROAD CLASSIFICATION

Proposed Road Classification Criteria

Currently, the City does not have road functional classification criteria for City's roads. One of the major objectives of the road functional classification is to design roadways based on required geometric design standards of their defined class and function. Based on its roadway service function, a roadway of a higher class can carry higher traffic volumes, and vice versa. Therefore, a roadway functional class impacts roadway capacity.

For road network analyses in this TMP study, a set of road classification criteria, as presented in Table 5-7, are proposed based on a review of best practices, and the City's current road classification system and road characteristics. Note that public lanes are not within the TMP scope and Expressways are under the jurisdiction of MTO. These two classes are not included in the proposed road classification system.

The criteria recommended in the Transportation Association of Canada (TAC) are applied, except for some criteria such as number of vehicle lanes, posted speeds, and parking restrictions, which reflect the City of Barrie current practices. The proposed road classification criteria include:

- 1 traffic service function
- 2 land service / access
- 3 desirable connections
- 4 typical daily traffic volume in two directions (veh/day)
- 5 number of vehicle lanes
- 6 flow characteristics
- 7 posted speed
- 8 transit service
- 9 accommodation of cyclists
- 10 accommodation of pedestrians
- 11 parking restrictions
- 12 minimum intersection spacing

Proposed Road Classification System

A review of City roads with the current road classification was conducted based on the proposed criteria in Table 5-7 existing and future forecasted ADT volumes, and future proposed transportation infrastructure including active transportation and transit services. Some changes to current road classification are proposed, which are summarized in Table 5-8. The proposed road classification system is shown in Figure 5-4. Detailed rationale assessment for the proposed changes is included in the 'Emme Macro Modelling and Improvements Rationale Technical Memorandum' provided in Appendix E.

Table 5-7 Proposed Road Classification Criteria

No.	Factor	Locals		Minor Collectors		Major Collectors		Arterials
		Residential	Industrial / Commercial	Residential	Industrial / Commercial	Residential	Industrial / Commercial	
1 *	Traffic service function	Traffic movement secondary consideration		Traffic movement and land access of equal importance		Traffic movement and land access of equal importance		Traffic movement primary consideration
2 *	Land service / access	Land access primary function		Traffic movement and land access of equal importance		Traffic movement and land access of equal importance		Property access control
3 *	Desirable connections	Locals, collectors		Locals, collectors, arterials		Locals, collectors, arterials		Collectors, arterials, expressways
4 *	Typical daily traffic volume in two directions (veh/day)	< 1,000	< 3,000	1,000 - 8,000	3,000 - 12,000	< 16,000	< 20,000	10,000 - 30,000
5 *	Number of vehicle lanes ^a	One (one-way streets) or two		Two to three		Two to five		Two to seven
6	Flow characteristics	Interrupted flow		Interrupted flow		Interrupted flow		Uninterrupted flow except at signals and crosswalks
7	Posted speed	20 - 40		40 - 50		40 - 50		50 - 60 (urban) 60 - 80 (rural)
8 *	Transit service	Generally not provided		Permitted		Permitted		Preferred
9 *	Accommodation of cyclists	No restrictions or special facilities		Special facilities considered		Special facilities considered		Special facilities considered
10 *	Accommodation of pedestrians	Sidewalks normally on one or both sides	Sidewalks provided where required	Sidewalks normally on both sides	Sidewalks provided where required	Sidewalks normally on both sides	Sidewalks provided where required	Sidewalks on both sides
11	Parking (typically)	No restrictions or restrictions one side only		Few restrictions other than peak hours		Prohibited or peak hour restrictions		Prohibited or peak hour restrictions
12	Min. intersection spacing (m)	60		60		60		200 - 400 (between two traffic controls)

Reference source:

1. Table 2.6.5 - Characteristics of Urban Roads, Geometric Design Guide for Canadian Roads, Transportation Association of Canada (TAC), 2017.
2. Road Classification Criteria, adopted by City of Toronto Council on February, March 1&2, 2000.
3. Table 3-3 - Characteristics of Major and Minor Collectors (Urban and Rural, Highway Functional Classification Concepts, Criteria and Procedures, U.S. Federal Highway Administration, 2013.

Notes:

1. The major criteria adopt the criteria recommended in TAC, particularly the daily traffic volumes. Other criteria reflect the City of Barrie current practices, such as the posted speeds and parking restrictions.
2. Major collector routes are longer in length; have lower connecting densities; have higher speed limits; have higher daily traffic volumes; and have more travel lanes, compared to minor collector roads (Reference source No.3). Based on the current City's road classification, major collector roads are similar to minor arterial roads defined in the TAC Guide.
3. Public lanes are not within the TMP scope and Expressways are under the jurisdiction of MTO. These two classes are not included in the proposed road classification system.

* Indicates the key criteria for road classification.

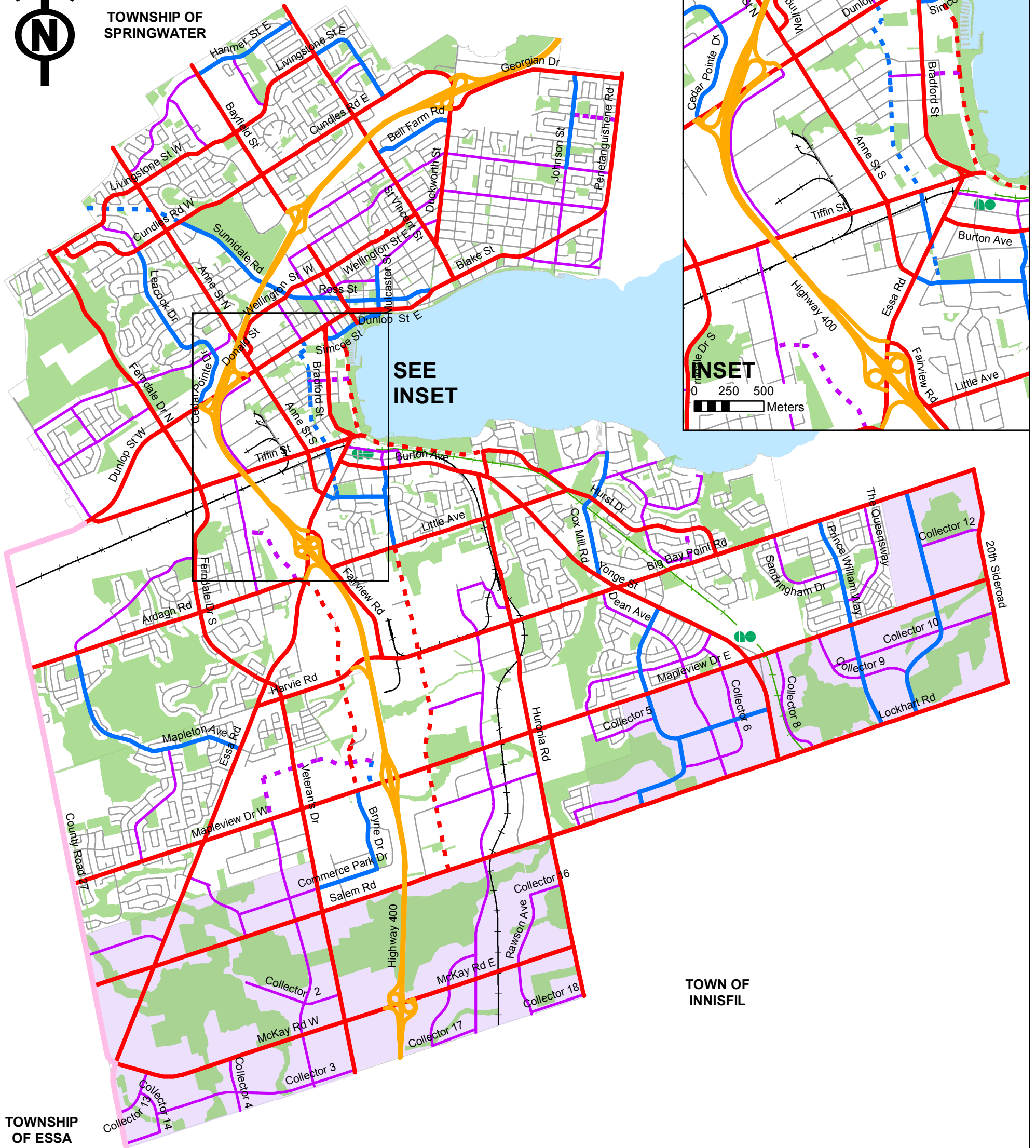
^a. The number of lanes includes HOV or bus lanes and a centre two-way left-turn lane (TWLTL), excluding bike lanes.

Table 5-8 Changes of Road Classification from 2014 MMATMP

Roadway	From	To	Current Classification	Proposed Classification
Barrie View Drive	Mapleview Drive	Caplan Avenue	Local	Major Collector
Bayview Drive	Little Avenue	Big Bay Point Road	Major Collector	Arterial
Bayview Drive	Big Bay Point Road	Mapleview Drive	Major Collector	Arterial
Bayview Drive	Mapleview Drive	Lockhart Road	Major Collector	Arterial
Bryne Drive	Essa Road	Mapleview Drive	Major Collector	Arterial
Caplan Avenue	Reid Drive	Veterans Drive	Local	Minor Collector
Caplan Avenue	Veterans Drive	Bryne Drive	Local	Minor Collector
Caplan Avenue	Bryne Drive	Barrie View Drive	Local	Minor Collector
Cheltenham Road	John Street	Penetanguishene Road	Major Collector	Minor Collector
Grand Forest Drive	Hurst Drive	Golden Meadow Road	Local	Minor Collector
Innisfil Street	Dunlop Street	Tiffin Street	Minor Collector	Major Collector
Innisfil Street	Tiffin Street	Essa Road	Minor Collector	Major Collector
Innisfil Street	Essa Road	Baldwin Lane	Minor Collector	Major Collector
Lakshore Drive	Simcoe Street	Tiffin Street	Parkway	Arterial
Mapleton Avenue	Essa Road	Veterans Drive	Local	Major Collector
Morrow Road	Patterson Road	Ardagh Road	Local Street	Minor Collector
Reid Drive	Caplan Avenue	Mapleview Drive	Local	Minor Collector
Sunnidale Road	Cundles Road	City Northwest Limits	Minor Collector	Major Collector
Victoria Street	Ellen Street	Lakeshore Drive	Major Collector	Minor Collector



TOWNSHIP OF
SPRINGWATER



TOWN OF
INNISFIL

TOWNSHIP
OF ESSA

Notes:
- The proposed changes are for the TMP study purpose to support road network analyses and can be considered by the City to incorporate in the City OP Update in consultation with staff and the public.

Transportation Features		Natural Features	
Provincial Freeway	Major Collector	GO Station	Park / Open Space
Simcoe County Road	Minor Collector	GO Transit Railway	Other Features
Arterial	Local Street	BCRY Railway	Secondary Plan Areas
	Proposed Change		

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Figure 5-4
Road Classification, Preferred Network - 2041
City of Barrie Transportation Master Plan



5.5.3.2 PROPOSED NUMBER OF LANES

Figure 5-5 illustrates the total number of vehicle lanes and network connections proposed for 2041. Figure 5-6 illustrates the changes in vehicle lanes on roadways from the base year 2016, which indicate the road improvements by 2041. Figure 5-7 illustrates the changes in the proposed number of vehicle lanes, compared to the previous 2014 MMATMP recommendations for 2031.

It should be noted that the new partial interchange at Harvie Road / Big Bay Point Road recommended in the 2014 MMATMP was not approved by MTO. Therefore, it is not included in the proposed network. However, additional improvements have been planned by both the MTO and the City of Barrie to improve the future traffic operation conditions on Maplevue Drive adjacent to Highway 400.

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TOWNSHIP OF
SPRINGWATER



SEE
INSET

INSET

0 250 500
Meters

TOWNSHIP OF INNISFIL

TOWNSHIP OF
ESSA

Notes:

- ① Diverging Diamond Interchange (DDI) (MTO 2017 TESR)
- ② New Parclo A3 Interchange
- ③ Further study to evaluate improvements on Bradford Street and at Tiffin Street intersections at Bradford/Essa and Lakeshore
- ④ Further study to assess the need for disconnection of Little Avenue from Hurst Drive

- A TWLTL or median is counted as one lane in the City of Barrie TMP.
- The number of lanes for a ramp indicates the lanes where a ramp merges with or diverges from Highway 400.
- Existing and future potentially required exclusive turn lanes at intersections are not shown.
- Local streets in the Salem and Hewitt's Secondary Plan Areas are not shown.
- One-way streets are not shown.

Transportation Features

- 10 Lanes with Continuous Median (MTO 2017 TESR)
- 8 Lanes with Continuous Median (MTO 2017 TESR)
- 7 Lanes (including TWLTL or Median)
- 6 Lanes
- 5 Lanes (including TWLTL or Median)
- 4 Lanes
- 3 Lanes (including TWLTL or Median)
- 2 Lanes
- 2 Lanes (Ramp)
- 1 Lane (Ramp)

- Existing Grade Separation
- New Grade Separation
- New Grade Separation Initiated by Metrolinx
- GO Station
- GO Transit Railway
- BCRY Railway

Natural Features

- Park / Open Space
- Other Features
- Secondary Plan Areas

0 500 1,000 2,000 3,000 4,000
Metres

Date Updated: Friday, April 05, 2019
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Figure 5-5
Total Number of Vehicle Lanes, Proposed Preferred Network – 2041
City of Barrie Transportation Master Plan



