



The City of

Barrie

CITY OF BARRIE

TRANSPORTATION MASTER PLAN

Technical Appendix B – Active Transportation Strategy

June 2019

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2019-06-12

Mr. Tom Reeve
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**Subject: Transportation Master Plan
Technical Memorandum: Active Transportation Strategy | JUNE 2019**

Dear Mr. Reeve:

On behalf of WSP Canada we are pleased to provide you with the Final Draft Technical Memorandum for the Active Transportation component of the City of Barrie's Transportation Master Plan (TMP). This Active Transportation (AT) Strategy has been integrated into the TMP. It was informed by the study team's expertise as well as information and guidance from city staff, the public and stakeholders and includes:

- A review of best practices;
- Consideration of existing conditions, future development and growth plans and current city planned capital projects;
- A network plan and associated facility types informed by Ontario Traffic Manual Book 18: Cycling Facilities;
- Suggested outreach programs and initiatives to support a culture change that embraces multi-modal choices; and
- A proposed implementation program including a three-phase strategy to implement AT and Trail improvements, along with other road improvements where proposed, between 2019 out to 2041.

A comprehensive Trails Master Plan is provided as a separate technical appendix to the TMP. The phasing and costing associated with trails has been integrated into the AT Strategy.

Yours sincerely,

A handwritten signature in black ink that reads "J. David McLaughlin".

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EXECUTIVE SUMMARY

Barrie's Active Transportation Strategy (AT Strategy) is a blueprint for enhancing walking and cycling infrastructure, programs and initiatives over the next 20+ years. It identifies long-term recommendations to help guide implementation and provides City staff and its partners with tools, references and guidelines to aid in the future of active transportation decision making.

In 2014, the City developed its first Multi Modal Active Transportation Master Plan (MMATMP) to improve mobility and active transportation throughout the City of Barrie. Since its development, there has been significant growth and investment throughout the City which has resulted in an increasing shift in support for active transportation. In 2017, the City decided to revisit recommendations of the previous plan to reflect the socio-demographic and geographic changes in the City. This Executive Summary highlights and summarizes the key concepts of the AT Strategy.

ES. 1 Why Update?

As per the Planning Act, municipal master plans are intended to be updated every five to ten years. Barrie's AT Strategy has been updated to build upon the City's successes and respond to the changes in demographics and community trends, design guidelines, legislation and best practices. The update will help provide a more relevant reflection of current and future trends and changes within City and surrounding area. The update reviews and revises what was previously proposed, identifies lessons learned from the previous plan, integrates best practices related to infrastructure design and programming and balances input from various groups. The information contained in the AT Strategy includes recommendations for continued progress and achievements with the intention of creating long-term, positive change within the community.

ES. 2 Vision & Objectives

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. Through discussion with City staff and stakeholders, the vision was updated to reflect the current and future desire for active transportation outcomes in the community.

The active transportation vision statement is:

*The City of Barrie offers a **continuous, well-connected** and **safe** active transportation network for residents and visitors that supports **recreational and commuter active transportation** opportunities, enhances **connectivity** to **key destinations** and increases **mobility** for users of **all ages and abilities**.*

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** Offer residents and visitors direct active transportation opportunities to travel throughout the City and to connect to key destinations such as the Waterfront and The Great Trail.

- 2** Provide a transportation system that supports all modes of travel and users of all ages and abilities.

- 3** Establish a direct, connected and continuous network of different active transportation options that accommodates safe walking, cycling, hiking and other active modes of transportation.

- 4** Develop a balanced network of on and off-road facilities to offer comfortable, safe and secure facilities for all users.

- 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 destinations such as schools, transit stations, shops, etc.

- 7** Allocate an appropriate annual maintenance budget to maintain existing and new active transportation infrastructure, including on and off-road routes.

- 8** Establish a winter maintained network consisting of spine routes in order for walking and cycling to be viable modes of transportation year-round. For example, winter maintained routes can include on and off-road facilities to facilitate utilitarian trips such as commutes to school, work and transit hubs.

- 9** Identify a core network of spine routes that provides direct north-south and east-west connectivity for pedestrians, cyclists, mobility-assisted users and other users to increase the AT modal share in Barrie.

- 10** Encourage a cultural shift through education and promotion to increase walking and cycling activity in the City of Barrie.

ES. 3 Study Process

The AT Strategy was developed using a three-phased process that involved participation and engagement from the public, stakeholders and City staff. The approach used was consistent with Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) master planning process. Effective consultation and engagement was a critical component of the process. Input gathered over the course of the study was reviewed to inform the content of the AT Strategy.

The AT Strategy was developed between Summer 2017 and Winter 2019. The study process included three phases, each informed by input collected during the course of the study to ensure that the recommendations and tools contained in the AT Strategy reflect the interest and needs of residents, stakeholders and City staff. The process that was used to develop the AT Strategy is illustrated below.



ES. 4 The Network

The network for Barrie was developed by reviewing, revising and confirming proposed active transportation routes in Barrie using the following steps:

- 1** **Review existing conditions**

Map existing and previously planned routes to develop an understanding of 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** **Investigate the candidate routes**

Undertake field investigations and a geospatial analysis to understand factors that could inform the selection of potential new 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 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 proposed network builds on the existing system of 973.3 kilometres of active transportation routes. The proposed network includes 484.7 kilometres of routes consisting of bike routes, bike lanes, urban shoulders, signed routes, in-boulevard trails, cycle tracks, off-road trails and sidewalks as shown in **Table ES.1** below.

Table ES.1 – Overview of the Proposed AT Network

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

The existing and previously proposed active transportation routes and facility types are illustrated on **Map ES1**. The proposed active transportation and facility types are illustrated on **Map ES2**.

ES. 5 Implementation

The AT Strategy is organized into three phases: short term (2019-2023); medium term (2024-2031) and long term (2032-2041). A successful master plan needs a strategy to ensure implementation is continued beyond the lifespan of the plan. An implementation strategy should clearly identify priority projects and initiatives within the short term as well as the long term that are considered feasible and which align with other City projects and scheduled work. The estimated total cost to implement the active transportation infrastructure and supportive programs is approximately \$150,211,754. This includes the cost for design and approvals (30%), contingency (30%) and HST (1.76%) over 20+ years. A summary of the estimated costs compared to what was proposed in the 2014 MMATMP is presented in the table below.

Table ES.2 – Summary of Estimated 2014 MMATMP Capital Costs and 2018 AT Strategy Update Costs¹

Item	Length (km)	Estimated Cost
	2019 TMP	
Cycling and Multi-use Facilities	272.5	\$64,965,987
Off-Road Trails	69.6	\$20,093,822
Sidewalks	142.5	\$50,674,394
Additional costs <i>(Includes outreach, a feature trail bridge, related studies, and all proposed trail bridges / underpasses)</i>	n/a	\$14,477,552
Total	484.7	\$150,211,754
2014 MMATMP		
Cycling Facilities	Refer to 2014 MMATMP	\$154,700,000
Multi-use Facilities		\$65,000,000
Pedestrian Facilities		\$219,700,000
Total		
% Change from 2014 to 2019		
Cycling Facilities	n/a	- 58%
Multi-use Facilities		8.1%
Pedestrian Facilities and Trails		

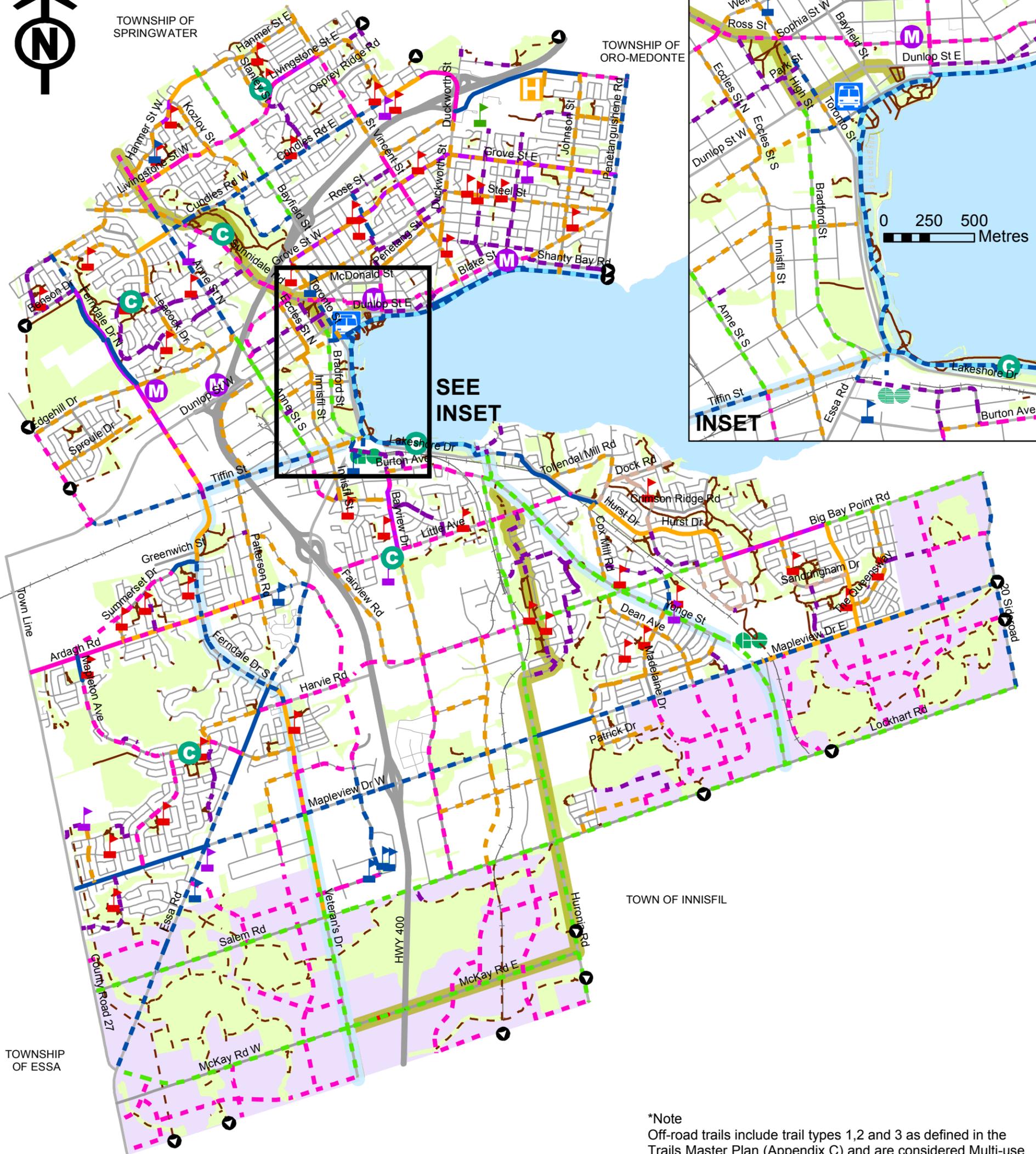
Note:

1. The estimated capital cost to implement the active transportation and trails network is significantly lower as part of the 2019 TMP compared to the 2014 MMATMP due to the unit prices and assumptions applied. For example, the 2014 MMATMP identified a unit price of \$1.3 million per kilometre to implement buffered bike lanes which includes road reconstruction to accommodate the buffered bike lanes. As part of the 2018 Active Transportation Strategy, buffered bike lanes are only recommended on roads that would require remarking / paint (\$10,000 to \$15,000 per kilometre), or in conjunction with other planned roadway projects (\$290,000 per kilometre). It is recommended that facility types such as cycle tracks or in-boulevard multi-use pathways be implemented above the curb, if and when a roadway is reconstructed. The cost to implement a cycling facility above the curb when the roadway is reconstructed is more cost-effective than reconstructing a road only for the purpose of adding bike lanes. As part of the 2019 TMP – Active Transportation Strategy, the unit price used to implement cycle tracks in conjunction with planned roadway projects is \$250,000 to \$500,000 per kilometre (less than the 2014 MMATMP \$1.3 million per kilometre for buffered bike lanes).



TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE



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TOWN OF INNISFIL

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

Existing Facilities

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

Proposed Facilities

- In-Boulevard Pathway
- Cycle Track
- Buffered Bike Lane
- Bike Lane
- Paved Shoulder
- Urban Shoulder
- Signed Bike Route
- Off-road Trail

Trail Systems

- Province-Wide Cycling Network
- The Great Trail

Transportation Features

- GO Station
- Barrie Bus Terminal

Other Features

- Secondary Plan Area
- Park / Open Space
- Connection to Surrounding Municipality

Points of Interest

- Royal Victoria Hospital
- Municipal Facility
- Community Centre
- Elementary School
- High School
- Private School
- College

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



Map ES1
Draft Cycling and Multi-use Trail Network
City of Barrie Transportation Master Plan



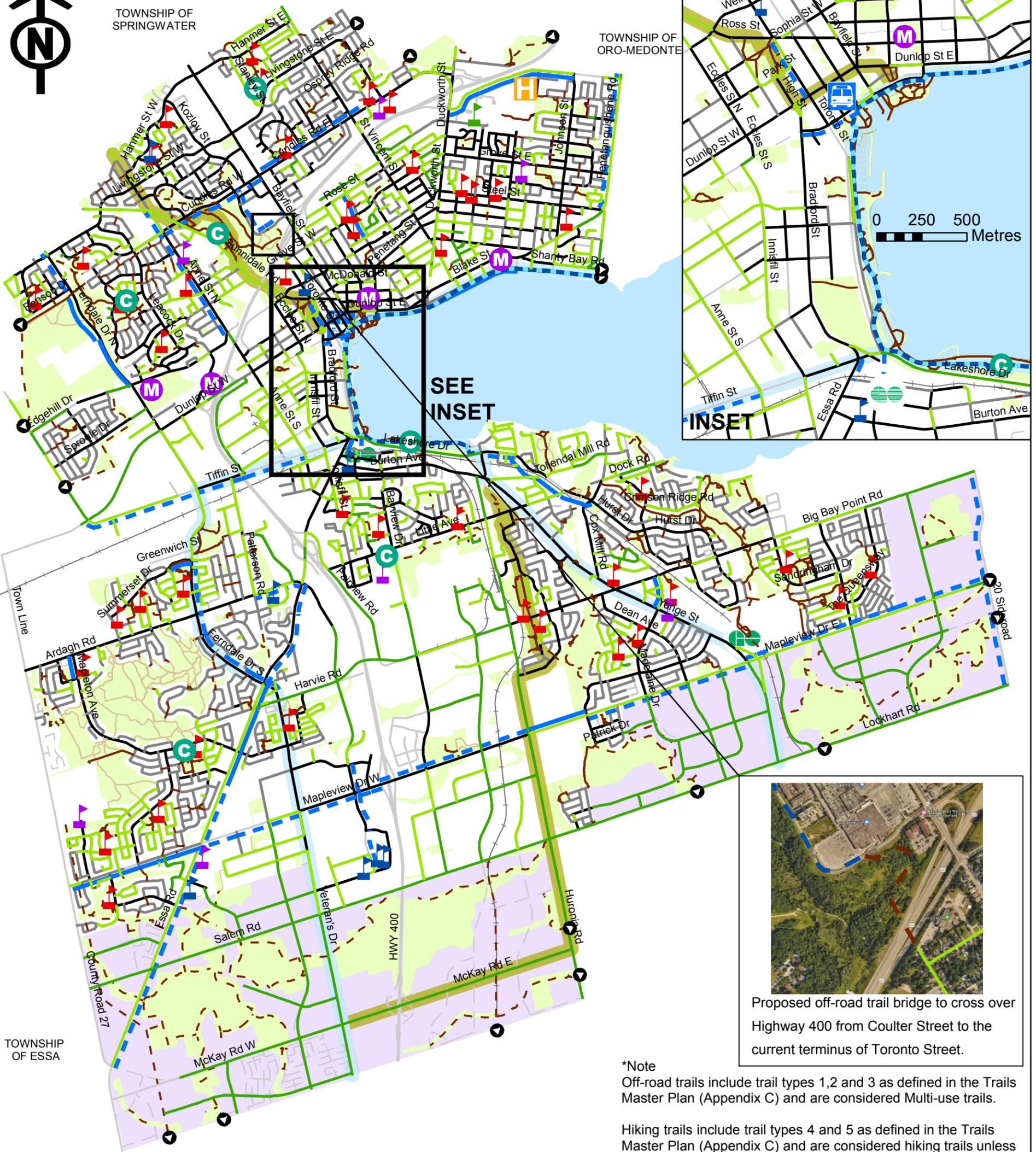


TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE

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Metres



Proposed off-road trail bridge to cross over Highway 400 from Coulter Street to the current terminus of Toronto Street.

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

Hiking trails include trail types 4 and 5 as defined in the Trails Master Plan (Appendix C) and are considered hiking trails unless otherwise noted as a mountain bike trail.

Existing Facilities

- Waterfront Multi-use Trail
- In-Boulevard Pathway
- Off-road Trail
- Hiking Trail

Sidewalk Network

- Sidewalks on both sides
- Sidewalks on one side

Proposed Facilities

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

Trail Systems

- Province-Wide Cycling Network
- The Great Trail

Transportation Features

- GO Station
- Barrie Bus Terminal

Other Features

- Secondary Plan Area
- Park / Open Space
- Connection to Surrounding Municipality

Points of Interest

- Royal Victoria Hospital
- Municipal Facility
- Community Centre
- Elementary School
- High School
- Private School
- College

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



ES. 6 Summary of Recommendations

The AT Strategy includes a set of recommendations which form the foundation for the City's next steps. These recommendations are action statements to guide supportive planning, design, implementation and operations of active transportation in Barrie. The following is a summary of the recommendations contained in the AT Strategy.

Recommendations

1	Adopt the proposed active transportation network illustrated on Maps 4a and 4b to guide future active transportation facility design and implementation. The network maps should be incorporated as a Schedule in the City's Official Plan when next updated.
2	The proposed active transportation network must be flexible enough to provide for changes in routing and/or facility types based on new information, Council policy and data as it becomes available. There may be opportunities for additional or alternate connections to be made in the future. These connections should be considered and the mapping and database should be updated if a change is warranted.
3	Give consideration to implementing separated facilities such as cycle tracks or in-boulevard pathways when future planned roads are constructed.
4	Reference the design guidelines / standards identified in section 2.4 when moving forward with the planning, design and implementation of active transportation infrastructure
5	Integrate active transportation routes and transit service into the planning, designing and implementation of the road network as the City's secondary plan areas are developed in the future.
6	Prioritize the implementation of a sidewalk in locations where there are no sidewalks at an existing bus stop.
7	Integrate design features at intersections and other conflict points that help to increase a user's sense of comfort and safety and to encourage increased active transportation usage.
8	Reference the design guidelines / standards identified in section 2.4 including the forthcoming update to OTM Book 18 when planning and designing roundabouts.
9	Provide and strategically locate end-of-trip facilities such as rest areas, washrooms bike lockers etc. when planning, designing and implementing new active transportation routes. In addition, the City should encourage shower facilities in new commercial developments.
10	Consider developing a bike parking strategy to identify strategic locations throughout Barrie to install bike parking and encourage increased ridership and active transportation usage.
11	Develop a branded signage and wayfinding strategy for on and off-road active transportation routes throughout Barrie.
12	Adopt the proposed phasing plan identified in Maps 5a and 5b and Maps 6a and 6b as a guide for staff / decision makers when moving forward to implement the active transportation network.

Recommendations

13	Undertake corridor studies and Municipal Class Environmental Assessment (EA) Schedule C studies on roads that would require any increase in the right-of-way width, to determine the feasibility of the proposed improvement and the preferred design treatment(s).
14	Consider undertaking a two-phase Corridor Planning and Municipal Class EA Study for Bayfield Street to assess the future land-use planning and transportation context including the streetscape, density, land-use designations and built-form goals.
15	Refer to Figure 34 to inform the implementation of urban shoulders in the interim, until such time a more formal and designated cycling facility can be implemented.
16	Review and utilize the proposed active transportation priorities identified in Table 13 and Table 14 (also illustrated on Figure 35) on an annual basis to identify of annual projects which can be implemented as part of large-scale infrastructure projects or should additional budget arise as part of annual Council budgeting processes.
17	Use the cost spreadsheet in Technical Appendix B3 as a reference to track future implementation, budgeting and costing of the proposed active transportation network.
18	Use the preliminary costing to inform future budgeting decisions on an annual basis. As needed, the costing should be updated to reflect more accurate estimates based on inflation and other external factors.
19	Report back to Council on an annual basis to provide an update on the implementation of new infrastructure and to provide Council with an outlook for anticipated projects to be completed in the following year.
20	Review the proposed AT initiatives outlined in Table 18 and develop an annual action plan to fund specific initiatives, identify staff who will champion the implementation of various initiatives or determine if additional staff are needed to undertake the proposed initiatives.
21	Allocate \$50,000 per year as part of the annual budgeting process to undertake up to five initiatives identified in Table 18 on a yearly basis.
22	Review and consider utilizing the five-step implementation process when moving forward with implementation of the AT Strategy. The details of the process and each step are outlined in OTM Book 18 and should be reviewed and communicated to other City staff.
23	Coordinate between City departments the implementation of the AT Strategy. A point person from each department should be identified to track progress and next steps as required.
24	Review and update the proposed list of partners identified in Table 20 as opportunities arise. City staff should continue to seek opportunities to partner with external agencies and other organizations.
25	Review the policy recommendations identified in section 3.4.4 and where appropriate integrate into the City's existing policies when they are next updated.
26	Update City policies every five to ten years consistent with the Planning Act, to ensure they are reflective of current trends and best practices.

Recommendations

27	Pull together the elements of City policies that speak to complete streets to form a complete streets policy similar to what other municipalities in Ontario have / are currently undertaking.
28	Maintain and update the network management tools developed as part the AT Strategy on a regular basis and use the tools to assist in the implementation and management of active transportation infrastructure.
29	Use the information contained in the AT Strategy including the considerations identified in Table 21 to determine a set of key performance measures which could be assessed on an annual basis to determine the success of implementing the recommendations contained in the strategy.
30	Review and adopt the appropriate risk management and liability prevention strategies into day-to-day decision making related to active transportation planning, design and maintenance.
31	Review and revise their existing maintenance policy to ensure current practices are consistent with the Province's updated Minimum Maintenance Standards (O. Reg 239/02). If City staff select to use a maintenance policy different than the MMS, the City should be consistent with the application of their maintenance policy.
32	Revisit annual budgets to ensure the amount allocated for operations is sufficient as the active transportation network is implemented.
33	Consider enhancing the level of service for winter maintenance on roads / routes identified in Figure 37 to form a winter maintained active transportation system.
34	Continue to explore external funding sources and partnerships to help fund implementation of the AT Strategy.

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ACKNOWLEDGMENTS

We would like to thank City staff, members of the public and stakeholders including Barrie's Active Transportation Working Group (ATWG), who contributed to the development of the City of Barrie Active Transportation Strategy, including those who participated in the public open house and all others who provided written or verbal input to the study team.

On behalf of the study team and all those who contributed to this study, it is our hope that the City of Barrie Active Transportation Strategy, an integral component of Barrie's new Transportation Master Plan, will provide the City and its partners with the tools and guidance necessary to improve conditions for active transportation.



1. STRATEGY CONTEXT

Active transportation is a key indicator of an accessible and multi-modal transportation system. Providing options to make walking, cycling and other forms of human-powered transportation more viable and appealing is a critical component when undertaking a “complete streets” approach to planning, designing and implementing an integrated transportation system. The Active Transportation (AT) Strategy is meant to build upon the previous Multi-Modal Active Transportation Master Plan (MMATMP) and past work completed by the City and its partners. It is intended to help guide future decision-making and prioritization to support the on-going development of active transportation infrastructure and programming as part of Barrie’s new Transportation Master Plan.

The AT Strategy is intended to compliment the Trails Master Plan (Technical Appendix C of the TMP) which provides a more detailed analysis and set of recommendations for off-road multi-use facilities. Collectively, the AT Strategy and Trails Master Plan will provide a set of tools, strategies and recommendations to enhance opportunities for people of all ages and abilities to engage in active forms of travel and recreation.

What is contained in Chapter 1?

- | | |
|------------|--|
| 1.1 | The definition of active transportation and anticipated user groups |
| 1.2 | An overview of why the Active Transportation Strategy is being updated |
| 1.3 | The socio-demographic profile and trends in Barrie |
| 1.4 | A summary of input gathered from the engagement activities undertaken over the course of the study |
| 1.5 | An overview of the study process, vision and objectives |



Barrie Rail Trail in Winter

Source: <https://www.flickr.com/photos/retiredinwasaga/33014318102/in/photolist-Sin1z5-8ANENA/>

1.1 What is Active Transportation?

Active transportation refers to any form of human-powered transportation including walking, cycling, rollerblading or skateboarding (Transport Canada, 2011). Active transportation is part of everyone's daily activities as most trips typically start with a walk to and from a secondary transportation mode such as biking, taking transit or driving. When planned and designed as part of transportation infrastructure and the built-form, active transportation can be used by people of all ages and abilities for a variety of purposes and trips.

For the purposes of updating the City's Active Transportation Strategy, pedestrians and cyclists are assumed to be the primary user groups as shown in **Figure 1**. The strategy focuses on accommodating these two user groups but also takes into consideration the needs of other non-motorized forms of travel to create an accessible and multi-modal transportation system for Barrie.

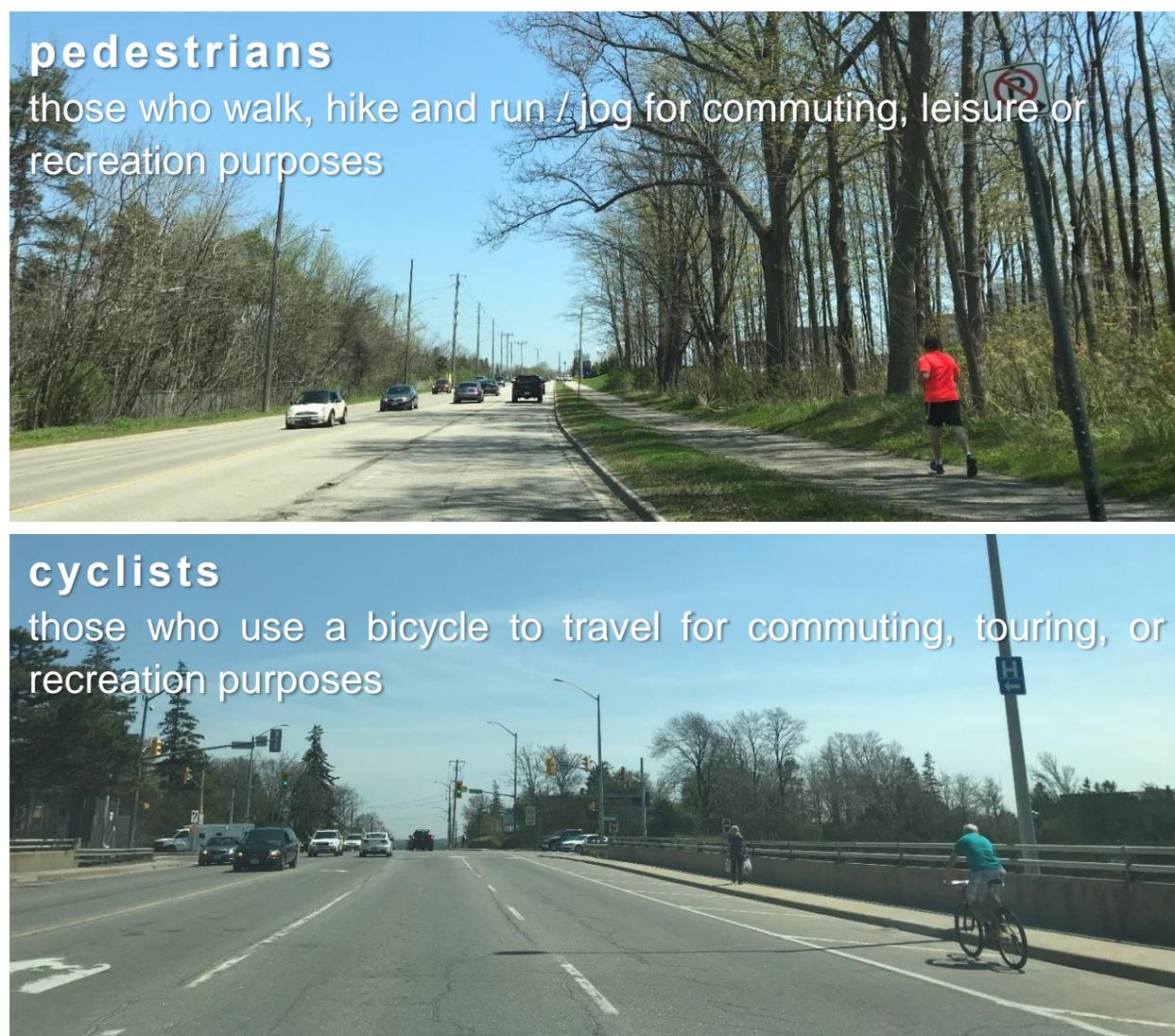


Figure 1 - AT Strategy Primary User Groups
Source: WSP, 2018

Designing for active transportation users is not a one-size-fits-all approach. Each user has a unique set of preferences, characteristics and interests which influence how they wish to experience their trip and perceive their overall level of comfort and sense of safety. **Figure 2** outlines some of the common different user considerations which can influence how people choose to engage in active forms of travel and recreation.



location

the place where a person lives or spends a significant amount of time



values

aspects that a person finds to be important in their daily activities



demographics

the age of a person



experience

a person's experience using similar modes



trip type

the type of trip that is being made e.g. to work or school, for leisure etc.



education

a person's knowledge of the rules of the road for all road users

Figure 2 - AT User Considerations

The way in which people use active modes of transportation can significantly vary depending on the mode that they are using. There are unique considerations for pedestrians and cyclists which have a strong bearing on how routes and facilities are selected and how recommendations are designed. Understanding these factors is important when not only planning and designing an active transportation network, but also when establishing an implementation strategy and recommending priorities. The development of the strategy considered these influences when identifying active transportation supportive recommendations and strategies.



Winter trail use in Barrie

Source: City of Barrie, 2016

1.2 Why Update the AT Strategy?

The 2014 Strategy

The City's first Active Transportation Strategy was developed in 2014 as part of the Multi-Modal Active Transportation Master Plan (MMATMP). The 2014 strategy was completed in coordination with other land use and planning studies at that time including secondary plans for the City's expanded boundary and intensification corridor studies. The objective of the 2014 strategy was to identify an integrated City-wide active transportation network consisting of sidewalks, on-road cycling facilities and off-road multi-use facilities. The 2014 strategy also identified design standards, policies and mode share targets to help guide future decision-making and implementation of the recommended active transportation network.

The 2019 Strategy

Since the adoption of the 2014 MMATMP and the AT Strategy, several kilometres of new active transportation facilities have been implemented throughout the City. In addition, new policies and plans have been developed by all levels of government that influence how active transportation facilities are planned, design and maintained. The updated AT Strategy is not intended to "reinvent the wheel" – it is meant to build upon the City's past successes and on-going work to shape the desired outcomes and prioritization of infrastructure and programming to support active transportation in Barrie over the next 20 years. The AT Strategy includes recommendations for infrastructure improvements, supportive programming, and implementation to help the City achieve a 12% active transportation mode share target by 2041.

Why is the AT Strategy being updated?

The AT Strategy is being updated to reflect best practices, current design guidelines, anticipated growth and future transportation needs. Based on the Province's Growth Plan for the Greater Golden Horseshoe (2017), the City of Barrie's population and employment rates are expected to increase by 75% by 2041. The projected population and employment growth is planned to be served by enhanced regional and local transit services within Barrie, including the enhancement of existing GO Transit rail service to a two-way all-day operation along the entire length of the Barrie Line from Toronto Union Station to Allandale Waterfront GO Station. There are also plans to relocate the Downtown Barrie bus terminal to the Allandale Waterfront GO Station. In addition, the City's transportation network is anticipated to grow by approximately 500 lane kilometres by 2031 and include a new interchange at Highway 400 and McKay Road, new crossings of Highway 400 at Lockhart Road / Salem Road and Harvie Road / Big Bay Road as well as other planned improvements for pedestrians and cyclists at existing Highway 400 crossings and interchanges.

The guidance and information presented in the AT Strategy provides City staff and its partners with the tools and strategies to inform decision making and implementation of active transportation infrastructure and programming for the next 20 years. The strategy is meant to build upon and address the City's anticipated growth and planned infrastructure projects. The strategy achieves this by outlining clear recommendations to support the implementation of active transportation routes, facilities, programs and initiatives that can help to achieve the City's vision for an integrated, accessible and multi-modal transportation system, and a 12% active transportation mode share target by 2041. A 12% mode share target for active transportation was identified in the 2014 MMATMP and is still considered to be an appropriate and practical target that can be achieved by 2041 with the proposed active transportation network, supportive outreach initiatives and policy considerations that are identified in the updated AT Strategy.

1.2.1 Benefits

Since the development of the 2014 MMATMP, research continues to indicate that investment in active transportation infrastructure and programming can have benefits within the community and at an individual level. Demonstrating the benefits of active transportation can help to shape the business case for investments and on-going implementation of the AT Strategy. The following is a sample of the potential benefits that can be realized by investing in active transportation infrastructure and programming.



health

- ↑ Physical and active lifestyles
- ↑ Cardiovascular health and mental health
- ↓ Health care costs



tourism

- ↑ Tourism and popularity of cycling and hiking
- ↑ Support for local and regional tourism



social

- ↓ Cost of travel options
- ↑ Mobility and equity for vulnerable and low-income populations
- ↑ Independence, mobility and health for aging populations



environment

- ↓ Greenhouse gases and overall air pollution
- ↓ Water pollution from pollutants related to driving
- ↑ Protection of green space and natural environments



safety

- ↑ Sense of safety and livability among residents
- ↑ Motorist awareness of cyclists on road
- ↑ Sense of safety if there are other pedestrians and cyclists around



economic

- ↓ Household money being spent on car related payments
- ↓ Infrastructure costs for municipal governments
- ↑ Local investment in business and community development

1.2.2 Policies

There have been a number of policies and planning documents that have been developed and adopted by all levels of government since the completion of the 2014 MMATMP. These policies have an impact on the planning, design, implementation and operations of active transportation infrastructure and programming. These were reviewed to develop a better understanding of the existing support for active transportation and to inform the development of new recommendations that address policy direction from different levels of government.

Figure 3 provides an overview of new policies that have been adopted since the completion of the 2014 MMATMP and reviewed by the study team as part of this update. A detailed summary of all policies and plans is provided in **Technical Appendix B1** of the AT Strategy.



federal

- ▶ Transport Canada, Sustainable Development Strategy (2016)
- ▶ Pan-Canadian Framework on Clean Growth and Climate Change (2016)



provincial

- ▶ Provincial Policy Statement (2014)
- ▶ Growth Plan for the Greater Golden Horseshoe (2017)
- ▶ Ontario Cycling Strategy #CycleON Action Plan 2.0 (2018)
- ▶ Ontario Trails Act (2016)
- ▶ Ontario Environment Plan (2018)
- ▶ Ontario's Cycling Tourism Plan (2017)
- ▶ Ontario Regulation 293/02: Municipal Maintenance Standards for Municipal Highways (2018)
- ▶ Accessibility for Ontarians with Disabilities Act (2017)



city

- ▶ Official Plan (2018)
- ▶ Waterfront & Marina Strategic Plan (2015)
- ▶ Council Strategic Plan - Plan for a Better Barrie (2015)
- ▶ Urban Design Manual (2014)

Figure 3 - Overview of applicable policies and plans

1.2.3 What has been done since 2014

Since the completion of the 2014 MMATMP, the City has completed a number of roadway improvements including enhancements to active transportation infrastructure. It is important to establish an understanding of these improvements to help identify opportunities for new active transportation routes and facilities. The AT Strategy is meant to review and where appropriate, revise the network identified in the 2014 MMATMP to ensure that what is being recommended achieves the desired vision and objectives for active transportation in Barrie over the next 20 years.

Table 1 provides an overview of the road improvements that have occurred since the completion of the 2014 MMATMP. This table also includes photos to illustrate the roadway condition prior to and after reconstruction / improvements.