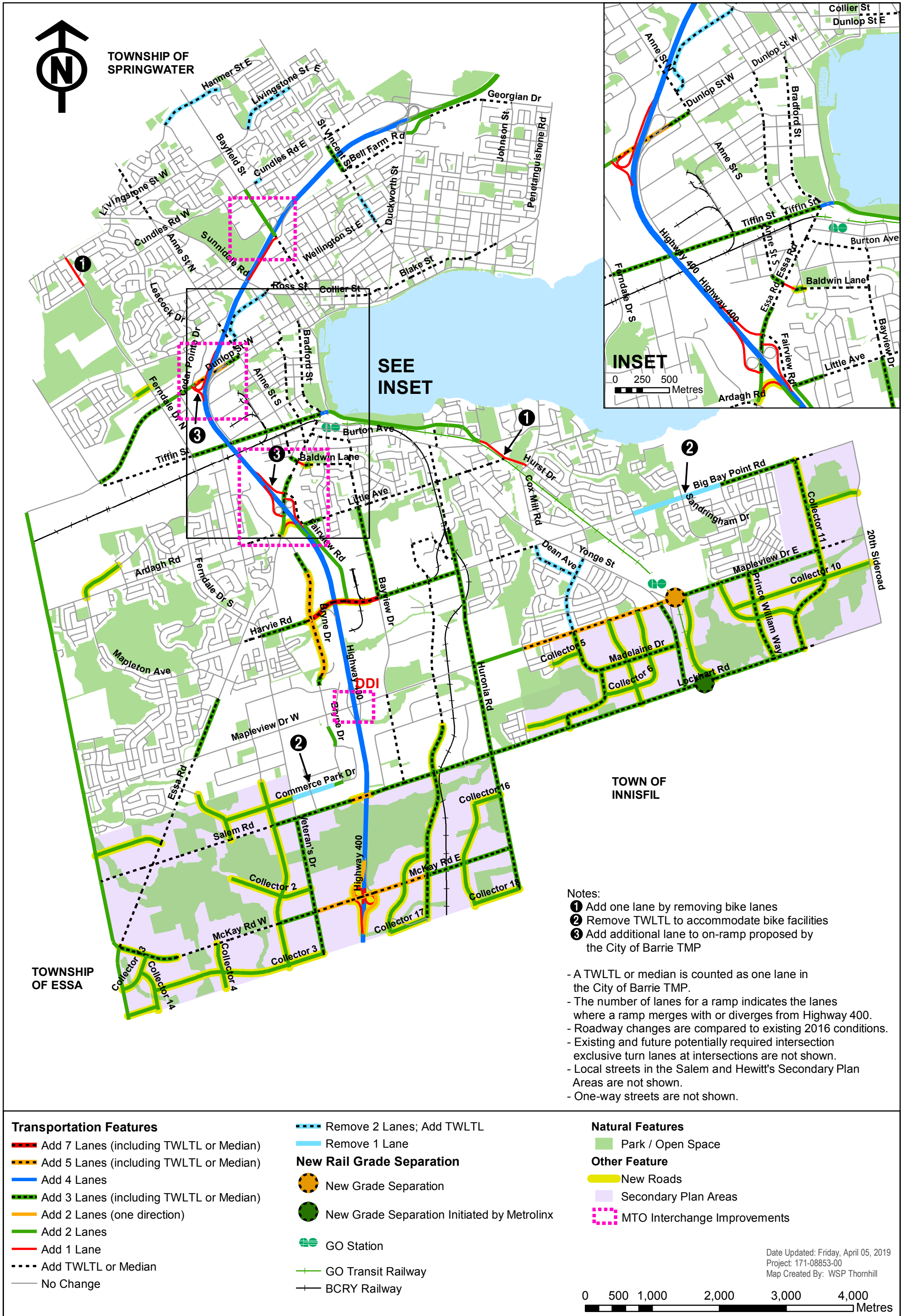
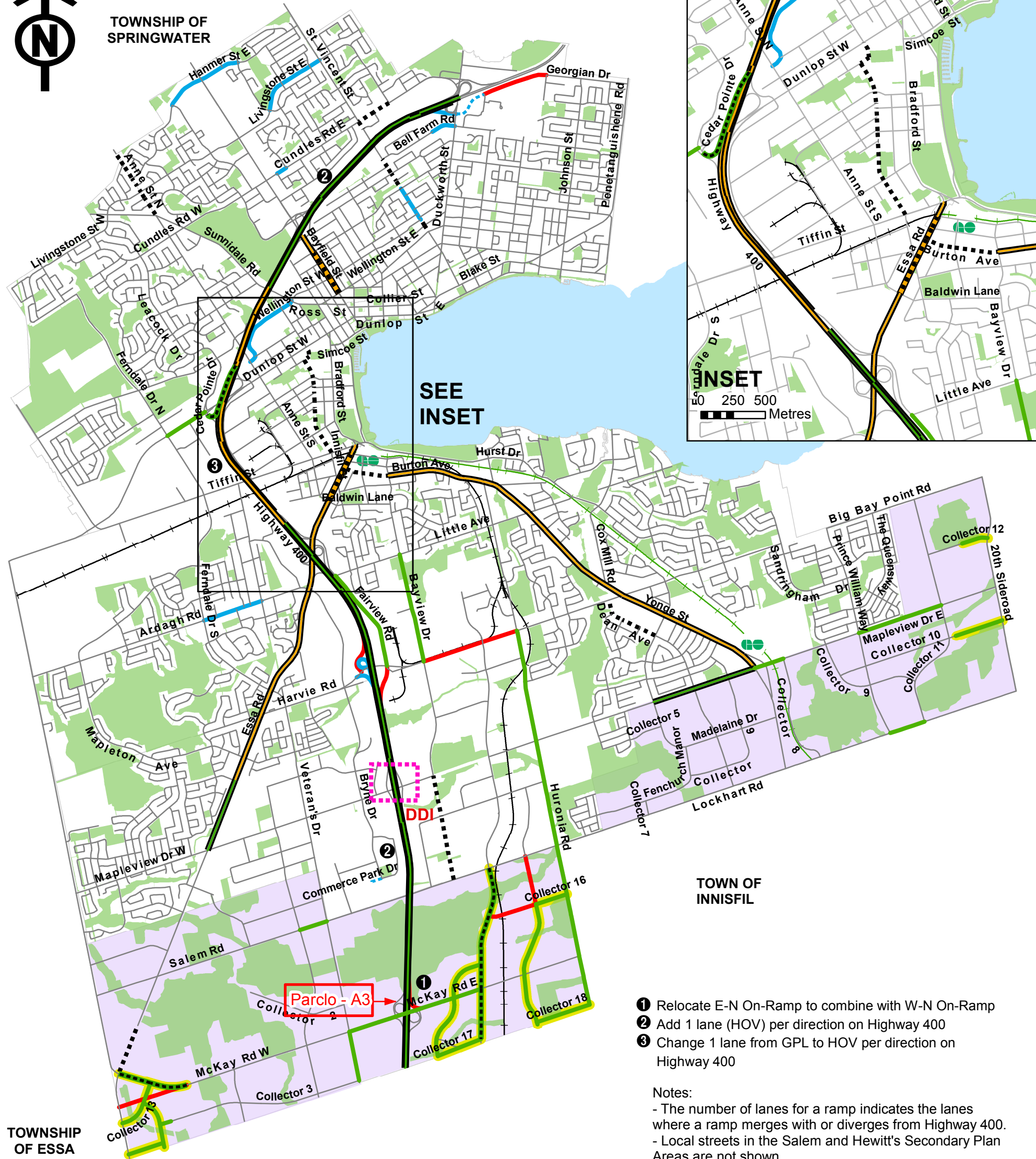


Figure 5-6
Change in Vehicle Lanes from 2016, Proposed Preferred Network – 2041
City of Barrie Transportation Master Plan



TOWNSHIP OF
SPRINGWATER



SEE
INSET

INSET

0 250 500
Metres

- ① Relocate E-N On-Ramp to combine with W-N On-Ramp
- ② Add 1 lane (HOV) per direction on Highway 400
- ③ Change 1 lane from GPL to HOV per direction on Highway 400

Notes:

- The number of lanes for a ramp indicates the lanes where a ramp merges with or diverges from Highway 400.
- Local streets in the Salem and Hewitt's Secondary Plan Areas are not shown.
- Roadway changes are compared to existing conditions.
- New roads are assumed to have zero lanes in existing conditions.
- Existing and future potentially required exclusive turn lanes at intersections are not shown.
- One-way streets are not shown.

Transportation Features

- Add 3 Lanes (including TWLTL)
- Add 2 Lanes
- Add 2 HOV
- Convert 2 GPL to HOV
- Convert 2 GPL to HOV; Add TWLTL
- - - - Add 1 TWLTL Only
- Add 1 Lane
- No Change

- Remove 2 Lanes
- Remove 2 Lanes (One Direction)
- Remove 1 Lane
- - - - Remove TWLTL
- GO Station
- GO Transit Railway
- BCRY Railway

Natural Features

- Park / Open Space

Other Features

- New Roads
- Secondary Plan Areas
- - - - MTO Interchange Improvements

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Project: 171-08853-00
Map Created By: WSP Thornhill

0 1,000 2,000 3,000 4,000
Metres

Figure 5-7
Changes in Proposed Vehicle Lanes from 2014 MMATMP
City of Barrie Transportation Master Plan



5.5.3.3 IMPROVEMENTS TO HIGHWAY 400 INTERCHANGE RAMPS AND CROSSINGS

Table 5-9 summarizes the proposed improvements to Highway 400 interchange ramps and crossings that are different from the recommendations in the MTO 2017 TESR Update.

Table 5-9 Proposed Improvements to Highway 400 Interchange Ramps and Crossings, Horizon 2041

Highway 400 Interchange / Crossing	Location	2016 Network	MTO 2017 TESR Update	2018 TMP Proposed Network
Proposed Interchange Ramp Options				
Dunlop Street Interchange	E/W-S On-Ramp (SB)	1 lane ^a	1 lane	Widen to 2 lanes
Essa Road Interchange	E-N On-Ramp (NB)	1 lane	1 lane	Widen to 2 lanes
Proposed Improvements to Crossings or New Crossings				
St. Vincent Crossing		2 lanes	2 lanes (no improvements)	Widen to 5 lanes plus bike lanes
Anne Street Crossing		4 lanes	4 lanes (no improvements)	Widen to 5 lanes with cycle tracks
Dunlop Street Interchange	Dunlop Street	2 lanes	Widen to 4 lanes plus 2 speed-change lanes	Widen to 7 lanes
Essa Road Interchange	Essa Road	4 lanes	Widen to 6 lanes	Widen to 7 lanes
Salem Road / Lockhart Road Crossing		Does not exist	No crossing	New 5-lane crossing with cycle tracks
McKay Road Interchange	McKay Road	2 lanes	2 lanes (no improvements)	Widen to 7 lanes with cycle tracks
Proposed HOV at Interchanges				
Bayfield Street Interchange	Bayfield Street	No HOV	No HOV	Convert 2 GPL to HOV
Essa Road Interchange	Essa Road	No HOV	No HOV	Convert 2 GPL to HOV
Mapleview Street Interchange	Mapleview Drive	No HOV	No HOV	Convert 2 GPL to HOV

Notes: TWLTL = Two-way left turn lane; LTL = Left turn lane; GPL = General Purpose Lane; HOV = High Occupancy Vehicle; TESR represents MTO's Transportation Environmental Study Report. ^a. The number of lanes for a ramp indicates the lanes where a ramp merges with or diverges from Highway 400.

Table 5-9 identifies the required number of lanes for each facility. However, it is anticipated that further traffic studies, feasibility studies or reviews will be required at several locations to validate the extent and impact of widening to ramps, incorporation of Active Transportation facilities, and HOV lanes, among others. Potential locations for further studies include, but are not limited to:

- **Widening at Highway 400 Interchanges:**
 - E/W-S On-Ramp (southbound) at the Dunlop Street
 - E-N On-Ramp (northbound) at the Essa Road
 - Essa Road
 - Dunlop Street
 - McKay Road
- **Widening to the Highway 400 crossings at:**
 - St. Vincent Street
 - Anne Street
 - Harvie Road / Big Bay Point Road (further widening from the approved 5 lanes)
 - Salem Road / Lockhart Road (new crossing)
- **HOV lanes at Highway 400 Interchanges:**
 - Bayfield Street
 - Essa Road
 - Mapleview Drive

It should be noted that the above-proposed improvements are subject to MTO's approval. MTO has planned the future recommended improvements to the existing crossings, interchanges and Highway 400 mainline. These improvements include road capacity and network improvements as discussed in Section 4.2.3, as well as other improvements such as structure replacement (e.g., Sunnidale Road, Anne Street, Tiffin Street, etc.). The proposed improvements in this TMP should be coordinated with the MTO planned improvements and be prioritized where required.

5.5.3.4 CITY ROAD IMPROVEMENTS

As discussed in Section 5.5.1, City road improvements are proposed based on a systematic analysis of road deficiencies for 2041. Table 5-10 summarizes the proposed changes to the previous recommendations and additional road improvements (highlighted in red texts), as well as the road improvements identified in the 2014 MMATMP that have been confirmed. Detailed rationale for the proposed road improvements is included in the 'Emme Macro Modelling and Improvements Rationale Technical Memorandum' provided in Appendix E.

Table 5-10 identifies the required number of lanes for each City facility; however, it is anticipated that further operational traffic studies will be required at several locations to validate the extent and impact of widening, need for exclusive turn lanes, incorporation of Active Transportation facilities, HOV lanes and other specific transit priority measures, traffic controls such as traffic signals or roundabouts, locations of traffic medians, and impact to on-street parking.

Potential locations for further studies include, but are not limited to:

- Bradford Street, from Simcoe Street to Tiffin Street
- Tiffin Street, from Bradford Street / Essa Road to Lakeshore Drive
- Ferndale Drive, from City north limits to Benson Avenue
- Hurst Drive, from Bay Lane to Cox Mill Road
- Little Street at Hurst Drive
- McKay Road re-alignment, from City west boundary limits to approximately 900m east of City boundary
- Rawson Avenue and Collector 16 in the Salem Secondary Plan, where cross the creek or the rail
- Mapleview Drive, between Bryne Drive and Bayview Drive
- Mulcaster Street, Collier Street, Ross Street, and Bayfield Street (from Ross Street to Simcoe Street)

Table 5-10 Proposed Improvements, Horizon 2041 (Page 1/7)

Road	From	To	Road Classification	2016 Network	2018 TMP Proposed Network ¹	Changes from 2014 MMATMP
Anne Street	City Northwest Limits	Sunnidale Road	Arterial	2 lanes	2 lanes + TWLTL	1 new TWLTL
Anne Street N (Highway 400 Crossing)	Edgehill Drive	Donald Street	Arterial	4 lanes	4 lanes + TWLTL	No
Anne Street N	Donald Street	Dunlop Street W	Arterial	4 lanes	4 lanes + TWLTL	No
Anne Street S	Tiffin Street	Centre Street / Campbell Avenue	Arterial	2 lanes	2 lanes + TWLTL	No
Anne Street S	Centre Street / Campbell Avenue	Essa Road	Arterial	2 lanes	4 lanes + TWLTL	No
Anne Street S	Essa Road	Adelaide Street	Major Collector	2 lanes	2 lanes + TWLTL	No
Anne Street S	Adelaide Street	Innisfil Street / Baldwin Lane	Major Collector	Does not exist	2 lanes + TWLTL	No
Ardagh Road	Patterson Road	Essa Road	Arterial	4 lanes	4 lanes + TWLTL	No
Baldwin Lane	Innisfil Street	Bayview Drive	Major Collector	2 lanes	2 lanes + TWLTL	No
Bayfield Street	City Northwest Limits	Cundles Road	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	No
Bayfield Street	Cundles Road	Highway 400 SB Off-Ramp	Arterial	4 lanes + TWLTL	6 lanes + TWLTL	No
Bayfield Street (Highway 400 Crossing)	Highway 400 SB Off-Ramp	Highway 400 NB Off-Ramp	Arterial	4 lanes + TWLTL	6 lanes + TWLTL	No
Bayfield Street	Highway 400 NB Off-Ramp	Grove Street	Arterial	4 lanes	4 lanes + TWLTL	No
Bayfield Street	Grove Street	Sophia Street	Arterial	4 lanes	4 lanes + TWLTL	1 new TWLTL
Bayview Drive	Burton Avenue	Little Avenue	Major Collector	2 lanes	2 lanes + TWLTL	No
Bayview Drive	Little Avenue	Big Bay Point Road	Arterial	2 lanes	4 lanes + TWLTL	2 additional lanes
Bayview Drive	Mapleview Drive	Lockhart Road	Arterial	2 lanes	2 lanes + TWLTL	1 new TWLTL
Bell Farm Road	St. Vincent Street	Alliance Boulevard (East End)	Major Collector	2 lanes	2 lanes + TWLTL	No
Big Bay Point Road	Fairview Road	Bayview Drive	Arterial	2 lanes	6 lanes + TWLTL	No

Table 5-10 Proposed Improvements, Horizon 2041 (Page 2/7)

Road	From	To	Road Classification	2016 Network	2018 TMP Proposed Network ¹	Changes from 2014 MMATMP
Big Bay Point Road	Bayview Drive	Huronia Road	Arterial	2 lanes	4 lanes + TWLTL	Reduce 2 lanes
Big Bay Point Road	Leggott Avenue	Dean Avenue	Arterial	4 lanes	4 lanes + TWLTL	No
Big Bay Point Road	Hurst Drive	Prince William Way	Arterial	4 lanes + TWLTL	4 lanes	Reduce 1 lane to accommodate AT
Big Bay Point Road	Prince William Way	Collector 11	Arterial	2 lanes	4 lanes + TWLTL	No
Big Bay Point Road	Collector 11	Approx. 280m east of Collector 11	Arterial	2 lanes	2 lanes + TWLTL	No
Blake Street	Duckworth Street	Johnson Street	Arterial	2 lanes	2 lanes + TWLTL	No
Bradford Street	Simcoe Street	Tiffin Street	Arterial	4 lanes	4 lanes + TWLTL	No
Bryne Drive (North)	Approx. 200m south of Essa Road	South end of existing Bryne Drive	Arterial	2 lanes	4 lanes + TWLTL	No
Bryne Drive (North)	South end of existing Bryne Drive	North end of existing Bryne Drive (north of Mapleview Drive W)	Arterial	Does not exist	4 lanes + TWLTL	No
Bryne Drive (South)	North end of existing Bryne Drive (north of Mapleview Drive W)	Caplan Avenue	Arterial	2 lanes	4 lanes + TWLTL	No
Bryne Drive (South)	Approx. 150m south of Mapleview Drive	Commerce Park Drive (North end)	Major Collector	2 lanes + TWLTL	4 lanes + TWLTL	No
Burton Avenue	Essa Road	Bayview Drive	Arterial	2 lanes	2 lanes + TWLTL	1 new TWLTL
Burton Avenue	Bayview Drive	Robinson Street	Arterial	2 lanes	4 lanes	No
Collier Street	Blake Street	Mulcaster Street	Major Collector	2 lanes	2 lanes + TWLTL	No
Commerce Park Drive	Veterans Drive	Approx. 180m west of Bryne Drive	Major Collector	4 lanes + TWLTL	4 lanes	Reduce 1 lane to accommodate AT
Commerce Park Drive	Approx. 180m west of Bryne Drive	Bryne Drive	Major Collector	2 lanes	4 lanes	Reduce 1 lane to accommodate AT
Cundles Road	Carlton Street	Springdale Drive	Arterial	4 lanes	2 lanes + TWLTL	Reduce 1 lane
Cundles Road	St. Vincent Street	Livingston Street	Arterial	4 lanes	4 lanes + TWLTL	1 new TWLTL

Table 5-10 Proposed Improvements, Horizon 2041 (Page 3/7)

Road	From	To	Road Classification	2016 Network	2018 TMP Proposed Network ¹	Changes from 2014 MMATMP
Dean Avenue	Big Bay Point Road	Madelaine Drive	Major Collector	4 lanes	2 lanes + TWLTL	Reduce 1 lane
Dunlop Street W	Miller Drive / Tiffin Street	Ferndale Drive N	Arterial	2 lanes	4 lanes + TWLTL or Median	No
Dunlop Street W	Ferndale Drive N	Cedar Pointe Drive	Arterial	4 lanes + TWLTL	6 lanes + TWLTL	2 additional lanes
Dunlop Street W (Highway 400 Crossing)	Cedar Pointe Drive	Highway 400 NB On-Ramp	Arterial	2 lanes	6 lanes + TWLTL	No
Dunlop Street W	Highway 400 NB On-Ramp	Anne Street N	Arterial	4 lanes	6 lanes + TWLTL	No
Essa Road	Tiffin Street	Gowan Street	Arterial	4 lanes	4 lanes + TWLTL	No
Essa Road	Gowan Street	Anne Street	Arterial	4 lanes	4 lanes + TWLTL	1 new TWLTL
Essa Road	Anne Street S	Approx. 230m west of Anne Street S	Arterial	4 lanes	4 lanes + TWLTL	No
Essa Road	Approx. 230m west of Anne Street S	Fairview Road	Arterial	4 lanes	6 lanes + TWLTL	No
Essa Road (Highway 400 Crossing)	Fairview Road	Highway 400 SB Off-Ramp	Arterial	4 lanes	6 lanes + TWLTL	No
Essa Road	Highway 400 SB Off-Ramp	Ardagh Road	Arterial	4 lanes + TWLTL	6 lanes + TWLTL	No
Essa Road	Coughlin Road	Mapleview Road	Arterial	2 lanes	4 lanes + TWLTL	2 additional lanes
Essa Road	Mapleview Drive	Salem Road	Arterial	2 lanes	2 lanes + TWLTL	No
Essa Road	Salem Road	Approx. 670m south of Salem Road	Arterial	2 lanes	2 lanes + TWLTL	No
Essa Road	Approx. 670m south of Salem Road	McKay Road / CR-27	Arterial	2 lanes	2 lanes + TWLTL	1 new TWLTL
Fairview Road	Essa Road	Little Avenue	Arterial	4 lanes	4 lanes + TWLTL	No
Fairview Road	Little Avenue	Big Bay Point	Arterial	2 lanes	4 lanes	2 additional lanes
Ferndale Drive	City North Limits	South of Benson Drive	Arterial	2 lanes + TWLTL	4 lanes	Add 1 lane with removal of bike lanes
Georgian Drive	Duckworth Street	Governors Drive	Arterial	4 lanes	6 lanes	Remove TWLTL

Table 5-10 Proposed Improvements, Horizon 2041 (Page 4/7)

Road	From	To	Road Classification	2016 Network	2018 TMP Proposed Network ¹	Changes from 2014 MMATMP
Georgian Drive	Governors Drive	Gallie Court	Arterial	4 lanes	4 lanes + TWLTL	Remove 2 lanes
Georgian Drive	Gallie Court	Johnson Street	Arterial	4 lanes	4 lanes + TWLTL	No
Hamilton Road	Truman Road	Welham Road	Minor Collector	2 lanes	2 lanes + TWLTL	No
Harvie Road	Essa Road	Veterans Drive	Arterial	2 lanes	2 lanes + TWLTL	No
Harvie Road	Veterans Drive	Bryne Drive	Arterial	2 lanes	4 lanes + TWLTL	No
Harvie Road	Bryne Drive	Fairview Road	Arterial	Does not exist	6 lanes + TWLTL	No
Huronian Road	Yonge Street	Little Avenue	Arterial	2 lanes	2 lanes + TWLTL	No
Huronian Road	Little Avenue	Herrell Avenue	Arterial	2 lanes	2 lanes + TWLTL	No
Huronian Road	Herrell Avenue	Big Bay Point Road	Arterial	2 lanes	4 lanes + TWLTL	No
Huronian Road	Big Bay Point Road	Mapleview Drive	Arterial	2 lanes	4 lanes + TWLTL	2 additional lanes to match County's improvements for CR-54 / 10 Sideroad
Huronian Road	Mapleview Drive	Lockhart Road	Arterial	2 lanes	4 lanes + TWLTL	
Huronian Road	Lockhart Road	McKay Road E	Arterial	2 lanes	4 lanes + TWLTL	
Huronian Road	McKay Road E	City South Limits	Arterial	2 lanes	4 lanes + TWLTL	
Hurst Drive	Minet's Point Road	Bay Lane	Arterial	2 lanes	4 lanes	No
Hurst Drive	Bay Lane	Little Avenue	Arterial	2 lanes + TWLTL	4 lanes	No
Hurst Drive	Little Avenue	Cox Mill Road	Arterial	2 lanes + TWLTL	4 lanes	No
Innisfil Street	Dunlop Street	Tiffin Street	Major Collector	2 lanes	2 lanes + TWLTL	1 new TWLTL
Innisfil Street	Tiffin Street	Essa Road	Major Collector	2 lanes	2 lanes + TWLTL	No
Lakeshore Drive	Tiffin Street	Minet's Point Road	Arterial	2 lanes + Median	4 lanes + Median	No
Little Avenue	Fairview Road	Marshall Street	Arterial	2 lanes	4 lanes + TWLTL	No
Little Avenue	Marshall Street	Bayview Drive	Arterial	2 lanes	2 lanes + TWLTL	No
Little Avenue	Bayview Drive	Huronian Road	Arterial	2 lanes	2 lanes + TWLTL	No
Little Avenue	Huronian Road	Hurst Drive	Arterial	2 lanes	2 lanes + TWLTL	No
Lockhart Road	Salem Road	Huronian Road	Arterial	2 lanes	4 lanes + TWLTL	No
Lockhart Road	Huronian Road	Yonge Street	Arterial	2 lanes	4 lanes + TWLTL	No
Lockhart Road	Yonge Street	Prince William Way	Arterial	2 lanes	4 lanes + TWLTL	No

Table 5-10 Proposed Improvements, Horizon 2041 (Page 5/7)

Road	From	To	Road Classification	2016 Network	2018 TMP Proposed Network ¹	Changes from 2014 MMATMP
Lockhart Road	Prince William Way	Collector 11	Arterial	2 lanes	4 lanes + TWLTL	2 additional lanes
Lockhart Road	Collector 11	Approx. 150m east of Collector 11	Arterial	2 lanes	2 lanes + TWLTL	No
Madelaine Drive (North of Mapleview)	Yonge Street	Mapleview Drive	Major Collector	4 lanes	2 lanes + TWLTL	No
Mapleview Drive	Essa Road	Bryne Drive	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	No
Mapleview Drive	Bryne Drive	West Ramp Terminal	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	No
Mapleview Drive (Highway 400 Crossing)	West Ramp Terminal	East Ramp Terminal	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	No
Mapleview Drive	East Ramp Terminal	Bayview Drive	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	No
Mapleview Drive	Bayview Drive	Welham Road	Arterial	6 lanes	6 lanes (including 2 HOV) + TWLTL	No
Mapleview Drive	Welham Road	Huronia Road	Arterial	6 lanes + TWLTL	6 lanes (including 2 HOV) + TWLTL	No
Mapleview Drive	Huronia Road	Country Lane	Arterial	4 lanes + TWLTL	6 lanes + TWLTL	No
Mapleview Drive	Country Lane	Madelaine Drive	Arterial	2 lanes	6 lanes + TWLTL	No
Mapleview Drive	Madelaine Drive	Yonge Street	Arterial	2 lanes	6 lanes + TWLTL	2 additional lanes
Mapleview Drive	Yonge Street	Collector 8	Arterial	2 lanes	6 lanes + TWLTL	2 additional lanes
Mapleview Drive	Collector 8	Prince William Way	Arterial	2 lanes	4 lanes + TWLTL	No
Mapleview Drive	Prince William Way	Collector 11	Arterial	2 lanes	4 lanes + TWLTL	2 additional lanes
Mapleview Drive	Collector 11	Approx. 428m east of Collector 11	Arterial	2 lanes	2 lanes + TWLTL	No
McKay Road W	City West Limits (west end of McKay Road W)	Approx. 900m east of City West Limits	Arterial	2 lanes	Realign road, 2 lanes + TWLTL	Realign road segment and add a TWLTL

Table 5-10 Proposed Improvements, Horizon 2041 (Page 6/7)

Road	From	To	Road Classification	2016 Network	2018 TMP Proposed Network ¹	Changes from 2014 MMATMP
McKay Road W	Approx. 900m east of City West Limits	Reid Drive	Arterial	2 lanes	2 lanes + TWLTL	No
McKay Road W	Reid Drive	Veterans Drive	Arterial	2 lanes	4 lanes + TWLTL	No
McKay Road W	Veterans Drive	West Ramp Terminal	Arterial	2 lanes	6 lanes + TWLTL	2 additional lanes
McKay Road W (Highway 400 Crossing)	West Ramp Terminal	East Ramp Terminal	Arterial	2 lanes	6 lanes + TWLTL	2 additional lanes
McKay Road W	East Ramp Terminal	Welham Road	Arterial	2 lanes	6 lanes + TWLTL	2 additional lanes
McKay Road W	Welham Road	Huronia Road	Arterial	2 lanes	4 lanes + TWLTL	No
Minet's Point Road	Lakeshore Drive	Yonge Street	Arterial	4 lanes	4 lanes + TWLTL	No
Salem Road	County Road 27	Essa Road	Arterial	2 lanes	2 lanes + TWLTL	No
Salem Road	Essa Road	Reid Drive	Arterial	2 lanes	2 lanes + TWLTL	No
Salem Road	Reid Drive	Veterans Drive	Arterial	2 lanes	4 lanes + TWLTL	2 additional lanes
Salem Road	Veterans Drive	Lockhart Road	Arterial	4 lanes	4 lanes + TWLTL	No
Salem Road (Highway 400 Crossing)	Approx. 600 m east of Veterans Road	Lockhart Road	Arterial	Does not exist	4 lanes + TWLTL	No
Sproule Drive	Sproule Drive east end	Ferndale Drive N	Minor Collector	Does not exist	2 lanes	No
St. Vincent Street (Highway 400 Crossing)	Sperling Drive	Bell Farm Road	Arterial	2 lanes	4 lanes + TWLTL	No
St. Vincent Street	Bell Farm Road	Grove Street	Arterial	4 lanes (2 lanes only north of Ottaway Avenue)	4 lanes + TWLTL	1 new TWLTL
St. Vincent Street	Grove Street	Wellington Street	Arterial	4 lanes	2 lanes + TWLTL	Reduce 1 lane
Summerset Drive	Summerset Drive west end	Ardagh Road	Minor Collector	Does not exist	2 lanes	No
Tiffin Street	Dunlop Street	Ferndale Drive	Arterial	2 lanes	2 lanes + TWLTL	

Table 5-10 Proposed Improvements, Horizon 2041 (Page 7/7)

Road	From	To	Road Classification	2016 Network	2018 TMP Proposed Network ¹	Changes from 2014 MMATMP
Tiffin Street	Ferndale Drive	Essa Road	Arterial	2 lanes	4 lanes + TWLTL	
Tiffin Street ²	Essa Road	Lakeshore Drive	Arterial	2 lanes + TWLTL	7 lanes	No
Truman Road	Huron Road	Hamilton Road	Minor Collector	2 lanes	2 lanes + TWLTL	No
Veterans Drive	Salem Road	McKay Road W	Arterial	2 lanes	4 lanes + TWLTL	No
Veterans Drive / 5 Sideroad	McKay Road	South Limit of Annexed Lands	Arterial	2 lanes	4 lanes + TWLTL	2 additional lanes to match County improvements for CR-53 / 5 Sideroad
Welham Road	Hamilton Road	Big Bay Point Road	Minor Collector	2 lanes	2 lanes + TWLTL	No
Welham Road	Big Bay Point Road	Mapleview Drive	Minor Collector	2 lanes	2 lanes + TWLTL	No
Welham Road	Mapleview Drive	South of Saunders Road	Minor Collector	2 lanes	2 lanes + TWLTL	No
Welham Road	South of Saunders Road	Lockhart Road	Minor Collector	Does not exist	2 lanes + TWLTL	No
Wellington St W	Sunnidale Road	Bayfield Street	Arterial	2 lanes	2 lanes + TWLTL	No
Salem and Hewitt's Secondary Plans						
Collector Roads	Salem and Hewitt's Secondary Plans			Do not exist	Build out new collector roads	Build out the rest of new collector roads (Secondary Plans, Phase 3)

Notes: TWLTL = Two-way left turn lane; GPL = General Purpose Lane; HOV = High Occupancy Vehicle.

¹ . HOV lanes and road diets are not included in this table.

² . The number of lanes for the special, short section on Tiffin Street includes the turn lanes at two adjacent intersections.

5.5.4 Proposed HOV Lanes and Transit Priority

Considering the current and future forecasted roadway volumes and the initiatives of improving transit travel times to promote transit usage, HOV corridors are proposed along Bayfield Street, Bradford Street, Essa Road, Burton Avenue, Yonge Street, and Maplevue Drive, as illustrated in Figure 5-8. The proposed HOV corridors will provide connections between transit hubs.

Table 5-11 summarizes the road sections with the total number of travel lanes where HOV lanes are proposed, as well as the changes in HOV lanes compared to the 2014 MMATMP.

It is important to note that HOV lanes are not roadway widening, but are conversion of existing or future proposed lanes shown in Figure 5-5. The proposed HOV lanes on City's roads are curbside (rightmost) travel lanes to be used by transit vehicles, as well as vehicles carrying two or more people. HOV lanes on the Highway 400 mainline were recommended by the MTO 2017 TESR Update and are reserved for the leftmost travel lanes.

As discussed above, MTO should be consulted regarding the proposed HOV lanes at the Highway 400 Interchanges at Bayfield Street, Essa Road, and Maplevue Drive.

Transit priority measures are proposed along Bayfield Street, Ross Street, Maple Avenue, Dunlop Street, Simcoe Street, and Burton Avenue, as shown in Figure 5-8, to connect and complement the HOV networks, thus improving travel time for transit users.

In addition, future HOV corridors along Essa Road, McKay Road and Huronia Road on the south of Maplevue Drive are proposed to be protected beyond 2041, as shown in Figure 5-8. As such, additional vehicle lanes and roadway rights-of-way are proposed to be protected.