Table 1 - Overview of road and AT improvements undertaken since the 2014 MMATMP

Road Description and Improvements Undertaken	Roadway condition before reconstruction	Roadway condition after reconstruction
<p>Ferndale Drive Dunlop Street to Tiffin Street</p> <ul style="list-style-type: none"> ▶ Widened to four lanes ▶ Added sidewalks ▶ Implemented painted markings for cyclists (sharrows) 		
<p>Lakeshore Drive Tiffin Street to Simcoe Street</p> <ul style="list-style-type: none"> ▶ New traffic signal at Victoria Street and at parking lot entrance ▶ Left-turn lanes added for parking lots ▶ New dedicated cycling path along the waterfront 		
<p>Cundles Road Livingston Street to J. C. Massie Way</p> <ul style="list-style-type: none"> ▶ Widened to five lanes ▶ Implemented bike lanes and exclusive left-turn lanes 		
<p>Duckworth Street J.C. Massie Way to Bell Farm Road</p> <ul style="list-style-type: none"> ▶ Widened to seven lanes ▶ Implemented buffered bicycle lanes and exclusive left-turn lanes 		

Road Description and Improvements Undertaken	Roadway condition before reconstruction	Roadway condition after reconstruction
<p>Essa Road Coughlin Road to Ferndale Drive</p> <ul style="list-style-type: none"> ▶ Widened to five lanes ▶ Implemented an in-boulevard pathway 		
<p>Hurst Drive Bay Lane to Big Bay Point Road</p> <ul style="list-style-type: none"> ▶ Road diet from 4 to 2 lanes and a continuous centre turn lane with bike lanes on both sides of the road 		
<p>Livingstone Street West Kozlov Street to Anne Street</p> <ul style="list-style-type: none"> ▶ Road diet from 4 to 2 lanes and a continuous centre turn lane with bike lanes on both sides of the road 		
<p>Cundles Road Anne Street to Leacock Drive</p> <ul style="list-style-type: none"> ▶ Road diet from 4 to 2 lanes and a continuous centre turn lane with bike lanes on both sides of the road 		
<p>Mapleview Drive Huron Road to Country Lane</p> <ul style="list-style-type: none"> ▶ Widening to five lanes ▶ Implemented an in-boulevard pathway on the north side of the road 		

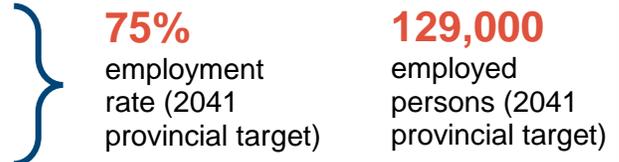
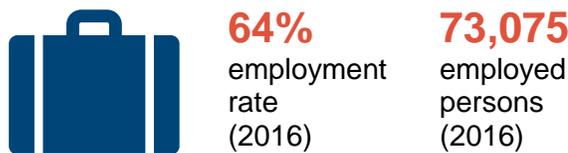
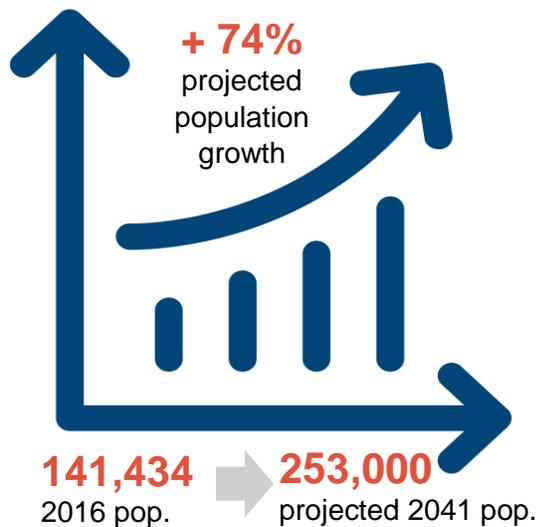
Source: Google© Streetview

1.3 Informing the AT Strategy

The following sections provide an overview of the current demographics, travel trends and the opinions of City residents, stakeholders and staff that were reviewed when developing the AT Strategy to ensure the recommendations and information contained in the document responds to the existing and future needs of Barrie.

1.3.1 City Profile

The City's existing and projected demographic data was reviewed to better inform the guiding principles and recommendations contained in the AT Strategy. The following graphics provide an overview of Barrie's socio-demographics and transportation habits using information collected from the 2016 Census Data, 2016 Transportation Tomorrow Survey (TTS) and the 2017 Growth Plan for the Greater Golden Horseshoe.



existing mode share of all trips over 24 hours from TTS:



1.3.2 Integrating the input received

Consultation and engagement is a critical component of all master plans. A comprehensive consultation and engagement program was designed, developed and implemented to inform key stages of the AT Strategy study process. Three audience groups were engaged throughout the study process using a number of different tools and tactics. An overview of the audience groups is provided below. Additional details on the engagement activities and input received is provided in the TMP report.

who was engaged?

public

The people who live, work and play within Barrie. The recommendations contained in the AT Strategy can have a direct impact on how the residents go about their daily activities.

stakeholders

Local interest groups, technical agencies and clubs who have a vested interest in the outcomes of the AT Strategy and may have a role in its implementation.

city staff

The people who will be responsible for the implementation and decision making around the AT Strategy and have a detailed understanding of the unique transportation aspects of the City.

how were they engaged?

- ▶ invited to the public open house
- ▶ updated on the City's website / social media platforms
- ▶ invited to the public open house
- ▶ updated on the City's website / social media platforms
- ▶ attended Active Transportation Working Group Meeting
- ▶ internal working meetings
- ▶ engaged with members of the public and stakeholder at the public open house

Throughout the study process, a number of key themes emerged which helped inform and shape the recommendations identified in the AT Strategy. The key themes of input are summarized below.



Connectivity

Providing continuous access to key destinations including but not limited to shops, employment areas, neighbourhoods and transit stops.



End-of-Trip Facilities

Access to facilities and amenities such as refuse and recycling containers, bike parking, wayfinding signage, and benches and rest areas.



Safety

Addressing areas of concern where there are real and perceived safety issues (such as poor lighting, high speed roadways, etc.) which can be addressed by improving facilities, crossings, lighting facilities, reducing speeds, and intersection treatments.

1.4 Developing the Plan

The City of Barrie’s AT Strategy was developed collaboratively with City staff, stakeholders and members of the public. The AT Strategy is intended to be consistent with key planning and engineering processes and builds upon the lessons learned and best practices from the 2014 MMATMP. The following sections provide an overview of the overall process that was used to develop the AT Strategy and the City’s guiding principles for active transportation.

1.4.1 Study Process

The AT Strategy was developed using a three-phased approach between Summer 2017 and Winter 2019. Each phase was informed by input collected during the course of the study to ensure that the recommendations and tools contained in the AT Strategy reflect the interests and needs of residents, stakeholders and City staff. **Figure 4** illustrates the process that was used to develop the AT Strategy.

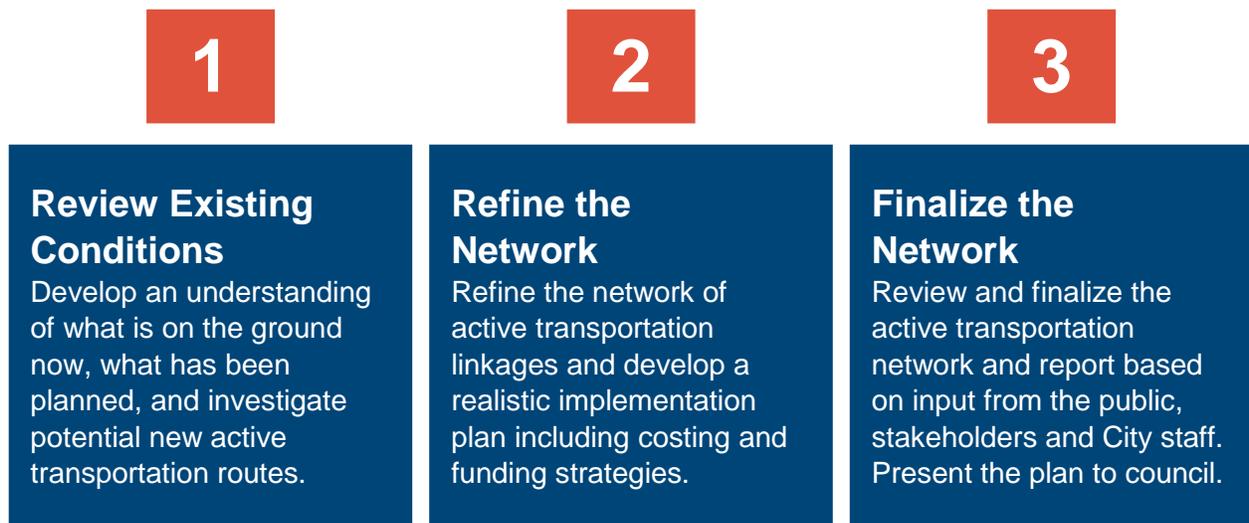


Figure 4 - City of Barrie AT Strategy Development Process

1.4.2 Planning Framework: Municipal Class EA Process

To complete the AT Strategy, Phases 1 and 2 of the Municipal Class Environmental Assessment (MCEA) Master Plan process were completed. The MCEA process is typically followed for projects that could have environmental impacts to ensure that all potential impacts are considered and any negative impacts are addressed and mitigated. **Figure 5** illustrates the MCEA requirements for a master plan to be completed consistent with Phases 1 and 2.

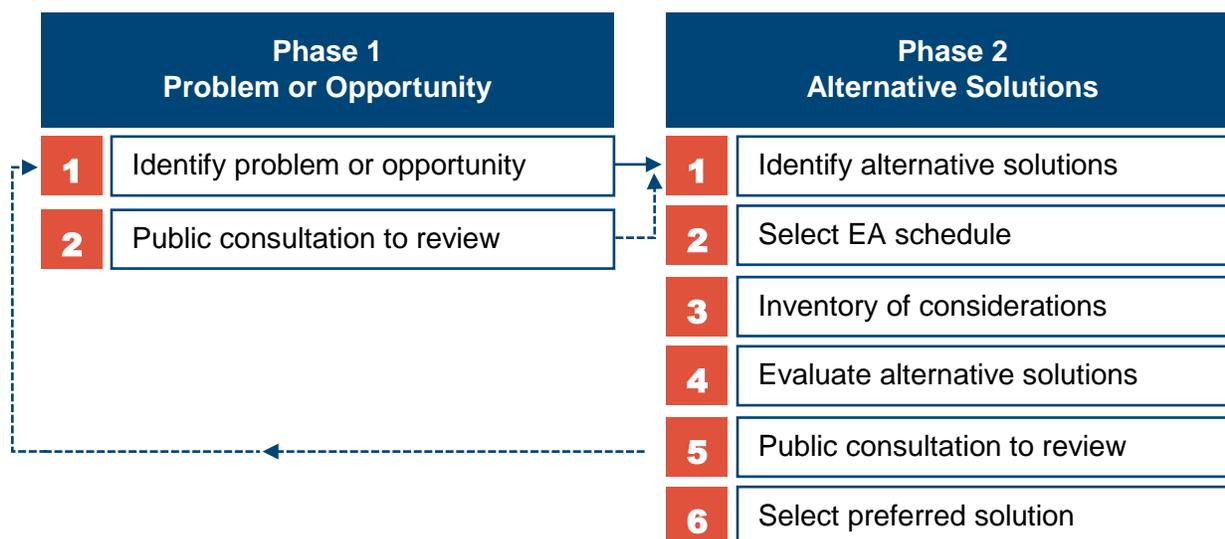


Figure 5 - Municipal Class Environmental Assessment Process Overview

Source: Municipal Class Environmental Assessment, 2015



City staff at the ground-breaking for the Harvie Road / Highway 400 overpass construction

Source: <https://barrie.ctvnews.ca/construction-to-start-on-new-hwy-400-overpass-in-barrie-1.3952199>

1.4.3 Vision and Key Principles

A key component of updating the AT Strategy included the development of a long-term vision statement. The AT vision is supported by principles that reflect the City's on-going commitment and future priorities to improve walking, cycling and multi-modal transportation conditions and builds upon the opportunity statement contained in the 2014 MMATMP.

active transportation vision:

The City of Barrie offers a continuous, well-connected and safe active transportation network for residents and visitors that supports recreational and commuter active transportation opportunities, enhances connectivity to key destinations and increases mobility for users of all ages and abilities.

To support the City's active transportation vision, a set of guiding principles were established to shape the recommendations and tools contained in the strategy. The principles, like the vision, build upon the opportunity statement identified in the 2014 MMATMP.

active transportation guiding principles:

- 1 Offer residents and visitors direct active transportation opportunities to travel throughout the City and to connect to key destinations such as the Waterfront and The Great Trail.
- 2 Provide a transportation system that supports all modes of travel and users of all ages and abilities.
- 3 Establish a direct, connected and continuous network of different active transportation options that accommodates safe walking, cycling, hiking and other active modes of transportation.
- 4 Develop a balanced network of on and off-road facilities to offer comfortable, safe and secure facilities for all users.
- 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 destinations such as schools, transit stations, shops, etc.
- 7 Allocate an appropriate annual maintenance budget to maintain existing and new active transportation infrastructure, including on and off-road routes.
- 8 Establish a winter maintained network consisting of spine routes in order for walking and cycling to be viable modes of transportation year-round. For example, winter maintained routes can include on and off-road facilities to facilitate utilitarian trips such as commutes to school, work and transit hubs.
- 9 Identify a core network of spine routes that provides direct north-south and east-west connectivity for pedestrians, cyclists, mobility-assisted users and other users to increase the AT modal share in Barrie.
- 10 Encourage a cultural shift through education and promotion to increase walking and cycling activity in the City of Barrie.

1.4.4 Goals and Objectives

The vision statement should be supported by goals and objectives that guide the development of recommendations contained in the strategy. The goals identify specific outcomes that the AT Strategy is meant to achieve. The objectives are action oriented statements that describe how these goals can be achieved.

Table 2 presents the draft goals and objectives developed for the AT Strategy. These objectives are not mutually exclusive and are intended to support one or more of the AT Strategy goals.

Table 2 - AT Strategy Goals and Objectives

AT Strategy Objectives	AT Strategy Goals				
	Enhance AT options as a practical travel mode choice in Barrie	Improve efficiency and directness of existing and future routes	Integrate AT infrastructure and land use planning	Enhance current AT maintenance standards	Promote public health and safety
Design a continuous and connected AT network that includes facilities to accommodate a range of users and abilities	✓	✓			✓
Provide a well-connected AT network that connects to existing and future transit routes and stations to encourage multi-modal transportation and to support increased transit use	✓	✓			✓
Provide increased cycling and walking facilities around schools and key destinations to encourage more people to use AT for short trips and develop healthy transportation habits	✓	✓	✓		✓

AT Strategy Objectives	AT Strategy Goals				
	Enhance AT options as a practical travel mode choice in Barrie	Improve efficiency and directness of existing and future routes	Integrate AT infrastructure and land use planning	Enhance current AT maintenance standards	Promote public health and safety
Update maintenance standards and annual budgets for year-round maintenance of select spine routes to support walking and cycling as viable transportation modes		✓		✓	✓
Increase AT promotional, educational and outreach initiatives	✓				✓
Improve end-of-trip facilities such as bike parking, adequate lighting, water refill stations, etc.		✓	✓		✓
Provide a variety of AT facilities that are considered comfortable and safe to varying ages and abilities	✓				✓
Minimize environmental impacts from transportation sources by encouraging AT	✓		✓		✓
Integrate AT facilities into the planning of current and new developments and secondary plan areas	✓		✓		



City of Barrie existing signed bike route
Source: WSP, 2018

2. THE ACTIVE TRANSPORTATION NETWORK

A key component of the AT Strategy 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. The City of Barrie's recommended active transportation network is intended to help the City achieve a 12% active transportation mode share target by 2041.

An active transportation network is not a one size fits all approach; it should be designed and developed to provide mobility and recreational opportunities for people of all ages and abilities. The City's 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.

The following sections provide an overview of the steps used to identify the recommended active transportation network, the outcomes of each step and additional considerations to help inform the future planning and design of active transportation infrastructure in the City of Barrie.

It is important to note that the development of the AT Strategy and the recommended active transportation network was completed as part of a multi-modal study that looked at all travel modes. The AT Strategy was also completed in parallel with the Trails Master Plan (Technical Appendix C in the TMP). Additional details on the recommended off-road multi-use trails network are contained in the Trails Master Plan.

What is contained in Chapter 2?

2.1	A detailed overview of the process applied to identify the recommended active transportation network including a description of each step and the outcomes
2.2	An overview of the various facility types included in the recommended active transportation network
2.3	A summary of the anticipated user groups
2.4	An overview of potential design enhancements that can be applied to support the active transportation network

2.1 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 3**. The details and outcomes of each step are documented in the following sections. Details on step 6 (identify phasing and priorities) are presented in **Chapter 3**.

1	Review existing conditions	Map existing and previously planned routes to develop an understanding of 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	Investigate the candidate routes	Undertake field investigations and a geospatial analysis to understand factors that could inform the selection of potential new 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 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.

Table 3 - Barrie Active Transportation Network Development Process

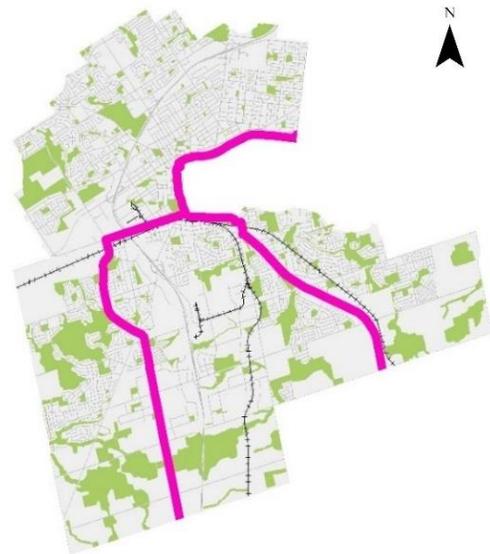
Step 1: Review and Map Existing and Previously Planned Routes

Information was collected from the City of Barrie and the County of Simcoe to develop a geographic information system (GIS) database of existing active transportation conditions including routes and facilities that have been identified in previous planning documents such as the 2014 MMATMP. The GIS database was updated on an on-going basis as part of the iterative network development process to incorporate new information and input received from members of the public and City staff over the course of the study that led to this AT network strategy. The database is intended to be used beyond the lifespan of the study as a tool for City staff to guide and monitor implementation of active transportation infrastructure.

The intent of Barrie's active transportation network is to build upon existing active transportation facilities, previously planned routes and regionally significant trail / cycling systems within the City. The following graphics illustrate key features that were reviewed and mapped as part of step 1 and informed the AT network development process.

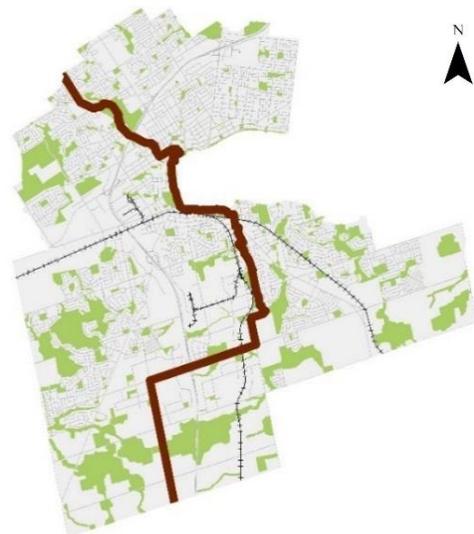
MTO Province-wide Cycling Network

The MTO Province-wide Cycling Network includes existing and proposed routes within Barrie and to surrounding municipalities. The current alignment of the MTO Province-wide Cycling Network uses major arterial roads, collector roads and other regional trail systems such as the Great Trail (formerly the Trans Canada Trail). The cycling network provides opportunities for users of varying ages and abilities to engage in active transportation for different trip purposes including commuting, recreational or touring.



The Great Trail

The Great Trail (formerly the Trans Canada Trail) is a 24,000 kilometre trail system that stretches across Canada. Within the City of Barrie, the Great Trail is located along on-road and off-road segments accommodating users of varying abilities and trip purposes. The Great Trail provides connections to key destinations within the City of Barrie including the downtown, Allandale Waterfront GO Station, waterfront parks, commercial areas and residential areas.



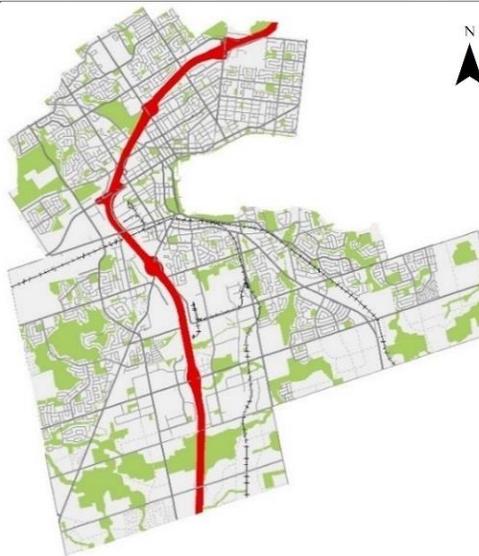
Barrie's Waterfront Trails

The City of Barrie's waterfront, specifically Centennial Park / Beach, Allandale Station Park, Heritage Park and Kempenfelt Park, provides a number of leisure and recreation opportunities for residents and visitors. The City's waterfront includes several cycling routes and multi-use trails to accommodate users of varying ranges, abilities and trip purposes.



Highway 400

Highway 400 serves as the primary route from Toronto to southern Georgian Bay and Muskoka (Ontario's cottage country). The highway bisects Barrie from north to south and can impact a user's connectivity. There are a number of planned improvements along Highway 400 in Barrie including new crossings, new interchanges and upgrades to existing crossings to improve pedestrian and cycling connectivity through these locations.



Secondary Plan Areas

The secondary plan areas including Hewitt's and Salem Secondary Plan Areas are located along the southern edge of the City's former urban boundary and cover an area of approximately 2,300 hectares. The secondary plan areas are planned for significant re-development and urbanization in the future and represent an opportunity to integrate active transportation into the planning, design and construction of land-use and transportation infrastructure.



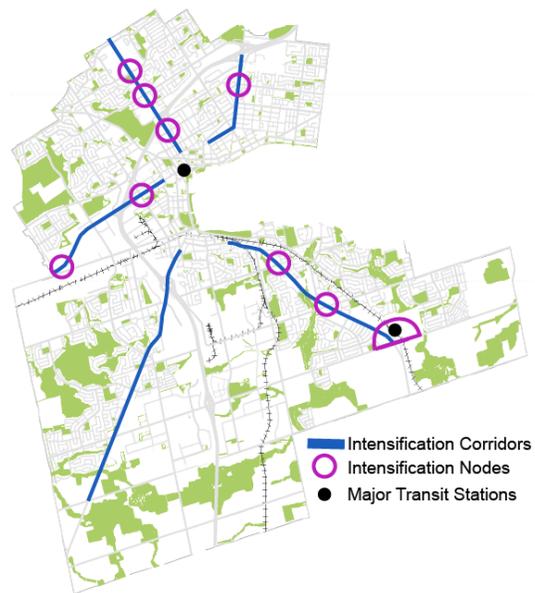
Community Destinations

Direct and continuous connections to key community destinations such as schools, transit hubs, commercial areas, the downtown area and Barrie's waterfront can help increase the desirability for users to engage in active travel for daily trips and active recreation for a variety of purposes such as leisure, health and fitness.



Intensification Nodes and Corridors

The City of Barrie's Official Plan (Schedule I) identifies areas where intensification and growth is expected to occur including major transit stations, primary and secondary corridors, and primary and secondary nodes. Intensification corridors include Yonge Street, Essa Road, Dunlop Street, Bayfield Street, Duckworth Street and Codrington Street. Implementing active transportation infrastructure in areas that are identified for intensification can help provide accessible and equitable options for people of all ages and abilities to get around.



Map 1a illustrates the existing and previously planned active transportation routes in Barrie from the 2014 MMATMP. **Map 1b** illustrates the existing and previously planned off-road trail linkages and pedestrian facilities in Barrie. A summary of the existing and previously proposed active transportation facility types is presented in **Table 4**.

Table 4 - Existing and Previously Proposed Active Transportation Facilities

	Existing	Previously Proposed
Off-Road Trails ¹	99.3 km	N/A ²
In-Boulevard Pathways	16.3 km	2 km
Buffered Bike Lanes	2.3 km	92 km
Bike Lanes	16.8 km	118 km
Signed Routes	10.8 km	46 km
Sidewalks	827.9 km	314.9 km
Total	973.3 km	572.9 km

Note:

1. Off-Road Trails include: Types 1-5. Refer to Trails Master Plan (Appendix C) for additional details on they 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.



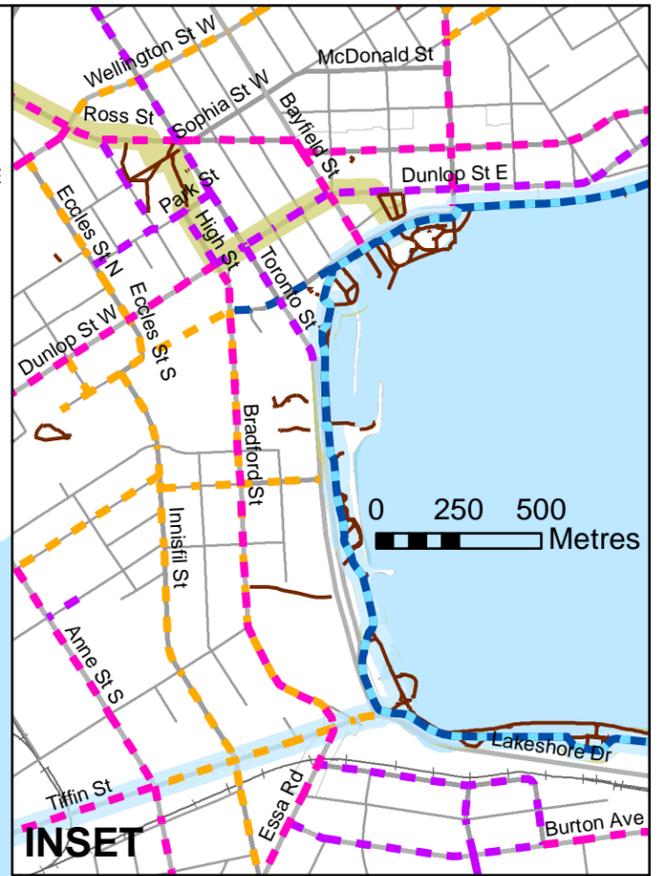
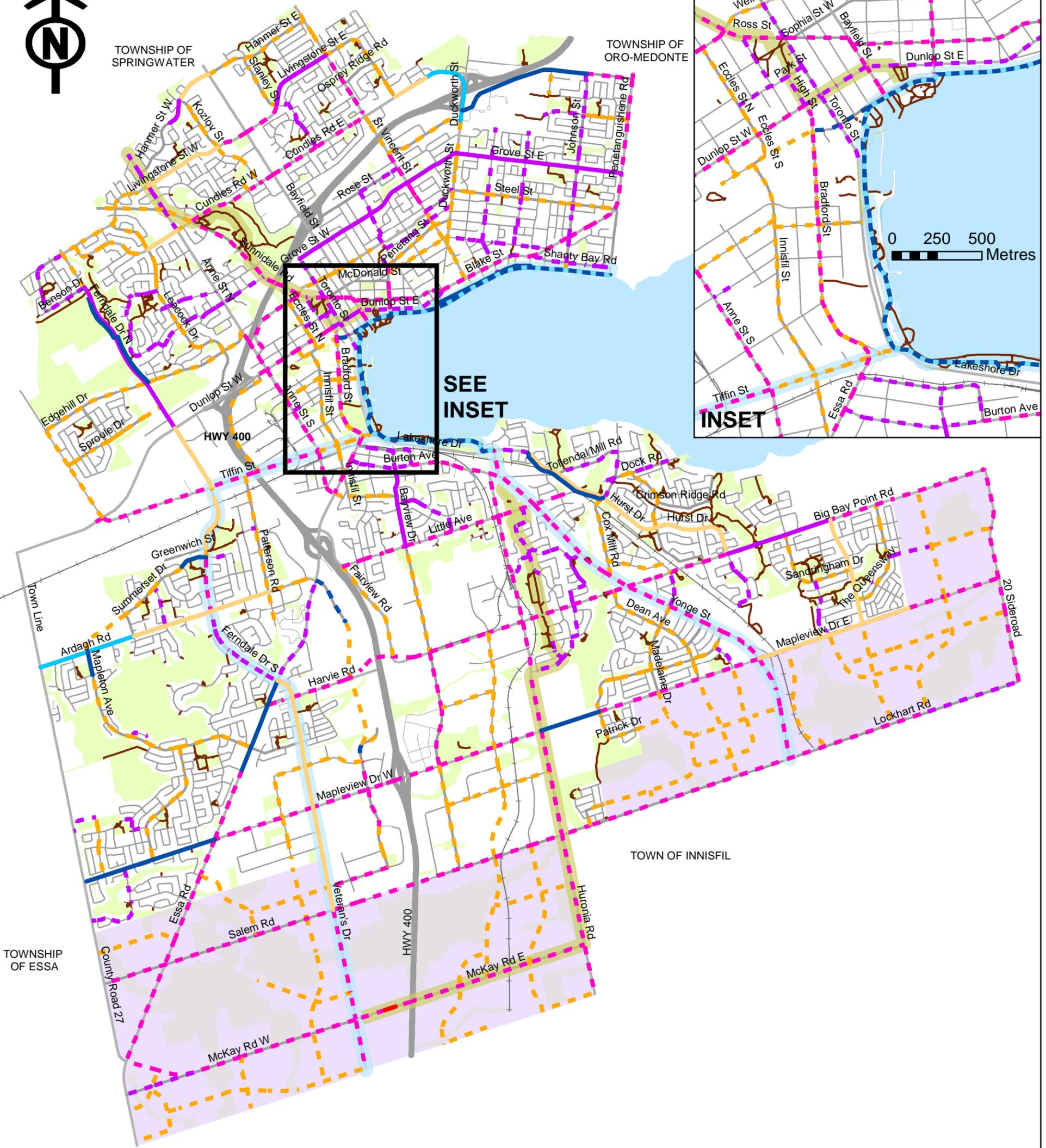
City of Barrie Waterfront Trail

Source: WSP, 2018



TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE



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



Map 1a
 Existing and Previously Proposed Cycling and Multi-use Trail Network
 City of Barrie Transportation Master Plan





TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE

SEE
INSET

INSET

0 250 500
Metres

Pedestrian Network

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

Sidewalk Network

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

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

Map 1b
Existing and Previously Proposed Sidewalk and Multi-use Pathways Network
City of Barrie Transportation Master Plan



Step 2: Identify Criteria and Potential New Connections

Route selection criteria support guiding principles that are meant to reflect the City's vision, goals and objectives for active transportation. These criteria were developed and reviewed by City staff and the public and used over the course of the network development process to select, review and ultimately confirm routes to form part of Barrie's active transportation network.

Table 5 outlines the route selection criteria used to assess each route. The criteria are based on best practices and reflect the planning and design principles identified in plans of a similar scope and scale and those outlined in widely accepted planning and engineering guidelines, including Ontario Traffic Manual Book 18: Cycling Facilities.

Table 5 - Active Transportation Route Selection Criteria

Connected/Linked	The active transportation network should provide residents and visitors with direct connections to key destinations such as employment lands, commercial areas, schools, public transportation, as well as natural, historic and cultural destinations.
Comfort and Safety	The active transportation network should reduce risks to users by providing various facilities that are considered comfortable to users of different ages and abilities.
Environmentally Sensitive	Implementation of the proposed active transportation network should have minimal impact of the natural features and environmental context of the surrounding area.
Diverse	The active transportation network should appeal to a variety of user abilities and interests by providing a diverse and balanced network of on and off-road active transportation facilities.
Attractive and Interesting	The active transportation network should take advantage of scenic areas, views, and vistas. Routes should provide users with the opportunity to experience the cultural and natural heritage found throughout the City.
Integrated	Active transportation should be integrated with the planning and construction of the transportation network and be easy to identify and navigate by users.
Cost Effective	Proposed active transportation routes should take into consideration future-planned construction, maintenance and upgrading of infrastructure. Consideration should also be given to implementation timelines to ensure timely and cost-efficient delivery of on and off-road routes.
Equitable	The active transportation network should provide viable travel options to all residents, and routes should be located in dense urban areas to accommodate users that may not have access to other forms of transportation.

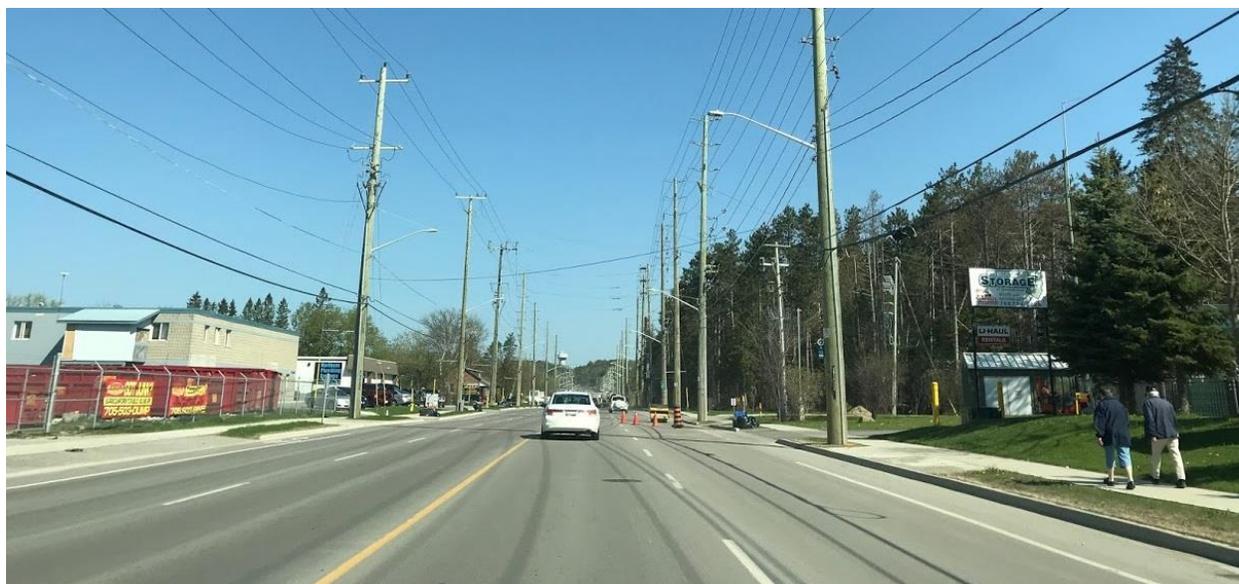
The route selection criteria were used to identify a set of initial candidate routes which are potential new connections that could form part of the City's active transportation network. The candidate routes were intended to build upon existing and previously planned routes by:

- ▶ Completing gaps between existing routes;
- ▶ Completing gaps between previously proposed routes;
- ▶ Connecting to key destinations in the City;
- ▶ Providing direct connections through a highway crossing / interchange;
- ▶ Connecting to the City's waterfront trails and parks;
- ▶ Enhancing connectivity in already established areas;
- ▶ Connecting to future development areas including the City's secondary plan areas;
- ▶ Enhancing connectivity to transit hubs including the Allandale Waterfront GO and Barrie GO stations;
- ▶ Providing connections to surrounding municipalities; and
- ▶ Providing connections to regionally significant trail systems.

To supplement these criteria, the study team applied the following factors to identify new sidewalk connections for the active transportation network:

- ▶ On future proposed roads, specifically roads proposed in the secondary plan areas, identify a sidewalk to be built on both sides of the road; and
- ▶ On existing roads where there is an active transportation route (existing or proposed), there should be a sidewalk on one side of the road at minimum.

The results of applying the route selection criteria is the set of candidate routes presented on **Maps 2a** and **2b**. These candidate routes were further refined through field investigations, a geo-spatial analysis, and City staff input to confirm the preferred active transportation network.



Ferndale Drive (looking north), north of Tiffin Street
Source: WSP, 2018



TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE

SEE
INSET

INSET

TOWN OF INNISFIL

TOWNSHIP OF ESSA

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

Candidate Routes

- Proposed Route

Trail Systems

- Province-Wide Cycling Network
- The Great Trail

Points of Interest

- Royal Victoria Hospital
- Municipal Facility
- Community Centre
- Elementary School
- High School
- Private School
- College

Transportation Features

- GO Station
- Barrie Bus Terminal

Other Features

- Secondary Plan Area
- Park / Open Space

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

Map 2a
Draft Existing, Previously Proposed and Candidate Cycling and Multi-use Trail Network
City of Barrie Transportation Master Plan





TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE



SEE INSET

INSET

Existing Facilities

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

Sidewalk Network

- Sidewalks on both sides
- Sidewalks on one side

Previously Proposed Facilities

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

Candidate Routes

- Proposed Route

Trail Systems

- Province-Wide Cycling Network
- The Great Trail

Points of Interest

- Royal Victoria Hospital
- Municipal Facility
- Community Centre
- Elementary School
- High School
- Private School
- College

Transportation Features

- GO Station
- Barrie Bus Terminal

Other Features

- Secondary Plan Area
- Park / Open Space

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



Map 2b
Draft Existing, Previously Proposed and Sidewalks and Multi-use Trail Network
City of Barrie Transportation Master Plan



Step 3: Refining the Candidate Route Network

Once the candidate active transportation routes were identified (refer to step 2), an iterative process was undertaken to investigate the potential network to better understand the existing active transportation context as well as key areas that could significantly benefit from the implementation of active transportation infrastructure.

Three days of field investigations were undertaken to develop a better understanding of existing conditions, previously planned routes and potential new candidate routes. Photos and information were documented for each route and location investigated, including observed traffic speed and traffic volume, roadway width, on-street parking and surrounding land uses. **Figure 6** provides an example of the waypoints and photos illustrated in Google Earth that were collected during field investigations. Field investigations were supplemented by a desktop review allowing the study team to revisit specific routes throughout the study process.