Table 5-11 Proposed HOV Lanes, 2041

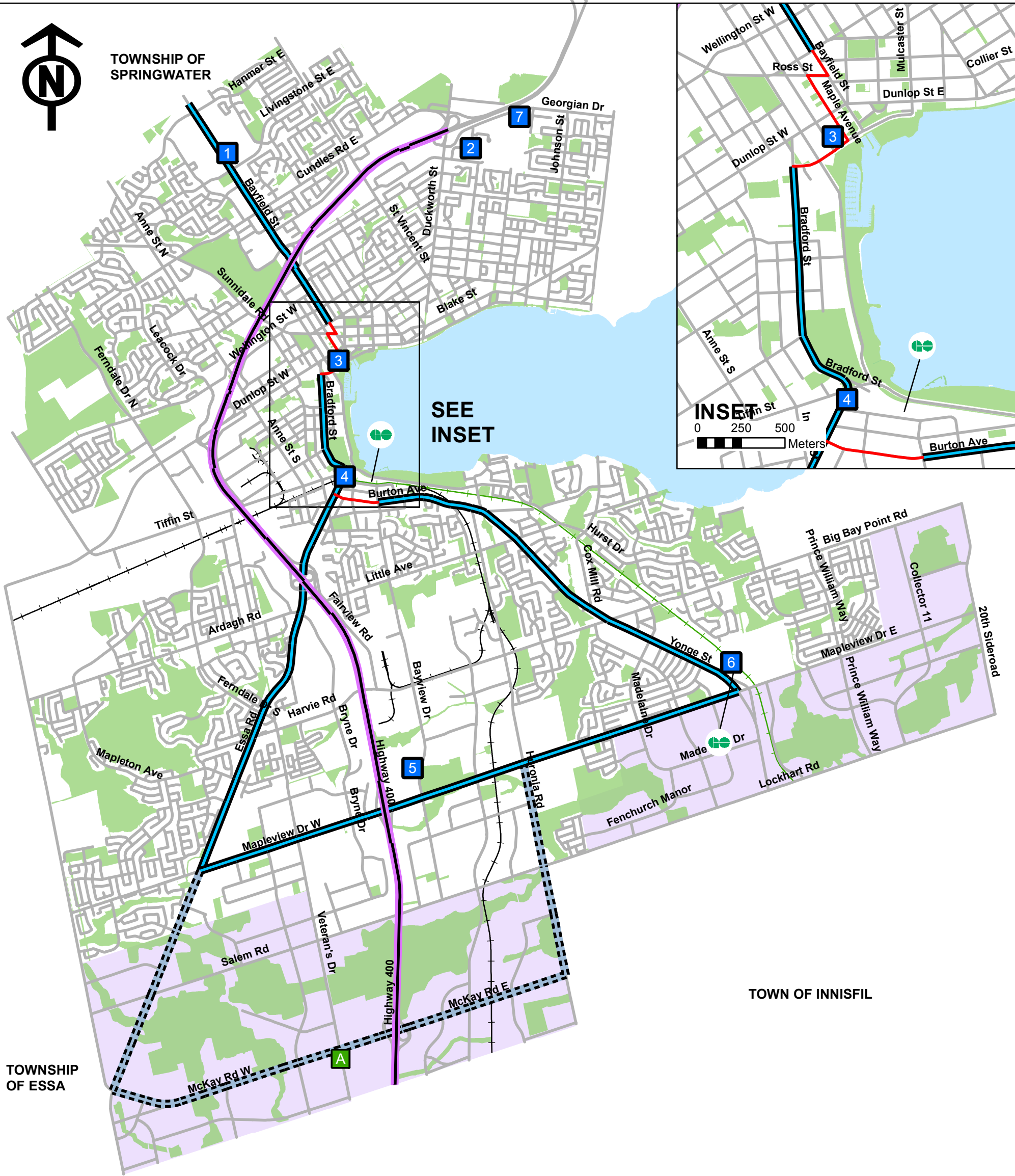
Road	From	To	2018 TMP Proposed Road Network	Including 2 HOV Lanes?	Included in 2014 MMATMP Recommended Network?
Bayfield Street	City Northwest Limits	Rose Street / East Ramp Terminal ¹	6 lanes + TWLTL	Yes	Yes
Bayfield Street	Rose Street / East Ramp Terminal ¹	Sophia Street	4 lanes + TWLTL	Yes	NEW
Bradford Street	Simcoe Street	Tiffin Street	4 lanes + TWLTL	Yes	Yes
Burton Avenue	Bayview Drive	Approx. 80m east of eastern Melinda Crescent	4 lanes	Yes	NEW
Burton Avenue	Approx. 80m east of eastern Melinda Crescent	Garden Avenue	4 lanes + TWLTL	Yes	NEW
Essa Road	Tiffin Street	Approx. 230m south of Anne Street	4 lanes + TWLTL	Yes	NEW
Essa Road	Approx. 230m south of Anne Street	Ardagh Road / Bryne Drive	6 lanes + TWLTL	Yes	NEW
Essa Road	Ardagh Road / Bryne Drive	Mapleview Drive	4 lanes + TWLTL	Yes	NEW
Mapleview Drive	Essa Road	Madelaine Drive	6 lanes + TWLTL	Yes	Yes
Mapleview Drive	Madelaine Drive	Yonge Street	6 lanes + TWLTL	Yes	NEW
Yonge Street	Garden Avenue	Huronia Road	4 lanes + TWLTL	Yes	NEW
Yonge Street	Huronia Road	Mapleview Drive	4 lanes + TWLTL	Yes	NEW

Notes: TWLTL = Two-way left turn lane; HOV = High Occupancy Vehicle.

¹. Bayfield Street is referenced to as an East-West street, opposed to the N-S Highway 400 mainline.



TOWNSHIP OF SPRINGWATER



Existing Transit Hub

- 1** Georgian Mall
- 2** Georgian College
- 3** Downtown Terminal
- 4** Allandale/Waterfront GO Station
- 5** Park Place
- 6** Barrie South GO Station
- 7** Royal Victoria Hospital

New Transit Hub

- A** Salem Transit Hub
- Transit Priority Features

Transportation Features

- HOV (Leftmost Lane) (MTO 2017 TESR)
- HOV (Rightmost Lane)
- Protected HOV beyond 2041 (Rightmost Lane)
- Roads without HOV
- GO Transit Railway
- BCRY Railway
- GO Station

Natural Features

- Park / Open Space

Other Features

- Secondary Plan Areas

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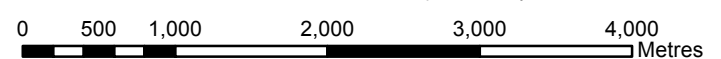


Figure 5-8
Proposed HOV Lanes and Transit Priority Features
City of Barrie Transportation Master Plan



5.5.5 Phasing Road Networks by 2031

The phasing of the road networks prior to 2041 was developed based on forecasted population and employment growth, the development timing resulting in the needs for improvements identified by an Emme modelling analysis, as well as road capacity and network improvement projects already programmed in the City's Capital Plan 2019 – 2028, and planned and recommended improvements by the Simcoe County and MTO. In addition, the timings of road improvements account for the expected timelines when the adjacent land developments are to be implemented and the construction phases planned by the City for a road widening project.

The Emme modelling analysis for 2031 was conducted based on the associated employment and population growth projections and the resulting capacity deficiencies. As a conservative approach to determining the improvement needs for the City's roads by 2031, the following assumptions were applied:

- MTO planned improvements to the existing Highway 400 Interchanges at Bayfield Street, Dunlop Street, Essa Road, Mapleview Drive, and Innisfil Beach Road, as listed in Table 4-2.
- Highway 400 would remain the **current six lanes**.

Prioritization of competing capital projects within the City could also have an important bearing on the timing of implementation. The TMP acknowledges that comprehensive City transportation policies and implementation strategies are needed to effectively address the City's existing and future transportation needs now and into the future, while respecting the City's financial capacity. The timing associated with the proposed transportation improvements contained within this TMP may need to be adjusted based on financial constraints, adopted policies and the actual timing when development occurs while still addressing the overall goals and objectives set out in this TMP to provide the levels of service ultimately established by Barrie City Council.

The following sections discuss the phasing of road improvements.

5.5.5.1 HORIZON YEAR 2031

Figure 5-9 illustrates the total number of vehicle lanes and network connections proposed for 2031. Figure 5-10 illustrates the changes in vehicle lanes on roadways from the base year 2016, which indicates the road improvements by 2031. The timings and phases for some of the improvements are discussed below:

Salem Road / Lockhart Road Crossing: The need for the Salem Road / Lockhart Road Crossing at Highway 400 by 2031 is identified based on the capacity deficiencies at crossings and the congestion and capacity deficiencies on Mapleview Drive. The construction of the Salem Road / Lockhart Road Crossing would relieve the congestion and capacity deficiencies on Mapleview Drive. Detailed assessment is included in the 'Emme Macro Modelling and Improvements Rationale Technical Memorandum' provided in Appendix E.

The following improvements are planned by the City to be built by 2031 at the first phase:

- **Dunlop Street, from west of Cedar Pointe Drive to Anne Street:** Widen to five lanes.
- **Harvie Road / Big Bay Point Road, from Bryne Drive to Bayview Drive:** Widen to five lanes.
- **Mapleview Drive, from Huronia Road to east of Prince William Way:** Widen to five lanes.
- **McKay Road, from Veterans Drive to Welham Road:** Widen to five lanes.
- **Huronia Road, from Big Bay Point Road to City south limits:** Widen to 3 lanes.

Refer to Table 5-10 for the details of other road improvements that are illustrated in Figure 5-9.

Proposed HOV Networks: As discussed in Section 5.5.4, HOV corridors and transit priority measures are proposed to improve transit travel times to promote transit usage. The implementation of these proposed HOV corridors and transit priority measures is important to achieve the proposed future transit modal share target. It is suggested that HOV lanes and transit priority measures be implemented by 2031, or that they can be implemented by the City subject to demand needs and transit initiatives.



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Notes:

- ① Diverging Diamond Interchange (DDI) (MTO 2017 TESR)
- ② New Parclo A3 Interchange
- ③ Further study to evaluate improvements on Bradford Street and at Tiffin Street intersections at Bradford/Essa and Lakeshore
- ④ Further study to assess the need for disconnection of Little Avenue from Hurst Drive
- ⑤ Highway 400 is assumed to remain the current 6 lanes. The timeframe for future widening needs to be confirmed by MTO

- A TWLTL or median is counted as one lane in the City of Barrie TMP.
- The number of lanes for a ramp indicates the lanes where a ramp merges with or diverges from Highway 400.
- Existing and future potentially required exclusive turn lanes at intersections are not shown.
- Local streets in the Salem and Hewitt's Secondary Plan Areas are not shown.
- One-way streets are not shown.

Transportation Features

- 6 Lanes with Continuous Median (MTO)
- 7 Lanes (including TWLTL or Median)
- 6 Lanes
- 5 Lanes (including TWLTL or Median)
- 4 Lanes
- 3 Lanes (including TWLTL or Median)
- 2 Lanes
- 2 Lanes (Ramp)
- 1 Lane (Ramp)

- Existing Grade Separation
- New Grade Separation
- GO Station
- GO Transit Railway
- BCRY Railway

Natural Features

- Park / Open Space
- Other Features
- Secondary Plan Areas

0 500 1,000 2,000 3,000 4,000
Metres

Date Updated: Friday, April 05, 2019
Project: 171-08853-00
Map Created By: WSP Thornhill

Figure 5-9
Total Number of Vehicle Lanes, Proposed Preferred Network – 2031
City of Barrie Transportation Master Plan



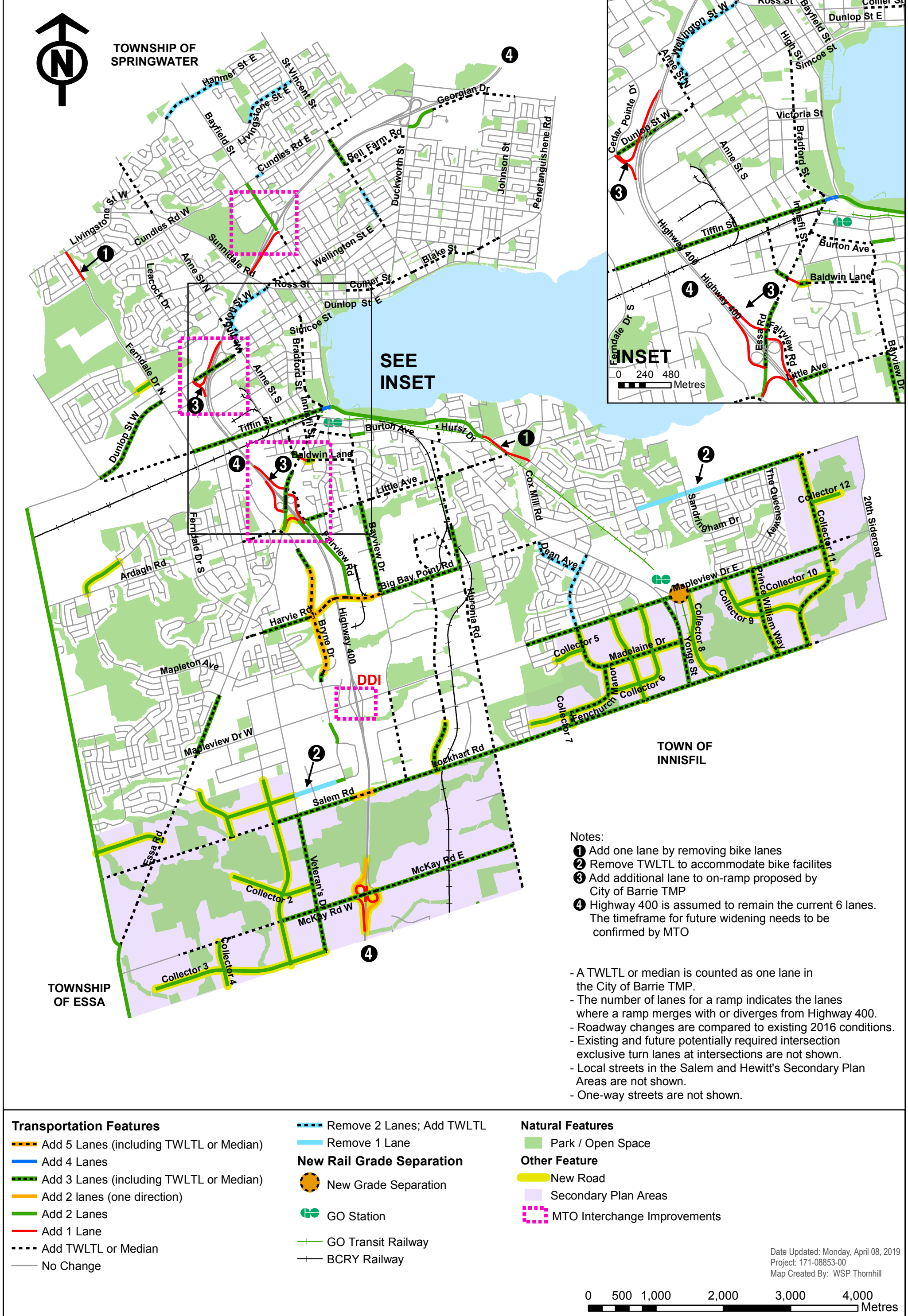


Figure 5-10
 Change in Vehicle Lanes from 2016, Proposed Preferred Network – 2031
 City of Barrie Transportation Master Plan



5.5.5.2 PRIORITIZATION OF 2031 ROAD IMPROVEMENTS

Table 5-12 lists the proposed road improvements by 2031 and their prioritization and suggested timings. As discussed in Section 4.2.3.7 and Table 4-5, a list of road improvements has been prioritized by the City and programmed in the City most-current 2019 Capital Plan. The timings are generally categorized by:

- 1 Capital Plan, indicating that the improvements have been programmed in the City 2019 Capital Plan
- 2 concurrent with other improvements or widen when adjacent development occurs
- 3 before 2026, indicating the suggested timing of an improvement that requires for prioritization and to be considered in the future Capital Plan
- 4 2026 - 2031, indicating the suggested timing of an improvement

In summary, the following major improvements are critical to address capacity needs and are required for prioritization:

- St. Vincent Street crossing widening from Sperling Drive to south of Bell Farm Road
- Tiffin Street widening from Ferndale Drive North to Bradford Street
- Lakeshore Drive widening from Bradford Street to Bay Lane
- Essa Road widening from Tiffin Street to Ardagh Road
- Salem Road / Lockhart Road Crossing, from Veterans Drive to Huronia Road
- Wellington Street widening from Sunnidale Road to Bayfield Street