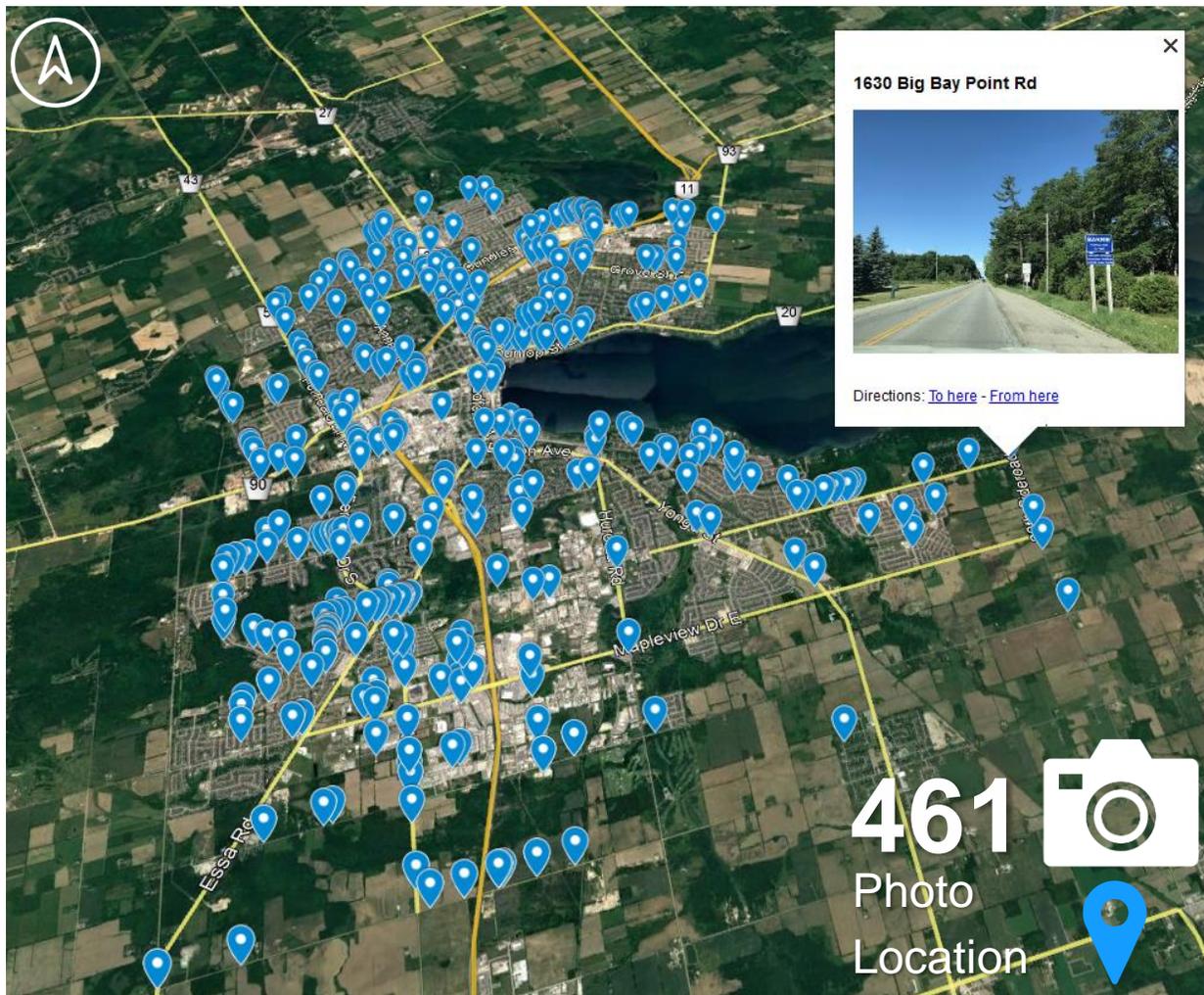


Figure 6 - Field Investigation Waypoints and Photos

To supplement the field investigations, a GIS analysis was conducted using data collected from the City of Barrie, 2016 Statistics Canada and Strava Heatmap. An analysis of demographic information, route density and current user behavior was conducted using specific indicators such as population density, mode share, access to transit and frequently cycled routes.

The findings were used to inform the network development process and to highlight areas where accessibility and connectivity could be enhanced with pedestrian and cycling infrastructure. The findings were also used to support the application of the route selection criteria and identify areas for new potential routes. The outcomes of this mapping are presented in **Figures 7 to 11**.

Population Density

A key goal of developing an active transportation network is to support origin destination trips – connecting where people live to where they frequently visit such as their place of work or school.

Typically, more densely populated areas have a greater potential for active transportation trips if appropriate infrastructure is provided. **Figure 7** displays the areas of Barrie by population density. Areas in red have a high population density and areas in blue have a low population density. The map reveals:

- ▶ High to medium population density along Essa Road between Harvie Road and Mapleview Drive.
- ▶ High to medium population density in Innis-Shore, Bayshore, Painswick North and Painswick South.
- ▶ High to medium population in the north areas of the City.

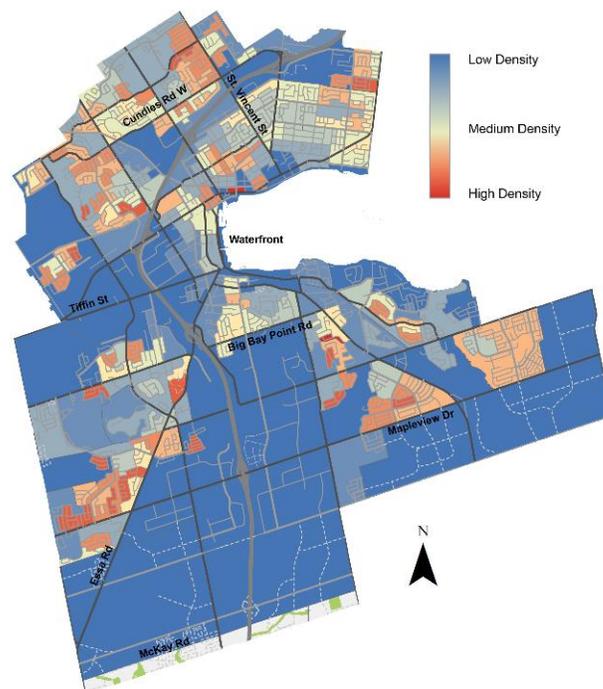


Figure 7 - City of Barrie Population Density
Source: 2016 Statistics Canada

Active Transportation Hot Spots

Another key goal of developing an active transportation network is to support existing AT users. Areas with greater AT mode share represent an opportunity to improve AT conditions for a population that already uses active modes of transportation. Conversely, areas that have low AT mode share represent an opportunity to encourage new active transportation use.

Figure 8 illustrates the current AT mode share for the City of Barrie. Areas in red have a high percentage of people who use AT as their primary mode of transportation and areas in blue are lower in AT mode share. The map reveals:

- ▶ Barrie’s downtown area and waterfront have the highest active transportation mode share.
- ▶ The area north of the downtown has a high percentage of active transportation users.

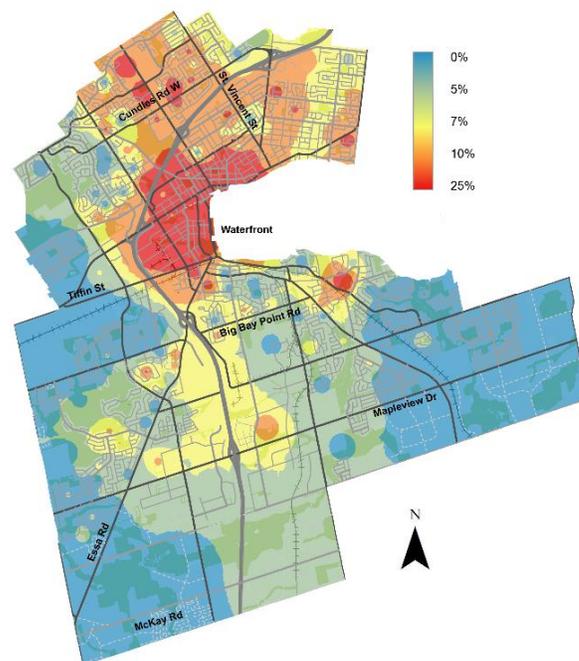


Figure 8 - City of Barrie Active Transportation Hot Spots
Source: 2016 Statistics Canada

Access to Transit

Access to transit is an important factor in developing an AT network, especially in addressing the first and last mile of a trip. Reducing the distance from the place of residence to the nearest transit stop is the best way to encourage residents to use AT and transit to travel around the City of Barrie.

Figure 9 illustrates the network based walking distance to transit stops. These are based off a 5,10, and 20 minute walk. The map reveals:

- ▶ The majority of residents in Barrie are within a 10-minute walk to a transit stop.
- ▶ The downtown and dense residential areas all have 5-minute walks to transit stops.

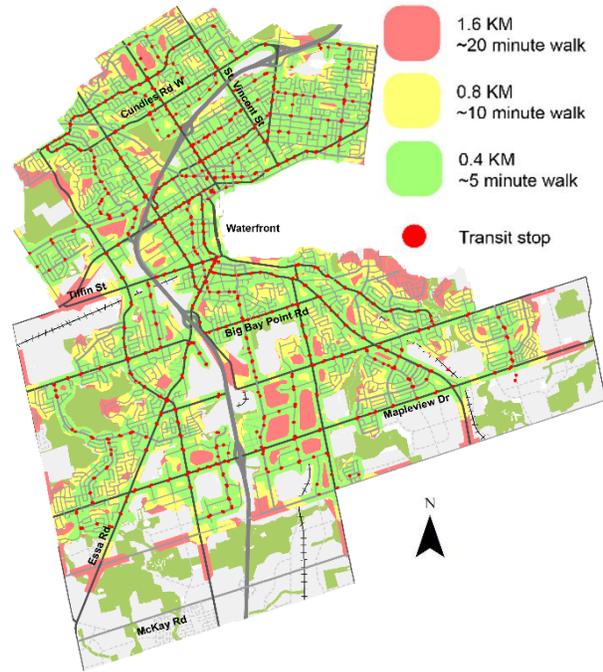


Figure 9 - Access to Transit Indicator
Source: City of Barrie GIS Data

Current Trends (Strava)

Special consideration was given to the existing user behavior in the City of Barrie. Strava data were analyzed to identify routes that are popular among active transportation users. Although these data represent a small group of experienced cyclists who shared their route choices and frequency of use information with Strava, it is still useful information to consider.

Figure 10 illustrates the most popular routes among active transportation users based on Strava data from December 2018. The map reveals:

- ▶ Existing active transportation users most frequently use the City’s arterial roads to travel around Barrie.
- ▶ Bayfield Street is currently not a route that is widely used by active transportation users.
- ▶ The waterfront route is the most popular route for active transportation users.

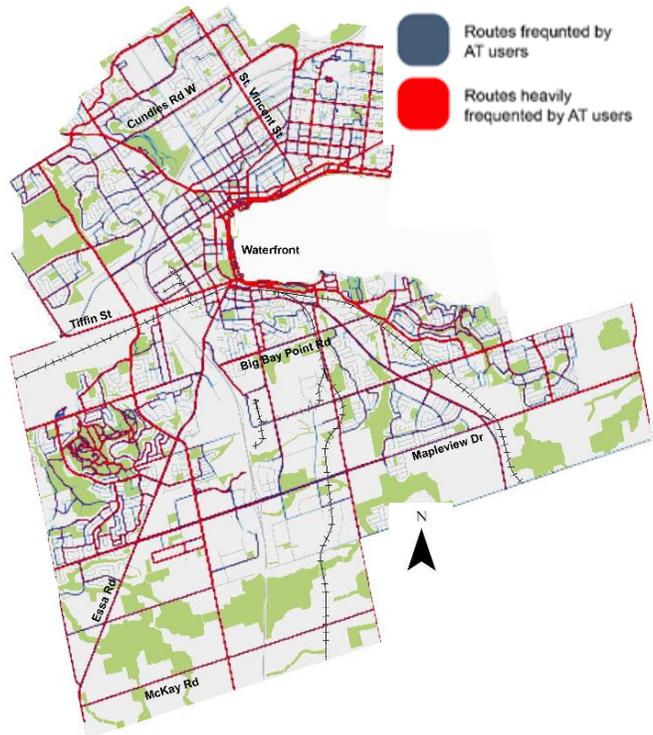


Figure 10 - Current Cycling Behaviour
Source: Strava Heat Map

Active Transportation City Core

The study team also identified areas surrounding the City of Barrie’s urban core that should be designated as active transportation zones. Active transportation zones are areas adjacent to the urban core where new residential development is planned and where new AT infrastructure should be implemented at the same time as development occurs. These are also zones where ATV and snowmobile use should be discouraged. **Figure 11** illustrates the City’s active transportation zones.



Figure 11 - City of Barrie Active Transportation Zones
 Source: City of Barrie GIS Data

The findings from **Figures 7 to 11** represent the areas that are thought to benefit the most from active transportation enhancements and also support the City’s target to achieve a 12% active transportation mode share target by 2041. These findings were not used exclusively or in isolation; they were intended to supplement the findings from each step in the network development process as well as feedback received from City staff, stakeholders and members of the public. These findings were used to assess the candidate routes identified in step 2 and to help refine and confirm the recommended active transportation network outlined in the next step.



Bike lanes on Duckworth Street at the Highway 400 southbound ramp
 Source: WSP, 2018

Step 4: Confirm Network and Develop AT Route Hierarchy

The preferred active transportation network is a culmination of the outcomes from steps 1-3 of the network development process, and input received over the course of the study and by applying the network planning approach in Ontario Traffic Manual (OTM) Book 18: Cycling Facilities (2013). **Map 3** illustrates the preferred active transportation route hierarchy. The preferred route network is organized into two categories and described below:

spine routes

- ▶ Direct and typically linear north-south and east-west routes
- ▶ Access to major destinations such as transit hubs, commercial centres and the waterfront
- ▶ Typically located on arterial and some collector roadways and regional trail systems
- ▶ Connections through Highway 400 crossings and interchanges
- ▶ Accommodate commuting and utilitarian trip purposes

neighbourhood routes

- ▶ Typically located along collector / local roads with low motor vehicle volumes and speeds as well as off-road trails
- ▶ Access to local parks, open spaces and destinations including schools
- ▶ Direct connections to the spine network

The preferred routes form the proposed active transportation network for Barrie. These routes were further investigated to determine the appropriate facility type for each route – see step 5 of the network development process.

Step 5: Confirm Facility Types

Based on the preferred active transportation network established in step 4, a three-step process was applied to determine the preferred facility type and level of separation for each route on an existing road, and in some cases off-road routes. The process was used to identify the appropriate facility type and to ensure the recommendation was consistent with the facility selection tool outlined in OTM Book 18. The three-step process is illustrated in **Figure 12**.

OTM Book 18 is currently being updated for the Province of Ontario by WSP and the thresholds for separated cycling facilities are expected to be reduced. For example, the preference to have designated or separated cycling facilities is anticipated to be recommended for traffic volume levels lower than what is currently identified in OTM Book 18.

For routes located on future proposed roads, the following assumptions were applied:

- ▶ Uni-directional cycle tracks (vertically separated and behind the curb) or in-boulevard pathways along future arterial roads, and in some cases major collector roads; and
- ▶ Buffered bike lanes or bike lanes along future minor collector roads.

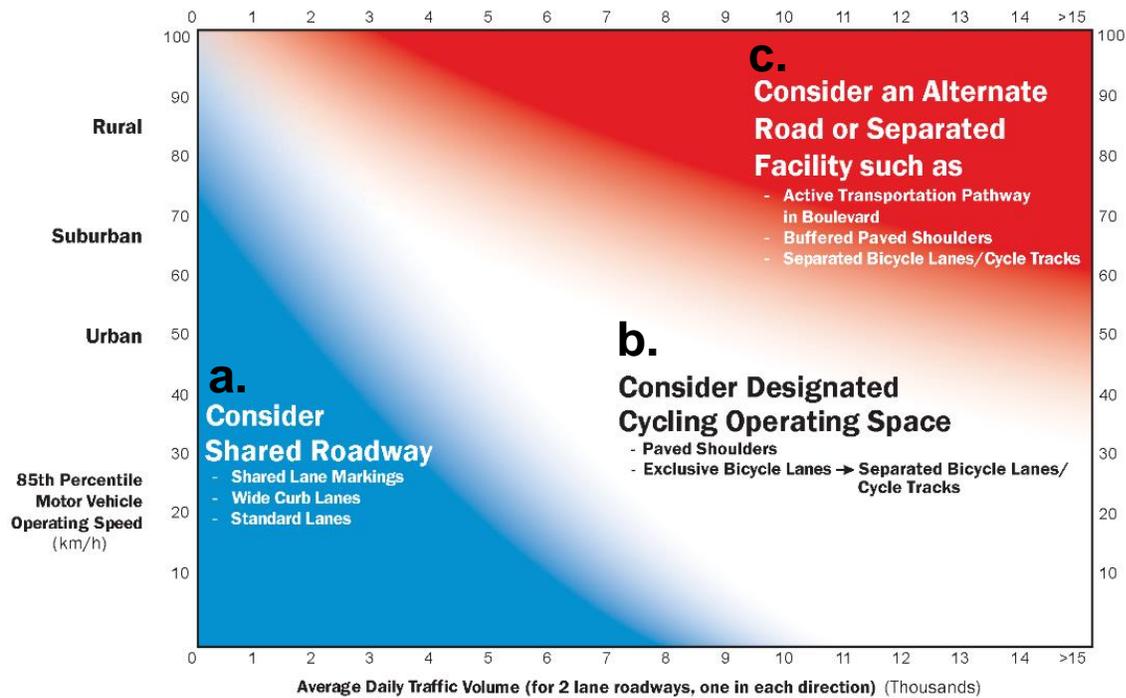
Routes located outside of the road right-of-way, such as sidewalks and off-road trails, were assessed to address pedestrian connectivity and missing gaps. Missing pedestrian links were identified based on:

- ▶ Input provided by City staff, stakeholder and public input;
- ▶ Future planned projects;
- ▶ AT Strategy objectives; and
- ▶ Location specific context observed through field work investigations and GIS analysis.

OTM Book 18 Facility Pre-Selection Tool (3 steps)

step 1: pre-selection nomograph

Assess the 85th percentile motor vehicle operating speed and traffic volumes of each route to determine the preferred facility types using the facility pre-selection nomograph to determine the level of separation required for on-road routes on the active transportation.



Consider an alternate route or off-road trail (where possible) for roadways with an AADT greater than 15,000 vehicles and an operating speed of greater than 50 km/h.

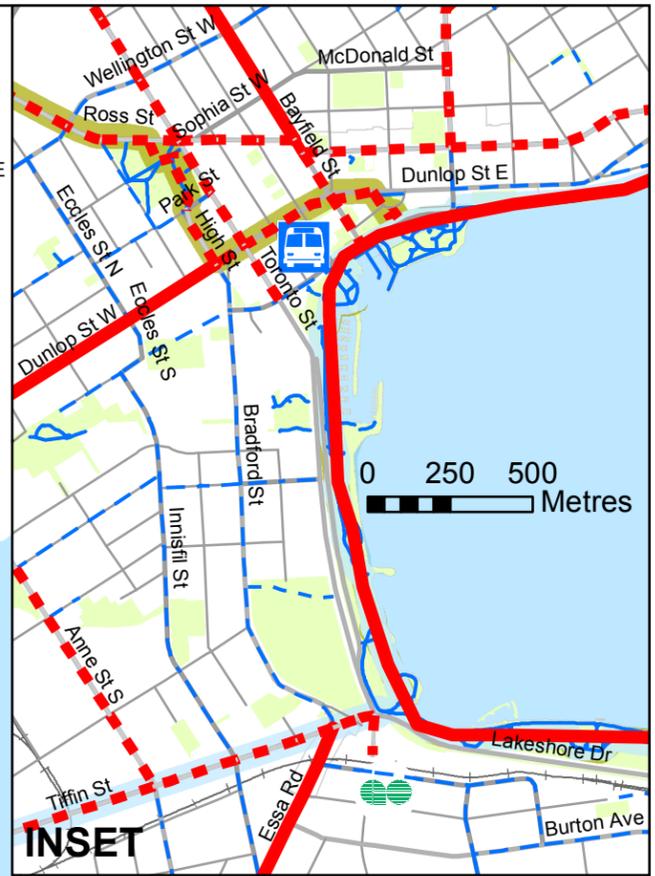
steps 2 and 3 on the following page

Figure 12 - City of Barrie Active Transportation Facility Selection Process
 Source: Based on Ontario Traffic Manual Book 18: Cycling Facilities, 2013



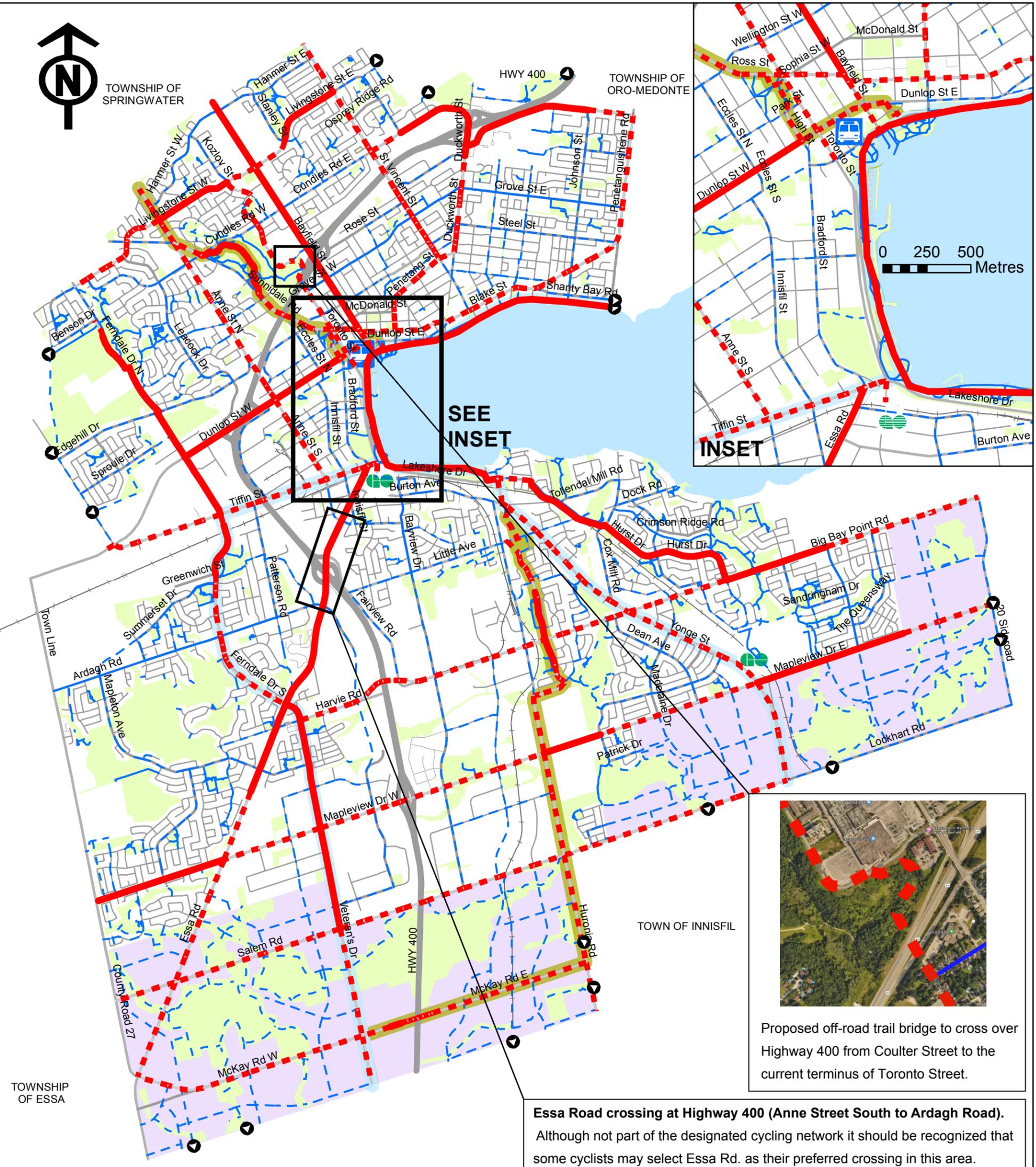
TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE



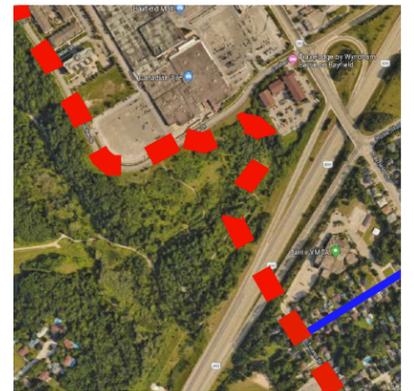
SEE INSET

INSET



TOWNSHIP OF ESSA

TOWN OF INNISFIL



Proposed off-road trail bridge to cross over Highway 400 from Coulter Street to the current terminus of Toronto Street.

Essa Road crossing at Highway 400 (Anne Street South to Ardagh Road).
Although not part of the designated cycling network it should be recognized that some cyclists may select Essa Rd. as their preferred crossing in this area.

Spine Connections

- Existing spine route
- Proposed spine route

Neighbourhood Connections

- Existing neighbourhood route
- Proposed neighbourhood route

Note:
1. Spine routes consist of north-south and east-west linkages that provide direct connections to major commercial, employment, institutional, residential and tourist nodes and destinations throughout the City. The spine network includes on-road facilities, off-road facilities and sidewalks that are intended to accommodate pedestrians, cyclists, mobility-assisted users and other active transportation users.

Trail Systems

- Province-Wide Cycling Network
- The Great Trail

Transportation Features

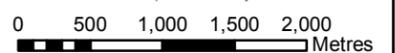
- GO Station
- Barrie Bus Terminal

Other Features

- Secondary Plan Area
- Park / Open Space
- Connection to Surrounding Municipality

Note:
Refer to Technical Appendix D (Simcoe County TMP - AT Network) for additional details on surrounding connections.

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



Map 3
Draft Route Network Hierarchy
City of Barrie Transportation Master Plan



step 2: examine other factors

Consider context specific factors for on and off-road routes and revise facility types for routes where required. Factors to be considered include:

on-road routes

- ▶ Function of the roadway
- ▶ Vehicle mix and speed
- ▶ Collision history
- ▶ Available space
- ▶ Cost
- ▶ Anticipated use
- ▶ Type of improvement
- ▶ On-street parking
- ▶ Intersection Frequency
- ▶ Accessibility (AODA)

off-road routes

- ▶ Connectivity
- ▶ Environmental protection and regulatory process
- ▶ Safety
- ▶ Potential use
- ▶ User experience
- ▶ Topography
- ▶ Barriers
- ▶ Cost
- ▶ Maintenance
- ▶ Accessibility (AODA)

step 3: recommend and document results

on-road routes

-  Pedestrian facilities:
 - ▶ Sidewalks
-  Multi-use facilities:
 - ▶ Paved shoulders
-  Cycling facilities:
 - ▶ Buffered bike lanes
 - ▶ Bike lanes
 - ▶ Signed bike routes

off-road routes

-  Pedestrian facilities:
 - ▶ Sidewalks
-  Multi-use facilities:
 - ▶ In-boulevard pathways
 - ▶ Off-road trails

The proposed active transportation network by facility type is presented on **Maps 4a and 4b** and summarized in **Table 6**. In total, there are **484.7 kilometres** of proposed active transportation facilities in Barrie including routes intended for pedestrian, cycling and multi-use purposes. This includes 69.8 kilometres of off-road trails. Additional details, including trail classifications, can be found in the Trails Master Plan in Appendix C of the TMP.

Table 6 - Overview of the Proposed AT Network

Source: WSP, 2018

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

The City's preferred active transportation network includes a number of new sidewalks connections that are in addition to the sidewalk links identified in the 2014 MMATMP. A summary of new infill sidewalk links is provided in **Table 7** below.



TOWNSHIP OF SPRINGWATER

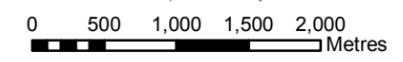
TOWNSHIP OF ORO-MEDONTE



*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



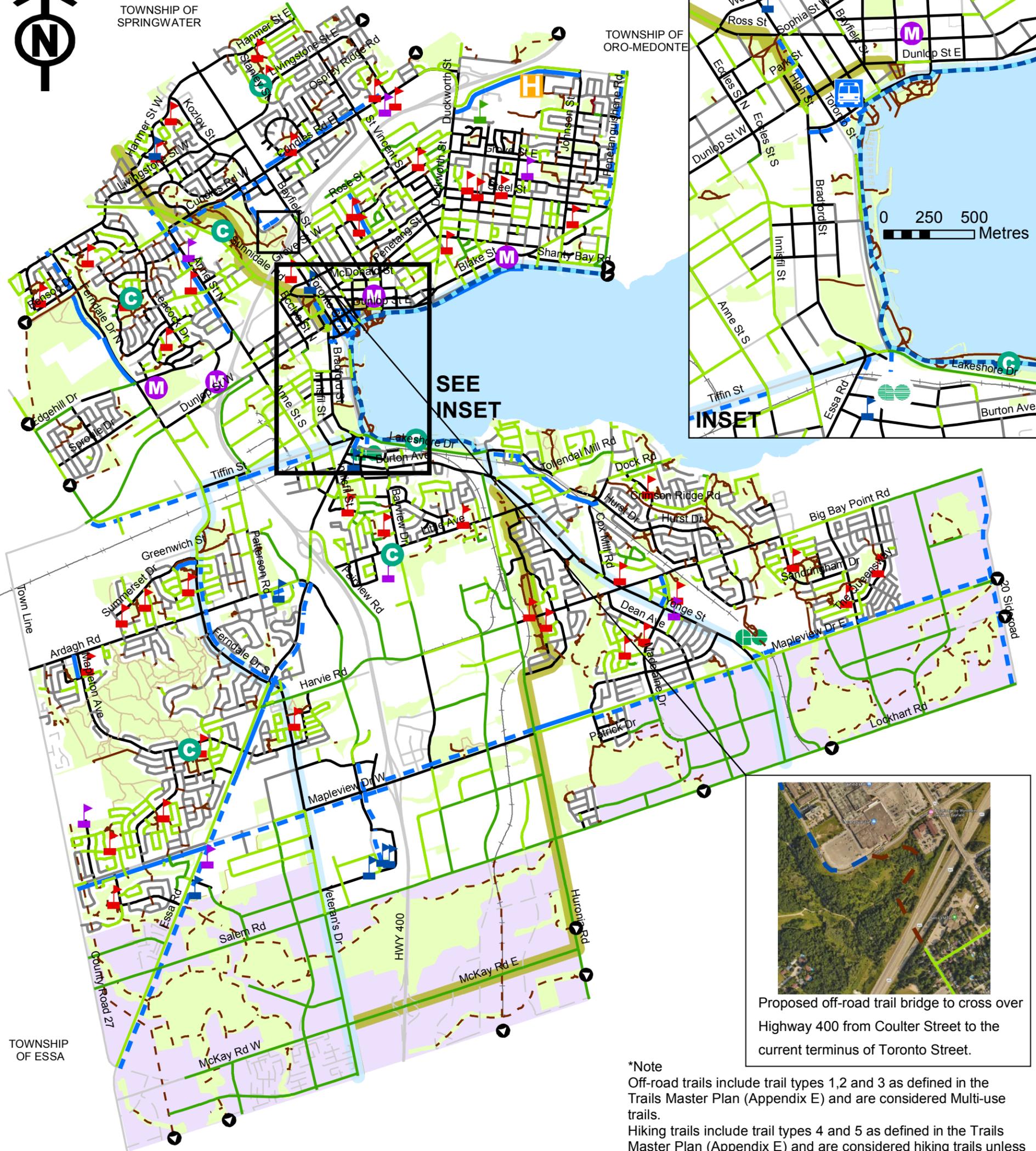
Map 4a
Draft Cycling and Multi-use Trail Network
City of Barrie Transportation Master Plan





TOWNSHIP OF SPRINGWATER

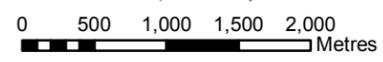
TOWNSHIP OF ORO-MEDONTE



*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.
Hiking trails include trail types 4 and 5 as defined in the Trails Master Plan (Appendix E) and are considered hiking trails unless otherwise noted as a mountain bike trail.

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



Map 4b
Draft Sidewalk and Multi-use Trail Network
City of Barrie Transportation Master Plan



Table 7 - Summary of New Proposed Infill Sidewalk Links

Location	# of sidewalks	Length (m)
Montgomery Drive (Bertha Avenue to Yonge Street)	1 side	138.2
Bayshore Boulevard (Clearwater Court to Furner Drive)	1 side	192.1
Furner Drive (Bayshore Boulevard to Dock Road)	1 side	63.7
Robert Street (John Street to Fredrick Street)	1 side	73.7
Fredrick Street (Innisfil Street to Robert Street)	1 side	104.5
Victoria Street (Robert Street to Innisfil Street)	1 side	256.9
Victoria Street (Anne Street to Robert Street)	1 side	266.4
Robert Street (Dufferin Street to John Street)	1 side	87.3
George Street (Vespra Street to Anne Street)	1 side	463.2
Gunn Street (Peel Street to Newton Street)	1 side	110.3
Bothwell Crescent (Davidson Street to Bothwell Crescent)	1 side	190.9

The preferred facility types for all existing and previously proposed routes was also assessed. As a result, there are number of routes (existing and previously proposed) that are being recommended to be upgraded to a facility type that provides greater separation between motor vehicles and active transportation users. In most cases facility revisions resulted in an increased level of separation (e.g. previously proposed buffered bike lanes revised to a one-way cycle track above the curb). The recommended revisions reflect current design standards and are intended to better reflect the surrounding context and roadway characteristics, such as the road profile, road users, volume, speed and design.

In addition, the study team reviewed the planned roadway improvements for each road containing a proposed active transportation facility in the TMP. This review was conducted to ensure the planned roadway improvement and future road right-of-way could accommodate the recommended active transportation facility. Along future proposed roads or roads identified for future widening, it is recommended that City staff consider implementing a separated facility such as a cycle track or an in-boulevard pathway. Based on best practices and recent experiences from comparable municipalities in Ontario, it has been proven more cost effective to construct an active transportation facility behind the roadway curb compared to widening or reconstructing a road for the sole purpose of adding an on-road cycling facility. It is not recommended that the City undertake any roadway widening for the sole purpose of implementing on-road cycling facilities as there could be significant impacts to the roadway platform including drainage, catch basins and leads as well as utility / hydro poles and surrounding landscaping.

Research clearly indicates that separated facilities typically help to increase a user's sense of comfort and safety along a route and appeals to a broader range of users. Though an active transportation network is meant to contain a variety of facility types, continuous linkages of separated facilities will significantly support the City's 12% active transportation mode share target by accommodating more user groups and encouraging more people to engage in active forms of travel.

Recommendations

- 1 Adopt the proposed active transportation network illustrated on **Maps 4a and 4b** to guide future active transportation facility design and implementation. The network maps should be incorporated as a Schedule in the City's Official Plan when next updated.
- 2 The proposed active transportation network must be flexible enough to provide for changes in routing and/or facility types based on new information, Council policy and data as it becomes available. There may be opportunities for additional or alternate connections to be made in the future. These connections should be considered and the mapping and database updated if a change is warranted.
- 3 Give consideration to implementing separated facilities such as cycle tracks or in-boulevard pathways when future planned roads are constructed.



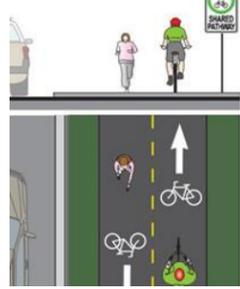
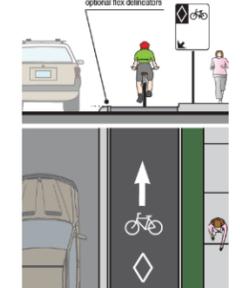
Tiffin Street bridge construction

Source: <https://www.simcoe.com/news-story/7570047-completion-of-barrie-bridge-may-be-delayed-by-one-year>

2.2 Understanding the Network

The City's active transportation network includes different facility types, both existing and proposed. **Table 8** outlines key design considerations for each facility type included in the City's active transportation network.

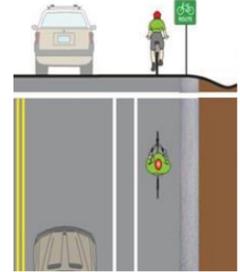
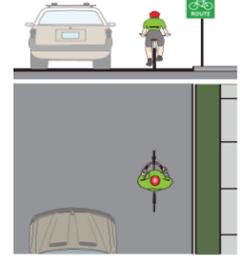
Table 8 - Active Transportation Facility Type Considerations

Facility Type	Cross Section	Description	Location		Context			Volume	Speed	Minimum Width	Signage				Pavement Markings		
			O*	W*	U*	S*	R*				Green Bike Route Sign	Bike Lane Sign	Share the Road	Multi-use Pathway	Bike Stencil	Painted Line	Chevron
In-Boulevard Pathway		A separated space found within the boulevard of the roadway – in place of a sidewalk – which accommodates both pedestrians and cyclists in a shared space. Can be uni or bi-directional.		•	•	•		▲	▲	3.0m				×	×		
Cycle Track		A separate space behind the roadway curb. Appropriate on roads with high speeds and volumes. Can be uni or bi-directional.		•	•	•		▲	▲	1.5m One-way 3.0m Two-way					×		
Buffered Bike Lane		On roads with higher volume and speed within urban and suburban areas a buffer may be implemented to provide more separation between the cyclist and motor vehicles.		•	•	•		▲	▲	Lane 1.5m Buffer 0.5m		×			×	×	
Bike Lane		Cyclists are provided with a designated space which is identified by pavement markings and signage. Bike lanes could include green painted treatment along key corridors. When approaching an intersection dash lines to allow for passing.		•	•	•		▶	▶	1.5m		×			×	×	

Location Notes: *O – Outside of the Road Right of Way; *W – Within the Road Right of Way

Context Notes: context pertains to the type of land-use / neighbourhood where the facility type might be more appropriate *U – Urban; *S – Semi-Urban; *R – Rural

▲ high traffic volume or speed; ▶ moderate traffic volume or speed; ▼ low traffic volume or speed

Facility Type	Cross Section	Description	Location		Context			Volume	Speed	Minimum Width	Signage				Pavement Markings		
			O*	W*	U*	S*	R*				Green Bike Route Sign	Bike Lane Sign	Share the Road	Multi-use Pathway	Bike Stencil	Painted Line	Chevron
Buffered Paved Shoulder		On roads with higher volume and speed within rural areas, in addition to the paved shoulder a buffer may be implemented. The width depends on the speed and volume of the roadway.		●				▲	▲	Shoulder 1.5m Buffer 0.5m	×		×			×	
Signed Bike Route		Motorists and cyclists share the same vehicular travel lane. Bicycle route signs are used to provide route guidelines. Could be supplemented by a Share the Road sign in select locations e.g. poor sightlines, etc.		●	●	●	●	▼	▼	N/A	×		×				
Off-road Trail		A separated space typically through a natural area or corridor that accommodates pedestrians and cyclists. The surface type can range from natural surface to asphalt depending on the location. See the Trails Master Plan for more details on trail types and classification.	●		●	●	●	N/A	N/A	3.0m							
Sidewalk		A space within the boulevard which accommodates pedestrians.	●		●	●	●	▲	▲	1.5m							

Location Notes: *O – Outside of the Road Right of Way; *W – Within the Road Right of Way
 Context Notes: context pertains to the type of land-use / neighbourhood where the facility type might be more appropriate *U – Urban; *S – Semi-Urban; *R – Rural
 ▲ high traffic volume or speed; ► moderate traffic volume or speed; ▼ low traffic volume or speed

2.3 The Network Users

Barrie's active transportation network is intended to accommodate a range of users with varying abilities and skills. As noted in section 1.1, pedestrians and cyclists are considered the design user group, however, the assessment of routes included in the City's active transportation network took into account other non-motorized forms of travel and recreation. **Table 9** outlines the different user systems which collectively form a continuous and connected active transportation network for Barrie.

Table 9 - Summary of AT Users

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 cyclists.</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>

2.4 Design Considerations

There are a number of design guidelines and standards that should be used by City staff and its partners when planning, designing and implementing the active transportation network. It is recommended that City staff refer to the Ontario Traffic Manual (OTM) series of guideline books for AT facility design, markings and signage. In addition to the OTM guidelines, there are resources available at the international, national, provincial and local level, which can guide active transportation infrastructure design. The following provides an overview of guidelines and resources that could serve as a resource to City staff and its partners.

international

- ▶ American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities
- ▶ Dutch CROW Design Manual for Bicycle Traffic

national

- ▶ National Association of City Transportation Officials (NACTO) Urban Bikeways Design Guide and Urban Street Design Guide
- ▶ Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads
- ▶ Transportation Association of Canada (TAC) Bikeway Traffic Control Guideline for Canada

provincial

- ▶ Ontario Traffic Manual (OTM) Book 18: Cycling Facilities
- ▶ Ontario Traffic Manual (OTM) Book 15: Pedestrian Crossing Treatments
- ▶ Ministry of Transportation Ontario (MTO) Bikeways Design Guidelines.
- ▶ Accessibility for Ontarians with Disabilities Act (AODA) – Built Environment Standards

city

- ▶ City of Barrie Urban Design Manual
- ▶ City of Barrie Roadway Design Standards

The following sections provide an overview of key design elements that should be considered when planning and implementing the active transportation network. This guidance should be used by City staff and its partners together with the standards / guidelines noted above.

Recommendations

4

Reference the design guidelines / standards identified in section 2.4 when moving forward with the planning, design and implementation of active transportation infrastructure.

2.4.1 Integration of Active Transportation and Transit

The integration of active transportation infrastructure and transit is a critical component of designing a multi-modal and accessible transportation system in the City of Barrie. A balanced transportation system should accommodate pedestrians, cyclists and transit users.

The City of Barrie is serviced by local bus service, Barrie Transit, which operates 11 two-directional fixed bus routes through the City and to surrounding municipalities (Borden). Barrie Transit operates with 15-minute corridor service on key roads including Bayfield Street and Yonge Street and also provides connections to all GO Train hubs in Barrie. Barrie Transit has approximately 48 conventional transit buses and has an estimated ridership of approximately 2.7 million annual passenger trips.

In addition to the local bus services, there are two GO Transit stations in Barrie – Allandale Waterfront GO Station and Barrie GO Station. As per GO Transit's Regional Express Rail program, rail service along the Barrie line will be upgraded to be a two-way, all-day rail service. The Metrolinx Regional Transportation Plan 2041 further recommends that this service will operate along the entire length of the Barrie Line (from Toronto Union Station to Allandale Waterfront GO Station) at a minimum frequency of 15 minutes per train in either direction between Toronto Union and Aurora GO Station, and a frequency of 30 minutes between Aurora GO and Allandale Waterfront GO Stations. It is anticipated that upgrades to GO Transit service will accommodate the projected population and employment growth for the City of Barrie.

It is recommended that the City leverage the existing local and regional transit systems by developing high quality, accessible active transportation connections and include amenities at transit stops that support first and last mile connections to transit. 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.

Figure 13 provides an overview of the general distance ranges that support the interaction of active transportation and transit. Providing viable options for people to walk and / or cycle as part of their daily trip can help to achieve the City's target for a 12% active transportation mode share.



Figure 13 - First and Last Mile Connectivity to Transit
Source: WSP, 2018 adapted from Alta Planning + Design

All Barrie Transit buses are equipped with bike racks to carry up to two bikes. **Figure 14** illustrates the Bike and Ride Brochure that was developed by the City to help inform users on how to use the bike racks on Barrie Transit busses. Barrie Transit also offers specialized transit which includes a door-to-door shared ride service to accommodate persons varying mobility limitations.

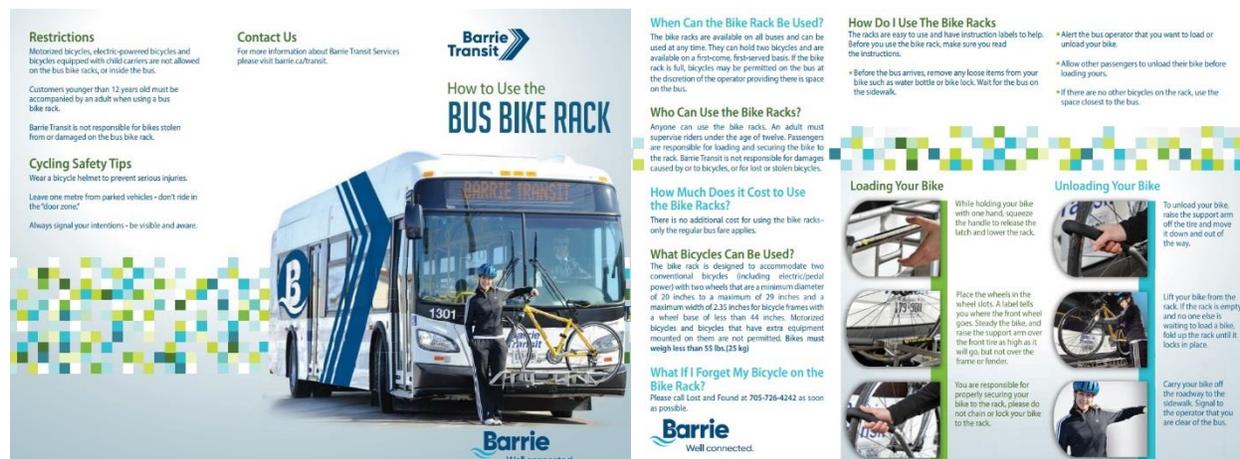


Figure 14 - Barrie Transit Bike & Ride Brochure

Source: https://www.barrie.ca/Living/Getting%20Around/BarrieTransit/Documents/BikeRackFlyer_web.pdf

When integrating active transportation facilities along transit routes, additional consideration should be given to mitigating potential conflicts between different users. For example, in locations where a cycling route crosses a bus bay, buses would be required to cross the facility to access the bus bay (curbside). Where no bus bay is provided, buses must maneuver up to the curb to minimize the gap across which passengers board the bus thus encroaching on any curbside cycling route. In some cases, practitioners may consider incorporating the bike facility into the transit platform. For example, the bike facility can ramp up to the platform to slow cyclists as they approach the conflict area. Additional pavement markings and coloured tactile paving be used to clearly identify the conflict zones for all users. Refer to OTM Book 18 section 5.4.2 for additional design considerations.

It is also recommended that all transit stops be accessible via sidewalks to ensure pedestrian connectivity. Amenities for transit users such as shelters, schedules, benches, refuse containers, as well as real-time information on upcoming transit arrivals can help to enhance the experience for all transit users.

Recommendations

- 5** Integrate active transportation routes and transit service into the planning, designing and implementation of the road network as the City’s secondary plan areas are developed in the future.

- 6** Prioritize the implementation of a sidewalk in locations where there are no sidewalks at an existing bus stop.

2.4.2 Transitions and Conflict Points

Integrating walking and cycling into the overall transportation system can create conflicts between the active modes and other road users at intersections. Building new facilities both within and outside of the road right-of-way can cause confusion at points of transition.

To maximize connectivity, pedestrians and cyclists should be able to transition between facilities and cross conflict points in a way that is considered to be both safe and comfortable. Most conflicts occur at intersections as they are the most common location where different modes cross paths. A conflict typically occurs when a right or left-turn is being made. There are a number of treatments which can help to improve a user’s ability to cross a roadway or transition between facility types more comfortably and safely. Examples of these treatments are provided below. Section 5.0 of OTM Book 18 describes these treatments in further detail.

bike boxes

These are designated areas between the crosswalk and the stop bar which are meant to be used by cyclists while waiting for a signal to change. The bike box is intended to increase a motorist’s visibility of cyclists and allows cyclists to proceed ahead of motorists on the green traffic signal.

Figure 15 provides an example of a bike box from OTM Book 18.

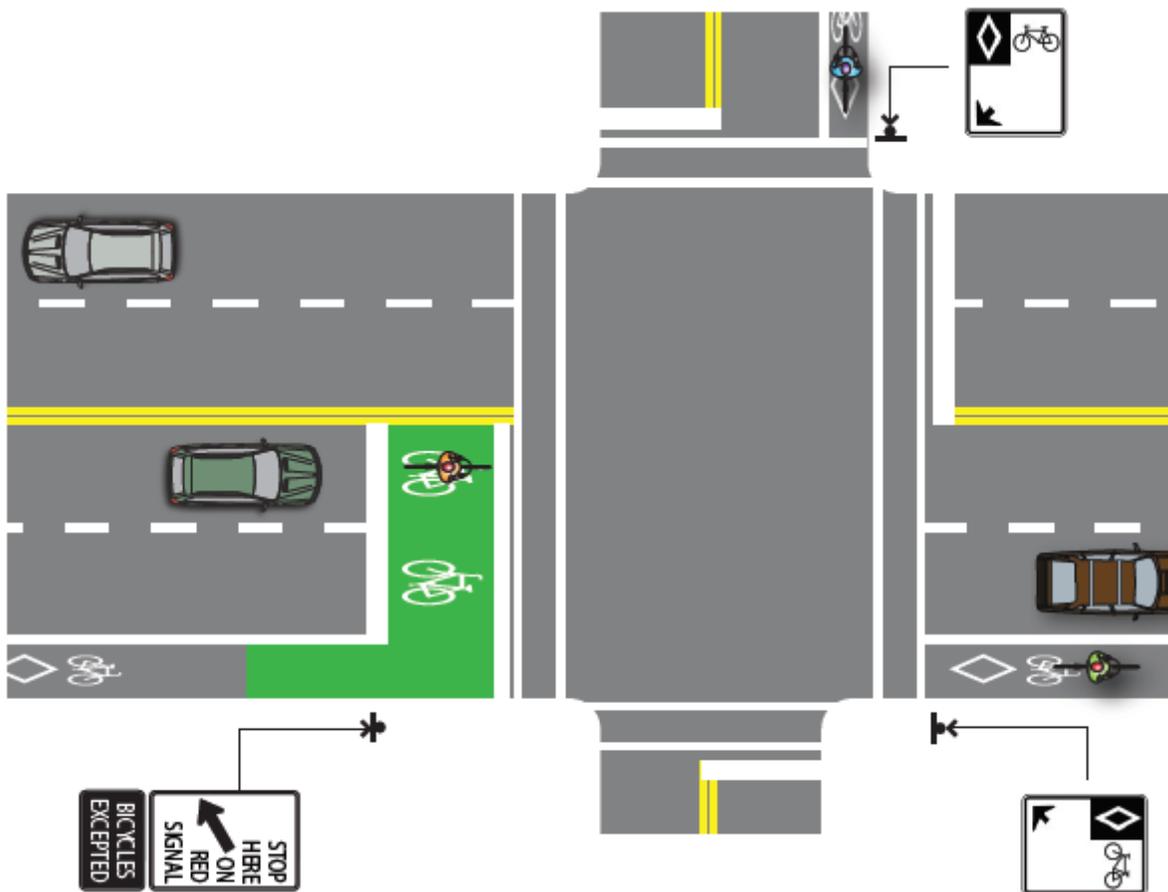


Figure 15 - Bike Box Graphic
Source: OTM Book 18 Cycling Facilities

pavement markings

Includes painted visual cues on the pavement to increase awareness of the presence of cyclists on the road and to provide cyclists with a space to use when going through an intersection or transitioning to another facility. Pavement markings can include directional arrows, lines to designate the space, stencils of pedestrians and cyclists, and sharrows. **Figure 16** provides an example of directional pavement markings through an intersection to guide cyclists to the bike lane on the far side of the intersection.

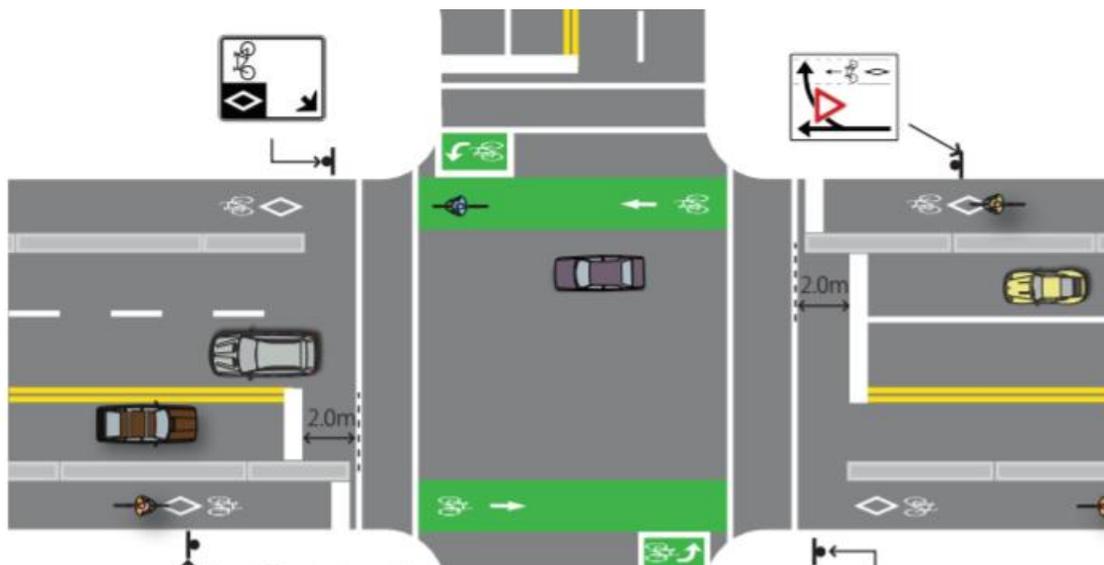
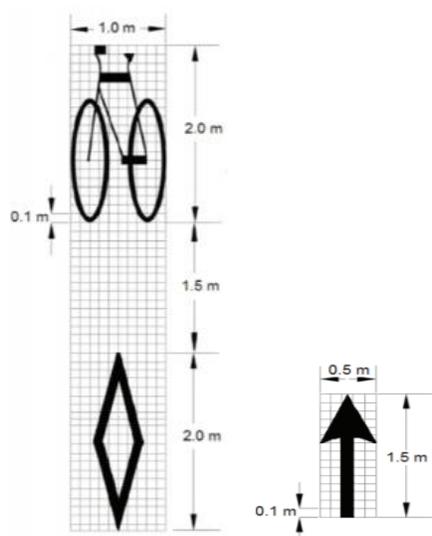


Figure 16 - Separated Bicycle Lane with Pavement Markings Through an Intersection
 Source: OTM Book 18 Cycling Facilities

Figure 17 outlines the dimensions of pavement markings including a directional arrow and bike lane marking. An example of these pavement markings applied in the Town of Newmarket is also provided. The design specifications for each of these markings is provided in OTM Book 18.



Pavement markings through driveway in Newmarket, ON
 Source: WSP 2018

Figure 17 - Sharrow Pavement Marking (left) and Bike Lane Pavement Marking (right)
 Source: OTM Book 18 and WSP

cross-rides

A crossing treatment that can be used by both pedestrians and cyclists. Cross-rides allow cyclists to proceed through the intersection without having to dismount and separates pedestrians and cyclists to decrease potential conflict. **Figure 18** provides an example of a cross-ride from OTM Book 18.

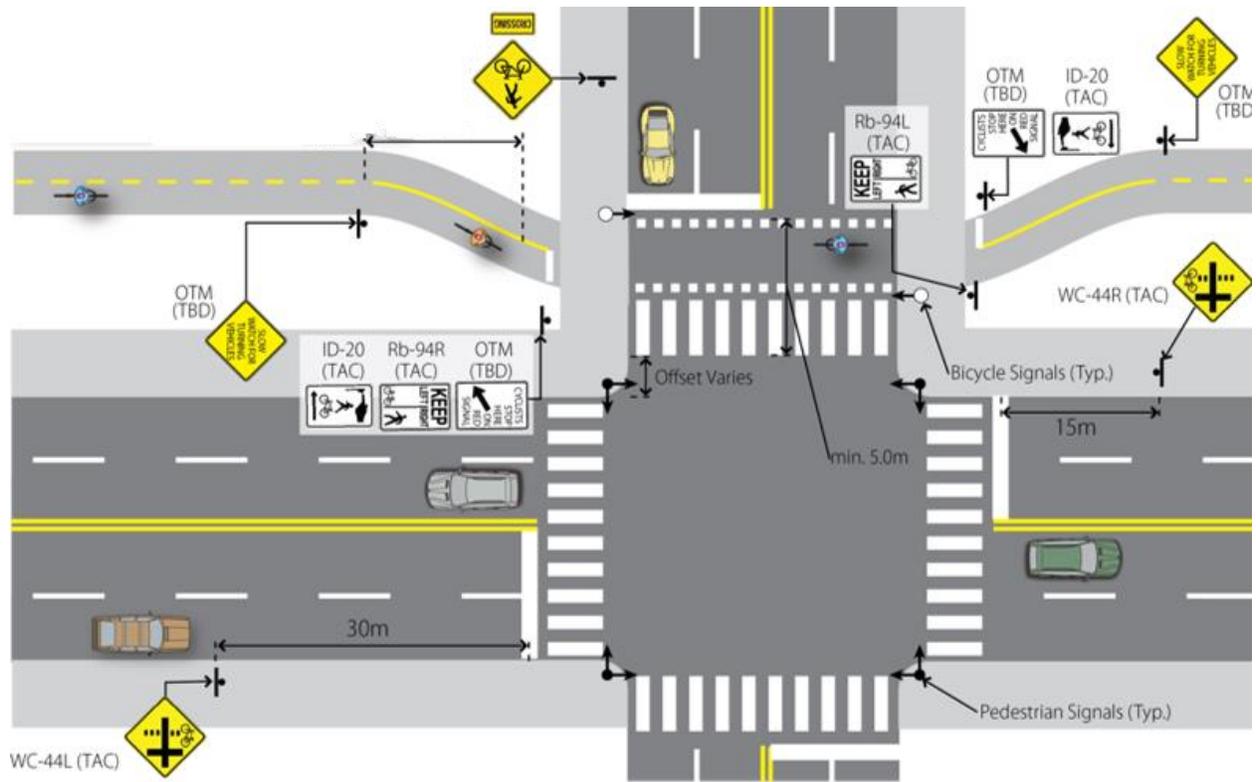


Figure 18 - Separated Cycling and Pedestrian Cross-ride
Source: OTM Book 18

Figure 19 provides the design specifications for a separated cross-ride that is used in **Figure 18**. These specifications are based on OTM Book 18.

Recommendations

- 7** Integrate design features at intersections and other conflict points that help to increase a user's sense of comfort and safety and to encourage increased active transportation usage.

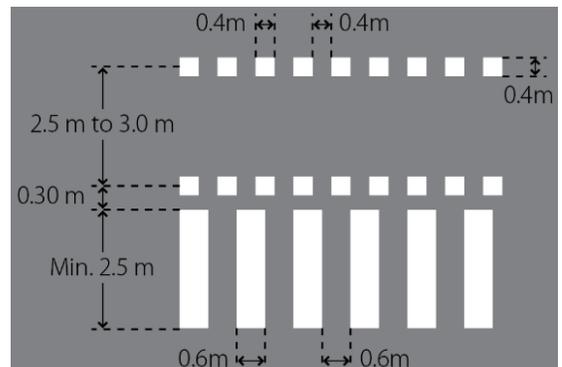


Figure 19 - Separated Cross-ride
Source: OTM Book 18

2.4.3 AT Routes through Roundabouts

Roundabouts are circular intersection treatments that permit vehicle traffic to flow in one direction around a central island. Typically, roundabouts do not have traffic signals so entering vehicles must yield to traffic already in the roundabout. Active transportation routes and facilities should be planned and designed to guide pedestrians, cyclists and other active transportation users through the roundabout in a manner that is considered comfortable, safe and intuitive. Roundabouts can be organized into two categories: single-lane roundabouts and multi-lane roundabouts.

Figure 20 provides an graphic example of an active transportation facility through a multi-lane roundabout based on the City of London’s Complete Streets Design Guide. This 2018 guide provides additional consideration for the following user groups when planning, designing and implementing roundabouts and should be used as a reference by the City of Barrie.

<p>pedestrians</p> 	<ul style="list-style-type: none"> ▶ A Level 2 Type B (OTM Book 15) pedestrian crossing can be used which includes push button activated rapid flashing rectangular beacons, roadside and cantilevered pedestrian crossing signs, a raised crossing, zebra stripes and sharks teeth. ▶ A splitter island can be used on all legs which allows pedestrians to cross in two stages. Pedestrian connections between the legs of the intersection have a straight alignment, accommodating the pedestrian desire line.
<p>cyclists</p> 	<ul style="list-style-type: none"> ▶ Sharks teeth and a "Cyclists Yield to Pedestrians" sign should be included at all pedestrian crossings of the cycling facility. ▶ Cyclists cross the roundabout as pedestrians and activate the PXO through a pushbutton. "Cyclists Dismount" signs are required at all crossings. A short connecting link between the PXO and the AT route requires cyclists to make a 90 degree turn, reinforcing the need for cyclists to reduce their speed, stop and dismount. This link also improves the predictability of pedestrian and cyclists’ movements for motorists, as only pedestrians and cyclists who are crossing the roadway traverse the connecting link.
<p>transit users</p> 	<ul style="list-style-type: none"> ▶ Transit stops should be positioned on the far side of the roundabout, beyond the pedestrian crossing in order to maintain clear sightlines between pedestrians at the crossing and approaching motorists (in a near side stop, a stopped bus would obstruct this sightline). ▶ Motorists would typically not expect a vehicle to stop in the lane on the far side of the roundabout, downstream of a pedestrian crossing. Therefore, transit stops should include a bus bay to avoid rear end collisions with the bus.
<p>motor vehicles</p> 	<ul style="list-style-type: none"> ▶ The geometric design of the roundabout creates a greater angle of deflection for the entry lanes than for the exit lanes. This encourages motorists to reduce their speed as they enter the roundabout and provides motorists with a better sightline to the exit lane pedestrian crossing. ▶ Sightlines between the motor vehicle travel lanes and the pedestrian and cycling facilities are clear on the roundabout approach and through the roundabout.

It is recommended that City staff refer to current design standards, best practices and emerging guidelines including the OTM Book 18 Update when planning and designing active transportation routes through roundabouts.

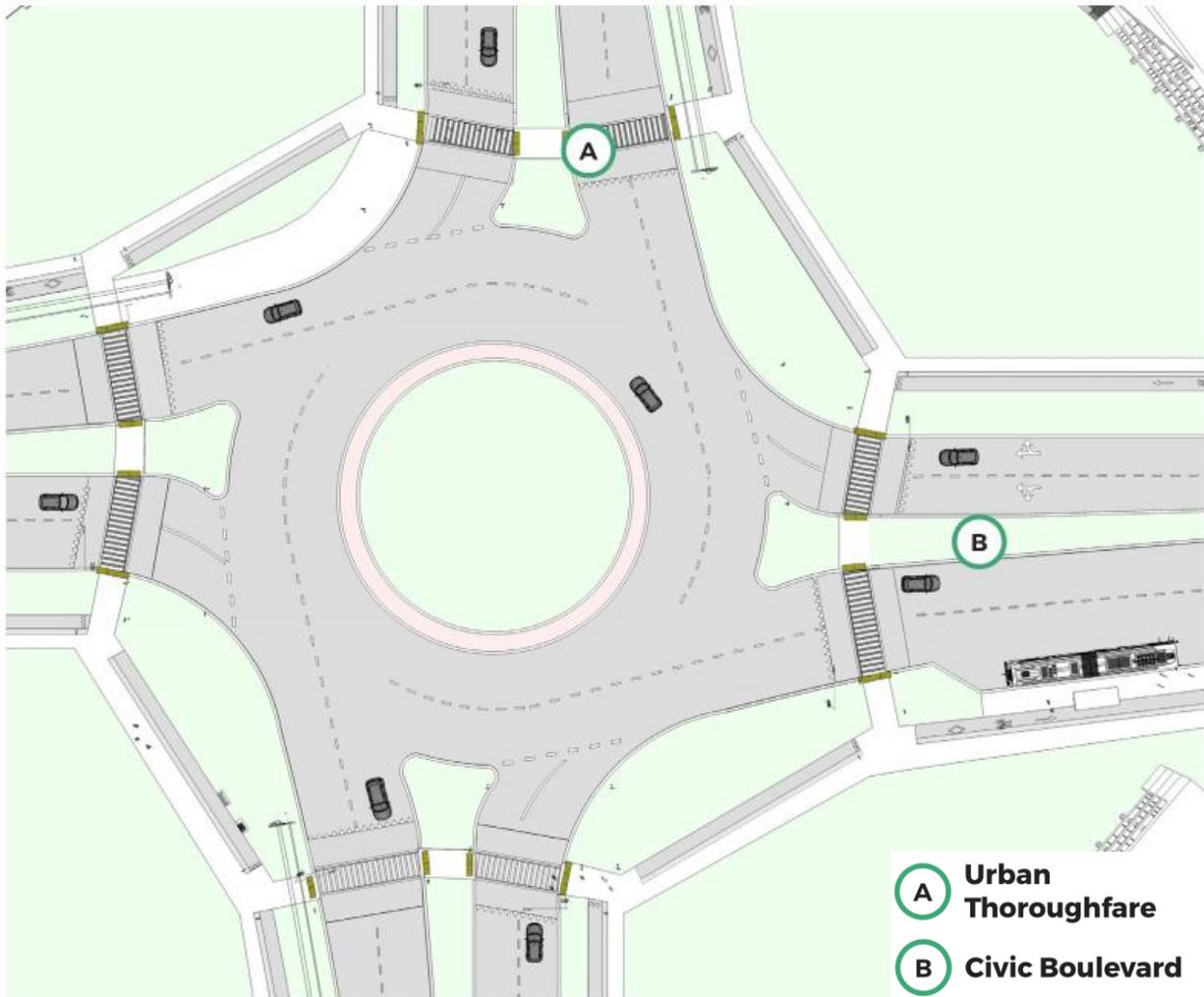


Figure 20 - Example of a multi-lane roundabout
 Source: WSP, City of London Complete Streets Design Manual, 2018

Recommendations

- 8** Reference the design guidelines / standards identified in section 2.4 including the forthcoming update to OTM Book 18 when planning and designing roundabouts.

2.4.3 Railway Crossings

A well-connected and continuous active transportation network typically includes routes that cross over physical barriers such as railways. The implementation of crossings or design features to help pedestrians, cyclists and other AT users cross from one side of a route to another side can help achieve overall connectivity within the AT network.

Railway crossings could be considered obstacles for pedestrians, cyclists and other AT users due to varying surface elevations between the railway and roadway pavement, surface (e.g. tracks can become slippery during rainfall) and potential gaps on either side of the railway that can trap a bicycle wheel. At locations where an active transportation routes crosses a railway, it is recommended that City staff consider implementing additional design features to address user safety and comfort concerns. Crossing enhancements can include signage, pavement markings, facility transitions and in some cases grade-separated crossings and should be consistent with the most current Transport Canada guidelines for at-grade rail crossings.

Figure 21 illustrates an example of an at-grade railway crossing with an on-road cycling facility. In some cases, and where space permits, jug handles may be implemented at a skewed railway crossing to allow for the bicycle facility or be aligned perpendicular to the railway tracks. Section 5.7 of OTM Book 18 describes crossing treatments at railways in further detail.

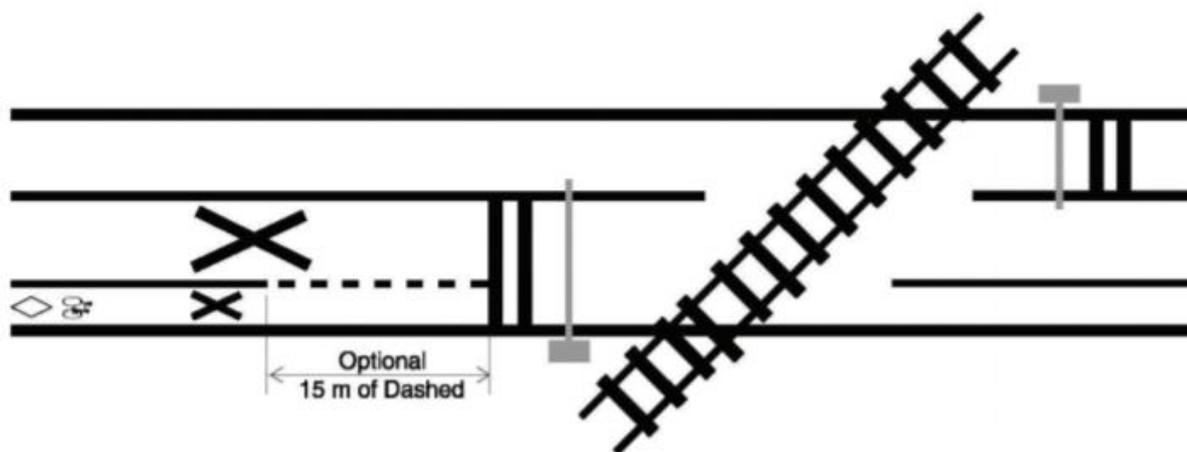


Figure 21 - Bicycle Lane at Skewed Railway Crossing – Gate Controlled

Source: OTM Book 18

2.4.4 End-of-Trip Facilities

The City of Barrie's active transportation network should encompass more than facility types and routes. Implementing supportive amenities along and at the end point of an active transportation route can help to improve a user's sense of comfort and safety around the activity. End-of-trip facilities can include bicycle parking, water fountains, washrooms, bike repair tools / stations, lockers (for personal belongings), benches, garbage/recycling receptacles, showers, and bike washing stations.

End-of-trip facilities have a number of tangible benefits for all active transportation users. Incorporating facilities into the design process can encourage more people to cycle and walk for both recreational and commuting purposes, and to use active transportation for longer distance trips.

The City of Barrie provides a number of end-of-trip facilities for pedestrians, cyclists and other active transportation users. These include benches, garbage/recycling bins, washrooms and bicycle repair tools. Many of the facilities are located in or near public parks and civic destinations. **Figure 22** illustrates the free bike repair stand that is located at Barrie City Hall for minor repairs and maintenance.

Rest areas such as benches should be located in areas where users are expected to stop such as vistas and lookouts, access points to trails and key destinations such as Barrie's Waterfront. **Figure 23** illustrates the rest area and end-of-trip facilities at Johnson's Beach in Barrie. It is recommended that rest areas be provided every five kilometres along high-volume, popular trails, promenades or near seniors' centres. Locations for sitting should be closely spaced at intervals of 100 to 250 metres. Rest areas may include washrooms, garbage and recycling bins, tables and benches among others. OTM Book 18 provides standards and guides of how to best design and incorporate end-of-trip facilities into the active transportation network.



Figure 22 - Bike Repair Station at Barrie City Hall
Source: WSP, 2018



Figure 23 - Rest Area and End-of-Trip Facilities at Johnson's Beach, Barrie
Source: Google© Streetview

Recommendations

9

Provide and strategically locate end-of-trip facilities such as rest areas, washrooms bike lockers etc. when planning, designing and implementing new active transportation routes. In addition, the City should encourage shower facilities in new commercial developments.

2.4.5 Bike Parking

Bicycle parking is a critical component of designing active transportation facilities and routes. Access to safe, secure bicycle parking throughout the network is critical to increasing active transportation usage. It is not just the provision of bicycle parking that is important, but the location and type of bicycle parking facilities as well. Placing bicycle parking facilities that are in well lit areas and in close proximity to key destinations, shops, institutions and other end-point facilities throughout the network is imperative to encouraging more people to cycle and improve conditions for cyclists. It is also important to select the appropriate bicycle parking facility for the context in which it is being used. Some facilities are more protective and secure than others and support different uses. For example, bicycle parking at commuter rail stations for the first and last mile may need to be more secure, such as a bike locker and bike room, whereas a more traditional bicycle parking facility may be better suited outside shops where people are completing quick errands.

The City of Barrie provides two main types of bicycle parking throughout the City. **Figure 24** provides a map of existing bicycle parking facilities in downtown Barrie. These include bicycle racks / posts and bicycle lockers.

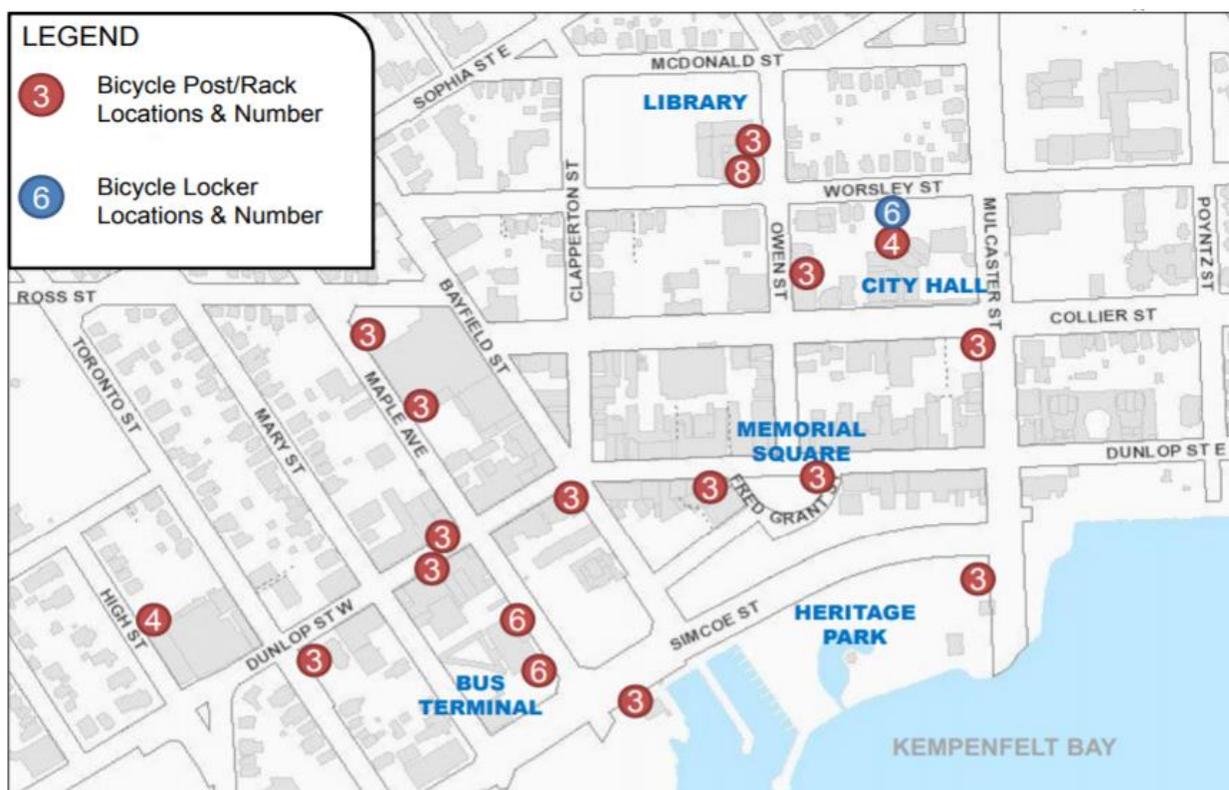


Figure 24 - City of Barrie Downtown Bike Parking Map

Source: www.barrie.ca/Living/Getting%20Around/Documents/DowntownBicycleparkingMap.pdf

Many of the City's existing bike parking facilities are located near civic destinations such as Barrie City Hall, Memorial Square and libraries. For example, Barrie City Hall contains bicycle lockers which provide room for up to six cyclists to lock their bikes in separate compartments. There are also four street pod bike racks available for cyclists to securely lock their bikes at City Hall. **Figure 25** illustrates the bicycle lockers and racks found at City Hall.



Figure 25 - Bicycle Lockers and Rack at Barrie City Hall
Source: WSP, 2018

Bicycle parking can be organized into two categories:

class a: long-term bike parking

Class A bike parking is typically provided by private developers and located in multi-unit residential, commercial areas and at transit hubs / stations. This type of bike parking is designed to meet the needs of users who leave their bicycles parked for an extended period of time which requires higher security and protection from the elements. **Figure 26** illustrates examples of long term bike parking.

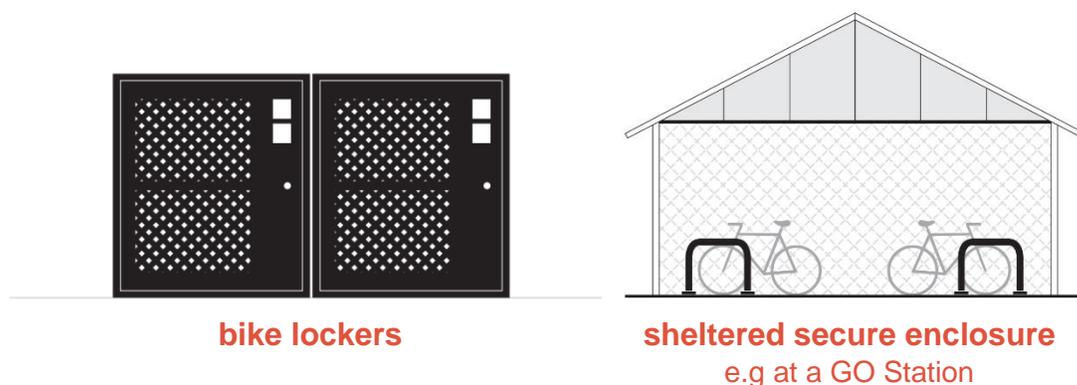


Figure 26 - Examples of Long Term Bike Parking

Source: *Essentials of Bike Parking: Selecting and Installing Bike Parking that Works (2015)*, Association of Pedestrian and Bicycle Professionals

class b: short-term bike parking

Class B bike parking is typically designed for short-term use such as completing errands, visiting institutions, etc. Class B users may be infrequent visitors so it is important to provide parking that is visible and easy to use. **Figure 27** illustrates examples of short term bike parking.