Table 5-12 Prioritization and Timings of Proposed 2031 Road Improvements (Page 1/5)

Road	From	To	2016 Network	2031 Proposed Network ¹	Proposed Time Frame
Anne Street N (Highway 400 Crossing)	Edgehill Drive	Donald Street	4 lanes	4 lanes + TWLTL	Capital Plan ⁴
Anne Street N	Donald Street	Dunlop Street	4 lanes	4 lanes + TWLTL	before 2026, or concurrent with Dunlop Street widening
Anne Street S	Tiffin Street	Centre Street / Campbell Avenue	2 lanes	2 lanes + TWLTL	2026 - 2031
Anne Street S	Centre Street / Campbell Avenue	Essa Road	2 lanes	4 lanes + TWLTL	2026 - 2031
Anne Street S	Essa Road	Adelaide Street	2 lanes	2 lanes + TWLTL	2026 - 2031
Anne Street S	Adelaide Street	Innisfil Street / Baldwin Lane	Does not exist	2 lanes + TWLTL	2026 - 2031
Anne Street	City Northwest Limits	Sunnidale Road	2 lanes	2 lanes + TWLTL	2026 - 2031
Ardagh Road	Patterson Road	Essa Road	4 lanes	4 lanes + TWLTL	before 2026
Baldwin Lane	Innisfil Street	Bayview Drive	2 lanes	2 lanes + TWLTL	When adjacent redevelopment occurs
Bayfield Street	Cundles Road	Highway 400 SB Off-Ramp	4 lanes + TWLTL	6 lanes + TWLTL	Concurrent with MTO interchange improvements
Bayfield Street (Highway 400 Crossing)	Highway 400 SB Off-Ramp	Highway 400 NB Off-Ramp	4 lanes + TWLTL	6 lanes + TWLTL	
Bayfield Street	Highway 400 NB Off-Ramp	Grove Street W	4 lanes	4 lanes + TWLTL	
Bayview Drive	Burton Avenue	Little Avenue	2 lanes	2 lanes + TWLTL	2026 - 2031
Bayview Drive	Little Avenue	Big Bay Point Road	2 lanes	4 lanes + TWLTL	2026 - 2031
Bayview Drive	Mapleview Drive	Lockhart Road	2 lanes	2 lanes + TWLTL	2026 - 2031
Bell Farm Road	St. Vincent Street	Alliance Boulevard (East End)	2 lanes	2 lanes + TWLTL	Capital Plan
Big Bay Point Road	Fairview Road	Bayview Drive	2 lanes	4 lanes ² + TWLTL	Capital Plan
Big Bay Point Road	Bayview Drive	Huron Road	2 lanes	4 lanes + TWLTL	Capital Plan
Big Bay Point Road	Leggott Avenue	Dean Avenue	4 lanes	4 lanes + TWLTL	2026 - 2031
Big Bay Point Road	Hurst Drive	Prince William Way	4 lanes + TWLTL	4 lanes, lane reconfiguration	2026 - 2031
Big Bay Point Road	Prince William Way	Collector 11	2 lanes	4 lanes + TWLTL	Capital Plan
Big Bay Point Road	Collector 11	Approx. 280m east of Collector 11	2 lanes	2 lanes + TWLTL	Capital Plan
Blake Street	Duckworth Street	Johnson Street	2 lanes	2 lanes + TWLTL	2026 - 2031
Bradford Street (/ High Street)	Simcoe Street	Tiffin Street	4 lanes	4 lanes + TWLTL	2026 - 2031
Bryne Drive (North)	Approx. 200m south of Essa Road	South end of existing Bryne Drive	2 lanes	4 lanes + TWLTL	Capital Plan

Table 5-12 Prioritization and Timings of Proposed 2031 Road Improvements (Page 2/5)

Road	From	To	2016 Network	2031 Proposed Network ¹	Proposed Time Frame
Bryne Drive (North)	South end of existing Bryne Drive	North end of existing Bryne Drive (north of Mapleview Drive)	Does not exist	4 lanes + TWLTL	Capital Plan
Bryne Drive (South)	North end of existing Bryne Drive (north of Mapleview Drive)	Caplan Avenue	2 lanes	4 lanes + TWLTL	Capital Plan
Bryne Drive (South)	Approx. 150m south of Mapleview Drive	Commerce Park Drive	2 lanes + TWLTL	4 lanes + TWLTL	Capital Plan
Burton Avenue	Essa Road	Bayview Drive	2 lanes	2 lanes + TWLTL	When adjacent redevelopment occurs
Burton Avenue	Bayview Drive	Robinson Street	2 lanes	4 lanes	
Collier Street	Mulcaster Street	Blake Street	2 lanes	2 lanes + TWLTL	2026 - 2031
Commerce Park Drive	Veterans Drive	Approx. 180m west of Bryne Drive	4 lanes + TWLTL	4 lanes, lane reconfiguration	2026 - 2031
Commerce Park Drive	Approx. 180m west of Bryne Drive	Bryne Drive	2 lanes	4 lanes	2026 - 2031
Cundles Road	St. Vincent Street	Livingston Street	4 lanes	4 lanes + TWLTL	2026 - 2031
Dunlop Street W	City boundary	Ferndale Drive N	2 lanes	4 lanes + TWLTL	2026 - 2031
Dunlop Street W (Highway 400 Crossing)	Cedar Pointe Drive	Highway 400 NB On-Ramp	2 lanes	4 lanes + TWLTL	Capital Plan
Dunlop Street W	Highway 400 NB On-Ramp	Anne Street N	4 lanes	4 lanes + TWLTL	Capital Plan
Essa Road	Tiffin Street	Gowan Street	4 lanes	4 lanes + TWLTL	before 2026
Essa Road	Gowan Street	Anne Street	4 lanes	4 lanes + TWLTL	before 2026
Essa Road	Anne Street S	Approx. 230m west of Anne Street S	4 lanes	4 lanes + TWLTL	before 2026
Essa Road	Approx. 230m west of Anne Street S	Fairview Road	4 lanes	6 lanes + TWLTL	before 2026
Essa Road (Highway 400 Crossing)	Fairview Road	Highway 400 SB Off-Ramp	4 lanes	6 lanes + TWLTL	Capital Plan
Essa Road	Highway 400 SB Off-Ramp	Ardagh Road	4 lanes + TWLTL	6 lanes + TWLTL	Capital Plan
Essa Road	Coughlin Road	Mapleview Road	2 lanes	4 lanes + TWLTL	before 2026
Essa Road	Mapleview Drive	Salem Road	2 lanes	2 lanes + TWLTL	Capital Plan
Essa Road	Salem Road	Approx. 670m south of Salem Road	2 lanes	2 lanes + TWLTL	Capital Plan
Essa Road	Approx. 670m south of Salem Road	CR-27	2 lanes	2 lanes + TWLTL	Add short segment to current Capital Plan
Fairview Road	Essa Road	Little Avenue	4 lanes	4 lanes + TWLTL	before 2026, or concurrent with Essa widening

Table 5-12 **Prioritization and Timings of Proposed 2031 Road Improvements** (Page 3/5)

Road	From	To	2016 Network	2031 Proposed Network ¹	Proposed Time Frame
Fairview Road	Little Avenue	Big Bay Point	2 lanes	4 lanes	2026 - 2031
Ferndale Drive	City North Limits	South of Benson Drive	2 lanes + TWLTL	4 lanes, lane reconfiguration	2026 - 2031
Georgian Drive	Duckworth Street	Governors Drive	4 lanes	6 lanes	2026 - 2031
Georgian Drive	Governors Drive	Gallie Court	4 lanes	4 lanes + TWLTL	
Georgian Drive	Gallie Court	Johnson Street	4 lanes	4 lanes + TWLTL	
Hamilton Road	Truman Road	Welham Road	2 lanes	2 lanes + TWLTL	When adjacent redevelopment occurs
Harvie Road	Essa Road	Veterans Drive	2 lanes	2 lanes + TWLTL	Capital Plan
Harvie Road	Veterans Drive	Bryne Drive	2 lanes	4 lanes + TWLTL	
Harvie Road	Bryne Drive	Fairview Road	Does not exist	4 lanes + TWLTL	
Huronia Road	Yonge Street	Little Avenue	2 lanes	2 lanes + TWLTL	2026 - 2031, or when adjacent development occur
Huronia Road	Little Avenue	Herrell Avenue	2 lanes	2 lanes + TWLTL	
Huronia Road	Herrell Avenue	Big Bay Point Road	2 lanes	4 lanes + TWLTL	
Huronia Road	Big Bay Point Road	Mapleview Drive	2 lanes	2 lanes + TWLTL	
Huronia Road	Mapleview Drive	Lockhart Road	2 lanes	2 lanes + TWLTL	
Huronia Road	Lockhart Road	McKay Road E	2 lanes	2 lanes + TWLTL	Capital Plan
Huronia Road	McKay Road E	City South Limits	2 lanes	2 lanes + TWLTL	2026 - 2031
Hurst Drive	Minet's Point Road	Bay Lane	2 lanes	4 lanes	2026 - 2031
Hurst Drive	Bay Lane	Little Avenue	2 lanes + TWLTL	4 lanes, lane reconfiguration	
Hurst Drive	Little Avenue	Cox Mill Road	2 lanes + TWLTL	4 lanes, lane reconfiguration	
Innisfil Street	Tiffin Street	Essa Road	2 lanes	2 lanes + TWLTL	When adjacent development occur
Lakeshore Drive	Tiffin Street	Minet's Point Road	2 lanes + Median	4 lanes + Median	before 2026
Little Avenue	Fairview Road	Marshall Street	2 lanes	4 lanes + TWLTL	2026 - 2031
Little Avenue	Marshall Street	Bayview Drive	2 lanes	2 lanes + TWLTL	
Little Avenue	Bayview Drive	Huronia Road	2 lanes	2 lanes + TWLTL	
Little Avenue	Huronia Road	Hurst Drive	2 lanes	2 lanes + TWLTL	
Lockhart Road	Salem Road	Huronia Road	2 lanes	4 lanes + TWLTL	Capital Plan
Lockhart Road	Huronia Road	Yonge Street	2 lanes	4 lanes + TWLTL	2026 - 2031
Lockhart Road	Yonge Street	Prince William Way	2 lanes	4 lanes + TWLTL	
Lockhart Road	Prince William Way	Collector 11	2 lanes	4 lanes + TWLTL	
Lockhart Road	Collector 11	Approx. 150m east of Collector 11	2 lanes	2 lanes + TWLTL	

Table 5-12 Prioritization and Timings of Proposed 2031 Road Improvements (Page 4/5)

Road	From	To	2016 Network	2031 Proposed Network ¹	Proposed Time Frame
Mapleview Drive	Country Lane	Madelaine Drive	2 lanes	4 lanes + TWLTL	Capital Plan
Mapleview Drive	Madelaine Drive	Yonge Street	2 lanes	4 lanes + TWLTL	
Mapleview Drive	Yonge Street	Collector 8	2 lanes	4 lanes + TWLTL	
Mapleview Drive	Collector 8	Prince William Way	2 lanes	4 lanes + TWLTL	
Mapleview Drive	Prince William Way	Collector 11	2 lanes	4 lanes + TWLTL	Capital Plan, but propose revising to build to ultimate conditions with additional 2 lanes
Mapleview Drive	Collector 11	Approx. 428m east of Collector 11	2 lanes	2 lanes + TWLTL	Capital Plan
McKay Road	Approx. 900m east of City West Limits	Reid Drive	2 lanes	2 lanes + TWLTL	Capital Plan
McKay Road	Reid Drive	Veterans Drive	2 lanes	4 lanes + TWLTL	
McKay Road W	Veterans Drive	West Ramp Terminal	2 lanes	4 lanes + TWLTL	
McKay Road W (Highway 400 Crossing)	West Ramp Terminal	East Ramp Terminal	2 lanes	4 lanes + TWLTL	
McKay Road W	East Ramp Terminal	Welham Road	2 lanes	4 lanes + TWLTL	
McKay Road	Welham Road	Huron Road	2 lanes	4 lanes + TWLTL	
McKay Road	Highway 400		Does not exist	New interchange	
Minet's Point Road	Lakeshore Drive	Yonge Street	4 lanes	4 lanes + TWLTL	
Salem Road	County Road 27	Essa Road	2 lanes	2 lanes + TWLTL	Capital Plan
Salem Road	Essa Road	Reid Drive	2 lanes	2 lanes + TWLTL	
Salem Road	Reid Drive	Veterans Drive	2 lanes	4 lanes + TWLTL	
Salem Road	Veterans Drive	Approx. 600 m east of Veterans Road	2 lanes	4 lanes + TWLTL	
Salem Road (Highway 400 Crossing)	Approx. 600 m east of Veterans Road	Lockhart Road	Does not exist	4 lanes + TWLTL	
Sproule Drive	Sproule Drive east end	Ferndale Drive N	Does not exist	2 lanes	2026 - 2031
St. Vincent Street (Highway 400 Crossing)	Sperling Drive	Bell Farm Road	2 lanes	4 lanes + TWLTL	before 2026
St. Vincent Street	Bell Farm Road	Grove Street	4 lanes (2 lanes only north of Ottaway Avenue)	4 lanes + TWLTL	before 2026
St. Vincent Street	Grove Street	Wellington Street	4 lanes	2 lanes + TWLTL	before 2026
Summerset Drive	Summerset Drive west end	Ardagh Road	Does not exist	2 lanes	2026 - 2031
Tiffin Street	Dunlop Street	Ferndale Drive	2 lanes	2 lanes + TWLTL	When adjacent redevelopment occurs

Table 5-12 Prioritization and Timings of Proposed 2031 Road Improvements (Page 5/5)

Road	From	To	2016 Network	2031 Proposed Network ¹	Proposed Time Frame
Tiffin Street	Ferndale Drive	Essa Road	2 lanes	4 lanes + TWLTL	before 2026
Tiffin Street ³	Essa Road	Lakeshore Drive	2 lanes + TWLTL	7 lanes ³	before 2026
Truman Road	Huron Road	Hamilton Road	2 lanes	2 lanes + TWLTL	When adjacent redevelopment occurs
Veterans Drive	Salem Road	McKay Road	2 lanes	4 lanes + TWLTL	Capital Plan
Veterans Drive / 5 Sideroad	McKay Road	City South Limits	2 lanes	4 lanes + TWLTL	
Welham Road	Hamilton Road	Big Bay Point Road	2 lanes	2 lanes + TWLTL	When adjacent redevelopment occurs
Welham Road	Big Bay Point Road	Mapleview Drive	2 lanes	2 lanes + TWLTL	
Welham Road	Mapleview Drive	South of Saunders Road	2 lanes	2 lanes + TWLTL	
Welham Road	South of Saunders Road	Lockhart Road	Does not exist	2 lanes + TWLTL	
Wellington Street	Sunnidale Road	Bayfield Street	2 lanes	2 lanes + TWLTL	before 2026
Yonge Street	Mapleview Drive	Lockhart Road	2 lanes	4 lanes + TWLTL	Capital Plan
MTO Highway 400 Interchanges					
E/W-S On-Ramp (SB)	Dunlop Street Interchange		1 lane	2 lanes ⁵	Concurrent with MTO interchange improvements
E-N On-Ramp (NB)	Essa Road Interchange		1 lane	2 lanes ⁵	Concurrent with MTO interchange improvements
Salem and Hewitt's Secondary Plans					
Collector Roads in Salem and Hewitt Secondary Plans	Salem and Hewitt's Secondary Plans		Do not exist	Build out new collector roads (Secondary Plans, Phases 1&2)	When development occurs and requires

Note: TWLTL = Two-way left turn lane; GPL = General Purpose Lane; HOV = High Occupancy Vehicle.

¹. HOV lanes and road diets are not included in this table. Refer to the TMP texts for their timings.

². The number of through lanes in red indicates that it is different from the total number of through lanes by 2041 and road sections will be built by phase.

³. The number of lanes for the special, short section on Tiffin Street includes the turn lanes at two adjacent intersections.