Figure 27 - Examples of Short Term Bike Parking

Source: *Essentials of Bike Parking: Selecting and Installing Bike Parking that Works (2015)*, Association of Pedestrian and Bicycle Professionals

Table 10 provides a summary of the different considerations for Class A and Class B bike parking. Additional design guidance on bike parking can be found in the Association of Pedestrian and Bicycle Professionals (APBP) Bicycle Parking Guidelines. This document addresses the selection and placement of short term and long-term bicycle parking.

Table 10 - Bike Parking Considerations

Considerations	Long-Term (Class A)	Short-Term (Class B)	Considerations for both Short Term and Long Term
Location	<ul style="list-style-type: none"> ▶ Should be visible from and close to the entrance it serves. ▶ The location of long-term bike parking and building entrances should be within 50m. 	<ul style="list-style-type: none"> ▶ Should be visible from and close to the entrance it serves. ▶ Should provide weather-protected parking. ▶ Provision of lighting for all hours of the day. 	<ul style="list-style-type: none"> ▶ High density racks should be used in areas with high bike traffic and limited space, such as in front of schools and transit stations. ▶ High-density racks with high turnover rates should have more than one entrance to help facilitate arriving and departing cyclists.
Security	<ul style="list-style-type: none"> ▶ Access to parked bicycles can be limited individually (as with lockers) or in groups (as with locked bike rooms or other secure enclosures). ▶ Options for access control include user-supplied locks, keys, smart cards, and other technologies. 	<ul style="list-style-type: none"> ▶ Parking should be visible to the public and within eye sight from the destination and in view of a steady flow of pedestrian traffic and near street lamps to minimize safety hazards, vandalism and theft. ▶ Areas with high rates of theft may consider special security features such as specialty racks, tamper-proof mounting techniques or active surveillance. 	<ul style="list-style-type: none"> ▶ All racks must be sturdy and well anchored. ▶ Bike parking should be in well lit areas and areas of high visibility.
Placement	<ul style="list-style-type: none"> ▶ Ideally, the distance between long-term bike parking and building entrances should be within 50m. 	<ul style="list-style-type: none"> ▶ The minimum spacing between horizontally parked bikes is 0.6m by 1.8m with a vertical dimension of 1.9m. 	<ul style="list-style-type: none"> ▶ The minimum spacing between horizontally parked bikes is 0.6m by 1.8m with a vertical dimension of 1.9m. ▶ Racks holding more than two bikes should consider the following spacing guidelines: <ul style="list-style-type: none"> ▪ Minimum 0.45m distance between the rack and wall or object if bikes are parked parallel or minimum 2.5m if bikes are parked perpendicular and have double-sided access ▪ Minimum 0.6m if bikes are parked perpendicular and have single-sided access ▪ Aisle width (space between bikes) of 1.8m ▪ Space of 0.9m between rack ends for a linear series of racks ▶ Racks holding two bikes should consider the following spacing guidelines: <ul style="list-style-type: none"> ▪ Minimum 1.5m between racks perpendicular to wall, curbs or other obstacles ▪ Minimum 0.7m between racks parallel to walls or other obstacles ▪ Distances between individual racks should be a minimum of 2.5m between racks parallel to walls or other obstacles ▪ Distances between individual racks should be a minimum of 1.0m for racks perpendicular to walls or other obstacles

Recommendations

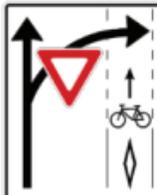
10 Consider developing a bike parking strategy to identify strategic locations throughout Barrie to install bike parking and encourage increased ridership and active transportation usage.

2.4.6 Signage and Wayfinding

Signage provides important wayfinding, regulatory, etiquette and warning information. This can enhance users' awareness of routes, comfort and enjoyment and also mitigate conflict and risk. **Table 11** provides an overview of the proposed signs to be implemented as part of the City's active transportation network

Table 11 - Regulatory, Information and Warning Signage

Sign Type & Dimensions	Description	Application	Reference	Other Information
<p>Bicycle Route Marker Sign</p>  <p>M511 (OTM) 450mm x 450mm</p>	<p>To be used on segments of a shared roadway that are designated as a bicycle route</p>	<ul style="list-style-type: none"> ▶ Signed Bike Route ▶ Paved Shoulder 	<p>OTM Book 18, Section 4.1.1.2 (page 44)</p>	<ul style="list-style-type: none"> ▶ Placed every 2.0km on rural roadways ▶ Placed every 400m to 800m on urban roadways ▶ Installed on the far side of major intersections or other major decision points
<p>Share the Road Sign</p>  <p>Wc-19 (OTM) 600mm x 600mm</p>  <p>Wc-19t(OTM) 300mm x 300mm</p>	<p>Intended to caution all road users on the approach to locations where there may be a change in the road configuration</p>	<ul style="list-style-type: none"> ▶ Signed Bike Route ▶ Paved Shoulder 	<p>OTM Book 18, Section 4.1.1.2 (page 46)</p>	<ul style="list-style-type: none"> ▶ In locations where motorists are discouraged from passing cyclists, (i.e. where lane widths are narrow) the 'Shared Use Single File' sign (Wc-24, OTM) and supplementary tab sign (Wc-24t, OTM) should be installed
<p>Shared Pathway Sign</p>  <p>Rb-71 (OTM) 300mm x 450mm</p>	<p>To be installed along in-boulevard shared-use facilities to indicate that users are expected to share the space</p>	<ul style="list-style-type: none"> ▶ In-boulevard pathways and trails 	<p>OTM Book 18, Section 4.4.1.2 (page 117)</p>	<ul style="list-style-type: none"> ▶ Signs should be mounted with a minimum clearance of 2.5m between the pavement surface and lower edge of the sign ▶ Installed on the far side of major intersections or other major decision points

Sign Type & Dimensions	Description	Application	Reference	Other Information
<p>Reserved Bicycle Lane Sign</p>  <p>RB-91 (TAC) 600mm x 750mm</p>	<p>Used to designate an on-road lane for the exclusive use of cyclists</p>	<ul style="list-style-type: none"> ▶ Bike Lane ▶ Buffered Bike Lane 	<p>OTM Book 18, Section 4.2.1.2 (page 63)</p>	<ul style="list-style-type: none"> ▶ Maximum spacing between signs is 200m ▶ Signs should be installed after every intersection ▶ Oversized version may be used where traffic conditions warrant greater visibility
<p>Reserved Bicycle Lane Sign</p>  <p>RB-92 (TAC) 600mm x 750mm</p>	<p>Used to designate the terminus an on-road lane for the exclusive use of cyclists</p>	<ul style="list-style-type: none"> ▶ Bike Lane ▶ Buffered Bike Lane 	<p>OTM Book 18, Section 4.2.1.2 (page 63)</p>	<ul style="list-style-type: none"> ▶ Should be installed up to 15m upstream of the end of a bicycle lane ▶ Share the Road sign should be installed following the end of a bicycle lane to indicate to users that they are entering a shared space
<p>Turning Vehicles Yield to Bicycles Sign</p>  <p>RB-37 (TAC) 60cm x 75cm</p>	<p>Used at conflict zones where motorists turn across a bicycle facility and are required to yield to cyclists</p>	<ul style="list-style-type: none"> ▶ Bike Lane ▶ Buffered Bike Lane ▶ Cycle Track ▶ In-boulevard pathway 	<p>OTM Book 18, Section 4.3.1.2 (page 110)</p>	<ul style="list-style-type: none"> ▶ The sign should incorporate the type of bicycle facility marking or treatment present in the conflict zone.

To supplement regulatory, information and warning signage, wayfinding signs can be implemented to encourage more residents to engage in active forms of travel and recreation as well as tourists who are not familiar with the City’s active transportation network. The wayfinding concept outlined in the following sections describes how signage, pavement markings and other wayfinding features can improve the usability of the active transportation network.

Destination Information (Advanced Decision) signs provide active transportation users with distances and directions to key destinations. These signs should include distance in kilometres and directional arrows to help users plan their route and inform them of the surrounding area. Destination Information signs should be provided 40 to 50 metres before key decision points and display only a limited amount of information. Signs should feature no more than six destinations, and be ordered from the closest to the farthest destination. **Figure 28** provides examples of Destination Information signs.

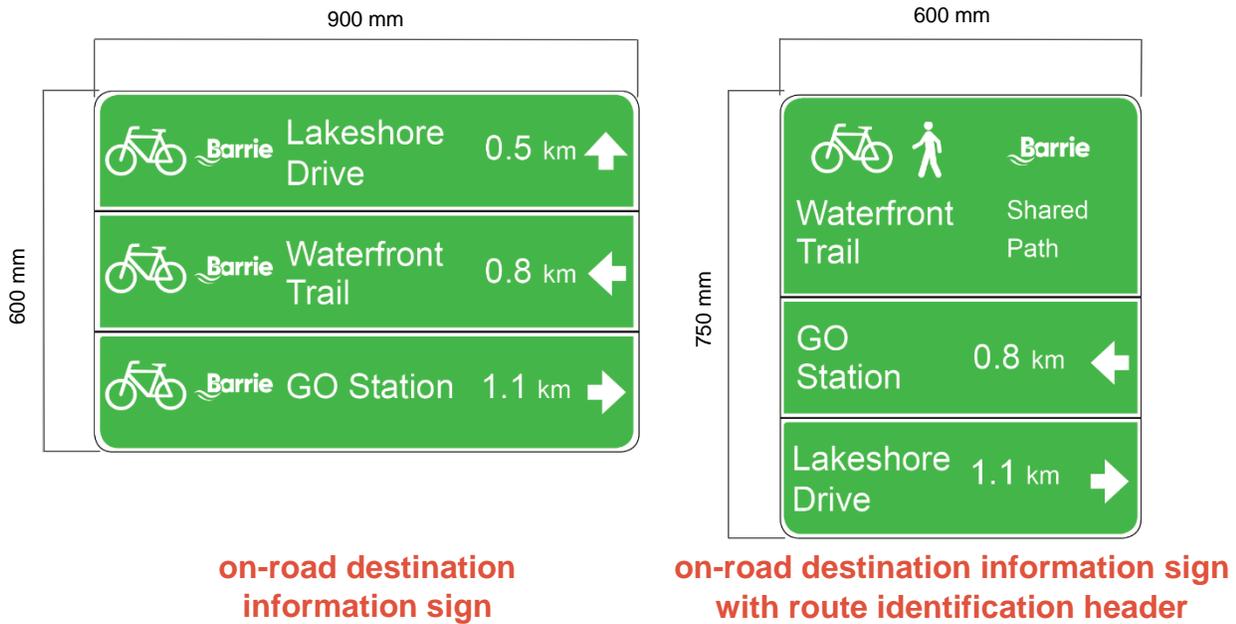


Figure 28 - Example of Destination Information Signage

Route Identification (Confirmation) signs help to assure cyclists that they are on their intended route. They should be provided 20-30 metres after an intersection, a change in facility type, or other major decision points along a route. Additionally, Route Identification signs should be provided at 400 to 800 metre intervals. These signs may be produced in large batches with generic designs to save costs or may be combined with Destination Information signs to include distances to key destinations. **Figure 29** provides examples of Route Identification signs.

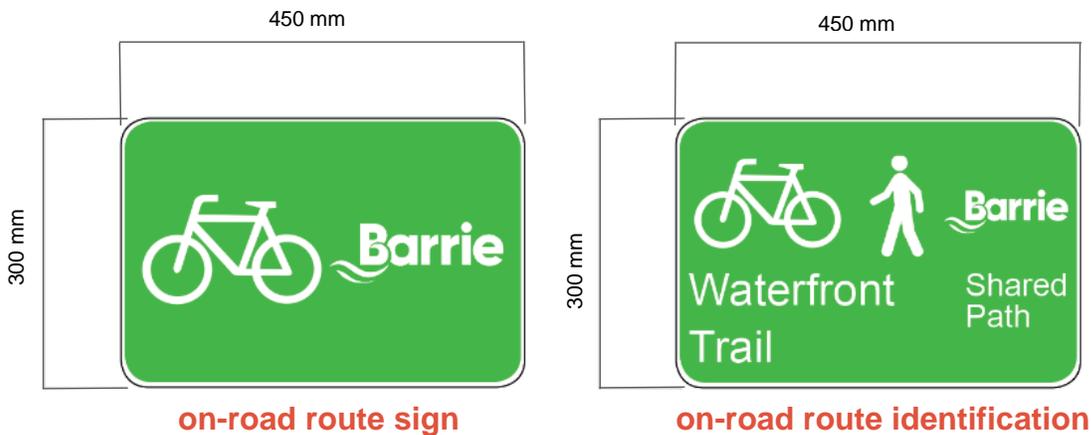


Figure 29 - Example of Route Identification Signage

Directional (Turning) signs help to guide cyclists when routes require a cyclist to make a turn. They should be provided 5-10 metres before an intersection or trail head and/or on the opposite side of an intersection. These signs should feature a bicycle icon and an arrow to direct cyclists to nearby cycling facilities or to significant network connections. Directional signs may be combined with Route Identification signage. **Figure 30** provide examples of Directional signs.

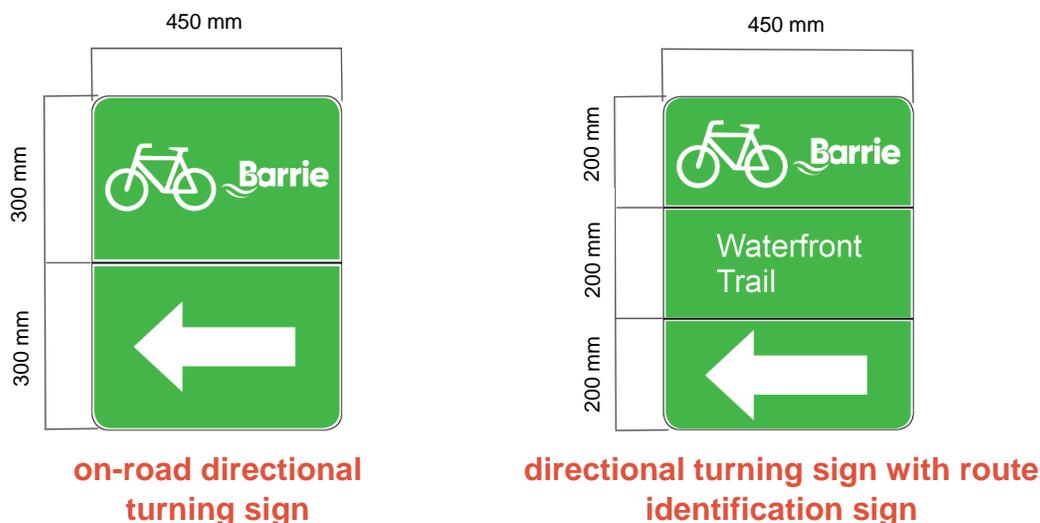


Figure 30 - Example of Route Identification Signage

Additional Wayfinding Support

Wayfinding signage can be complimented with several other supporting features and resources for navigating on and off-road facilities. Pavement markings, trail head maps, and digital/mobile information all play a part in how users plan and navigate their trips.

Pavement Markings and Sharrows can support Directional and Route Identification wayfinding signs. These markings should include a 1.0 metre by 2.0 metre bicycle stencil and 0.1 metres thick by 0.6 metre tall chevrons. The chevrons may be straight to assist Route Identification wayfinding or angled at 45 or 90 degrees to support Directional wayfinding. Sharrows with turn directions should be provided to guide users from secondary to primary routes or to guide users to stay on a primary route. **Figure 31** provides examples of pavement markings to support wayfinding signage.

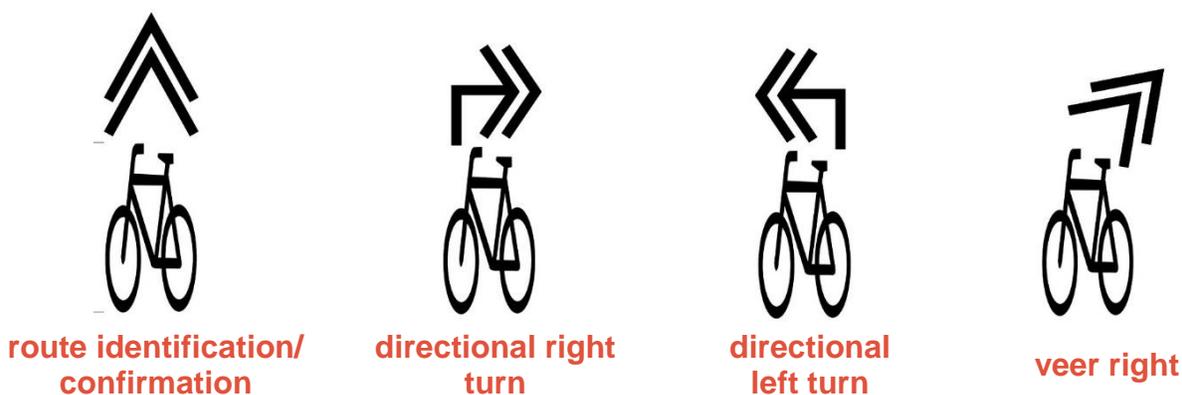


Figure 31 - Example of pavement markings to support wayfinding

Trail Head Maps are an important resource for pedestrians and cyclists to understand a trail system's connectivity to key destinations and to identify locations that may have accessibility challenges. Trail heads provide the appropriate information to give residents and visitors confidence to explore the trail system. These maps should highlight connections to key destinations, approximate travel times, and points of interest along the trail. Signage should have high tonal contrast and design and positioning that meets AODA requirements. **Figure 32** illustrates an example of AODA compliant trailhead signage.

A recreational trail must have a trail head at major access points that provide the following information:

- ▶ Length and surface type of trail;
- ▶ Average and minimum width of trail;
- ▶ Average and maximum running slope and cross slope; and
- ▶ The location of amenities.



Figure 32 - Example of AODA Compliant Trailhead Sign (Aurora, ON)
Source: WSP, 2017

Recommendations

11

Develop a branded signage and wayfinding strategy for on and off-road active transportation routes throughout Barrie.

2.4.7 Accessibility

Ensuring that all users can comfortably and safely use the active transportation network is important to include in the designing of the network and selecting facility types. Selecting appropriate materials and locations of routes is important when designing an active transportation route to be accessible to multiple modes and users. When designing an accessible active transportation route, there is no one-size-fits-all solution. Guidelines such as the Accessibility Standards for the Built Environment can play a key role in creating context-specific design of facilities that can accommodate people of all ages and abilities to use active transportation.

It is important to note that the Accessibility Standards for the Built Environment only apply to new construction and extensive renovation. It is not required for the design of on-road cycling facilities but the standards should be referenced and used as a guide for off-road road facilities. Depending on the environment and type of trail experience desired, it may not always be possible to implement an accessible trail and in such cases, municipal staff should notify all potential users to ensure they are aware of the conditions and anticipated experience of the facility.

City staff are expected to seek input from the Accessibility Advisory Committee when designing, planning and implementing new active transportation facilities or improving existing trails and facilities. Barrie's Accessibility Advisory Committee provides direction to Council when creating new or making substantial changes to existing facilities to ensure that they meet the needs of people of all abilities. Barrie's Waterfront Trail and North Shore Trail are both accessible trail options for people of all ages and abilities to enjoy.



Accessible Trail in Ontario

Source: <http://www.ontariotrails.on.ca/learn/trail-info/accessibility-a-guide-for-accessible-web-design>

3. IMPLEMENTATION

Successful implementation of the recommendations contained in the AT Strategy will continue beyond the lifespan of the study. To achieve the City's active transportation mode share target of 12% by 2041, implementation of the AT Strategy should be coordinated among the City departments and its partners. The strategy is intended to provide the supportive resources and tools to guide future planning, design, implementation and operations of active transportation in the City of Barrie.

The recommended implementation plan in the AT Strategy builds on the process that was used to complete the 2014 MMATMP as well as lessons learned from City staff since that time. The information contained in this chapter is intended to form a realistic and flexible strategy that adapts to on-going changes, future opportunities, and available resources as well as new funding and partnership opportunities. The following sections provide an overview of the proposed phasing plan, how it was developed, the estimated costs associated with implementation and maintenance, outreach initiatives and supportive tools to implement the recommendations, facilities and initiatives contained in the AT Strategy.

What is contained in Chapter 3?

3.1	An overview of the phasing plan including interim projects, priority projects and proposed road diets
3.2	An overview of the approach that was used to cost the active transportation network and preliminary capital costs
3.3	A summary of proposed outreach initiatives meant to support implementation of the AT Strategy
3.4	Implementation tools and considerations to help guide day-to-day decision making and future planning
3.5	A summary of maintenance best practices and future considerations
3.6	An overview of potential funding sources to support the implementation of the AT Strategy

3.1 Proposed Phasing

The implementation of the City of Barrie's AT Strategy is organized into three phases. The proposed phasing plan is meant to be flexible and used to inform future decision-making and prioritization for active transportation projects. The proposed phasing is not a commitment to funding or schedule. It is recommended that City staff review the AT Strategy on an annual basis as part of the budgeting process to determine available budgeting and required resources to continue implementation of the recommendations contained in the strategy. The proposed phasing horizons for the AT Strategy include:

short term
2019 to 2023

medium term
2024 to 2031

long term
2032 to 2041

The short and medium term horizons identified in the AT Strategy are consistent with the first phase of implementation identified in the TMP (2019 to 2031). The long term horizon is consistent with second phase of implementation identified in the TMP (2032 to 2041).

The proposed phasing for the AT Strategy is based on a number of considerations including:

- ▶ **Capital Projects:** active transportation projects can be coordinated and more efficiently implemented with planned roadway improvements identified in capital plans;
- ▶ **Plan Objectives:** the objectives identified in section 1.4.4 were considered when identifying the proposed phasing of active transportation routes and facilities;
- ▶ **Input Received:** timelines and preferences provided by residents and stakeholders through consultation; and
- ▶ **Staff Support:** priorities and preferences expressed by City staff during the study development process.

Maps 5a and 5b illustrate the proposed short term phasing for the City's active transportation network. **Maps 6a and 6b** illustrate the proposed medium term phasing for the City's active transportation network. Maps that illustrate the full built-out active transportation network (short term, medium term and long term) are contained in **Technical Appendix B2. Table 12** summarizes the proposed facility types by each phase.



TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE

SEE
INSET

INSET

0 250 500
Metres

TOWNSHIP OF ESSA

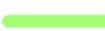
TOWN OF INNISFIL

Existing Facilities

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

*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.

Proposed Phasing

-  Short Term (Year 2019 - 2023)

Other AT Network Features

-  Proposed Route (medium & long term)
-  Connection to Surrounding Municipality

Other Features

-  Secondary Plan Area

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

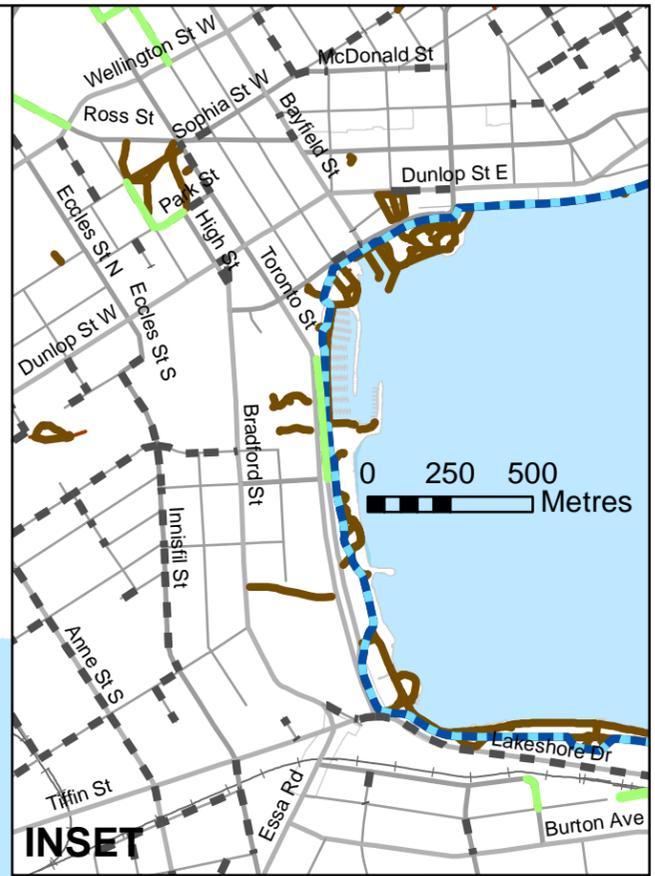
Map 5a
Draft Short Term Phasing (2019 - 2023): Cycling and Multi-use Trail Network
City of Barrie Transportation Master Plan





TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE



SEE
INSET

INSET



Existing Facilities

- Waterfront Multi-use Trail
- In-Boulevard Pathway
- Road with One or Two Sidewalks
- Off-road Trails
- Hiking Trails

Phasing

- Short term (Year 2019 - 2023)

Other AT Network Features

- Proposed Route (medium & long term)
- Connection to Surrounding Municipality

Other Features

- Secondary Plan Area

*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.
Hiking trails include trail types 4 and 5 as defined in the Trails Master Plan (Appendix E) and are considered hiking trails unless otherwise noted as a mountain bike trail.

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



Map 5b
Draft Short Term Phasing (2019 - 2023): Sidewalk and Multi-use Trail Network
City of Barrie Transportation Master Plan





TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE



SEE INSET

INSET

TOWNSHIP OF ESSA

TOWN OF INNISFIL

Existing Cycling Network

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

*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.

Proposed Phasing

- Medium Term (Year 2024 - 2031)

Other Network Features

- Proposed Route (long term)
- Connection to Surrounding Municipality

Other Features

- Secondary Plan Area

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



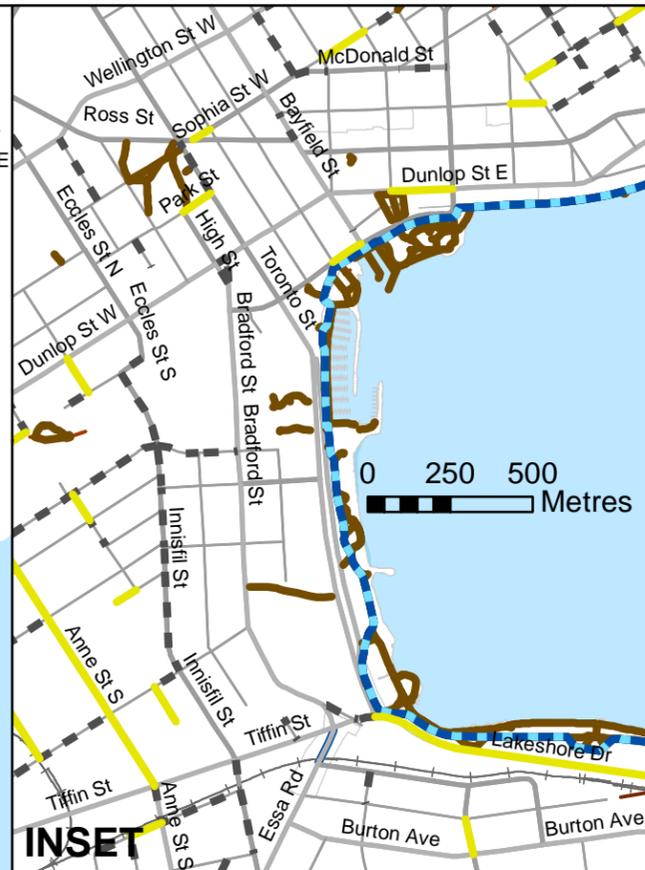
Map 6a
Draft Medium Term Phasing (2024 - 2031): Cycling and Multi-use Trail Network
City of Barrie Transportation Master Plan





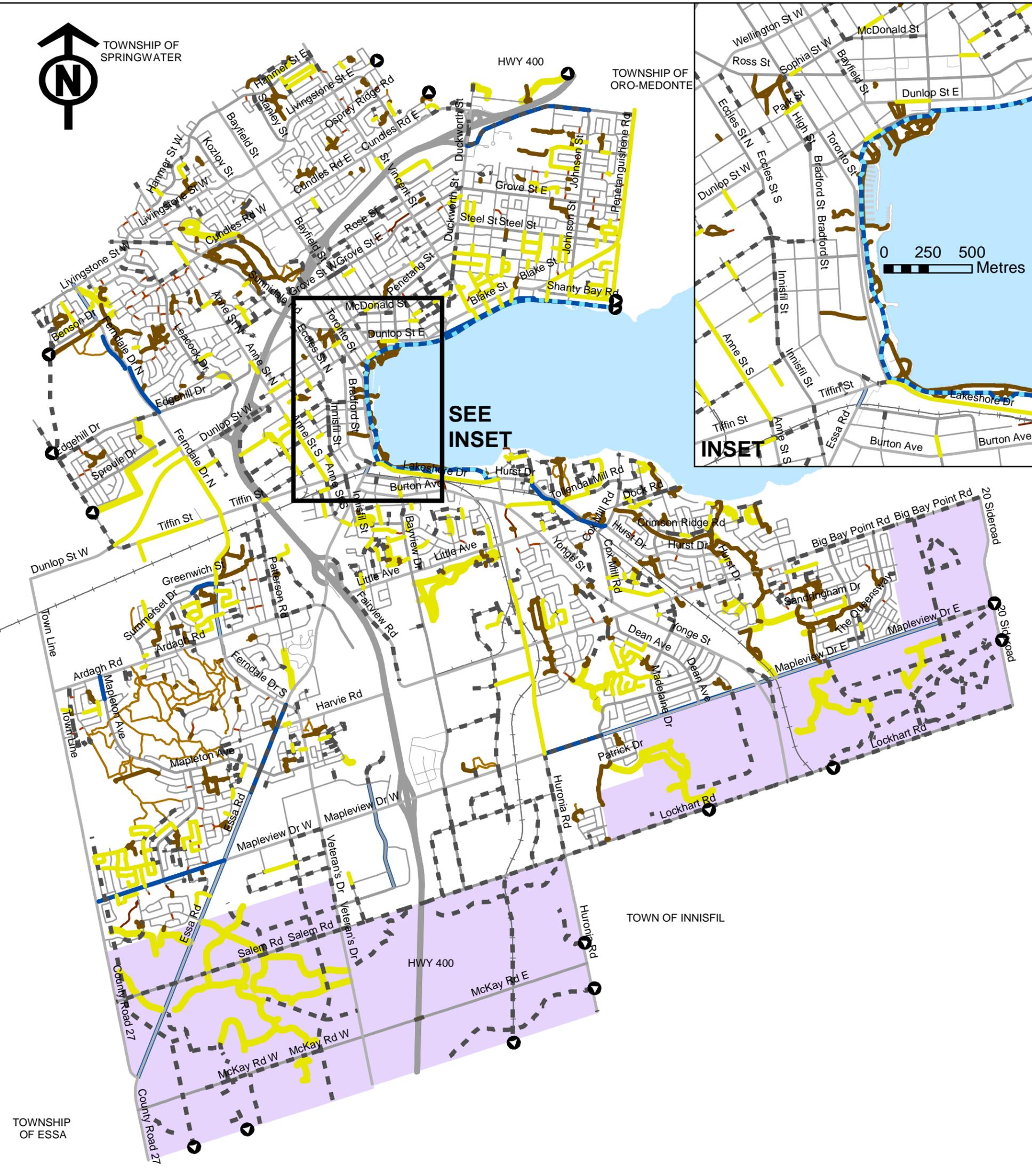
TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE



SEE INSET

INSET



TOWNSHIP OF ESSA

TOWN OF INNISFIL

Existing Cycling Network

- Waterfront Multi-use Trail
- In-Boulevard Pathway
- Road with One or Two Sidewalks
- Off-road Trail
- Hiking Trail

*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.
Hiking trails include trail types 4 and 5 as defined in the Trails Master Plan (Appendix E) and are considered hiking trails unless otherwise noted as a mountain bike trail.

Proposed Phasing

- Medium Term (Year 2024 - 2031)

cyclingOther Network Features

- Proposed Route (long term)
- Connection to Surrounding Municipality

Other Features

- Secondary Plan Area

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

Map 6b
Draft Medium Term Phasing (2024 - 2031): Cycling and Multi-use Trail Network
City of Barrie Transportation Master Plan



Table 12 - Barrie AT Phasing

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

The exact timing of projects should be determined by City staff and Council as they move forward with the implementation of the AT Strategy. It is recommended that the implementation plan identified in the AT Strategy 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.

The proposed implementation plan is not a commitment to funding or monies; rather it is intended to inform future decision making and planning processes. There are select locations in the City's preferred active transportation network, where there is no planned capital or road projects and the proposed on-road facility type may necessitate road reconstruction and / or property acquisition. These locations include:

Location	Proposed Facility Type
Yonge Street (Mapleview Drive East – Minet's Point Road)	Cycle Track
Big Bay Point Road (Yonge Street – Hurst Drive)	Cycle Track
Big Bay Point Road (Huron Road – Legott Avenue)	Cycle Track
Bayfield Street (Cundles Road East – City of Barrie boundary)	Cycle Track
Anne Street (Tiffin Street – Dunlop Street West)	Cycle Track

It is not recommended that the City undertake any road projects for the sole purpose of implementing on-road cycling facilities as there could be significant impacts to the roadway platform including drainage, catch basins and leads as well as utility / hydro poles and surrounding landscaping. It is recognized that implementation of an AT facility type along these corridors may not happen until the long term horizon or beyond. In these locations, it is recommended that City staff protect the corridor to implement a separated facility type that is consistent with the roadway characteristics and OTM Book 18 guidelines such as a uni-directional cycle track on both sides of the road or an two-way (bi-directional) in-boulevard pathway along one side of the road.

As such, it is recommended that when the City move forward from the master planning stage to detailed design, that staff undertake a corridor study and a Municipal Class Environmental Assessment (EA) study on roads that would require any increase in the right-of-way width, to determine the feasibility of the proposed improvement and the preferred design treatment(s). For example, City staff should consider undertaking a corridor study on Bayfield Street before any future redevelopment occurs, to provide details on the future land-use planning context including the streetscape, density, land-use designations and built-form goals.

As part of this study, it is recommended that City staff assess the feasibility to construct a trail bridge parallel to the Highway 400 / Bayfield interchange that would cross over the Highway 400 from the terminus of Toronto Street to Coulter Street. The proposed trail bridge could provide an alternate and parallel active transportation connection from Bayfield Street and connect users to the existing trails in the natural / open space north of Highway 400, the proposed in-boulevard pathway along Coulter Street, the future planned residential area on the north-west corner of Coulter Street and Bayfield Street, Hillcrest Public School and future development planned in the current Barrie YMCA location. Examples of existing trail bridges over 400-series highways and valley-lands in Ontario are illustrated below.



Figure 33 - Examples of Trail Bridge Crossings over 400-series highways and valleylands

Source: The Great Trail bridge crossing over Highway 401 in Cambridge (top left, top right), Herb Gray Parkway Trail bridge crossing over Highway 401 in Windsor (bottom left), Thames Valley Parkway trail bridge in London (bottom right)

Following a corridor study, City staff should undertake a Municipal Class EA study to assess potential impacts to the road right-of-way and the suggested roadway improvements. Alternatively, City staff may choose to conduct the studies as a two-phase Corridor Planning and Municipal Class EA Study.

3.1.1 Interim Projects

Though full build-out is the preferred outcome for the City's active transportation network, implementation of an interim facility could be considered to be more feasible 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 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 in the interim. Urban shoulders are typically marked with a white painted edge line to designate an operating space for cyclists and supplemented with Bicycle Route Marker sign (OTM M511). Urban shoulders are not bicycle lanes; vehicles are permitted to park on roads where there is an urban shoulder.

Urban shoulders represent a facility type that could be upgraded as the plan develops and evolves over time. When the plan is next updated, urban shoulders should be reassessed to confirm whether they can be upgraded to a permanent / designated facility such as bike lanes. An urban shoulder does not impact on-street parking, however, this treatment can be supplemented with signage to restrict on-street parking during peak times such as school drop-off and pick-up, and weekday a.m. and p.m. peak commuting hours. The intent of the restricted parking times is to encourage people (specifically youth and children) to engage in active modes of travel to and from school. In the future, the City may choose to undertake a feasibility study and / or parking demand study to assess the viability to remove on-street parking and implement a formal, designated cycling facility such as a bike lane. As part of these studies, it is recommended that City staff consult and engage with residents, businesses and local stakeholders to better understand the demand and use of on-street parking along a particular corridor.

Figure 34 illustrates the proposed bike lanes and urban shoulders that are recommended to form part of the City's active transportation network. City staff are recommended to use this figure to inform the location of potential interim projects including:

- ▶ Proposed bike lanes that could be implemented as urban shoulders in the interim; or
- ▶ Proposed urban shoulders that could be upgraded to bike lanes should opportunities arise in the future (e.g. reduced demand for on-street parking).



Figure 34 - Interim Active Transportation Projects

3.1.2 Network Priorities

As part of the implementation plan for the City of Barrie’s AT Strategy, a number of priorities have 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. The proposed priority projects are illustrated in **Figure 35**. A summary of the proposed priority projects is provided in **Table 13** and **Table 14** including a rationale and support for each project.