⁴. Capital Plan indicates that the improvements have been programmed in the City 2019 Capital Plan.

⁵. The number of lanes for a ramp indicates the lanes where a ramp merges with or diverges from the Highway 400 mainline. The widening to a 2-lane on-ramp requires an auxiliary lane on the mainline.

5.6 Railway Crossings

Future analysis was conducted to determine the warranted road-rail crossing protections in 2031 and 2041 for the 22 road-rail at-grade crossings under the City's jurisdiction. For this analysis, the type of crossing protection was selected based on a comparison of the Crossing Exposure Index (CEI) at each crossing location and the thresholds set in the Transport Canada Grade Crossing Standards (GCS). The CEI is the product of the forecasted daily number of trains and the forecasted AADT at a crossing location.

For at-grade crossings, where the road and rail physically intersect, there are three main types of crossing protection systems specified by the GCS:

- Standard Railway Crossing Sign;
- Flashing Lights and Bells; and
- Flashing Lights, Bells and Gates.

At a minimum, the GCS requires Standard Railway Crossing Signs to be installed at a public at-grade crossing. The GCS specifies crossing protection types based on the CEI as per Table 5-13.

Table 5-13 GCS Specified Crossing Protections

CEI (# of trains/day x AADT)	Warranted Crossing Protection
2,000 – 49,999	Flashing Lights and Bells
50,000 or more	Flashing Lights, Bells and Gates

An additional crossing protection is grade separation, which can be an overpass (road over railway) or underpass (road under railway) structure. Currently, the Transport Canada GCS do not specify criteria for the grade separation of a crossing. However, railway companies and road authorities generally apply a minimum CEI threshold value of 200,000 as a warrant for grade separation.

The warranted protection types for each grade crossing in 2031 and 2041 are provided in Table 5-14. Detailed analysis and results are discussed in the 'Railway Crossings Technical Memorandum' provided in Appendix D.

Table 5-14 Warranted Railway Protection for 2031 and 2041

No.	Location	Existing	2031	2041
1	Lockhart Road (GO)	FLBG	FLBG	Grade Separation
2	Mapleview Drive (GO)	FLBG	Grade Separation	Grade Separation
3	Little Avenue (GO)	FLBG + Traffic Signal Interconnection	FLBG	FLBG
4	Minet's Point Road (GO)	FLBG	FLBG	Grade Separation
5	Truman Road (BCRY)	Standard Railway Crossing Signs	FLB	Not determined ⁴
6	Welham Road (BCRY)	Standard Railway Crossing Signs	FLB	FLBG
7	Bayview Drive (BCRY)	Standard Railway Crossing Signs+ Traffic Signal Interconnection ¹	FLB	FLBG
8	McKay Road (BCRY)	FLB	FLBG	FLBG
9	Saunders Road (BCRY)	FLB	FLB	Not determined ⁴
10	Huron Road (South of Ellis Drive) (BCRY)	FLB	FLB	FLBG
11	Big Bay Point Road (West of Yonge Street) (BCRY)	FLB	FLBG	FLBG
12	Huron Road (South of Herrell Avenue) (BCRY)	FLB	FLB	FLBG
13	Burton Avenue (BCRY)	FLB	FLBG	FLBG
14	Little Avenue (BCRY)	FLB	FLBG	FLBG
15	Essa Road (BCRY)	Standard Railway Crossing Signs +Traffic Signal Interconnection ¹	FLBG	FLBG
16	Innisfil Street (BCRY)	FLBG ¹	FLB	FLBG
17	Anne Street South (BCRY)	FLBG ¹	FLB	FLBG
18	Patterson Road (BCRY)	FLB	FLB	FLBG
19	Ferndale Drive (BCRY)	FLBG	FLB	FLBG
20	Tiffin Street (BCRY)	Standard Railway Crossing Signs ²	Not determined ⁴	FLBG
21	Brock Street (BCRY)	Standard Railway Crossing Signs	Not determined ⁴	Not determined ⁴
22	John Street (BCRY)	No signs installed ³	Not determined ⁴	Not determined ⁴

Notes: - FLB = Flashing Lights and Bell - BCRY = Barrie Collingwood Railway

- SRCS = Standard Railway Crossing Sign - GS = Existing Grade Separation

- FLBG = Flashing Lights, Bells and Gates

¹Information provided by the City of Barrie (February 22, 2019)

²The current (2017) CEI at Tiffin Street is 14,334 which warrants the installation of Flashing Lights and Bells

³At minimum, Standard Railway Crossing Signs should be installed at the John Street grade crossing now

⁴Traffic volumes were unavailable from the City on local roads

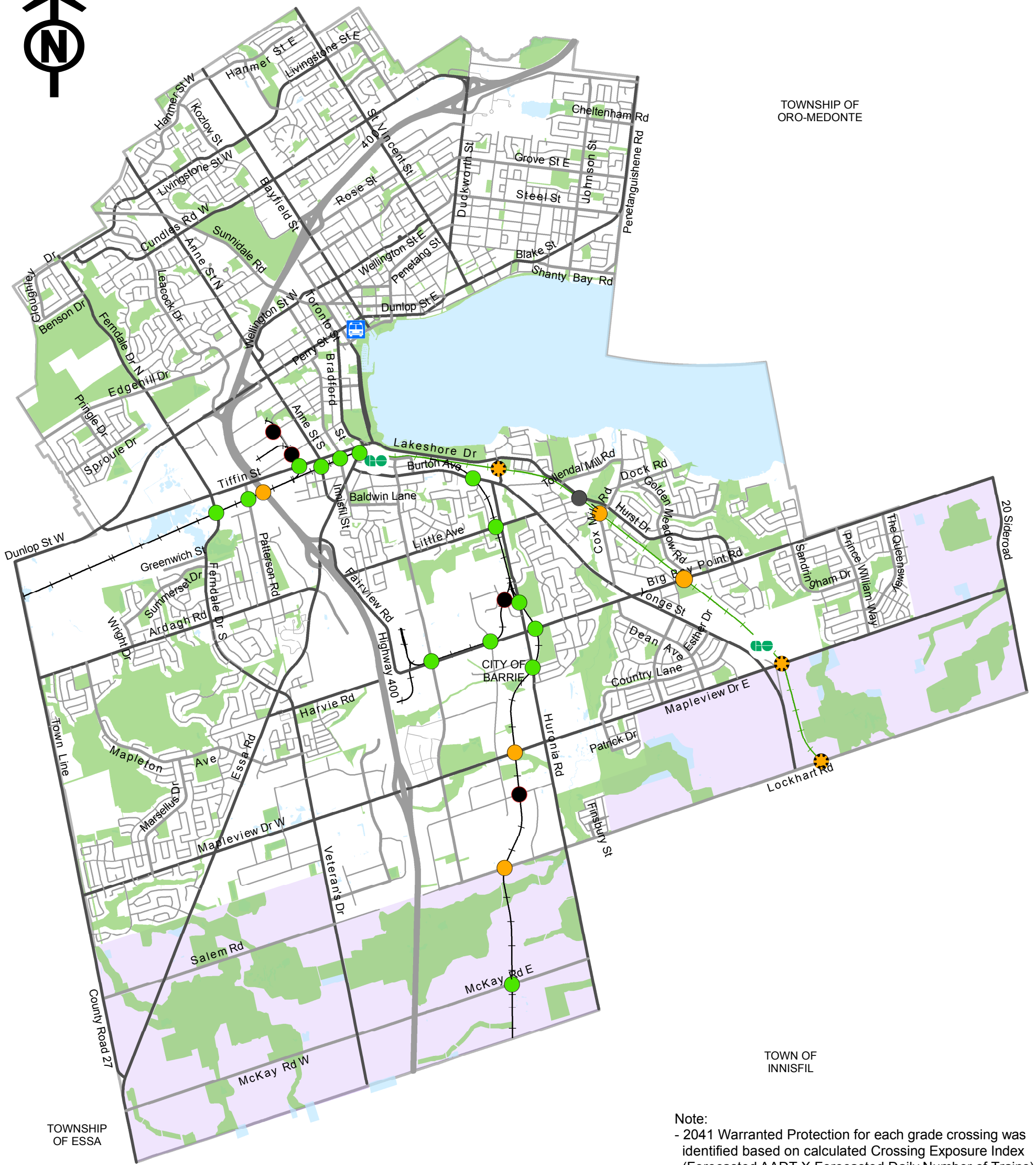
In 2041, the CEI exceeds 200,000 at three crossing locations, indicating that the feasibility of grade separation at these locations should be further investigated. These crossings are located on the GO Transit Newmarket Subdivision. Based on a ranking of the CEI value from highest to lowest, the crossings may be prioritized for grade separation as shown in Table 5-15.

Table 5-15 **Prioritization of crossings for grade separation in 2041**

No.	Location	2041 CEI
1	Mapleview Drive (GO)	1,107,200
2	Lockhart Road (GO)	888,000
3	Minet's Point Road (GO)	201,600

The warranted protection types for each grade crossing in 2041 are illustrated in Figure 5-11.

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TOWNSHIP OF ESSA

Note:
- 2041 Warranted Protection for each grade crossing was identified based on calculated Crossing Exposure Index (Forecasted AADT X Forecasted Daily Number of Trains).

Rail Crossings

- Flashing Lights, Bell and Gates (FLBG)
- Flashing Lights, Bell and Gate + Traffic Signal Interconnection
- New Grade Separated
- Existing Grade Separated
- Not Determined - 2041 AADT not available (Once data is collected, warranted protection should be reviewed)

Transportation Features

- Provincial Highway
- Arterial Road
- Collector Road
- Local Road
- Private Road

- + GO Station
- + Barrie Bus Terminal
- GO Transit Railway
- BCRY Railway

- Park / Open Space**
- Park / Open Space
 - Water
- Other Features**
- Secondary Plan Areas

Data Sources: City of Barrie
Date Updated: Monday, April 08, 2019
Project: 171-08853-00
Map Created By: WSP Thornhill

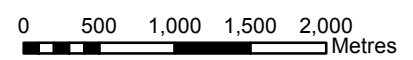


Figure 5-11
2041 Warranted Protection at Railway Crossings
City of Barrie Transportation Master Plan Update



6. ROADWAY RIGHT-OF-WAY

The right-of-way (ROW) is the width of land owned by the City that accommodates the roadway's infrastructure facilities, such as vehicle travel lanes, sidewalks, cycling facilities, and boulevards for landscaping, utilities, and other facilities. The entire width of these publicly-owned lands are designated as "highway" under the provisions of the Highway Traffic Act, Ontario, and are subject to the regulations under this Act. Right-of-way protection is essential for the development of the City's transportation network and ensuring sufficient land for future roadway work, widening of sidewalks, expansion of municipal services, installation of cycling facilities, street trees and furniture, etc. Generally, cities have typical roadway cross-section designs to help inform right-of-way protection needs for corridors.

This section details the design criteria used to determine the 2041 ROW for the proposed road widening projects based on the City's standard cross-section designs.

6.1 Standard Cross-Section Designs

The City of Barrie's Transportation Design Manual provides guidance on the design and installation of road infrastructure systems within the city. The design criteria outlined in the manual is based on current industry standards and specifications, including standards from the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (2017), Ontario provincial Standard (OPS) and the Ontario Traffic Manual (OTM). Standard cross-section designs for various road classifications and ROWs are documented in the manual, which were utilized to determine the 2041 ROW. The City should consider updating their Design Manual to incorporate new on- and off-road active transportation facilities, and develop Complete Street Guidelines with relevant cross-sections that can be used to design new streets to better accommodate all modes of travel.

6.2 Future 2041 Right-Of-Way

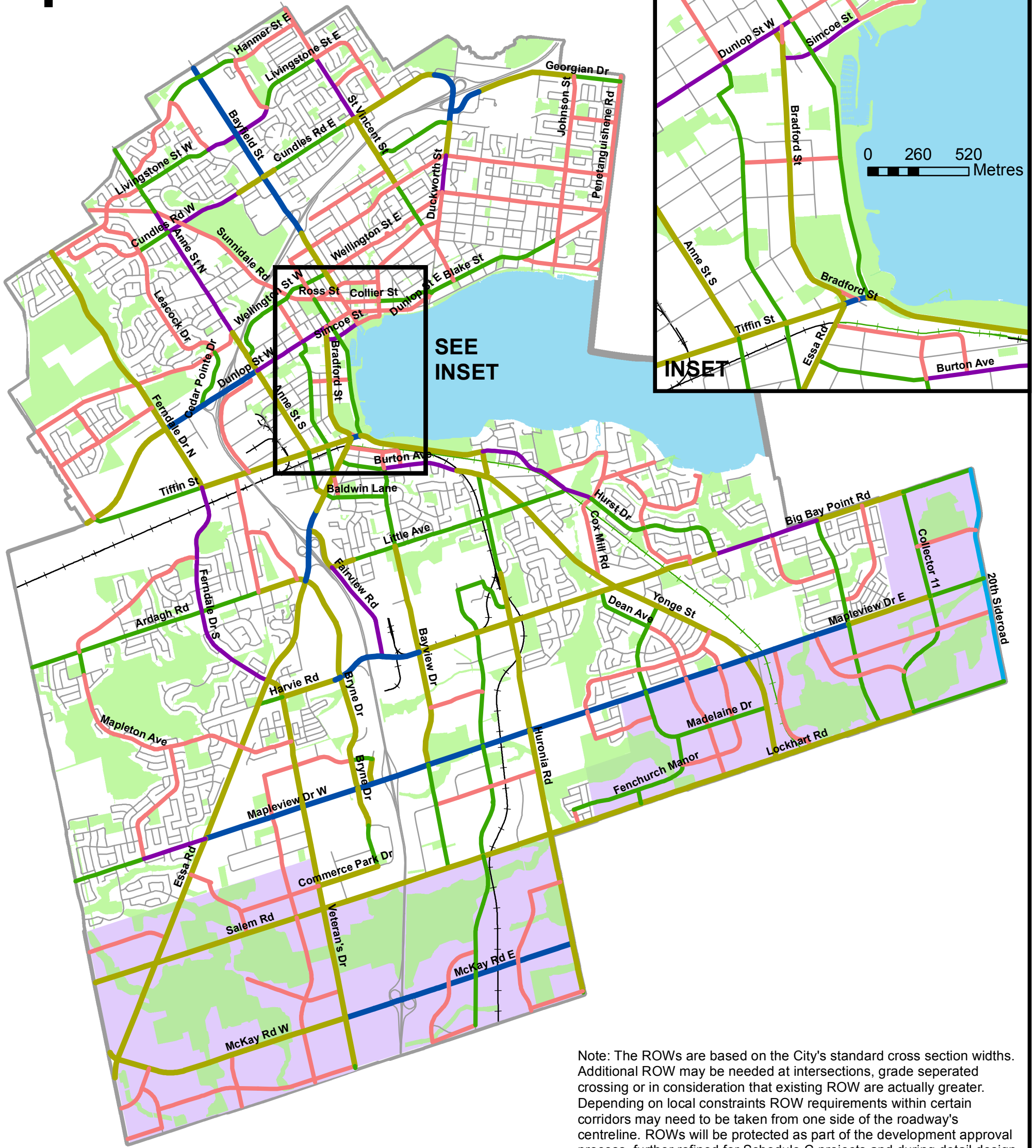
The required road rights-of-way should consider the needs of future roadway improvements and ensure that sufficient property is available to accommodate all roadway components as per the City's design standards. The future 2041 ROWs are based on the City's standard collector and arterial cross-sections and the number of vehicle lanes in the future 2041 network. Note that it was determined with the City that standard ROWs can accommodate the various cycling facility types by rearranging the pavement and boulevard widths in the standard cross-section designs. The specific rearrangements can be determined through individual EA studies, if required, or during detailed design of the roadway.

Figure 6-1 illustrates the future ROW based on the proposed 2041 roadway network. Further details on the determination of the ROW widths are provided in Appendix H.

Rights-of-ways in the secondary plan areas are maintained as per the Salem & Hewitts Secondary Plan Mid Block Right of Way Plan (2017).

Rights-of-ways requirements are defined in Schedule E of the City's Official Plan. To protect ROW and maintain the City's standard cross-section designs, the Official Plan should be amended to reflect the ROW needs of the recommended road projects identified in this 2019 TMP.

Additional ROW may be needed at intersections and grade separated crossings. The City may require additional lands at intersections to provide for exclusive turn lanes, bus queue jump lanes, transit stop amenities, and other special treatments including the construction of bridges, overpasses and underpasses, and possible parking bays. These would be determined through individual EA studies, if required, or during detailed design of the roadway.



Note: The ROWs are based on the City's standard cross section widths. Additional ROW may be needed at intersections, grade separated crossing or in consideration that existing ROW are actually greater. Depending on local constraints ROW requirements within certain corridors may need to be taken from one side of the roadway's centreline. ROWs will be protected as part of the development approval process, further refined for Schedule C projects and during detail design. Refer to Schedule E of the City's Official Plan for ROW requirements.

Right-of-Way Width (m)

- 24
- 27
- 29
- 30
- 34
- 41

Transportation Features

- +—+—+— GO Transit Railway
- +—+—+— BCRY Railway
- Roads

Natural Features

- Park / Open Space

Other Features

- Secondary Plan Areas

Date Updated: April 10, 2019
 Project: 171-08853-00
 Map Created By: WSP Thornhill

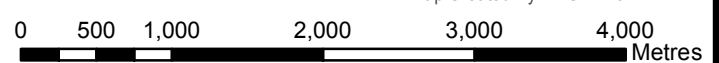


Figure 6-1
 Future 2041 Right-of-Way
 City of Barrie Transportation Master Plan



6.3 Protection for Future Right-of-Way beyond 2041

The previous sections outline the roadway lane requirements and the future ROW for horizon year 2041; however, there are some locations that may require further widening to accommodate future growth beyond 2041 or increased levels of development in some corridors not yet determined. This development intensification could impact the required number of traffic lanes, increase the demand for transit and High Occupancy Vehicle lanes, cycling facilities both on-road and in boulevard, pedestrian facilities as well as above and below ground municipal services and public utilities. For these reasons some roadways are recognized for additional right-of-way protection which are listed in Table 6-1.

Table 6-1 Future Roadway ROW Protection

Road	From	To	Future Protected ROW (m)
Anne Street	Tiffin Street	Essa Road	34
Big Bay Point Road	Bayview Drive	Huron Road	41
Dunlop Street	Anne Street	Toronto Street	34
Essa Road	Mapleview Drive	CR-27	34
Innisfil Street	Tiffin Street	Essa Road	34
Mapleview Drive	CR-27	Essa Road	34
McKay Road	CR-27	West of Veterans Road	34
McKay Road	West of Veterans Road	Huron Road	41
Salem Road	CR-27	Reid Drive	34
Wellington Street	Anne Street	Sunnidale Road	34

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7. TRANSPORTATION POLICY RECOMMENDATIONS

The provision of municipal transportation services today goes far beyond constructing, maintaining and operating road networks and planning for infrastructure improvements. To complement the proposed transportation networks discussed throughout Section 5, it is imperative to have supportive transportation policies to promote inclusive multimodal mobility and enhance safety for all transportation users. The success of these policies is dependent on the collaborative efforts of all stakeholders and the continuous promotion of the programs through educational and communicational campaigns. This subsection presents four policy guidelines to support an inclusive, safe and resilient mobility system including:

- Complete Streets
- Traffic Calming
- Transportation Demand Management (TDM)
- Intelligent Transportation Systems

7.1 Complete Streets

Complete streets are streets that are planned, designed, constructed, operated and maintained for all modes of transportation and all street users. Traditionally, roads have been designed to primarily accommodate automobile traffic. However, modern day planning recognizes the importance of integrating various features such as widened sidewalks, street furniture, intersection treatments and separated AT facilities, to enhance mobility and accessibility for various road users, as well as the overall sense of livability and safety in the streetscape. This shift in roadway planning and design takes into consideration all roadway users to provide a balanced, multi-modal and inclusive transportation network.

In other words, cities and towns can change the nature of streets to be more than just venues for mobility, but means for economic development, community well-being, environmental and public health promotion. Some associated benefits to implementing Complete Streets include:

- Increased health benefits through walking and cycling;
- Enhanced safety;
- Lower transportation costs;
- Greater opportunities for social interaction; and
- Reduce road congestion and pollution.

The City of Barrie should consider developing a Complete Streets Guideline document and elements of the guide can be incorporate into future amendment of the Official Plan or Design Standards.

7.2 Traffic Calming

Traffic calming is a series of design, engineering, educational, and/or enforcement measures to reduce the negative impacts of high motor-vehicle speeds and traffic volumes in local and collector streets, with the end goal of improving the liveability and safety conditions of neighbourhoods for all road users.

Traffic calming measures can vary. Physical interventions can range from the roundabouts, curb extensions, road diets and pedestrian islands, among others. Additional mitigation measures may include implementation of electronic speed feedback boards, community road watch programs, or localized police enforcement.

The City currently has a Traffic Calming Policy contained within Staff Report ENG003-11, dated January 10, 2011, which is actively being implemented as required. The City should update their current policy based on the Canadian Guide to Traffic Calming Second Edition, which was released in March 2018, and continue applying the updated Traffic Calming Policy as needed.

7.2.1 Road Diets

Road diets are one approach to traffic calming. A road diet is characterized by reallocating space on the roadway to other modes, such as cycling or transit, to encourage a modal shift of road users.

Implementing road diets have become common practice in many of Ontario's communities, to enhance road safety for all users, improve traffic conditions and speed management, implement active transportation networks and improve livability through streetscape revitalization.

A road diet can include several redesign measures to address the context-sensitive characteristics of a roadway and to reflect the vision of the local community. Road diets typically include a combination of the following goals and strategies:

- Repurpose vehicle travel lanes to other uses
- Decreasing the number and width of vehicle lanes
- Integrate bike lanes or separated bikeway facilities
- Expanding pedestrian infrastructure
- Reorganizing parking
- Installation of passive traffic control measures (roundabouts)

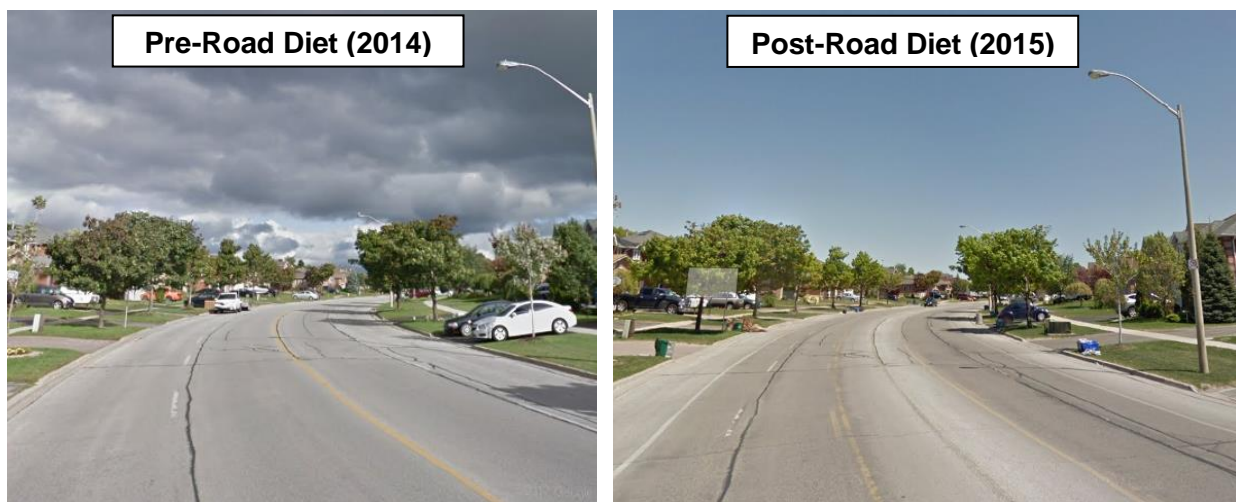
Road diet implementation provides the greatest benefit to roadways which have traffic volumes that do not exceed annual average daily traffic thresholds as set by city staff. AADT thresholds can be determined through combination of factors; such as geography, infrastructure development or growth objectives. Implementing a road diet on roadways with high traffic volumes can sometimes result in increased traffic congestion. However, road segments below a vehicle threshold, determined by city staff, could benefit from improved Active Transportation networks, possible safer streets and a more livable neighbourhood.

The 2014 MMATMP link capacity analysis identified 26 candidate road sections for a road diet. Once candidate sections were identified, the City of Barrie undertook an evaluation process to assess measures such as operations, traffic volume, collision history and traffic flow to help select

the best candidates for treatment. Of the 26 road segments identified, road diets were implemented on the following 6 roads:

- Ardagh Road
- Cundles Road
- Ferndale Drive
- Hurst Drive (as illustrated in Figure 7-1)
- Livingstone Street
- Prince William Way

Figure 7-1 Hurst Drive Road Diet Implementation



*(2014): 4 Lanes
Source: Google, 2019*

(2015): 2 Lanes with TWLTL and bike lanes

Building upon the success of the City's road diet implementation, this TMP proposes additional road diets through the selection of new candidate locations. Road diets have been identified only on roads informed by data that indicates a reduction in vehicle lanes is not expected to have an adverse impact on traffic flow or operations and will meet the vehicular capacity required to accommodate the projected 2041 traffic volumes.

This TMP identified 10 road links that would be suitable candidates for road diets by implementing active transportation infrastructure. These segments were considered favourable to encourage mode shift through active transportation facilities which could help to improve road safety, connectivity and promote multi-modal development. The candidate road segments were reviewed based on 2041 link volume-to-capacity results and ROW requirements to ensure no adverse impact would result to roadway operation or future needs.

Candidate road segments are outlined in Table 7-1. The proposed road diet segments are detailed in section 3.1.3 of the 'Active Transportation Strategy' provided in Appendix B. All proposed road diet segments recommend converting roadways with available space for either a bike lane or buffered bike lane. It is recommended that City staff monitor roads where road diets

have been implemented to ensure that they continue to meet the goals of the TMP and that they are reviewed long term, subject to growth beyond the 2041 horizon.

Table 7-1 2041 Proposed Road Diet Locations

Candidate Roadway	Approximate Length (km)	Existing Facility	Proposed Facility
St. Vincent St from Grove Street East to Bell Farm Road	0.5	4 Lanes	2 Lanes + TWLT + Buffered Bike Lanes
St. Vincent St from Cundles Rd to Livingstone Rd	1.0	4 Lanes	2 Lanes + TWLT + Buffered Bike Lanes
Hanmer St West from Anne St to Finlay Rd	1.0	2 Lanes	2 Lanes + Bike Lanes
Hanmer St East from Stanley St to Bayfield St	0.5	4 Lanes	2 Lanes + TWLT + Bike Lanes
Livingstone St East from Stanley St to St. Vincent St	1.0	4 Lanes	2 Lanes + TWLT + Buffered Bike Lanes
Big Bay Point Rd from Prince William Way to Hurst Dr	1.5	4 Lanes + TWLT	4 Lanes + Buffered Bike Lanes
Dean Ave from Big Bay Point Rd to Madelaine Dr	1.0	4 Lanes	2 Lanes + TWLT + Bike Lanes
Madeline Dr from Yonge St to Mapleview Dr	1.2	4 Lanes	2 Lanes + TWLT + Buffered Bike Lanes
Collier St from Bayfield St to Blake St	1.2	2 Lanes	2 Lanes + Buffered Bike Lanes
Wellington St from Anne St to Ross St	1.0	4 Lanes	2 Lanes + TWLT + Buffered Bike Lanes

7.3 Transportation Demand Management

Transportation Demand Management (TDM) refers to the application of policies, programs and initiatives that are intended to diversify the existing travel mode share by reducing dependency on motor vehicle travel and encouraging alternate modes of travel including walking, cycling, transit and carpooling. A comprehensive TDM strategy should outline options which support walking, cycling, transit and other non- single occupancy vehicles, as viable travel options through a set of incentive programs, policies and measures.

A TDM policy should encompass measures to influence infrastructure as well as user habits, including:

- **Hard measures:** development guidelines or investments in infrastructure to enhance opportunities for walking, cycling, transit and other non- single occupancy vehicles
- **Soft measures:** educational and promotional initiatives or information to influence behaviour change

TDM typically promotes the increase of transit ridership, cycling, walking, carpooling or rideshare through stakeholder based programs supported by municipal policy. These policy recommendations encourage and foster TDM programming, outreach and communication initiatives to workplaces, residents and schools, and could also influence parking management and development approvals. Through proactive policy, the City of Barrie can create healthy and sustainable workplaces, communities and connections.

7.3.1 Develop TDM Guidelines

Several municipalities in Ontario have developed comprehensive TDM guidelines that outline a framework of tools and strategies to implement “hard” and “soft” measures as well as a prioritized implementation plan for the recommendations contained in the plan. It is recommended that the City of Barrie develop TDM guidelines which collect, document and implement appropriate TDM measures, with the objective of shifting travel behavior, providing more efficient use of existing infrastructure and integrating TDM strategies into new development. These guidelines may require developers to provide a plan to reduce single occupancy vehicles related to a proposed site through an approved TDM measures matrix. Developing these guidelines will not only provide clear instructions for documenting where and when TDM measures are implemented but ensure consistency in the review and application of these requirements.

7.3.2 Potential TDM Measures

To support a set of TDM Guidelines, it is also recommended that the City assemble a matrix to outline specific TDM measures. This matrix could include new measures, enhancements to existing strategies, as well as defined responsibilities for staff and partners that will have a role in the implementation of TDM measures in Barrie.

The TDM matrix is intended to be a tool to allow City staff to assess TDM requirements based on location, land use, scale of development, existing infrastructure and cost. The matrix will organize the proposed measures into two categories: “hard” and “soft” measures, each requiring varying levels of commitment from various staff, stakeholders and partners. It is recommended that each measure be evaluated to determine the cost involved, who is responsible, the objective of the measure and where and when the measure is suitable for implementation.

Table 7-2 outlines examples of TDM measures which are currently being utilized by municipalities throughout Ontario. It is recommended that City staff review these measures to inform potential new or modified strategies that can be undertaken in Barrie.

Table 7-2 Example of TDM Measures Matrix

	Objective	Initiative	Agency responsible
TDM Supportive Infrastructure Policy	Facilitate TDM measures in the development review process which incentivizes and regulates travel alternatives which encourage mode shift	Development Application Process - TDM Requirements	Municipality
	Reduce minimum or impose maximum parking standards for new developments to reduce car ownership and car use	Parking Standards	Municipality
	Provide equitable access to sustainable transportation modes	Provide transportation facilities which are accessible to all users	Municipality
	Improve AT infrastructure to promote higher mode shift	On and off road Active Transportation Infrastructure	Municipality
	Provide ample bicycle parking to increase access to the AT network	Bicycle Parking Standards	Municipality
Municipality Delivered	Inform residents about alternative travel modes	Community Outreach	Municipal partnership
	Encourage more compact development to support sustainable travel behaviour	Land Use Policy	Municipality
Workplace Measures	Improve system efficiency by reducing single-occupant vehicles while lessening congestion on roadways	Carpooling	Regional Initiatives (Commute Ontario)
	Encourage mode shift where AT infrastructure exists	Bicycle Parking	Municipality and Property Owners
Provincially Delivered	Bike parking, lockers and transit infrastructure which can accommodate and encourage cycling	Bike Friendly Infrastructure	Metrolinx

7.3.3 Development Approval Process

As the City of Barrie grows, some TDM elements can be implemented by developers to support sustainable transportation options for individual developments or plans of subdivision. The City can establish a development threshold which would identify at what scale a development would be required to implement TDM measures as a condition of development approval rather than retrofit once the development is complete. For example, developers can be required to agree to support or implement enhancements to the active transportation network, bicycle parking requirements, and transit subsidies as part of their approval process. The proposed TDM requirements would need to be further developed in a “Transportation Demand Management for Development” guidelines, which will ascribe strategies and actions developers can, or be required to implement to reduce and discourage single-occupancy vehicle trips, alternative parking

standards, minimize parking, and promote transit use, cycling, car and bike sharing, carpooling, and other measures.