Table 13 - Short Term Phasing Priorities

Route Description	Facility Type	Rationale	Phasing Support			
			Capital Plan	AT Objectives	Public Input	Staff Support
1. Harvie Road from Bayview Drive to Emms Drive	<ul style="list-style-type: none"> ▶ In-boulevard pathway ▶ Bike lane 	<ul style="list-style-type: none"> ▶ Leverage planned roadway work identified in the City’s capital plan - reconstruction and widening scheduled for 2019-2021. ▶ Connects to existing bike lanes on Ferndale and existing in-boulevard pathway on Essa. ▶ Connects to Short Term Priority Project #2 and Medium Term Priority Project #2 to provide a continuous loop and access to Allandale Waterfront GO Station. 	✓	✓		
2. Tiffin Street from Ferndale Drive to Essa Street Essa Street from Tiffin Street to Gowan Street Gowan Street / Milburn Street from Essa Street to Burton Avenue	<ul style="list-style-type: none"> ▶ In-boulevard pathway ▶ Signed Route with sharrow 	<ul style="list-style-type: none"> ▶ Key east-west linkage that provides access from the City boundary to the waterfront and Allandale GO Station. ▶ Connects to existing facilities including bike lanes on Ferndale and the Waterfront Trail. ▶ Connects to Short Term Priority Project #1 and Medium Term Priority Projects #2 and #3 to provide a continuous and extensive loop through the City. 		✓	✓	
3. Sunnidale Road / Ross Street from Cundles Road West to Bayfield Street Bayfield Street from Ross Street to Collier Street Collier Street from Bayfield Street to Mulcaster Street	<ul style="list-style-type: none"> ▶ Buffered bike lane ▶ Bike lane 	<ul style="list-style-type: none"> ▶ Section along Sunnidale Road is part of the Great Trail (Trans Canada Trail). ▶ Key north-south link through the City that connects residential areas, downtown Barrie, and the waterfront. ▶ Connects to existing facilities including off-road trails in Arboretum Sunnidale Park, Queen’s Park and the Waterfront Trail. ▶ Connects with Short Term Priority Project #5 to provide a loop route though the north area of the City and connect residents to commercial areas, the downtown, City Hall, Royal Victoria Hospital and Georgian College. 		✓	✓	
4. Livingstone Street West from Koslov Street to Cundles Road	<ul style="list-style-type: none"> ▶ Buffered bike lane 	<ul style="list-style-type: none"> ▶ Key east-west link along the north of the City. Existing bike lanes recommended to be upgraded to buffered bike lanes through a road diet (re-marking travel lanes). Road diet from Stanley Street to Cundles Road planned for 2019. ▶ Connects residential areas to schools, parks, and a community centre. ▶ Connects to Medium Term Priority Project #3 and provides a route for residents along Livingstone Street to access the Allandale Waterfront GO Station. 	✓	✓	✓	

Route Description	Facility Type	Rationale	Phasing Support			
			Capital Plan	AT Objectives	Public Input	Staff Support
<p>5. Duckworth Street from Bell Farm Road to Penetang Street</p> <p>Penetang Street / Mulcaster Street from Duckworth Street to the Waterfront Trail</p>	<ul style="list-style-type: none"> ▶ Buffered bike lane ▶ Bike lane 	<ul style="list-style-type: none"> ▶ Connects to the existing buffered bike lanes on Duckworth Street (through the Highway 400 interchange). ▶ Connects to the existing in-boulevard pathway along Ring Road – linkage to Royal Victoria Hospital and Georgian College. ▶ Connects to Medium Term Priority Project #4 to provide a loop route through the north-east area of the City. 	✓	✓		
<p>6. Hurst Drive from Minet’s Point Road to Brennan Avenue</p>	<ul style="list-style-type: none"> ▶ In-boulevard pathway 	<ul style="list-style-type: none"> ▶ Completes a gap in the active transportation network – existing in-boulevard pathway east of Brennan Avenue and the Waterfront Trail west of Minet’s Point Road. ▶ Provides a connection to the Allandale GO Station. ▶ Based on direct input received from City staff to complete gap in the short term. 		✓	✓	✓



Cyclist and pedestrian along Penetang Street west of St. Vincent Street
 Source: WSP, 2018

Table 14 - Medium Term Phasing Priorities

Route Description	Facility Type	Rationale	Phasing Support			
			Capital Plan	AT Objectives	Public Input	Staff Support
1. Study for the proposed off-road trail bridge to cross over Highway 400 from Coulter Street to current terminus of Toronto Street	▶ Off-road trail	▶ Study is proposed to begin in the medium term to assess feasibility of the proposed trail bridge crossing of Hwy 400. Implementation of a trail crossing is not expected to begin until the long term.		✓		✓
2. Bayview Drive from Burton Avenue to Big Bay Point Road	▶ Buffered bike lane ▶ Bike lane	▶ Leverage planned roadway work identified in the City's capital plan – widening in 2023. ▶ Connects to two schools and Allandale Recreation Centre. ▶ Connects to Short Term Priority Projects #1 and #2 to provide a continuous loop and linkage to Allandale Waterfront GO Station.	✓	✓		
3. Anne Street from Tiffin Street to Carson Road	▶ Buffered bike lane	▶ Key north-south linkage through the City that connects residential areas to commercial nodes, schools, parks and existing trails. ▶ Connects to Short Term Priority Project #2 to provide direct access to the City's waterfront and Allandale GO Station.		✓	✓	
4. Penetanguishene Road from Georgian Drive to Blake Street Blake Street / Collier Street from Penetanguishene Road to Mulcaster Street	▶ In-boulevard pathway ▶ Buffered bike lane ▶ Bike lane	▶ Connects to the existing buffered bike lanes on Duckworth Street (through the Highway 400 interchange). ▶ Connects residents to the City's downtown area and waterfront amenities (trails and parks). ▶ Connects to Short Term Priority Project #4 to provide a loop route through the north-east area of the City.		✓		
5. Yonge Street from Minet's Point Road to Lockhart Road	▶ Cycle track	▶ Key north-south linkage through the south-east area of the City that connects residents to the Barrie GO Station, commercial nodes and surrounding municipalities (Town of Innisfil). ▶ Part of the Province-wide Cycling Network.		✓	✓	

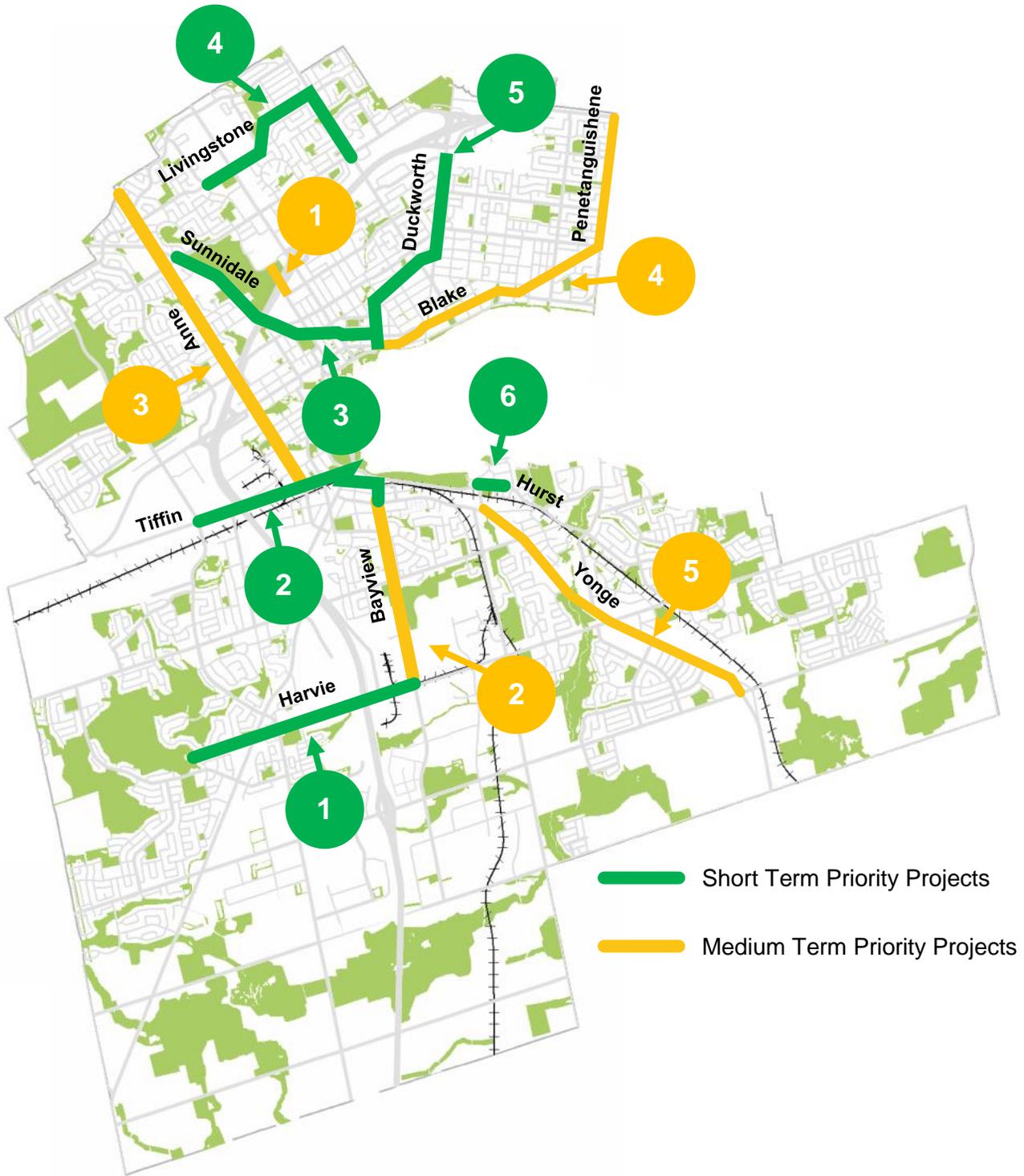


Figure 35 - Proposed Priority Projects for the Short and Medium Terms

3.1.3 Road Diets

There are a number of routes proposed as part of the City's active transportation network that are recommended to be implemented through a road diet. A road diet includes a redistribution of roadway space whereby the number of travel lanes are reduced or travel lane widths are narrowed and reallocated to other modes such as cycling.

Road diets have been identified only on roads where data indicates that a reduction in vehicle lanes is not expected to have an impact on the overall capacity and / or demand of motor vehicle traffic. However, it is important to note that road diets may influence travel behaviours and preferences (e.g. motorists may choose to use an alternate route) and have a natural calming effect on a roadway. **Table 15** provides an overview of each road that is recommended for a road diet to implement the preferred facility type as part of the City's active transportation network.

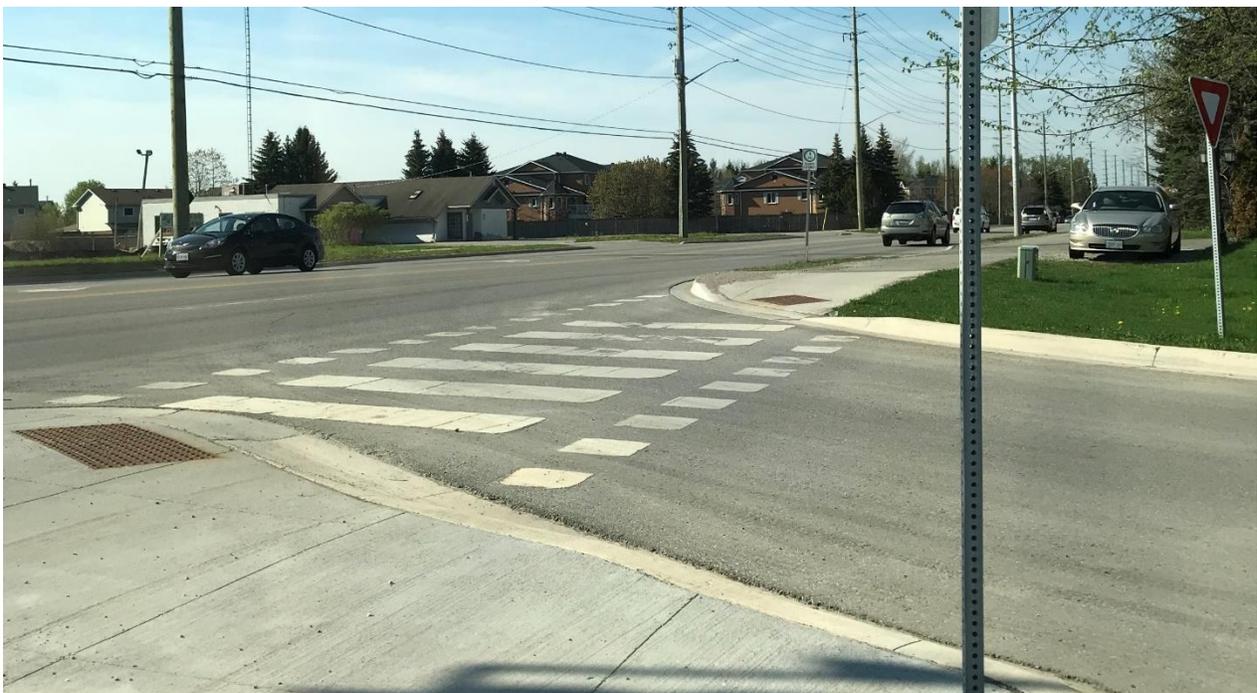
Table 15 - Road Diet Locations

Route Description	Length KM	Proposed Facility	Rationale
St. Vincent Street from Grove Street East to Bell Farm Road	0.5	Buffered Bike Lane	<ul style="list-style-type: none"> ▶ Posted speed at 50 km/h and AADT is 3,000 to 9,500. OTM Book 18 step 1 results indicate a designated facility. ▶ Key north-south corridor that provides access to Cundles and crosses Highway 400.
St. Vincent Street from Cundles Road East to Livingstone Road East	1.0	Buffered Bike Lane	<ul style="list-style-type: none"> ▶ Posted speed at 50 km/h and AADT is 7,800 to 13,000. OTM Book 18 step 1 results indicate a designated or separated facility. ▶ Key north-south corridor that provides access to Cundles including a number of schools and commercial areas along Cundles.
Hanmer Street West from Anne Street to Finlay Road	1.0	Bike Lane	<ul style="list-style-type: none"> ▶ Posted speed at 40 km/h and AADT is 3,000. OTM Book 18 step 1 results indicate a shared or designated facility. ▶ Sufficient roadway width to narrow travel lanes to implement bike lanes. ▶ Connect to existing bike lanes between Koslov and Bayfield to provide continuous facility along Hanmer Street.
Hanmer Street East from Stanley Street to Bayfield Street	0.5	Bike Lane	<ul style="list-style-type: none"> ▶ Posted speed at 40 km/h and AADT is 4,000 to 6,500. OTM Book 18 step 1 results indicate a designated facility. ▶ Sufficient roadway width to narrow travel lanes to implement bike lanes.

Route Description	Length KM	Proposed Facility	Rationale
Livingstone Street East from Stanley Street to St. Vincent Street	1.0	Buffered Bike Lane	<ul style="list-style-type: none"> ▶ Connect to existing bike lanes west of Bayfield. ▶ Posted speed at 50 km/h and AADT is 1,500 to 6,000. OTM Book 18 step 1 results indicate a shared or designated facility. ▶ Implement buffered bike lanes by undertaking a road diet from 4 lanes to 2 lanes with a centre turn lane.
Big Bay Point Road from Prince William Way to Hurst Drive	1.5	Buffered Bike Lane	<ul style="list-style-type: none"> ▶ Connect to existing bike lanes on Hurst Drive ▶ Posted speed at 50 km/h and AADT is 3,000 to 15,000. OTM Book 18 step 1 results indicate a designated or separated facility.
Madeline Drive from Yonge Street to Mapleview Drive	1.2	Bike Lane	<ul style="list-style-type: none"> ▶ Posted speed at 50 km/h and AADT is 2,400 to 3,800. OTM Book 18 step 1 results indicate a shared or designated facility. ▶ Sufficient roadway width to narrow travel lanes to implement bike lanes
Collier Street from Bayfield Street to Blake Street	1.2	Buffered Bike Lane	<ul style="list-style-type: none"> ▶ Posted speed at 50 km/h and AADT is 3,200 to 9,000. OTM Book 18 step 1 results indicate a designated facility. ▶ Key corridor that provides access to City Hall and downtown. ▶ Input from Town staff to implement buffered bike lanes along Collier Street.
Wellington Street from Anne Street to Ross Street	1.0	Buffered Bike Lane	<ul style="list-style-type: none"> ▶ Posted speed at 40 km/h and AADT is 9,000 to 11,000. OTM Book 18 step 1 results indicate a designated or separated facility. ▶ Provides access to key corridors such as Anne Street and Sunnidale Road.
Dean Avenue from Big Bay Point Road to Madelaine Drive	1.0	Bike Lane	<ul style="list-style-type: none"> ▶ Posted speed at 40 km/h and 50 km/h and AADT is 3,000 to 5,000. OTM Book 18 step 1 results indicate a shared or designated facility. ▶ Implement bike lanes by undertaking a road diet from 4 lanes to 2 lanes with a centre turn lane.

Recommendations

12	Adopt the proposed phasing plan identified in Maps 5a and 5b and Maps 6a and 6b as a guide for staff / decision makers when moving forward to implement the active transportation network.
13	Undertake corridor studies and Municipal Class Environmental Assessment (EA) Schedule C studies on roads that would require any increase in the right-of-way width, to determine the feasibility of the proposed improvement and the preferred design treatment(s).
14	Consider undertaking a two-phase Corridor Planning and Municipal Class EA Study for Bayfield Street to assess the future land-use planning and transportation context including the streetscape, density, land-use designations and built-form goals.
15	Refer to Figure 34 to inform the implementation of urban shoulders in the interim, until such time a more formal and designated cycling facility can be implemented.
16	Review and utilize the proposed active transportation priorities identified in Table 13 and Table 14 (also illustrated on Figure 35) on an annual basis to identify annual projects which can be implemented as part of large-scale infrastructure projects or should additional budget arise as part of annual Council budgeting processes.



Existing mixed cross-ride in Barrie

Source: WSP, 2018

3.2 Costing – Investing to Improve AT in Barrie

The recommendations contained in the AT Strategy will require investment and funding to support implementation and on-going maintenance. The following sections outline the approach that was used to cost the active transportation network as well as an overview of preliminary capital costs.

3.2.1 How was the network costed?

The proposed active transportation network has been costed and organized based on two funding streams – growth funded and existing benefit (unfunded). These funding streams reflect the City's current budgeting processes, are consistent with the Development Charges (DC) By-law and are meant to adapt to on-going changes and future opportunities that may arise. The funding streams are described below.

growth funded

Assumes projects will partially funded by development charges and includes routes within the City's secondary plan areas (Salem Secondary Plan Area and Hewitt's Secondary Plan Area). The City's Official Plan identifies the location of secondary plan areas (<https://www.barrie.ca/City%20Hall/Planning-and-Development/Pages/Official-Plan.aspx>).

existing benefit

Assumes projects will not be funded through development charges and will require general tax base or other level of government to fund implementation. These routes are intended to serve density within existing areas of Barrie and could include routes located on local roads within local neighbourhoods.

The following assumptions were applied when calculating the proportion of growth funding and existing benefit for routes included in the City's active transportation and trails network:

Routes in secondary plan area

- ▶ Assumes projects will be 85% funded through development charges and 15% of projects will be funded through the general tax base or other sources. Includes routes located within the Salem Secondary Plan Area and Hewitt's Secondary Plan Area.

Projects in former Barrie

- ▶ Assumes projects will be 65% funded through development charges and 35% of projects will be funded through the general tax base or other sources.
- ▶ Assumes that all signed bike routes in former Barrie will not be funded through development charges and will require additional sources to fund implementation.

Sidewalks

- ▶ Assumes all sidewalks will be 95% funded through development charges and 5% will be funded through the general tax base or other sources.

Trails in former Barrie

- ▶ Assumes all trails in former Barrie will be 65% funded through development charges and 35% will be funded through the general tax base or other sources. Alternatively, trails located within the City's secondary plan areas will be 85% funded through development charges and 15% will be funded through general tax base or other sources.

Outreach

- ▶ Any supportive outreach and programming that has been identified (refer to section 3.3 for details) to support active transportation and trails in Barrie assumes 65% of funds will be provided through development charges and 35% of the cost will be funded through the general tax base or other sources.

A funding stream was identified for each proposed route included in the City's active transportation network. An assessment of the different streams revealed the proportion of routes that would be funded through development charges compared to the general tax revenue. The following section provides an overview of the assumptions that were applied to develop preliminary capital costs for the City's active transportation network and a summary of these costs.

3.2.2 How much will it cost to build?

The estimated cost to implement the City's active transportation network was calculated using a set of unit prices and assumptions derived from recent tenders and projects of similar scope in Ontario. The unit prices have been reviewed by City staff and adjusted where necessary to reflect typical prices for infrastructure projects in Barrie. The unit prices are in 2019 dollars and are presented in **Technical Appendix B3**. Select unit prices used to cost the network are highlighted in this appendix and should be used as a reference as projects move from the master planning stage through to detailed design and implementation.

The level of effort to implement the City's active transportation network will vary on a project-by-project basis as some projects could require additional work compared to other projects included in cost estimates. The unit prices:

- ▶ Are intended to be used for functional design purposes as they only include the installation of facilities and do not include contingency, design and approvals costs;
- ▶ Do not include the cost of property acquisitions, signal modifications, utility relocations, major roadside draining works, or costs associated with site-specific projects such as bridges, railway crossings, retaining walls, and stairways, unless otherwise noted;
- ▶ Assume typical environmental conditions and topography; and
- ▶ Do not include applicable taxes and permit fees – which are considered additional.

Using the unit prices identified in **Technical Appendix B3**, a preliminary capital cost has been calculated to implement the active transportation network. **Table 16** provides a summary of the capital costs by funding stream. A detailed breakdown of the capital costs by facility types and phase is provided in **Technical Appendix B3**.

Table 16 - Estimated Active Transportation Network Capital Costs

Facility Types	Growth Funding ¹	Existing Benefit ¹
Cycling and Multi-Use Facilities		
▶ Signed Routes	\$21,719	\$64,415
▶ Urban Shoulders	\$6,550	\$15,764
▶ Bike Lanes	\$1,717,514	\$1,037,620
▶ Buffered Bike Lanes	\$2,333,884	\$2,431,029
▶ Cycle Tracks	\$27,299,986	\$8,041,144
▶ In-boulevard Pathways	\$13,910,806	\$8,085,556
Off-road Trails		
▶ Trails (Type 1-3)	\$17,441,283	\$1,879,109
▶ Trails (Type 4-5)	\$682,066	\$91,365
▶ Trail Bridge/ Underpass	\$8,695,408	\$4,682,143
Sidewalks	\$48,140,674	\$2,533,719
Outreach ²	\$715,000	\$385,000
Sub-total	\$120,964,886	\$29,246,864
	Total Cost	\$150,211,754

Notes:

1. The facility type costs in the Growth Funding and Existing Benefits columns includes costs for design and approvals (30%), contingency (30%) and HST (1.76%)
2. Costs assumes a 65% split for Growth Funding and 35% split for Existing Benefit. Refer to section 3.3 for additional details on the recommended outreach strategy.

The total estimated cost to implement the City of Barrie's AT Strategy is approximately \$150 million over 20+ years. This includes the cost for design and approvals (30%), contingency (30%) and HST (1.76%) . Approximately 81% of the total cost is anticipated to be funded by growth related projects such as the redevelopment of the City's secondary plan areas.. The cost for Existing Benefit assumes projects will not be funded through development charges and will require additional sources to fund implementation (e.g. additional capital investments, partnerships, external funding opportunities).

Detailed costing information is contained in **Technical Appendix B3**. It is recommended that this appendix be used as a tool by City staff to track implementation of the network and to inform future budgeting / decision making. Though the preliminary costing is meant to inform future decision making, the phasing and costing is not meant to be prescriptive.

Recommendations

- 17 Use the cost spreadsheet in **Technical Appendix B3** as a reference to track future implementation, budgeting and costing of the proposed active transportation network.
- 18 Use the preliminary costing to inform future budgeting decisions on an annual basis. As needed, the costing should be updated to reflect more accurate estimates based on inflation and other external factors.
- 19 Report back to Council on an annual basis to provide an update on the implementation of new infrastructure and to provide Council with an outlook for anticipated projects to be completed in the following year.

3.3 Outreach – Changing the Culture for AT

A successful AT Strategy is more than routes and facilities; it should encompass supportive programming and initiatives to influence behaviour change by residents and visitors in Barrie. The following sections provide an overview of the proposed outreach initiatives including the “Four E’s” approach which is intended to support the City’s active transportation network and help achieve the objectives identified in section 1.3.6.

3.3.1 Four E’s Approach

The Four E’s refer to initiatives, strategies and policies which address encouragement, education, evaluation and enforcement of active transportation. Collectively, the Four E’s are intended to support the preferred active transportation network and help achieve the City’s 12% active transportation mode share target by 2041. **Table 17** provides a description and examples for each of the Four E’s.

Table 17 - Overview of the Four E’s

	What...	How...
Educating +	The increase of knowledge and understanding of proper techniques, practices and opportunities related to cycling and trail use	<ul style="list-style-type: none"> ▶ Use existing platforms (websites, social media) to distribute educational information ▶ Work with partners to undertake bike rodeos and CAN-BIKE courses
Encouraging +	Methods to influence behaviour change resulting in more people engaging in active forms of travel and recreation	<ul style="list-style-type: none"> ▶ Host annual rides to highlight new cycling and trail infrastructure ▶ Implement amenities at key trailheads and destinations e.g. bike parking, benches, etc.
Enforcing +	Ensure pedestrian and cyclist safety by applying existing roadway laws and regulations	<ul style="list-style-type: none"> ▶ Work with Barrie Police to undertake annual safety blitzes ▶ Work with local clubs to establish trail safety and stewardship programs
Evaluating =	Tools and techniques to measure how infrastructure and programs are being used and how well they achieve the desired outcomes	<ul style="list-style-type: none"> ▶ Identify and implement a monitoring program to assess the impact of implementing new infrastructure / initiatives ▶ Invest in counters and technology to support data collection
Four E Approach	Intended to support the City’s active transportation network	

3.3.2 Potential Outreach Initiatives

To enhance the City's active transportation network and help achieve a 12% active transportation mode share target by 2041, pedestrians, cyclists and other user should be encouraged to engage in active forms of travel on a more frequent basis. Since the completion of the 2014 MMATMP, there have been many initiatives launched by the City and other community partners to promote active transportation in Barrie. Building upon past successes and lessons learned, a set of new / modified initiatives are recommended as part of the AT Strategy to address current trends, future needs and interests expressed by members of the public, stakeholders and City staff.

Table 18 summarizes the proposed initiatives that are meant to encourage more people to engage in active forms of travel and recreation. Each of these initiatives has been identified due to the role they could have in creating community awareness, demonstrating the values of active transportation, and educating residents on safe activities. Several of the recommendations are intended to support more than one of the Four E's and collectively form a strong approach to encourage active transportation in Barrie.

Table 18 - Proposed Outreach Initiatives

Initiative	Description	Existing or Proposed Initiative	Four E's			
			Education	Encouragement	Evaluation	Enforcement
1. Active Transportation (AT) Website, Mobile app and brochure	The AT website includes information about existing routes/ facilities, completed projects, events, background resources and proper use of active transportation facilities. The website is a helpful starting point for residents and visitors wanting to learn more about active transportation in Barrie. A downloadable FAQ and brochure will also be made available online.	Proposed	✓	✓		
2. City of Barrie Social Media	The City of Barrie social media accounts (Facebook, Twitter, Instagram, etc.) can be used to share information about what the City is doing to support the development and implementation of active transportation and the AT Strategy. This is useful for spreading the word about the AT Strategy and how it is affecting change in the Barrie.	Proposed	✓	✓		

Initiative	Description	Existing or Proposed Initiative	Four E's			
			Education	Encouragement	Evaluation	Enforcement
3. Bike Rodeos	Bike Rodeos are typically hosted at school or community events to educate youth and families on proper use of cycling techniques. Currently, the Barrie Police offer bike rodeos in partnership with other community partners.	Existing	✓	✓		
4. Annual Non-Motorized Traffic Counts	City staff should undertake counts at numerous locations in Barrie to determine usage on AT routes. Information collected could include number of cyclists and pedestrians, user gender and trip purpose.	Existing			✓	
5. Public Opinion Survey	Public Opinion surveys can be used to collect user input regarding awareness, values, attitudes to ward AT, and future AT priorities. The City of Barrie should consider developing a future survey to gather input from residents and stakeholders on their views on AT and future priorities.	Proposed		✓	✓	
6. Slow Rides	The City of Barrie should coordinate and host slow rides within the City to introduce residents to the social benefits / impacts of riding a bike.	Proposed	✓	✓		
7. Active & Safe Routes to School	The City of Barrie should continue to work with local schools throughout the City to establish active and safe routes to school plans.	Existing	✓	✓	✓	
8. Active Neighbourhoods	Develop a “you can walk and bike here” campaign throughout local communities to highlight the viability of biking and walking trips within the City of Barrie.	Proposed	✓	✓		
9. Open Streets Events	The City should consider hosting open streets events throughout Barrie.	Proposed	✓	✓		

Initiative	Description	Existing or Proposed Initiative	Four E's			
			Education	Encouragement	Evaluation	Enforcement
10. Law Enforcement	The City should work with local law enforcement to increase awareness of the rules of the road / safe active travel and to ensure safe behaviours through enforcement.	Proposed	✓			✓
11. Safe Passing Law	The City should expand awareness of the "safe passing law" by purchasing and utilizing devices that measure passing distances and distributing them at events.	Existing	✓			✓

A total of 11 outreach initiatives are proposed. It is recommended that the City review the anticipated level of effort needed to undertake the proposed initiatives and assess whether current staffing resources are adequate to manage and oversee delivery of each initiative. Furthermore, it is recommended that the City continue working with its partners to undertake and deliver the proposed active transportation initiatives.

Recommendations

20	Review the proposed AT initiatives outlined in Table 18 and develop an annual action plan to fund specific initiatives, identify staff who will champion the implementation of various initiatives or determine if additional staff are needed to undertake the proposed initiatives.
21	Allocate \$50,000 per year as part of the annual budgeting process to undertake select initiatives identified in Table 18 on an yearly basis.

3.4 Supporting Implementation

Implementation of the AT Strategy will require a collaborative and coordinated effort between City staff and its partners. A clear process with a set of tools is needed to ensure that implementation of the strategy is consistent but flexible. The following sections include proposed strategies and tools to help guide future decision-making and implementation of the AT Strategy.

3.4.1 Implementation Process

The proposed facility types and implementation plan identified in the AT Strategy are not prescriptive; they are meant to be flexible and used to inform future decision making. When proceeding to the detailed design and implementation phase, next steps will evolve through environmental assessment planning and capital budget processes. In addition to these on-going planning processes, a step-by-step process specific to active transportation planning has been outlined. As noted in section 3.1, it is recommended that when the City moves forward from the master planning stage to detailed design, that staff undertake corridor / detailed design studies specifically on roads that would require any increase in the right-of-way width, to determine the feasibility of the proposed improvement and the preferred design treatment(s).

The recommended implementation process is illustrated in **Figure 36**. This process is reflective of current best practices and lessons learned. The process is intended to be used by the City to guide future planning, design and implementation. Additional details on each stage is outline in OTM Book 18 section 6.1.

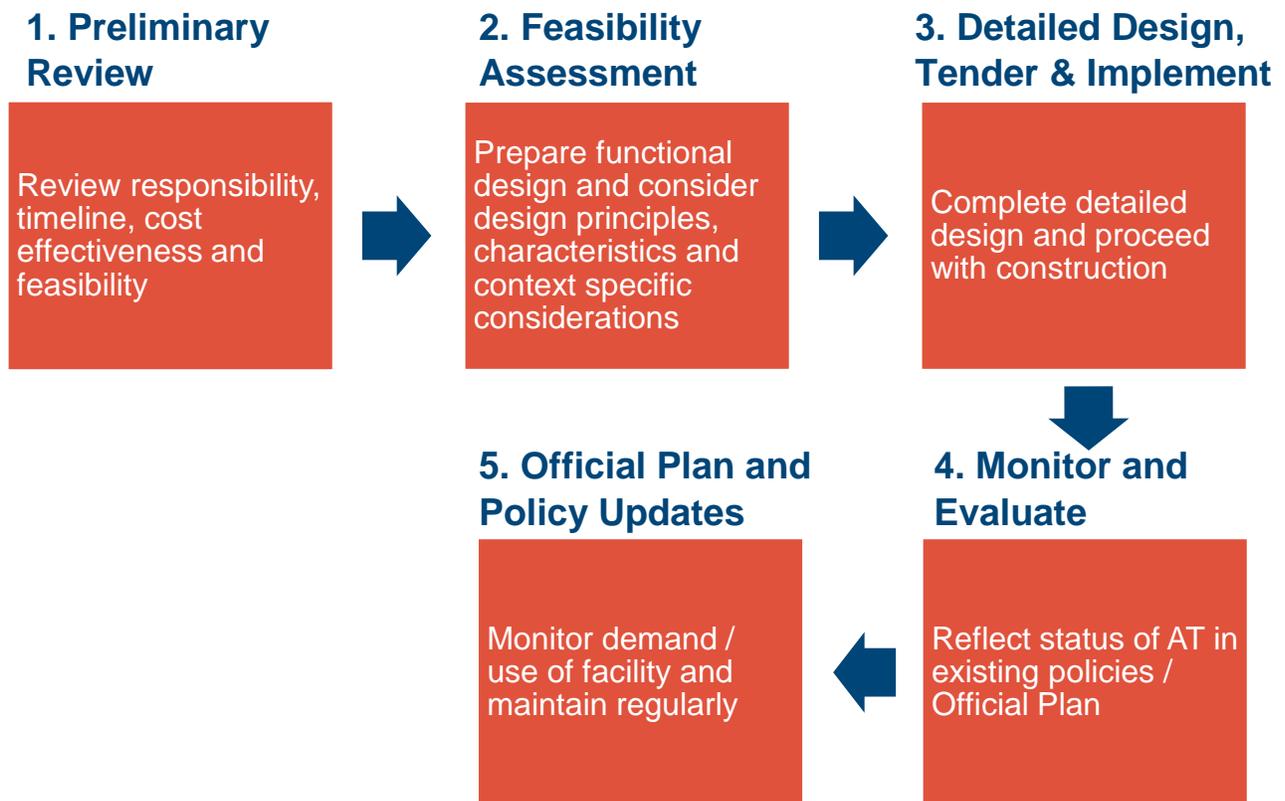


Figure 36 - Proposed Implementation Process

Recommendations

22

Review and consider utilizing the five-step implementation process when moving forward with implementation of the AT Strategy. The details of the process and each step are outlined in OTM Book 18 and should be reviewed and communicated to other City staff.

3.4.2 Municipal Class EA Process

Many large-scale infrastructure projects require the completion of an Environmental Assessment. As a result of completing the TMP and AT Strategy, City staff will have completed the necessary steps to fulfill Phases 1 and 2 of the Municipal Class EA (MCEA) process. Further assessment and potential environmental impacts will need to be discussed in the future stages of implementation to determine next steps.

The MCEA process was updated in 2015 to establish pre-approval for the design and implementation of active transportation projects including:

- ▶ Construction of multi-use trails outside of existing right-of-ways;
- ▶ Reconstruction of a roadway to include bicycle lanes or sidewalks, assuming no change in the number of motor vehicle lanes; and
- ▶ Road diets and the modification and / or addition of pavement markings, signage or localized operational improvements. A road diet is a redistribution of roadway space whereby the number of travel lanes are reduced or travel lane widths are narrowed and reallocated to other modes such as cycling and transit.

Schedule A and A+ projects are considered pre-approved and do not require a full Class EA. Pre-approved project include those where the proposed project does not require significant changes to the roadway or where traffic impacts have been studied and mitigated.

Projects valued between \$3.5 and \$9.5M should adhere to Schedule B, and over \$9.5M should adhere to Schedule C. The exemption is maintained for smaller projects and larger projects are to follow a well-accepted and proven process.

Moving forward, the City should continue to use the MCEA process and pre-approved projects to expedite next steps and proceed with implementation of active transportation projects. The documentation included in the AT Strategy can be used as support for pre-approved projects and provide context for additional design considerations.

3.4.3 Roles and Responsibilities

Successful implementation of the AT Strategy will require a clear understanding of who will be responsible for implementing various components of the strategy. Implementation of the strategy will require on-going coordination by City staff in various departments and committee representatives as well as external stakeholders and partners. **Table 19** provides an overview of various City departments and their anticipated responsibility for active transportation in Barrie.

Table 19 - AT Strategy Roles and Responsibilities

City Department	Responsibility							
	Planning	Design	Policies	Construction	Maintenance	Life Cycle Renewal	Enforcement	Outreach
Engineering	✓	✓	✓	✓	✓	✓		✓
Environmental Services	✓		✓					✓
Planning and Building Services	✓	✓	✓	✓		✓		
Roads, Parks and Fleet	✓	✓	✓	✓	✓	✓		✓
Finance				✓	✓			✓
Enforcement Services Branch							✓	

In addition to City departments, it is important to understand external partners that could have a direct influence in the implementation of the AT Strategy. Understanding who these partners are can help to communicate the expectations for each group and to establish a clear management process. **Table 20** identifies potential external partners and how they could contribute to the implementation of Barrie's AT Strategy.

Table 20 - Overview of Potential Partners

Partner	Potential Role
Surrounding Municipalities	Coordinate implementation of routes that connect to surrounding municipal and Simcoe County roads.
Ministry of Transportation (MTO)	The implementation of proposed active transportation linkages which have an impact on provincial roadways and interchanges need approval by MTO.
Lake Simcoe Region Conservation Authority (LSRCA)	The implementation of trails and active transportation facilities that are located around or near environmentally sensitive areas and provide input on how to design spaces to mitigate impacts to the natural environment when implementing AT facilities and help to highlight natural areas and features of significance.

Partner	Potential Role
Simcoe Muskoka District Health Unit	Promote the connection between health and active transportation and the importance of cycling and walking policies.
Barrie Police Services	Help to monitor and enforce safe cycling and walking.
Tourism Barrie	Promote and enhance active transportation tourism destinations within the City.
School Boards	Provide input and opportunities to partner with local schools that may be interested in participating in local events.
Local Advocacy Groups/ Organizations	Local advocacy groups and organizations have first-hand knowledge of routes in Barrie and can help identify opportunities for local events to promote AT.
Local BIAs	Partner with representatives from local businesses to identify opportunities to provide AT supportive amenities. Local businesses can help promote local tourism initiatives and benefit from a higher number of patrons visiting via bike.