7.3.4 Parking Pricing

Parking pricing can be an effective measure of discouraging single occupancy vehicle trips while diversifying mode share and managing parking demand. The City of Barrie currently provides paid parking of on and off-street facilities in the downtown, which is enforced 9am–5pm on weekdays. In specific waterfront areas, paid parking is enforced 7 days per week throughout the year for non-residents and is free for residents who display a Resident Parking Pass. User-fee cost-based parking pricing can enable transit ridership to increase, depending on the previous level of transit ridership and the range of travel options available. As shown in Table 7-3, currently transit fares in Barrie are typically higher than the fee for parking. The fee for parking should be set sufficiently higher than that of a full price monthly transit pass and priced to reflect parking as a service. Limiting parking demand through parking pricing can be one of the most significant tools in limiting peak-period congestion caused by auto travel.

Table 7-3 Transportation Costs

Transit Ticket	Transit	Type of Parking Pass	Parking Fee Per Vehicle
Single Ticket	\$3.00**	Per Hour Parking Rate	\$1.00 - \$1.25*
Transit Day Pass	\$7.50**	Daily Maximum Parking Rate	\$5.50*
Monthly Transit Pass	\$86 (Adult)**	Monthly Parking	\$60 - \$85*

* *City of Barrie Parking Rates, 2018 (barrie.ca/Parking)*

** *Barrie Transit & Specialized Transit Fares, 2018 (barrie.ca/Barrie Transit)*

7.3.5 TDM Policy Recommendations

To provide a non-auto supportive environment, encourage and promote the use of alternative modes of travel, it is recommended that:

1	City staff develop TDM guidelines which collect, document and implement appropriate TDM measures.
2	City staff assemble a matrix to outline TDM measures considered appropriate for implementation and follows the City of Barrie's community vision and TDM guidelines.
3	The development approval process should require new developments and redevelopments to include a TDM plan which implements suitable TDM measures in accordance with the City's guidelines developed as part of Recommendation 1.
4	City staff establish a parking pricing strategy where appropriate, designed to reduce auto travel, through incentivizing the existing transit pricing in key locations, such as the waterfront or downtown.
5	The City should review current parking requirements within the Zoning By-law to ensure appropriate parking rates are required based on current vision of a multi modal City and where appropriate adopt new requirements based on availability of current and planned transit service, Active Transportation facilities, public parking and area land uses. This review should also incorporate bicycle parking requirements for all land uses.

7.4 Intelligent Transportation Systems

Intelligent transportation systems (ITS) encompass any technology application to transportation infrastructure design and operation to enhance the efficiency, safety, quality and intelligence of a service for travelers. Cities across Canada are implementing ITS infrastructure and applications to collect valuable transportation data to assess performance and monitor hot spots, leading to more informed decision making at the city staff level, and to communicate traveler information to their residents, leading to more informed route and mode choice decision making. Some examples include:

- Smart signals at key intersections;
- Incident detection and monitoring;
- Traveler information systems; and
- Mid-block speed and volume collection devices.

It is recommended that city staff develop an ITS strategy to establish a vision for infrastructure technologies to increase the efficiency, safety, quality and intelligence of the city's transportation operations and services. This strategy should consider and assess any existing ITS implemented by the city and research any emerging technology applications for traveler information, data analytics and operations such as parking reservation and payment, as well as to consider both current and future traveler information needs for route and mode choice decision making.

8. IMPLEMENTATION AND PHASING

The implementation of the TMP is intended to be undertaken as a collaborative and coordinated effort between City staff and its partners. A clearly documented process and set of tools are needed to ensure that implementation is consistent and maintained on an on-going / annual basis. Identifying timelines of when projects will take place and identifying priorities is a critical component to successfully achieving the goals and outcomes of the TMP. The timelines and priorities for the various networks are discussed in greater detail below.

8.1 Transit Network

The Core and Supporting Transit System presented in Section 5.3.2 is proposed as the recommended transit system for the 2041 horizon year. However, the implementation of the transit network should be phased to proactively respond to intensification and changing travel demands within the City of Barrie. The phased implementation of the transit network will have the following benefits:

- Allow for quicker implementation of the core route concept in the existing dense areas such as northeast Barrie;
- Staged implementation of the core route service in the secondary plan areas as development is implemented, so the service is available to influence residents and employees travel behaviour very early;
- Minimized disruption to transit users;
- Availability to further tweak the 2041 system as more information becomes available;
- Gradually increase resources, such as bus fleet and transit staff, to support the core routes at high frequencies while still being able to start implementing a more reliable transit network for existing users;
- Annual reviews and monitoring will allow for changes in service, to better meet user demand; and
- More flexibility to adapt or respond to changes in technology that will affect the operations of the transit fleet and system or the surrounding environment in which they operate.

To influence change in travel behaviour and make transit a convenient and attractive alternative to auto travel, many of the proposed changes could be implemented in phases. However, to achieve the targeted 2041 mode share, significant changes from the existing network should occur by 2031.

The 10 and 20-minute frequencies are currently recommended on implementation of the new system during peak hours. However, through annual reviews and monitoring, Barrie Transit will be able to ascertain the frequencies and modifications required to meet demand during peak and off-peak periods.

The following items are key component for the successful implementation of the recommended Transit System:

- Improved service frequency during peak hours, especially to and from critical destination points within the City.

- Technology improvements such as contactless payment methods and integration of automation in the transit fleet.
- Non-Peak Service through the implementation of less frequent fixed routes or switching to either rideshare integration or on-demand transit.
- Coordination with Metrolinx and surrounding Regional Transit Agencies.

The estimated capital cost of implementation, including the number of buses and facilities required, is included in the 'Roadway and Transit Costing Technical Memorandum' provided in Appendix H.

8.2 Active Transportation and Trails

Successful implementation of the AT network will continue beyond the lifespan of the study. The implementation plan for the AT network builds on the process that was used to complete the 2014 MMATMP as well as lessons learned from City staff since that time. Identifying timelines of when particular projects will take place and identifying priorities is a critical component to successfully achieving the goals and outcomes of the MMATMP. An overview of the phasing and priorities for the AT network is provided below.

The AT network timelines are meant to be flexible and used to inform future decision-making and prioritization for active transportation projects. The phasing timeline for AT projects is organized into three phases:

- Short Term – 2019-2023
- Medium Term – 2024-2031
- Long Term – 2032-2041

Table 8-1 provides an overview of the proposed facility types by phase. Technical Appendix B2 of the AT Strategy provides maps that illustrate the full built-out AT network (short, medium, and long terms). As part of the implementation plan for the City of Barrie's AT network, a number of priorities have also been identified to help inform future decision-making, annual budget processes and other initiatives. The priority projects have been identified in the short and medium-term horizons. Although these projects are proposed for implementation within the specific horizons, they may not be completed until the long term due to necessary next steps as well as the complexity and scope of a project. The selection of proposed priority projects was informed using input collected from City staff and residents as well as planned infrastructure projects identified in the City's Capital Plan.

To successfully implement the proposed active transportation priorities, it is recommended that the City staff review and utilize the proposed active transportation priorities on an annual basis to identify projects which can be implemented in the following year as part of other capital infrastructure or rehabilitation projects. On-road projects should assess the feasibility and desirability of on-street parking and as part of this process. It is suggested that City staff, stakeholders and local businesses be consulted to understand the demand for on-street parking.

In addition to the three main phases and priorities of the AT network, the study team has also included an interim network that could be considered for implementation until the ultimate (preferred) facility is implemented. Though full build-out is the preferred outcome for the City's

active transportation network, implementation of an interim facility could be considered a more feasible solution in some locations.

Interim facilities represent projects where the current conditions or resources cannot easily support or accommodate the preferred facility type, but a treatment is desired due to local demand, safety considerations and interest for active transportation infrastructure. For example, on roads where the AT Strategy is recommending a conventional bike lane, City staff may choose to consider implementing an urban shoulder (painted edgeline marking) in the interim. Further details and considerations of implementing the interim network is provided in Section 3.1 of the 'Active Transportation Strategy' provided in Appendix B.

Table 8-1 Proposed Phasing Plan

Facility Type	Short Term KM	Medium Term KM	Long Term KM	Total (KM)
	2019-2023	2024-2031	2032-2041	
Sidewalk	24.8	47.4	70.3	142.5
Signed Routes	34.8	1.1	0.3	36.2
Urban Shoulders	4.3	0	0	4.3
Bike Lanes	33.4	35.7	1.2	70.3
Buffered Bike Lanes	30.5	24.4	25.2	80.2
Cycle Tracks	10	8.2	26.8	45.1
Off-Road Trails	1.6	33.9	34.1	69.6
<i>Types 1-3</i>	1.4	31.5	30.5	63.4
<i>Types 4-5</i>	0.2	2.4	3.6	6.3
Trail Bridge over Hwy. 400	0	0	0.2	0.2
In-Boulevard Pathways	11.9	15.4	9	36.3
Total	151.3	166	167.3	484.7

8.3 Road Improvement Projects

Section 5.5.3 of this report outlined the proposed road improvements required to support the population and employment growth projections to 2041. Section 0 and the accompanying Table 5-10 identified the road improvements required specifically to City of Barrie streets. Some of these road improvements are relatively narrow in scope and could be implemented through changes to pavement markings and other minor modifications.

There are some recommended improvements that would involve more significant capital works, including the widening of the pavement to provide additional travel lanes and turn lanes to increase vehicle capacity and improve operations, as well as the implementation of bike lanes to enhance the convenience and safety of cyclists. Given the scope and extent of these road improvements, approval is required under the Municipal Class Environmental Assessment (MCEA) process. As noted in Section 1.2 of this report, this TMP will serve to fulfill the Phase 1 and 2 components of the MCEA process. Phase 1 is the identification of the problem (deficiency) or opportunity, and Phase 2 is the identification of alternative solutions to address the problem or opportunity. By following Approach #2 of the MCEA process, as noted in Section 1.5, “the preparation of a Master Plan document at the conclusion of Phases 1 and 2 of the Municipal Class EA process where the level of investigation, consultation and documentation are sufficient to fulfill the requirements for Schedule B projects” will constitute approval of these projects. There are five Schedule B projects identified in this TMP, as listed in Table 8-2. Therefore, the final public notice for this TMP will represent the “Notice of Completion” for these Schedule B projects and they can then proceed to implementation, subject to the submission of any Part II Order requests.

For Schedule C projects, however, the City would be required to complete Phase 3 (alternative design concepts for the preferred solution) and Phase 4 (the preparation, submission and approval of an Environmental Study Report) prior to implementation. For the reconstruction or widening of roads to increase the capacity of the facility, the Schedule is determined by the estimated cost of construction. Currently, road improvement projects expected to exceed \$2.4 million would be subject to Schedule C of the MCEA. In the case of grade separations, such as the recommended Mapleview Drive diverging diamond interchange, a construction cost greater than \$9.5 million would be subject to Schedule C.

The total costs, which are planning level estimates and based on typical cross-sections, and anticipated timing of the recommended road improvements are presented in the ‘Class EA Process and Identification of Project Schedules’ provided in Appendix I. For these projects, refinement of the cost estimates should be undertaken over the next few years as the anticipated implementation date approaches to confirm the appropriate schedule of the MCEA and that the applicable process has been satisfied.

Table 8-2 EA Schedule B Projects

EA Project ID	Road	Proposed Roadway & Cycling Facility Description	Phasing	Total Road and AT Costs ^{1,2}
1126	Ferndale Drive North	+1 lane and In-Boulevard Pathway from Benson Drive to City Northwest Limits	2019-2023	\$1,140,000
1129	St. Vincent Street	+1 TWLTL or Median ³ , and bike lane from Wellington Street to Penetang Street	2024-2041	\$1,480,000
1309	Commerce Park Drive	+3 Lanes (including 1 TWLTL or Median) ³ and buffered bike lane from Bryne Drive to 140m west of Bryne Drive	2024-2041	\$1,070,000
1310	Sproule Drive	Addition of New Road, 2 lanes, and bike lane from west cul-de-sac to Ferndale Drive	2024-2041	\$910,000
2502	Mapleview Drive	Mapleview Diverging Diamond Interchange Addition of In-Boulevard Pathway on one side from Highway 400 to Park Place Boulevard	2024-2041	\$6,630,000

Notes:

¹ Costs presented in this table are used for the purpose of determining the applicable EA schedule.

² The total project costs exclude land acquisition costs, design/engineering fees, city project management, contract administration and site inspection, and HST.

³ The implementation of a TWLTL vs. a median should be based on a future assessment of local conditions and constraints as part of the design process.

The implementation of the recommended road improvements of the TMP will be dependent on the timing of necessary approvals, the identification of available funding, and the prioritization of these initiatives relative to other departmental and corporate needs. In some cases, additional approvals may be required from the County or the Province if the proposed improvements could affect their infrastructure and operations.

With respect to funding, significant and ongoing investments would be required from the City. These investments will need to be allocated appropriately to these improvements as well as to other needs of the transportation program, including rehabilitation to maintain the assets in a state-of-good-repair and local improvements to improve service and enhance safety, among many other demands and initiatives. To minimize costs, the City should consider the implementation of these road improvements in conjunction with the rehabilitation of this infrastructure as part of the state-of-good-repair program, although this could accelerate or defer the implementation of these improvements. Identifying external funding opportunities to support implementation, as discussed further in the following section, will help to offset the cost to the City and assist Council in determining the appropriate balance between service levels, affordability and sustainability.

Even if all these issues are adequately addressed and all the approvals are in place, scheduled construction should be coordinated with the capital programs of other stakeholders and services (e.g. Bell, hydro, Enbridge, sewers, watermains, etc.) to avoid the degradation of recently

constructed pavements and to minimize disruption to the travelling public. Following the coordination of the capital works of the various stakeholders and the establishment of the scheduled year of implementation, significant lead time is required prior to construction to undertake the necessary surveys, geotechnical studies and other investigations needed for the preparation of the detailed design. Following completion of the detailed design, the required tender documents can be prepared and the contract awarded.

8.4 Financial Investment

The timing and phasing of the proposed transportation improvements in this TMP are based on the current land use development phasing and associated employment and population growth projections. Furthermore, prioritization of capital projects within the City could also have an important bearing on the timing of the implementation. The TMP acknowledges that comprehensive City transportation policies and implementation strategies are needed to address the City's existing and future transportation needs, while respecting the City's financial capacity. The timing associated with the proposed transportation improvements contained within this TMP may need to be adjusted based on financial constraints, adopted policies and the timing of development while still addressing the overall goals and objectives set out in this TMP to provide the levels of service ultimately established by Barrie City Council.

Estimated capital costs of the TMP are estimated at \$2.04 Billion (2019 dollars) based on a high-level assessment of the transportation infrastructure requirements identified in this plan. The total capital cost can be categorized into the following projects: roadway, transit, trails and active transportation. Roadway and transit capital costs are detailed in the 'Roadway and Transit Costing Technical Memorandum' provided in Appendix H. Trails and Active transportation capital costs are provided separately in the 'Active Transportation Strategy' provided in Appendix B.

Table 8-3 TMP Capital Cost Estimates

Phase	Roads	Transit	Active Transportation & Trails	Total
2019-2023	\$676.7	\$31.1	\$28.2	\$736.0
2024-2041	\$987.0	\$199.2	\$122.0	\$1,308.2
Total	\$1,663.7	\$230.3	\$150.2	\$2,044.2

Notes:

1. Costs are in millions of dollars.
2. Where applicable, the following factors were applied to each capital project's cost: construction contingency (30%), design/engineering allowance (15%), city project management (5%), contract administration and site inspection (10%), outreach (\$50,000 per year), and HST (1.76%).

Note that the costs provided are planning level estimates and is reasonable for scope at a master plan level. This amount is significant and it is not realistic or possible for the cost to be the sole responsibility of the City. Potential external funding opportunities should be explored regularly and pursued wherever feasible to offset local costs. In addition to the general tax base to fund this infrastructure other sources could include development charges, contributions from developers and other private sector partners, federal and provincial funds, programs and contributions. Further details on the financial assessment as it relates to development charges is provided in Appendix H.