This table is not intended to be a fulsome list; there may be some partners that have a more prominent role in the planning, design, implementation and operation of routes / facilities while other partners may have a more significant influence on the development and delivery of supportive active transportation programs.

Recommendations

23

Coordinate between City departments the implementation of the AT Strategy. A point person from each department should be identified to track progress and next steps as required.

24

Review and update the proposed list of partners identified in **Table 20** as opportunities arise. City staff should continue to seek opportunities to partner with external agencies and other organizations.

3.4.4 Policy

The planning, design and implementation of active transportation routes should be supported by policies and plans. Integrating supportive policies into Barrie’s strategic planning documents particularly Barrie’s Official Plan will help ensure that active transportation is considered in all aspects of planning. The City’s supportive policies are intended to form the framework for active transportation planning and provide tools to help achieve implementation.

The following section outlines key policy principles that should be considered by City staff when strategic planning documents are next updated. These policy principles include:

- ▶ AT and Complete Streets;
- ▶ Cycling on sidewalks;
- ▶ E-bikes;
- ▶ Risk management and liability;
- ▶ New developments;
- ▶ Established areas/ intensification; and
- ▶ Accessibility.

complete streets

Key Considerations	The concept of complete streets is based on the principle that streets are meant to be designed for everyone. They are meant to be designed and operated to allow for safe access by all potential users including pedestrians, cyclists, motorists, transit users, etc. depending on the context and function of the street. The key to complete streets is that their design accommodates people of various ages and abilities. Complete Streets can be implemented in both urban and rural environments and support streets as public spaces and destinations rather than just transportation corridors.
Barrie Context	<ul style="list-style-type: none"> ▶ Currently Barrie does not have an exclusive complete streets policy but the Intensification Area Urban Design Guidelines and the Official Plan both identify goals and recommendations to support the development of complete communities. ▶ Guidance on Complete Streets policies will be provided in the updated TMP report.
Recommended	<ul style="list-style-type: none"> ▶ Complete streets principles should continue to be integrated into future transportation related planning and design projects.
Policies / Plans Affected by the AT Strategy	<ul style="list-style-type: none"> ▶ Official Plan

cycling on sidewalks

Key Considerations	<ul style="list-style-type: none"> ▶ The Highway Traffic Act (HTA) has been interpreted to generally prohibit cyclists from riding on a sidewalk unless authorized by a specific municipal by-law and / or directed by traffic signs or traffic control devices. A bicycle is defined as a vehicle under the HTA and states that a vehicle (including bicycles) shall be operated in a traffic lane. A sidewalk is not considered a traffic lane. ▶ OTM Book 18 defines a sidewalk as a travelled way intended exclusively for pedestrian use. ▶ According to the Provincial Manager of Specialized Patrol from the Ontario Provincial Police, the HTA does not specifically state that a bicycle cannot be operated on a sidewalk, but designates that a vehicle is to be operated in a lane and a sidewalk is not a lane. Given the OTM Book 18 definition of a sidewalk and the HTA provisions for vehicle travel, a cyclist is expected to operate a bicycle within a traffic lane or bike lane, unless otherwise permitted.
Barrie Context	<ul style="list-style-type: none"> ▶ Currently the City's By-law 2004-142 which regulates the use of City property identifies non-permitted activities on public property. ▶ Specific sections state what is not permitted on a sidewalk. It does not permit any person to ride a bicycle, skateboard and other human powered vehicle on or over any sidewalk or pedestrian way within the Downtown Business Improvement Area or Barrie Public Library, municipally known as 60 Worsley Street, except as may be authorized by the City, unless such person is under 16 years of age and accompanied by a parent or adult custodian.
Recommended	<ul style="list-style-type: none"> ▶ Consider updating By-law 2004-142 to prohibit cyclists from riding and / or parking bicycles on sidewalks with the exception of youth (e.g. children under the age of 12).
Policies / Plans Affected by the AT Strategy	<ul style="list-style-type: none"> ▶ Existing City by-laws

e-bikes

<p>Key Considerations</p>	<ul style="list-style-type: none"> ▶ A more detailed definition and regulations of where e-bikes are permitted appropriate to use (within the Province of Ontario) have been defined and adopted. Under provincial legislation, e-bikes are permitted where conventional bikes are allowed unless municipal by-law states otherwise. For example, many municipalities restrict e-bikes on linear off-road trails; we are not recommending that City staff implement this restriction. These regulations provide municipalities with some guidance but also present some challenges on where and how they should be permitted. When updating municipal policy, consideration should be made to: <ul style="list-style-type: none"> ▪ Allow the use of e-bikes by police and emergency services in the line of duty so these can be used for use for patrols and emergency access; ▪ Allow the use of e-bikes by municipal staff while performing duties, should the municipality wish to use e-bikes for some duties in the future rather than full sized service vehicles or gators; and ▪ Monitor evolving best practices related to e-bikes, including any changes in legislation at the provincial level given this is an emerging issue that many municipalities are challenged to resolve. ▶ There should be additional consideration for how e-bikes can be integrated and accommodated into the design of cycling infrastructure. There should be consideration for defined locations where e-bikes may be permitted both on and off-road and a complementary education program the public on how to do so safely and comfortably. Where possible e-bikes should be considered as future cycling amenities are designed i.e. bicycle parking, bike share, fix-it stations, etc.
<p>Barrie Context</p>	<ul style="list-style-type: none"> ▶ The City’s Traffic By-law 80-138 section 6(16) prohibits the operation of a vehicle, except a vehicle driven or propelled by muscular power or any automobile wheelchair within any sidewalk or boulevard area except for a permanent or temporary driveway, nor park a vehicle within any sidewalk area. Muscular power in this context is interpreted to mean a bicycle or human powered vehicle. ▶ The City’s by-law 2004-142 does not permit the use of electric bicycles on sidewalks and does not allow their operation. There does not seem to be distinction between on and off-road use or the impacts of potential conflicts that can arise between different users which could require more additional clarification on where and when e-bikes can be used.
<p>Recommended</p>	<ul style="list-style-type: none"> ▶ It is recommended to the City’s Traffic By-law 80-138 be amended to prohibit cyclists from riding bicycles on sidewalks with the exception of children under the age of 12. This recommendation is consistent with other municipalities, that do not allow cycling on sidewalks unless the user is under 12 years of age. ▶ Relevant City policies and by-laws should be updated to reflect existing regulations and restrictions on e-bikes as legislated by the Province and to clarify the use of on and off-road use.
<p>Policies / Plans Affected by the AT Strategy</p>	<ul style="list-style-type: none"> ▶ City of Barrie By-Law 80-138 ▶ City of Barrie By-Law 2004-142

accessibility	
Key Considerations	<ul style="list-style-type: none"> ▶ The Accessibility for Ontarians with Disabilities Act (AODA) promotes the goal of making Ontario accessible for people with disabilities by 2025. The Accessibility Standards for the Built Environment applies to pathways, trails and sidewalks with the overall goal of designing spaces that remove barriers to buildings and outdoor amenities. ▶ When designing off-road pathways facilities, the City should refer to the Built Environment Standards to ensure that the needs of all user groups are accommodated. ▶ The requirements of the AODA must be met to the greatest extent possible, given the context of each route location, the surrounding environment and type of experience that is desired. Sections 80.8 and 80.10 provide the technical requirements for multi-use recreational pathways.
Barrie Context	<ul style="list-style-type: none"> ▶ Barrie has an Accessibility Advisory Committee that provides direction to Council when creating new or making substantial changes to existing facilities to ensure that they meet the needs of people of all abilities.
Recommended	<ul style="list-style-type: none"> ▶ Provincial and federal policy provides specific timelines and requirements that need to be met by municipalities in order to ensure that policies, processes and practices are consistent with the regulations set-out in the Act. As policies are updated, they should reflect the AODA regulations. ▶ Other cities have developed accessibility plans that outline initiatives to improve accessibility within their respective municipalities and Barrie should consider developing their own accessibility plan to better support the needs of people of all ages and abilities.
Policies / Plans Affected by the AT Strategy	<ul style="list-style-type: none"> ▶ Official Plan

new development areas

<p>Key Considerations</p>	<ul style="list-style-type: none"> ▶ Planning for active transportation facilities is a critical component of the land development process. When a new development is being designed, developers should be expected to work through a process to create an appropriate network within their development area that reflects the intent of the AT Strategy. Many developers understand and acknowledge the value of integrating AT facilities into their projects. The added value that these features provide can have a positive effect on home sales and neighbourhood desirability. ▶ When integrating AT into new development areas developers should consider topography, drainage, slopes, soil conditions, plant and animal communities, microclimates and human comfort, historic / cultural resources, public education and significant views and vistas.
<p>Barrie Context</p>	<ul style="list-style-type: none"> ▶ The implementation of active transportation facilities within new development areas that connect to existing and proposed routes identified in the TMP should be considered a priority. ▶ Developers are currently required to demonstrate where and how these connections are being made at the time of Site Plan Approval and Plan of Subdivision.
<p>Recommended</p>	<ul style="list-style-type: none"> ▶ Information should be provided to local developers about the intended AT connections within various areas of the city. The Site Plan development and approvals process should be reviewed and updated (as needed) to reflect the implementation of new facilities. Connections should be made that are reflective of density, variety, hierarchy and character. ▶ The integration of AT facilities as part of the development process in intensification areas; conceptual / layout plans, detailed design drawings, development agreement requirements and inclusion under the development charges by-law should continue to be supported. Site plan requirements should be reviewed to provide maximum benefit while considering the experience gained in past developments. ▶ In addition, pedestrian infrastructure in new residential, industrial or commercial areas should be requested in accordance with the City's Engineering Design Standards or as determined by City staff to provide direct or indirect linkages for pedestrians.
<p>Policies / Plans Affected by the AT Strategy</p>	<ul style="list-style-type: none"> ▶ Site Plan Approvals Process ▶ Development Charges Bylaw ▶ Application for Draft Plan of Subdivision

existing neighbourhoods

Key Considerations	<ul style="list-style-type: none"> ▶ Barrie is targeted as an urban growth centre in the Growth Plan for the Greater Golden Horseshoe (GGH). This can present challenges in some cases when determining how to support intensification within established areas in an effort to support intensification. ▶ The density of the network is typically greater where urban development is more dense. The AT network is typically less dense in rural areas. As such, the implementation of new AT routes or the enhancement of existing facilities within existing neighbourhoods is important to consider to ensure that the transportation planning reflects the existing context. ▶ Though planned improvements are identified within a strategic planning document they may prove to be more challenging when they get to the point of detailed design and construction and will require a considerate and collaborative consultation process.
Barrie Context	<ul style="list-style-type: none"> ▶ Barrie's Official Plan and the Provincial Growth Plan for the Greater Golden Horseshoe (GGH) identify clear policies and direction on areas where intensification should occur and identifies the needs for integrating land use and transportation planning. ▶ Barrie also has Urban Design Guidelines for intensification areas that provide guidance for integrating intensification into existing established neighbourhoods.
Recommended	<ul style="list-style-type: none"> ▶ Where new on or off-road facilities or linkages are proposed or significant improvements are being made to the existing route, varying levels of consultation will be required. The level of consultation should be determined based on the project location, required design approvals, scope / complexity, identification in the AT Strategy or other strategic planning documents and / or past support or issues raised by the community. Four levels of consultation should be considered: <ol style="list-style-type: none"> 1. Notification – for projects proposed on City-owned lands produce a public notice. 2. Neighbourhood meetings – for projects approved through the master plan but not yet tendered. 3. Focus group sessions – an outcome of a neighbourhood meeting where revisions to the design concept are made to move forward with approvals. 4. Broad Consultation for EA – where a project triggers an EA study and consultations are completed to meet EA requirements.
Policies / Plans Affected by the AT Strategy	<ul style="list-style-type: none"> ▶ Official Plan ▶ Intensification Area Urban Design Guidelines

The emergence of e-scooters in North America introduces a new mobility device that municipalities will need to consider. E-scooters (also known as kick scooters) are not currently legal in Ontario, though it is expected that may change in the near future. Should e-scooters become legal, the City of Barrie could permit them where bicycles are currently permitted, but restrict them from sidewalks.

Recommendations

- | | |
|----|--|
| 25 | Review the policy recommendations identified in section 3.4.4 and where appropriate integrate into the City's existing policies when they are next updated. |
| 26 | Update City policies every five to ten years consistent with the Planning Act, to ensure they are reflective of current trends and best practices. |
| 27 | Pull together the elements of City policies that speak to complete streets to form a complete streets policy similar to what other municipalities in Ontario have / are currently undertaking. |



Off-road trail during winter season in Barrie
Source: WSP, 2018

3.4.6 Monitoring and Evaluation

Monitoring and evaluation is a key component to assessing the impacts and success of projects and programs that have been implemented and how well they are achieving the objectives of the AT Strategy. It is important to establish criteria and a way of evaluating achievements. Performance measures can help prioritize projects, track progress and measure user interest and impact. Research demonstrates that meaningful context-sensitive performance measures can help to:

- ▶ Demonstrate the value of pedestrian and bicycle projects to citizens and elected officials;
- ▶ Track the success of an active transportation program, or facility;
- ▶ Inform smarter investments through data-driven measures of success;
- ▶ Comply with funding requirements at varying levels of government;
- ▶ Produce a better built environment for walking and cycling;
- ▶ Provide information to engage a broad set of stakeholders in project and program identification and prioritization; and
- ▶ Capture the value of new and innovative datasets and data collection methods for the active transportation field.

The type of performance measures applied by municipalities can vary depending on desired outcomes and data available. As performance measures become more widely used by municipalities, the need to incorporate them into municipal planning processes becomes more important. Specifically, the development and documentation of performance measures to help inform the annual budgeting process to leverage increased capital investments that support the implementation of the plan. **Table 21** outlines possible performance measures that the City of Barrie should consider unitizing to establish documented results of implementing the network.

Table 21 - Suggested Performance Measures

Performance Measure	Description
Existing Use	On and off-road user counts. The assessment of the number of different users, the proximity to AT routes, demographics of AT users and duration of typical trip.
Network Provisions	An assessment of the amount of the network that has been built and the provision of typical end-of-trip facilities or rest areas.
Budget / Investment	The amount of funding made available to implementing the AT Strategy.
Comfort & Convenience	The number of facilities that are maintained and the number of destinations along the proposed route.
Partnerships and Recognition	Local events and businesses that help to support AT and external recognition of local efforts.

Performance Measure	Description
Outreach and Provision	The number of educational materials that are developed and provided, and assessment of how the public uses and values this information.
Public Engagement	The opportunities for public engagement, media coverage, generated views on the website, the amount of community support from stakeholders and the tourism generated.
Safety	The overall safety of cyclists and pedestrians determined through the number of collisions and injuries, safety of trail users is assessed by reported incidents and the use of the Share the Road Campaign.
Citation & Ticketing	How many citations the police service are involved in and/or positive reinforcement campaigns.

Recommendations

29 Use the information contained in the AT Strategy including the considerations identified in **Table 21** to determine a set of key performance measures which could be assessed on an annual basis to determine the success of implementing the recommendations contained in the strategy.



Barrie’s Waterfront Trail
Source: WSP, 2018

3.4.7 Risk Management and Liability

The way in which active transportation routes are designed and maintained can have a direct influence on liability. On-road facilities are compared against the same liability criteria as roadways and sidewalks, which means the City could be partially liable if the facility is improperly designed, constructed or maintained. Due to the bicycle being legally defined as a vehicle, routes where cycling is permitted may need to adhere to the same requirements as a roadway / highway. This further reinforces the importance of adhering to provincial and national design guidelines and standards as they provide the greatest legal protection.

In addition to using guidelines and standards to mitigate risk and liability issues, the City should also consider the following when designing, implementing and maintaining active transportation facilities:

- ▶ Improving the physical environment, increasing public awareness of the rights and obligations of users, and improve access to educational programs;
- ▶ Selecting and designing facilities in compliance with the highest prevailing standards;
- ▶ Design concepts should comply with all applicable laws and regulations;
- ▶ Conforming to acceptable standards, and if hazards cannot be removed, they should be isolated with a barrier or notified by clear warning signs;
- ▶ Monitoring on and off-road facilities through regular patrols, documenting the physical conditions and operations, and promptly respond as needed;
- ▶ Keep written records of all monitoring and maintenance activities;
- ▶ Avoid using descriptions such as “safe” or “safer” for routes;
- ▶ Maintaining proper insurance coverage;
- ▶ When considering new active transportation routes or modifications to the system, document the assessment tool used to select the preferred facility; and
- ▶ Consider using principles outlined in the Centre for Sustainable Transportation’s Child and Youth Friendly Land Use and Transport Planning Guidelines.

Recommendations

30

Review and adopt the appropriate risk management and liability prevention strategies into day-to-day decision making related to active transportation planning, design and maintenance.

3.5 Maintenance and Operations

A key component of the AT Strategy is to provide guidance for implementation and operations. Investing in maintenance from the onset of projects can help leverage capital investments, support user safety, and increase the lifespan of infrastructure. It is important that City resources, time and funding be allocated for the design and implementation as well as operation and necessary maintenance of active transportation projects and connections. The following section is intended to be used as a reference as the active transportation is implemented and provide key insights and best practices for the City of Barrie regarding maintenance and operations of active transportation infrastructure.

Maintenance practices and the level of service will need to be adapted to address new facilities, expectations of the public and minimum standards as the City's active transportation network grows. Priority should be given to routes and facilities that have a high volume of car, pedestrian and cyclist traffic. Updating and developing new by-laws and policies that support maintenance of core connections and network features is also an important consideration.

3.5.1 Existing Maintenance & Operations Practices

Many municipalities base their maintenance level of service targets on the Provincial Minimum Maintenance Standards (MMS) for Municipal Highway Regulation 239/02 to inform and guide maintenance practices, including those for active transportation facilities within the road right-of-way. These standards were updated by the Province in May of 2018 and include guidance for on-road bicycle lane winter maintenance standards, patrol obligations for sidewalks and the ability for municipalities to set aside these targets when they declare a significant weather event because of the implications for winter maintenance on roadways, bicycle lanes and sidewalks during the duration of the event. It is recommended that the City review and if deemed necessary, update current on and off-road route maintenance practices, consistent with the MMS, and assess the impact to operating budgets, equipment needs and resources.

To maintain roadways in good repair, maintenance practices such as cold mix patching, hot mix paving, shoulder maintenance, crack sealing, road resurfacing, sweeping, curb and gutter repair, bridge and culvert repair, sidewalk and pathway repair / cleaning, snow plowing, salting, sanding and snow removal should be considered.

Table 22 outlines the standards included in the MMS for Municipal Highway Regulation 239/02, to address snow accumulation on sidewalks and bicycle lanes based on the roadway class.

Table 22 - MMS Guidelines for Addressing Snow Accumulation

Roadway Class	Depth	Time
1	2.5 cm	8 hours
2	5 cm	12 hours
3	cm	24 hours
4	8 cm	24 hours
5	10 cm	24 hours
Sidewalk	8 cm	48 hours

Based on the MMS for Municipal Highway Regulation 239/02, the standard for addressing snow accumulation is:

- ▶ After becoming aware of the fact that the snow accumulation on a roadway is greater than the depth set out in **Table 22**; or
- ▶ After the snow accumulation has ended, reduce the snow to a depth less than or equal to the depth identified in the table and within the time set out in **Table 22**.

3.5.2 Maintenance Best Practices

To support active transportation as a more viable transportation mode, there needs to be consideration for additional maintenance. Enhanced maintenance could include repairs to potholes, shoulder drop-offs, pavement cracks and line markings, replacement of route signage as well as the removal or sweeping of debris. Maintaining active transportation infrastructure during winter months may also require special equipment such as narrower ploughs and may need to be cleared separately from the vehicle lanes along with surface treatments to limit ice accumulation should also be considered.

Consideration for an expanded maintenance and operations budget should be explored as the active transportation network is implemented. The allocated budget will depend on the types of facilities that are implemented and their intended use.

The City of Barrie should also consider identifying a winter maintained system within the overall active transportation network along high-volume routes to accommodate various user groups and trip purposes all year long. The intent of a winter maintained network is to identify key linkages which provide direct access to key destinations in the City and prioritize these routes for potential winter maintenance. As facilities are implemented, the City should consider the available resources and budget to determine the level of service that is possible for winter maintenance of on and off road active transportation facilities. **Figure 37** illustrates the suggested active transportation routes to be maintained during the winter months. In total, there are approximately 34 kilometres of routes that are proposed for enhanced level of maintenance during the winter months.



Snow removal on City of Barrie sidewalk

Source: <https://www.simcoe.com/news-story/4394301-more-cold-forecast-for-spring-in-barrie/>

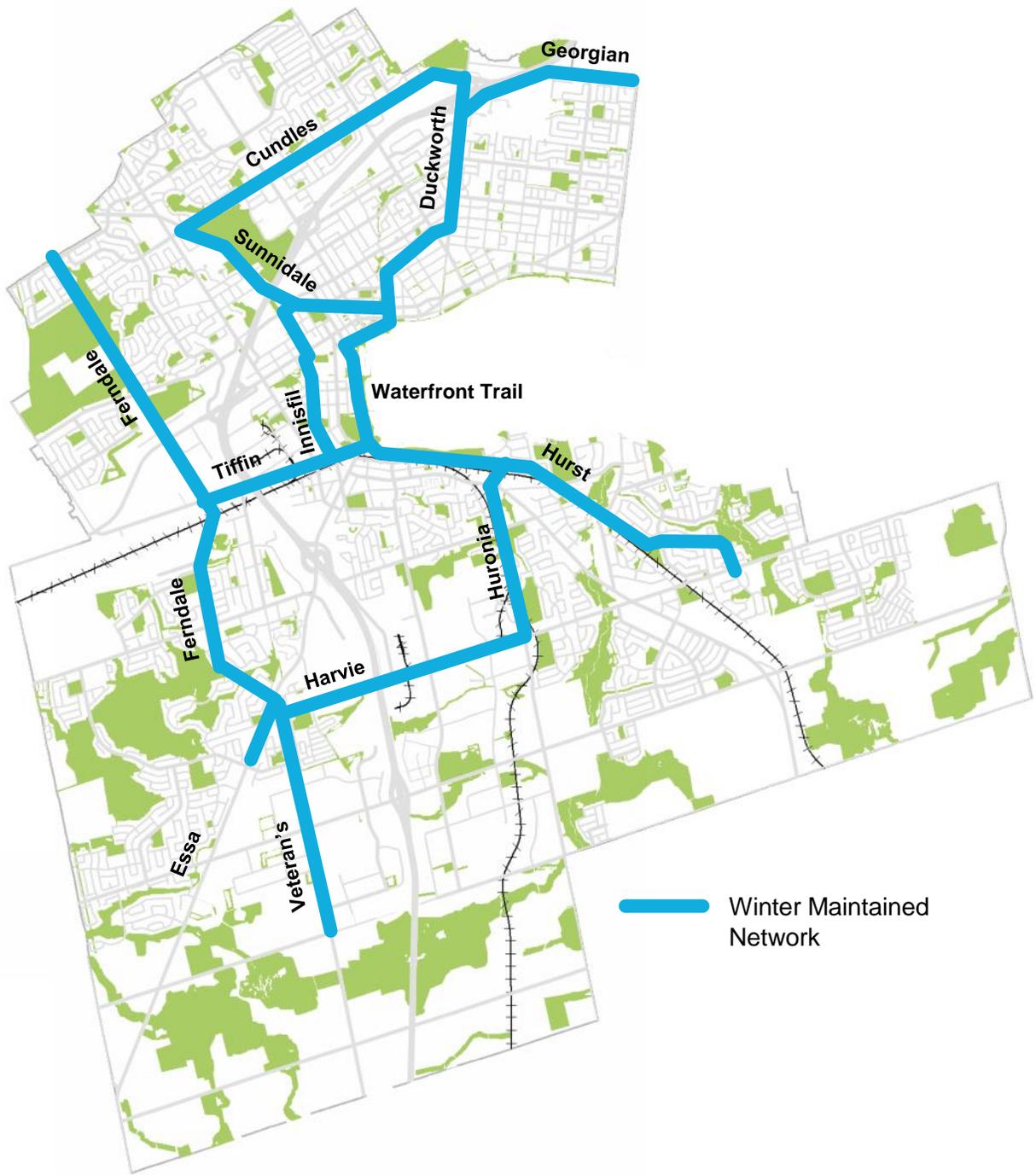


Figure 37 - Suggested Active Transportation Routes for Enhanced Winter Maintenance

3.5.3 Cost to Operate and Maintain

To support year-round use of the active transportation network, consideration should be given to maintenance costs to continue to provide safe and comfortable on and off-road active transportation facilities. **Table 23** summarizes typical annual maintenance costs for the active transportation network at full build-out in 2019 dollars.

Table 23 - Active Transportation Route Maintenance Cost Assumptions

Item	Unit Price	Assumptions
Painted Line Markings	\$2.5 / m	Unit price is for a single 100 mm wide painted line marking, therefore assume - \$5 / m for both sides of the road. Maintenance cost assumes that painted line markings are fully replaced / renewed on an annual basis.
Cold Plastic Line Markings	\$5 / m	Unit price is for a single 100 mm wide cold plastic line marking, therefore \$10 / m for both sides of the road. Maintenance cost assumes that plastic line markings are replaced every 5 years (or 20% annually). See calculations below: <ul style="list-style-type: none"> ▶ \$5 / m x 20% = \$1 / m
Painted Stencils	\$50 / m	Assumes stencils are placed every 75m as per OTM Book 18, therefore 26 stencils / kilometre on both sides of the road (13 signs on each side of the road). Maintenance cost assumes 30% of painted stencils will need to be replaced / renewed on an annual basis. This equates to \$400 per year. See calculations below: <ul style="list-style-type: none"> ▶ \$50 x 26 = \$1,300 ▶ \$1,300 x 30% = \$400
Cold Plastic Stencils	\$275 each	Assumes stencils are placed every 75m as per OTM Book 18. 26 signs in 1 kilometre on both sides of the road (13 signs on each side of the road). Maintenance cost assumes 30% of painted stencils will need to be placed / renewed on an annual basis. This equates to \$2,200 per year. See calculations below: <ul style="list-style-type: none"> ▶ \$275 x 26 = \$7,150 ▶ \$7,150 x 30% = \$2,200
Route Signs	\$200 / each	Assumes 26 signs per kilometre (13 on both sides of the road / route). Maintenance cost assumes 5% of all signs will need to be replaced annually. This equates to \$260 annually. See calculations below: <ul style="list-style-type: none"> ▶ \$200 x 26 = \$5,200 ▶ \$5,200 x 5% = \$260
Sweeping Costs	\$2,400 to \$4,000 / km	Assumes sweeping frequency of 6 times a year per roadway km (uni-directional, one side of the road).

Based on the costing assumptions identified in **Table 23**, **Table 24** and **Table 25** summarize typical non-winter and winter maintenance costs for various facility types.

Table 24 - Estimated Annual Maintenance Costs for Non-Winter Months

Facility Type	Per km Maintenance Cost (per year)	
	Minimum	Maximum
In-Boulevard Tail	\$1,685	\$2,310
Cycle Track	\$5,450	\$6,050
Buffered Bike Lane	\$6,850	\$7,650
Bike Lane	\$5,450	\$6,050
Signed Route with Sharrows	\$1,750	\$4,410
Signed Route	\$260	\$260
Buffered Paved Shoulder	\$6,260	\$7,660
Off-Road Trail	\$1,685	\$2,310
Sidewalks	\$2,550	\$2,550

Table 25 - Estimated Annual Maintenance Costs for Winter Months

Facility Type	Per km Maintenance Cost (per year)	
	Minimum	Maximum
In-Boulevard Tail	\$6,750	\$12,500
Cycle Track	\$13,500	\$25,000
Buffered Bike Lane	\$1,000	\$1,000
Bike Lane	\$1,000	\$1,000
Off-Road Trail	\$6,750	\$12,500
Sidewalks	\$6,750	\$12,500

Recommendations

- 31 Review and revise their existing maintenance policy to ensure current practices are consistent with the Province's updated Minimum Maintenance Standards (O. Reg 239/02). If City staff select to use a maintenance policy different than the MMS, the City should be consistent with the application of their maintenance policy.
- 32 Revisit annual budgets to ensure the amount allocated for operations is sufficient as the active transportation network is implemented.
- 33 Consider enhancing the level of service for winter maintenance on roads / routes identified in **Figure 37** to form a winter maintained active transportation system.

3.6 Funding the AT Strategy

On-going investments will be needed by the City, its partners and other funding sources to implement the proposed active transportation infrastructure and programming identified in the AT Strategy. There are a number of different funding sources that should be explored by City staff to support implementation of the AT Strategy including:

development charges

Growth-related infrastructure projects including active transportation initiatives that can be paid for by development charges. For example, the City's 2014 Development Charges By-law (currently being updated in conjunction with the TMP) summarizes capital costs for active transportation projects that are expected to be funded by development charges.

capital projects

Active transportation projects can be coordinated and funded in conjunction with other large-scale projects. It is recommended that City staff investigate opportunities to coordinate the implementation of active transportation facilities with other infrastructure projects to achieve economies of scale.

additional city funding

Monies made available by the City specifically allocated to the design and construction of active transportation infrastructure through general tax base.

partnerships

Existing partnerships and new partnerships should continue to be explored to help contribute to the funding of potential active transportation programs or infrastructure.

external funding sources

There are a number of funding opportunities available at the provincial and federal level. Where possible, external funding sources should be explored, such as:

- ▶ Federal / Provincial Gas Tax
- ▶ ecoMobility (TDM) Grant Program
- ▶ Federation of Canadian Municipalities Green Municipal Fund
- ▶ Healthy Communities Fund
- ▶ Federal and Provincial Infrastructure / Stimulus Programs
- ▶ Ontario Trillium Foundation
- ▶ Ontario Rural Economic Development Program
- ▶ Ontario Sport and Recreation Communities Fund
- ▶ Tourism Development Fund

Recommendations

34

Continue to explore external funding sources and partnerships to help fund implementation of the AT Strategy.

4. CONCLUSIONS & SUMMARY OF RECOMMENDATIONS

The AT Strategy is meant to be a flexible tool that provides long-term support and guidance for the continued implementation of active transportation infrastructure and programming in the City. The information contained in the strategy is intended to respond to current trends, accommodate future transportation demands and to help the City achieve a 12% active transportation mode share target by 2041. The AT Strategy is intended to provide City staff and its partners with the tools, strategies and recommendations to help integrate active transportation as part of Barrie's multi-modal transportation system.

The recommendations contained in the AT Strategy are informed by best practices, lessons learned and input received from City staff, stakeholders and members of the public. The following is a summary of all the recommendations contained in the AT Strategy that are intended to facilitate next steps for City staff and its partners.

Recommendations	pg. #	
1	Adopt the proposed active transportation network illustrated on Maps 4a and 4b to guide future active transportation facility design and implementation. The network maps should be incorporated as a Schedule in the City's Official Plan when next updated.	34
2	The proposed active transportation network must be flexible enough to provide for changes in routing and/or facility types based on new information, Council policy and data as it becomes available. There may be opportunities for additional or alternate connections to be made in the future. These connections should be considered and the mapping and database should be updated if a change is warranted.	34
3	Give consideration to implementing separated facilities such as cycle tracks or in-boulevard pathways when future planned roads are constructed.	34
4	Reference the design guidelines / standards identified in section 2.4 when moving forward with the planning, design and implementation of active transportation infrastructure	38
5	Integrate active transportation routes and transit service into the planning, designing and implementation of the road network as the City's secondary plan areas are developed in the future.	40
6	Prioritize the implementation of a sidewalk in locations where there are no sidewalks at an existing bus stop.	40
7	Integrate design features at intersections and other conflict points that help to increase a user's sense of comfort and safety and to encourage increased active transportation usage.	43
8	Reference the design guidelines / standards identified in section 2.4 including the forthcoming update to OTM Book 18 when planning and designing roundabouts.	45

Recommendations	pg. #	
9	Provide and strategically locate end-of-trip facilities such as rest areas, washrooms bike lockers etc. when planning, designing and implementing new active transportation routes. In addition, the City should encourage shower facilities in new commercial developments.	48
10	Consider developing a bike parking strategy to identify strategic locations throughout Barrie to install bike parking and encourage increased ridership and active transportation usage.	51
11	Develop a branded signage and wayfinding strategy for on and off-road active transportation routes throughout Barrie.	56
12	Adopt the proposed phasing plan identified in Maps 5a and 5b and Maps 6a and 6b as a guide for staff / decision makers when moving forward to implement the active transportation network.	70
13	Undertake corridor studies and Municipal Class Environmental Assessment (EA) Schedule C studies on roads that would require any increase in the right-of-way width, to determine the feasibility of the proposed improvement and the preferred design treatment(s).	70
14	Consider undertaking a two-phase Corridor Planning and Municipal Class EA Study for Bayfield Street to assess the future land-use planning and transportation context including the streetscape, density, land-use designations and built-form goals.	70
15	Refer to Figure 34 to inform the implementation of urban shoulders in the interim, until such time a more formal and designated cycling facility can be implemented.	70
16	Review and utilize the proposed active transportation priorities identified in Table 13 and Table 14 (also illustrated on Figure 35) on an annual basis to identify of annual projects which can be implemented as part of large-scale infrastructure projects or should additional budget arise as part of annual Council budgeting processes.	70
17	Use the cost spreadsheet in Technical Appendix B3 as a reference to track future implementation, budgeting and costing of the proposed active transportation network.	73
18	Use the preliminary costing to inform future budgeting decisions on an annual basis. As needed, the costing should be updated to reflect more accurate estimates based on inflation and other external factors.	73
19	Report back to Council on an annual basis to provide an update on the implementation of new infrastructure and to provide Council with an outlook for anticipated projects to be completed in the following year.	73
20	Review the proposed AT initiatives outlined in Table 18 and develop an annual action plan to fund specific initiatives, identify staff who will champion the implementation of various initiatives or determine if additional staff are needed to undertake the proposed initiatives.	77
21	Allocate \$50,000 per year as part of the annual budgeting process to undertake up to five initiatives identified in Table 18 on a yearly basis.	77

Recommendations		pg. #
22	Review and consider utilizing the five-step implementation process when moving forward with implementation of the AT Strategy. The details of the process and each step are outlined in OTM Book 18 and should be reviewed and communicated to other City staff.	79
23	Coordinate between City departments the implementation of the AT Strategy. A point person from each department should be identified to track progress and next steps as required.	81
24	Review and update the proposed list of partners identified in Table 20 as opportunities arise. City staff should continue to seek opportunities to partner with external agencies and other organizations.	81
25	Review the policy recommendations identified in section 3.4.4 and where appropriate integrate into the City's existing policies when they are next updated.	88
26	Update City policies every five to ten years consistent with the Planning Act, to ensure they are reflective of current trends and best practices.	88
27	Pull together the elements of City policies that speak to complete streets to form a complete streets policy similar to what other municipalities in Ontario have / are currently undertaking.	88
28	Maintain and update the network management tools developed as part the AT Strategy on a regular basis and use the tools to assist in the implementation and management of active transportation infrastructure.	89
29	Use the information contained in the AT Strategy including the considerations identified in Table 21 to determine a set of key performance measures which could be assessed on an annual basis to determine the success of implementing the recommendations contained in the strategy.	91
30	Review and adopt the appropriate risk management and liability prevention strategies into day-to-day decision making related to active transportation planning, design and maintenance.	92
31	Review and revise their existing maintenance policy to ensure current practices are consistent with the Province's updated Minimum Maintenance Standards (O. Reg 239/02). If City staff select to use a maintenance policy different than the MMS, the City should be consistent with the application of their maintenance policy.	97
32	Revisit annual budgets to ensure the amount allocated for operations is sufficient as the active transportation network is implemented.	97
33	Consider enhancing the level of service for winter maintenance on roads / routes identified in Figure 37 to form a winter maintained active transportation system.	97
34	Continue to explore external funding sources and partnerships to help fund implementation of the AT Strategy.	98

PHOTO REFERENCES

Photo Name and Source		pg. #
1	Barrie Rail Trail in Winter Source: https://www.flickr.com/photos/retiredinwasaga/33014318102/in/photolist-Sin1z5-8ANENA/	1 (cover)
2	Winter trail use in Barrie Source: City of Barrie, 2016	3
3	City of Barrie existing signed bike route Source: WSP, 2018	16
4	City of Barrie Waterfront Trail Source: WSP, 2018	22
5	Ferndale Drive (looking north), north of Tiffin Street Source: WSP, 2018	26
6	Bike lanes on Duckworth Street at the Highway 400 southbound ramp Source: WSP, 2018	32
7	Pavement markings through driveway in Newmarket, ON Source: WSP 2018	48
9	Accessible Trail in Ontario Source: http://www.ontariotrails.on.ca/learn/trail-info/accessibility-a-guide-for-accessible-web-design	63
10	Cyclist and pedestrian along Penetang Street west of St. Vincent Street Source: WSP, 2018	74
11	City staff at the ground-breaking for the Harvie Road / Highway 400 overpass construction Source: https://barrie.ctvnews.ca/construction-to-start-on-new-hwy-400-overpass-in-barrie-1.3952199	80
12	Tiffin Street bridge construction Source: https://www.simcoe.com/news-story/7570047-completion-of-barrie-bridge-may-be-delayed-by-one-year	87
13	Off-road trail during winter season in Barrie Source: WSP, 2018	96
14	Barrie's Waterfront Trail Source: WSP, 2018	99
15	Snow removal on City of Barrie sidewalk Source: https://www.simcoe.com/news-story/4394301-more-cold-forecast-for-spring-in-barrie/	102
16	City of Barrie existing crossride Source: WSP, 2018	107



The City of

Barrie

CITY OF BARRIE

TRANSPORTATION MASTER PLAN

Active Transportation Strategy | June 2019

Technical Appendix B1 – Policy Review



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POLICY REVIEW

A master plan typically outlines policies, strategies and recommendations that reflect community and municipal objectives. Policies provide the basis for future growth and development as well as community change. Where possible, master plans should be supported by policies and plans from other levels of government. Active transportation and recreation have been integrated into a number of policies and plans at the federal, provincial, and regional levels of government which have a direct impact on decision making in the City of Barrie. In order to understand how to influence future policy changes, it is important to understand the existing policies.

The following is a summary of active transportation and recreation supportive policies at the federal, provincial, regional, and local municipal level that have been reviewed as part of this project to provide the team with the necessary policy context.

1. FEDERAL POLICIES

1.1 Transport Canada

The Strategies for Sustainable Transportation Planning: a review of practices and options (2005) identifies guidelines for consideration when incorporating sustainable transportation into municipal policies. The report includes federal level principles that support the promotion of active transportation as a viable and sustainable mode of transportation. Potential strategies identified in the Transport Canada guidelines include those that support:

Land Use Planning Integration

- ▶ Encourage desirable land use form and design (e.g. compact, mixed-use, pedestrian / bike friendly) through transportation plan policies.

Environment & Health

- ▶ Mitigate air quality and noise impacts of transportation activities;
- ▶ Set goals and objectives for reducing the need to travel, improving transit mobility, and preserving minimum levels of service on roadways; and,
- ▶ Address the transportation needs of persons with disabilities, notably public transit service and barrier-free design in public rights-of-way.

Modal Sustainability

- ▶ Increase walking, cycling, other active transportation, transit, ridesharing and teleworking;
- ▶ Recognize synergies and tensions among different modes (e.g. potential for multimodal cycling-transit trips, potential for modal shift from transit to ridesharing); and,
- ▶ Make transit operations more sustainable.

The strategies identified in Transport Canada's report, demonstrate the federal government's commitment to developing national standards and practices which can be used to help improve conditions for walking and cycling.

1.2 Federation of Canadian Municipalities (FCM)

The Federation of Canadian Municipalities fosters the development of sustainable communities that enjoy a high quality of life by promoting strong, effective, and accountable municipal government. FCM's *Communities in Motion: Bringing Active Transportation to Life Initiative* is a key resource for all Canadian municipalities. It sets out goals for promoting active transportation and eliminating barriers to difficult travel modes. The strategy outlines active transportation considerations for community design including travel times and distance, lighting on trails, wayfinding, cycling amenities, and support for recreational, utilitarian, and tourism trip types. The design and development of walking and cycling facilities is reinforced and promoted through this policy. Local municipalities are encouraged to use the recommendations and design considerations outlined in this policy to help guide the development of individual routes, systems, and linkages.

1.3 Pan-Canadian Framework on Clean Growth and Climate Change (2016)

The Pan-Canadian Framework on Clean Growth and Climate Change is a plan developed in 2016 by the Federal Government to meet emissions reductions targets and proactively respond to the challenges of the changing climate.

The plan presents clear actions to reduce emissions based on various sectors, one of which addresses key actions and roles that transportation can play in helping to achieve lower emission targets. The plan identifies the action of shifting from higher to lower-emitting modes of transportation including support for cycling, walking and riding public transit instead of driving a car. It also establishes roles that different levels of government will play in achieving transportation goals. This includes the collaboration between federal, provincial and territorial governments in investing in public transit upgrades and transportation corridors/ hubs that prioritize more sustainable modes of transportation.

It also identifies key action areas to help build resilience to climate change. One of these areas includes protecting and improving human health and well-being which notes the negative impacts that climate change is having on the health and well-being. This includes things such as pollution-induced illness such as respiratory illness and obesity. By adapting the built form and encouraging education and outreach to support walking and cycling it can help reduce the negative impacts of climate change on the health and well-being on Canadian populations. This plan reaffirms the benefits that active transportation has on contributing to a more resilient and healthier environment and population.

2. PROVINCIAL

2.1 Places to Grow Act (2017)

The Places to Grow Act, the Growth Plan for the Greater Golden Horseshoe (GGH), sets out a vision for the Greater Golden Horseshoe 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. *Place to Grow* seeks to support and foster complete communities, a thriving economy, a clean and healthy environment, and social equity in the GGH region.

The plan provides policy objectives to guide the planning and development of an integrated and efficient transportation system to support a vibrant economy and high quality of life in the Greater Golden Horseshoe. Examples of specific policy objectives related to active transportation outlined in the plan include:

- ▶ 2.2.5.4 Economic development and competitiveness in the GGH will be promoted by: In planning for employment, surface parking will be minimized and the development of active transportation networks and transit-supportive built form will be facilitated.
- ▶ 2.2.7.b New development taking place in designated greenfield areas will be planned, designated, zoned and designed in a manner that: supports active transportation.
- ▶ 3.2.2.2.b The transportation system within the GGH will be planned and managed to: offer a balance of transportation choices that reduces reliance upon the automobile and promotes transit and active transportation.
- ▶ 3.2.2.4.c Municipalities will develop and implement transportation demand management policies in official plans or other planning documents or programs to prioritize active transportation, transit, and goods movement over single-occupant automobiles.
- ▶ 3.2.3.4 Municipalities will ensure that active transportation networks are comprehensive and integrated into transportation planning to provide: a) safe, comfortable travel for pedestrians, bicyclists, and other users of active transportation; and b) continuous linkages between strategic growth areas, adjacent neighbourhoods, major trip generators, and transit stations, including dedicated lane space for bicyclists on the major street network, or other safe and convenient alternatives.
- ▶ 3.2.8.6 New public service facilities, including hospitals and schools, should be located in settlement areas and preference should be given to sites that are easily accessible by active transportation and transit, where that service is available.
- ▶ 4.2.10.b Upper- and single-tier municipalities will develop policies in their official plans to identify actions that will reduce greenhouse gas emissions and address climate change adaptation goals, aligned with the Ontario Climate Change Strategy, 2015 and the Climate Change Action Plan, 2016 that will include: reducing dependence on the automobile and supporting existing and planned transit and active transportation.
- ▶ 6.3.2.d Municipalities with primary settlement areas will, in their official plans 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 that create attractive and vibrant places that support walking and cycling for everyday activities and are transit supportive.

2.2 Bill 51 Planning Act Reform Municipal Act (2001)

Bill 51 was approved in January of 2007 and reforms the Planning Act. The Planning Act provides the legislative framework and is the guiding document for land use planning in Ontario. The document outlines changes to the planning process intended to support intensification, sustainable development, and the protection of green space. This is facilitated by increasing municipalities' power and flexibility and providing them with the tools to efficiently use land, resources, and infrastructure. Bill 51 is consistent with Ontario's recent policy shift towards sustainable land use development and planning. For instance, Bill 51 allows municipalities to require environmentally sustainable design for individual buildings as well as entire neighbourhoods. It has also identified sustainable development as a provincial goal and objective as part of the Provincial Policy Statement.

2.3 Provincial Policy Statement (2014)

The 2014 update to the Provincial Policy Statement (PPS) set the foundation for regulating land use planning and development within the Province of Ontario while supporting provincial goals and objectives. The PPS sets out guidelines for sustainable development and the protection of resources of provincial interest. The PPS promotes transportation choices that facilitate pedestrian and cycling mobility and other modes of travel. "Transportation systems," as defined in the PPS, are systems that consist of corridors and rights-of-way used for the movement of people and goods as well as associated transportation facilities, including cycling lanes and park'n'ride lots. Policies pertaining to alternative modes of transportation are dispersed throughout the PPS. Policies which specifically address the development of active transportation infrastructure and programs include sections 1.1.3.2, 1.4.3, 1.5.1, 1.6.5, 1.6.7.4 and 1.8.1.

2.4 Ontario Cycling Strategy #CycleON (2018)

In November 2012 the Ministry of Transportation Ontario (MTO) published the Draft Cycling Strategy. The strategy acknowledges the importance of developing cycling infrastructure to help reduce GHG emissions, ease gridlock, enhance the economy, increase tourism and increase quality of life for Ontario residents. The strategy was developed based on increasing demand from local municipalities for direction from the province on the development of cycling facilities and responds to recommendations in the Coroner's report published in 2012.

The province's vision is to ultimately "develop a safe cycling network that connects the province, for collision rates and injuries to continue to drop, and for everyone from the occasional user to the daily commuter to feel safe when they get a bicycle in Ontario". The strategy outlines recommended cycling infrastructure, legislation changes and enhancements including a set of proposed changes to The Highway Traffic Act.

The Ontario Cycling Strategy – #CycleON was released by the MTO along with a clear set of actions. These actions are a strong basis for strategic municipal plans as they address both soft and hard infrastructure as well as the importance of short-term actions and priorities to demonstrate early success. Many of the actions and directions outlined in the strategy align with goals set out by local municipalities.

#CycleON Action Plan 2.0 sets five Strategic Directions:

- ▶ Design healthy, active and prosperous communities;
- ▶ Improve cycling infrastructure;
- ▶ Make highways and streets safer;
- ▶ Promote cycling awareness and behavioural shifts; and
- ▶ Increase cycling tourism opportunities.

2.5 Ontario Environment Plan

In November 2015, Ontario’s Ministry of Environment and Climate Change released a Climate Change Discussion Paper to educate Ontarians on key issues related to Climate Change in the provincial context. The Strategy is a response to the Climate Change Discussion Paper (February 2015) which presented a long-term vision and a set of goals to “fight” climate change. The Strategy builds upon the Ontario government’s past successes to reduce greenhouse gases – a milestone that was achieved in 2014 as a result of the Climate Change Action Plan established in 2007.

The updated strategy sets out changes which are required in order to reduce greenhouse gas emissions by 37% before 2030. Actions and initiatives have been identified based on Ontario’s ultimate goal of reducing greenhouse gas levels by 80% by 2050. Most of Ontario’s greenhouse gas emissions come from the transportation industry and buildings sectors. As such, a key consideration of the strategy is further investment in sustainable transportation. To reduce the greenhouse gas emissions produced by transportation, the province will continue to improve and provide residents with increased access to more sustainable transportation modes.

2.6 Ontario Trails Act (2016)

The Ontario Trails Act was developed by the Ministry of Tourism, Culture and Sport in June of 2016 to provide legislation to improve, sustain existing and future proposed urban, suburban and rural trails in Ontario. The Act supports a number existing initiatives and strategies such as the Ontario Trails Strategy (2005) and sets out to address long-term direction for the development, promotion and management of new and existing trails in Ontario.

The Act sets out to achieve the vision for trails in Ontario, viewing them as “a world-class system of diversified trails, planned and used in an environmentally responsible manner that enhances the health and prosperity of all Ontarians.” The act identifies four key purposes:

1. To increase awareness about and encourage the use of trails.
2. To enhance trails and the trail experience.
3. To protect trails for today’s generation and future generations.
4. To recognize the contribution that trails make to quality of life in Ontario.

The act helps to better support the trails community to effectively develop, operate and promote trails and enhance the trail user experience. It also helps to address common issues such as liability, trespassing, damage to property as well as long-term access to trails.

2.7 Highway Traffic Act (2001)

Bicycles are recognized as a vehicle under the Highway Traffic Act (HTA). They can operate on public roadways with the same rights and responsibilities as a motor vehicle. However, bicycles are not permitted on controlled access freeways such as the 400 series and QEW highways or any roadway restricted for cycling by a municipal by-law.

The HTA contains a number of cycling related policies including bicycle lanes on municipal roadways, vehicles interacting with bicycles, bicycles being overtaken, and regulating or prohibiting bicycles on highways. The passing of Bill 31, the *Making Ontario's Roads Safer Act* amendment to the HTA provides further clarifications and regulations related to cycling and pedestrian activities. At school crossings and pedestrian crossovers, drivers must yield only half of the roadway to pedestrians who are crossing. The legislation improves pedestrian safety by:

- ▶ Requiring drivers to yield the whole roadway to pedestrians at school crossings and pedestrian crossovers; and
- ▶ Amending the Highway Traffic Act to allow for new pedestrian crossing devices on low-speed and low-volume roads as requested by municipalities

The legislation responds to municipal requests, stakeholder input, and recommendations from the Office of the Chief Coroner for Ontario to promote cycling as active transportation and improve cyclist safety by:

- ▶ Allowing cyclists to use the paved shoulders on unrestricted provincial highways to promote safer opportunities to cycle;
- ▶ Increasing the fine range for convictions of dooring of cyclists to \$300 - \$1,000 and raising the demerit points from two to three;
- ▶ Requiring all drivers to maintain a 1 metre distance when passing cyclists; and
- ▶ Fines are now given for both dooring and passing offences in addition to demerit points for dooring. Under Bill 31 cyclists are now required to have proper lights, reflective materials, and reflectors with a fine being given for those who have improper lighting.

2.8 Reg. 239/02: Minimum Maintenance Standards for Municipal Highways (2018)

The Minimum Maintenance Standards for Municipal Highway (MMS) sets out minimum standards for road and highway maintenance for all municipalities. MMS regulations pertain to various elements of road repair and maintenance, such as the frequency of road inspections, weather monitoring, ice formation on roadways, snow accumulation, and sidewalk trip ledges. Under the MMS, roads and highways throughout the province are classified based on their average annual daily traffic and posted speed limits, and based on the classification of a road/highway, there are required minimum levels of inspection and repair. The highest standards of maintenance are required for ‘class 1’ roads, which are highways that experience a large volume of traffic and higher posted speed limits. Recent updates to the MMS came into effect in May 2018 and include updated definitions of bicycle facilities and lanes, standards and regulations for addressing snow accumulation on bicycle lanes and clearance during extreme weather events. While the number of hours in which a roadway and bicycle lane must be cleared are not the same, the fact that standards for cycling facilities are now clearly prescribed and included, is a considerable advancement for cyclist safety on roadways.

2.9 Accessibility for Ontarians with Disabilities Act (2005)

The Accessibility for Ontarians with Disabilities Act (A.O.D.A.) was passed on June 13, 2005. The policy calls on the business community, public and not-for-profit sector and people with disabilities to develop, implement and enforce mandatory standards. The policy makes Ontario the first jurisdiction in Canada to develop, implement and enforce accessibility standards applied to both private and public sectors. These guidelines provide directives on how businesses in Ontario can identify, remove and prevent barriers to accessibility. The Built Environment is the most relevant standard that can be applied to trail planning, design and construction.

Recently a revision and update of the Built Environment Standard was undertaken and released in early 2013. “The goal of the Accessibility Standards for the Built Environment is to remove barriers in public spaces and buildings. This will make it easier for all Ontarians — including people with disabilities, seniors and families — to access the places where they work, travel, shop and play”. The standard applies to new construction and redevelopment of existing facilities. The standards for public spaces cover: Recreational Trails and Beach Access Routes, Outdoor Public Use Eating Areas, Outdoor Play Spaces, Exterior Paths of Travel, Accessible Parking and Obtaining Services.

Some highlights of the technical requirements for recreational trails under the new regulation 80.8(1) include a minimum clear width of 1,000 mm; a clear height that provides a minimum head room clearance of 2,100 mm above the trail; a firm and stable surface type; and where trail is constructed adjacent to water or a drop-off, it must have edge protection that constitutes an elevated barrier that runs along the edge of the; a top edge of at least 50 mm above the trail surface; a protection barrier that does not impede the drainage of the trail surface; a clear opening of between 850 mm and 1,000 mm, whether the entrance includes a gate, bollard or other entrance design; and trail head signage that provides relevant accessibility information (the length of trail; the type of surface of which the trail is constructed; the average and the minimum trail width; the average and maximum running slope and cross slope and the location of amenities, where provided).

2.10 Transit Supportive Guidelines (2012)

In 1992, the Ontario Ministries of Transportation and Municipal Affairs and Housing published the Transit-Supportive Land Use Planning Guidelines which was updated in 2012 to reflect continued progress in the development of more compact, transit-supportive communities. The report documents the most current thinking on transit-supportive urban planning and design in addition to current best practices in transit planning. The documents builds upon the policies and initiatives developed by the Ministry over the past 10+ years and consists of over 50 guidelines and approximately 450 specific strategies to guide urban/transit planners and developers etc. in creating communities that support transit and transit ridership.

The document also supports the development of pedestrian and cycling connections throughout urban and rural communities to help enhance transit infrastructure and usage. The approach includes the provision of safe and accessible pedestrian and cycling connections to and from transit stops and stations. Recommendations set out on the transit-supportive guidelines will help to inform the development of proposed network linkages and recommendations which facilitate connectivity to transit and other modes of transportation. Specific reference is also made to the design and development of complete streets.

2.11 Ontario Environment Plan (2018)

The Ontario Environment Plan was proposed by the Government of Ontario and plans to balance the needs of addressing climate action and improving economic prosperity for residents Ontario. It acknowledges the importance of protecting the environment and reducing greenhouse gas emissions. The proposed plan seeks to address four key environmental challenges of:

1. protecting our lakes and rivers;
2. Addressing climate change;
3. Reducing litter and waste in our communities and keeping our land and soil clean
4. Conserving land and greenspace

The fourth challenge area, conserving land and greenspace speaks to the importance of preserving natural areas and the importance of healthy natural spaces for people to enjoy. By supporting the growth and development of active transportation infrastructure it can help address this challenge in a positive way.

Further the plan identifies actions that will help achieve its goals. A key action identified in the proposed plan is to establish a public education and awareness program to make people more aware of the environmental, financial and health impacts of their transportation choices. While the nature of this action is to better support and encourage people to take public transportation and expand commuter choices, active transportation can help achieve get to his goal by offering healthy and environmentally conscious ways of completing their first and last mile and supporting multi-modal transportation. Another key action that responds to the importance of active transportation is to support the of new trails across the province and expanding access to park space. Overall, this proposed plan identifies the importance of reducing harmful effects of climate change such as greenhouse gasses and provides some recommendations and actions of how active transportation and related infrastructure can play a key role in helping to achieve the goals and actions of this proposed plan.

2.12 Ontario's Cycling Tourism Plan (2017)

The Government of Ontario recently established Ontario's Cycling Tourism Plan in 2017. This plan sets out to promote bicycle tourism in Ontario and establish bicycle friendly economy and business that enhance cycling tourism across the region. Further, it's mission is to help Ontario emerge as a leader in the development of cycling tourism. It recognizes the role that cycling tourism plays in fostering a strong economy and its ability to attract visitors that stay longer and spend more within the province. It identifies key actions necessary to help expand achieve the goals of the plan and expand the impacts of cycling tourism across the region. These include:

1. Identify, attract and support signature cycling tourism festivals and events through the Celebrate Ontario program and/or Sport Hosting program.
2. Make funding available through Tourism Development Fund (TDF) to develop and enhance products and experiences that support cycling tourism.
3. Support ministry agencies and attractions to be bike-friendly and accessible by bike.
4. Collaborate with cycling organizations to promote cycling safety and bike-friendly activities.

It further identifies roles and partnerships to help increase support walking and cycling as part of an active lifestyle and key goals of positioning Ontario as a premier destination for cycling tourism; creating healthy, active and economically prosperous communities; and working collaboratively to develop and promote cycling tourism products that will enable Ontario to meet or exceed global growth over the coming years.

3. REGIONAL

3.1 Simcoe County Transportation Master Plan (2014)

The 2014 Simcoe County Transportation Master Plan (TMP) includes several sections related to active transportation. The TMP reviews existing conditions for active transportation and highlights the region as one with strong potential for recreational active transportation. Simcoe's 207 km of off-road trails and 54 km of on-road trails, such as the Trans Canada Trail, support active transportation through the provision of safe links between municipalities.

Complete Streets are a part of the Simcoe TMP. "Complete streets" are a network of roadways that are planned, designed, constructed, and operated to safely and comfortably provide for the needs of all users, including motorists, cyclists, pedestrians, and transit riders. The TMP calls for the inclusion of cycling infrastructure and for the provision of pedestrian friendly facilities along complete streets. Minimum widths (1.5m) are suggested for sidewalks with suggested larger, 2.4 m widths to encourage higher pedestrian activity. The Active Transportation chapter of the Simcoe TMP has several goals, which include to build upon:

- ▶ Routes and linkages already developed by the County and its local partners;
- ▶ Policies and plans already in place; and
- ▶ Promotion, tourism, and outreach initiatives being undertaken

This section provides a detailed guide for developing active transportation plans including background research steps, route selection and prioritization, network concepts, facility selection, phasing, and costings aspects.

3.2 Simcoe County Official Plan

The Simcoe County Official Plan (OP) provides many regional policies that are supportive of active transportation. Regarding development, the OP calls for minimum density requirements and the development of more compact communities that are transit supportive and facilitate pedestrian and cycling opportunities. Additionally, the OP highlights the need for attractive and vibrant places that support walking and cycling for everyday activities. Section 4.1, *Healthy Communities and Housing Development* includes active transportation supportive policies such as:

- ▶ Accessibility of education, health, human services, culture, and recreation facilities by walking, cycling, or transit is encouraged.
- ▶ The design of streetscapes, building orientation, and traffic flow should be planned to provide safe pedestrian and cycling access and movement in downtowns, main streets, and other activity areas.

Section 4.8, *Transportation*, also provides several supporting policies for active transportation infrastructure and programs, including:

- ▶ To plan for a more flexible transportation system including Transportation Demand Management (TDM) strategies, cooperative transit initiatives and supportive land use strategies which facilitate TDM and transit providing choices amongst walking, cycling, transit, and the automobile for all users.

- ▶ 4.8.13 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.

The Simcoe County Official Plan's recurring support for active transportation throughout the policy document demonstrates the region's priorities for improving active transportation infrastructure and encouraging modal shift towards more sustainable and active transportation choices.

Note: There are currently other regional policy documents for Simcoe County that are currently in draft. Although Barrie is separate from the County, there are two pending reports that may be relevant to the City of Barrie MMATMP in the future include the:

- ▶ Simcoe County Transit Feasibility & Implementation Study and
- ▶ Simcoe Area Multi-Modal Transportation Strategy

4. LOCAL

4.1 City of Barrie Multi-Modal Active Transportation Master Plan (2013)

The 2013 City of Barrie Multi-Modal Active Transportation Master Plan (MMATMP) provides guidance for further developing active transportation and transit in the City with goals set for 2031. For cycling and walking, the MMATMP proposes several levels active transportation investment and predicted active transportation mode shares. The 'medium modal share' option is identified as the preferred option in the Plan, at 12%. This target was set to greatly improve upon the 2013 existing conditions and increase emphasis on non-auto modes in Barrie.

The selected, medium modal share option provides several guiding statements for active transportation including:

- ▶ Limit the number of cul-de-sacs
- ▶ Provide pedestrian/cyclist specific shortcuts across long blocks and cul-de-sacs, especially to reach local services
- ▶ Provide sidewalks on both sides of the street on arterials and collectors, with 2.0m minimum widths on 6 and 7 lane roads and annexed lands roads
- ▶ Provide sidewalks on one side of the street on local streets, but both sides within 250m of schools and annexed land local streets, with 1.5m minimum width
- ▶ Achieve 90% of the City within 800m to access the cycling network and develop cycling network to have a mesh width of 1,000 and 1,500m (500 to 800m for annexed lands)
- ▶ Provide buffered bike lanes on streets with 4 lanes or more and provide bicycle lanes on all other arterials and collectors
- ▶ Provide hard-surfaced pathways through most natural corridors and natural heritage system
- ▶ Maintain sidewalks year round, and cycling facilities for at least 3 seasons

Additionally, the 2013 MMATMP provides several policy updates for active transportation. Policy 8.1.1 suggests to reduce auto-dependence, active transportation infrastructures must be well integrated in the planning of new developments.

The objectives of 8.1.1 include to facilitate active transportation by creating direct links and incite people to walk or bike for short trips. Additionally, policy 8.1.2 advises active transportation planning and design should be undertaken in close collaboration with land use, transit and road planning. This policy also prioritizes community transportation demand management efforts, public education campaigns, and Safe Route to School programs.

These current goals and policies for the 2031, 12% active mode share target provide a starting point for the forthcoming MMATMP update, with strong support in areas such as network development, connectivity, maintenance, facility selection, and active transportation in annexed land development.

4.2 City of Barrie Official Plan (2018)

The City of Barrie Official Plan (OP) includes many goals and policies supportive of active transportation. The City of Barrie recently updated their Official Plan in January 2018. A key planning principle is the City “continues to place a high priority on supporting active transportation (walking and cycling) and on accessibility to public transit in all new growth areas.” Goal 3.3.1 specifies building designs and densities for new housing should foster safe, vibrant, and walkable/bikeable streetscapes. Additionally, the improvement of current communities through active transportation is a reoccurring theme of the City of Barrie OP. Poor, inadequate or unsafe multi-modal facilities are an identified community improvement priority. Land use aspects of communities and active transportation are also discussed in the OP, with prioritization of mixed-use development and specifying, for example, school locations within bikeable distances. The OP also prioritizes the development of more connected, grid-like transportation networks in new and current communities, which will help reduce trip distances and promote active transportation participation.

The City of Barrie OP includes a *Transportation* policy section. Numerous active transportation supportive policies for Barrie are included, such as the General policy: “City streets shall be planned and developed as multi-modal transportation corridors that are designed within an urban cross section to safely accommodate pedestrian, bicycle, transit and vehicular movement for people of all ages and abilities.” Section 5.4.2.4, *Active Transportation* provides many guiding policies for pedestrian and cycling initiatives; key themes of the this section include connectivity, reduced barriers and increased active mode specific links, safety and comfort, design standards, active transportation development requirements, and components to be included in the City’s Active Transportation Master Plan.

Active transportation policies can also be found in the annexed lands, *Salem Secondary Plan* portion of the OP. This section of the OP establishes further details for future urban development of the Secondary Plan Area. Pedestrian and cyclist aspects included in the *Streetscape Design* section, such as policies:

- ▶ 8.4.4.4.b Pedestrian/cyclist comfort and safety will be a priority in streetscape design
- ▶ 8.4.4.4.i Arterial streets: a balance must be achieved between their transportation function, including the accommodation of transit and cycling
- ▶ 8.4.4.4.iii Local streets: support local transportation needs, as well as providing an attractive environment for pedestrians and cyclists through the provision of sidewalks and appropriate tree planting.

The City of Barrie OP and its frequent prioritization of active transportation in both current and new urban development will help foster an MMATMP update that is strongly supported by local policy.

4.3 City of Barrie Urban Design Manual (2014)

The goal of 2014 City of Barrie Urban Design Manual (UDM) is to “provide, through urban design policies and guidelines, a framework for the development and maintenance of a convenient, safe, efficient and aesthetically pleasing urban environment.” For *Physical Environment and Building Siting*, many pedestrian oriented guidelines are included, such as:

- ▶ Design the building setback at a pedestrian scale where appropriate and to contribute to a desirable streetscape.
- ▶ Locate active uses such as retail, service shops and restaurants at the street level to encourage pedestrian activity and interaction between internal spaces and the public realm.
- ▶ Energy saving designs and features is encouraged. Orient buildings, outdoor spaces and pedestrian activity areas to maximize sunlight exposure during cooler months and shading during the warmer months.

The UDM Pedestrian Circulation guidelines suggest extensive strategies for improving the built environment for pedestrians. Sightlines, accessibility, connectivity, sidewalk provisions, lighting, planting plans, and various pedestrian realm improvements are key themes to the UDM’s *Pedestrian Circulation* section. Additionally, the UDM provides a *Sidewalks* section with further details concerning minimum widths, maximum grades, consistency through driveways, and engineering specifications.

The City of Barrie UDM details many pedestrian oriented design considerations and provides procedures and requirements for the implementation of pedestrian facilities in the City. This resource should be incorporated into the design of future pedestrian network improvements and active transportation policy development.

4.4 Council Strategic Plan (2015)

In 2015 Council approved The Council Strategic Plan identifies key priorities, goals and directions for the timeline of 2014-2018 to help achieve the strategic goals and vision of the City. It identifies four key goals of:

1. Vibrant Business Community
2. Inclusive Community
3. Responsible Spending
4. Well-Planned Transportation

Part of building an inclusive community includes promotion and facilitation of community connections as identified in the strategic plan. Active transportation can help offer new connections within existing and new development areas for people of all ages to move throughout the City. Further, in order to support and achieve the goal of well-planned transportation, the City identifies the objective of improving options to get around. Active transportation is a viable mode

of transportation that can provide more economical, environmentally sensitive and equitable ways of getting around to people of all ages and abilities.

4.5 Waterfront & Marina Strategic Plan (2015)

Barrie's Waterfront & Marina Strategic Plan was approved in 2015. It provides a vision and direction for how this area should grow and develop to meet the needs of current residents as well as future populations. It presents three themes of the concept for the waterfront,

1. Activity Centres; which establishes a framework for better distributing events, festivals and recreational activities along the waterfront through clarification of the function, role and activity level of each destination.
2. Create a Continuous Mobility Network of streets, trails, and greenways throughout key areas along the waterfront;
3. Placemaking and Safety Features; which offers key areas and features like outposts to provide goods for visitors such as equipment rentals such as bicycles, food and drink in addition to pedestrian -scale lighting to make it safe and easy for people of all ages and abilities to navigate.

The plan identifies goals and objectives to improve opportunities for active transportation including improvements to the trail network to support connectivity for pedestrians and cyclists by designing all roads to facilitate the safe and comfortable movement of all road users, including pedestrians, cyclists, and transit users, in compliance with the City's Multi-Modal Transportation Master Plan. It also identifies supports for use of active transportation by residents by ensuring any other new cycling/walking routes connect the Discover Barrie Waterfront Trail with key destinations, such as the Barrie South GO Station.



The City of

Barrie

CITY OF BARRIE

TRANSPORTATION MASTER PLAN

Active Transportation Strategy | June 2019

Technical Appendix B2: Phasing Maps (Full Build-out)

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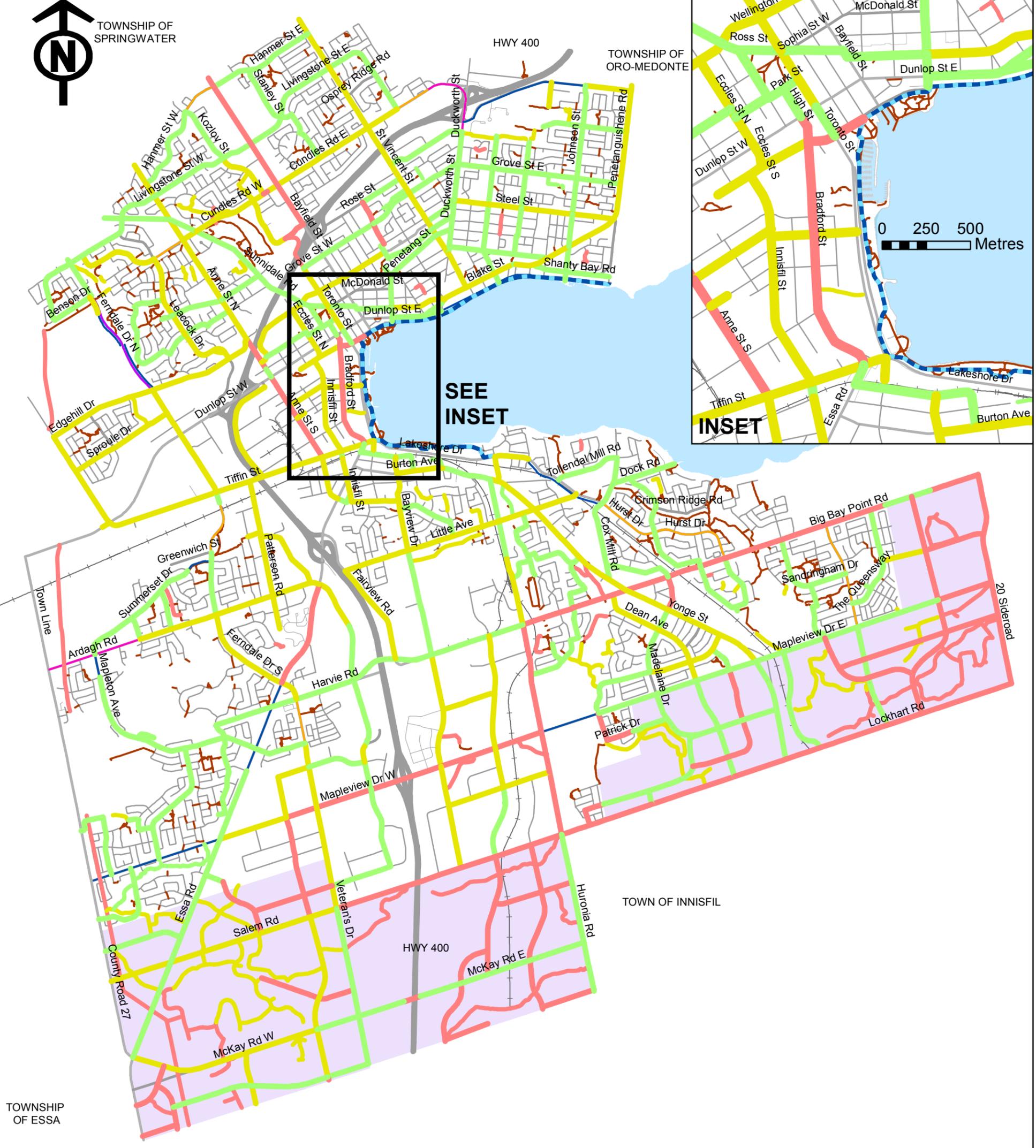
TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE



SEE INSET

INSET



TOWNSHIP OF ESSA

Existing Cycling Network

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

*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.

Proposed Project phasing

- Short Term (Year 2019 - 2023)
- Medium Term (Year 2024 - 2031)
- Long Term (Year 2032 - 2041)

Other Features

- Secondary Plan Area
- Water

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





TOWNSHIP OF SPRINGWATER

TOWNSHIP OF ORO-MEDONTE

INSET

SEE INSET

TOWN OF INNISFIL

TOWNSHIP OF ESSA

Cycling Network

-  Waterfront Multi-use Trail
-  In-Boulevard Pathway
-  Road with One or Two Sidewalks
-  Off-road Trail
-  Hiking Trail

Proposed Project Phasing

-  Short Term (Year 2019 - 2023)
-  Medium Term (Year 2024 - 2031)
-  Long Term (Year 2032 - 2041)

Other Features

-  Secondary Plan Area
-  Water

*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.
 Hiking trails include trail types 4 and 5 as defined in the Trails Master Plan (Appendix E) and are considered hiking trails unless otherwise noted as a mountain bike trail.

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





The City of

Barrie

CITY OF BARRIE

TRANSPORTATION MASTER PLAN

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Technical Appendix B3: Network Database

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Barrie Multi-Modal Active Transportation Master Plan (MMATMP)
Active Transportation and Trails Network Costing
Table 1 - Unit Price Schedule

This table provides an overview of the estimated unit costs for active transportation facilities, structures and crossings and other elements of an active transportation and trails network. All unit prices exclude tax, contingency, design and approvals costs.

ITEM	DESCRIPTION	UNIT	2018 MMATMP Unit Price Range /	Unit Price for Route Calculation	Previous 2014 MMATMP Unit Price	COMMENTS/ASSUMPTIONS
1.0 GENERAL ACTIVE TRANSPORTATION FACILITIES						
Shared Lanes / Paved Shoulders						
1.1	Signed Bike Route in Urban Area	linear KM	\$1,200	\$1,200	N/A	Price for both sides of the road, assumes one sign a minimum of every 500 metres in the direction of travel. Price assumes that signs will be mounted on an existing post. Price includes: - \$300 per sign x 4 signs (2 signs on each side of the road)
1.2	Signed Bike Route in Rural Area	linear KM	\$1,000	\$1,000	N/A	Price for both sides of the road, assumes one sign a minimum of every 2 kilometres in the direction of travel. Price assumes that signs will be mounted on a new post. Price includes: - \$500 per sign x 2 signs (1 sign on either side of the road)
1.3	Signed Bike Route with Sharrow Lane Markings <i>Intended to supplement a signed bike route in specific locations. Not intended to be a stand-alone facility type.</i>	linear KM	\$7,700	\$7,700	N/A	Price for both sides of the road, includes route signs every 500 metres and sharrow stencils every 75 metres as per OTM Book 18 guidelines. Price includes: - \$300 per sign x 4 signs (2 signs on each side of the road) - \$250 per stencil marking x 26 (13 stencils on each side of the road)
1.4	Signed Route with Edgeline	linear KM	\$3,200	\$3,200	N/A	Price for both sides of the road, includes signs and painted edgeline (100mm solid white line). Price includes: - \$300 per sign x 4 signs (2 signs on each side of the road) - \$1 per metre for painted solid white line
1.5	Signed Bike Route with Paved Shoulder in conjunction with existing road reconstruction / resurfacing	linear KM	\$100,000 - \$200,000	\$150,000	N/A	1.5 metre paved shoulder on both sides of the road. Assumes cycling project pays for additional granular base, asphalt and painted line. Price may vary from \$100,000 to \$200,000 depending on work needed to improve platform. Price includes: - \$300 per sign x 4 signs (2 signs on each side of the road) - \$1 per metre for painted solid white line (both sides of the road) Price may be higher if road platform needs to be widened.
1.6	Signed Bike Route with Buffered Paved Shoulder in conjunction with existing road reconstruction / resurfacing project	linear KM	\$200,000 - \$250,000	\$250,000	N/A	1.5 metre paved shoulder + 0.5-1.0 metre paved buffer on both sides of the road. Assumes cycling project pays for additional granular base, asphalt, painted edge lines and signs (buffer zone framed by white edgelines). Price may vary from \$200,000 to \$250,000. Price includes: - \$300 per sign x 4 signs (2 signs on each side of the road) - \$1 per metre for painted solid white line (both sides of the road)
1.7	Addition of Rumble Strip to Existing Buffered Paved Shoulder (rural)	linear KM	\$12,000	\$12,000	N/A	Price for both sides. Buffer \$6 / m.
1.8	Granular Shoulder Sealing	linear KM	\$18,000	\$18,000	N/A	Both sides spray emulsion applied to harden the granular shoulder. This will reduce gravel on the paved portion of the shoulder and significantly reduce shoulder maintenance. Use \$9 / m.
1.9	Upgrade Granular Surface Back Road to Chip Seal Surface	linear KM	\$56,000	\$56,000	N/A	Price includes pulverizing existing surface with double treatment (\$6 / m ²) or tar and chip (\$2 / m ²) at 7m wide.
Conventional and Separated Bike Lanes						
1.10	Conventional 1.5m-1.8m Bicycle Lanes by Adding Bike Lane Markings and Signs	linear KM	\$16,000	\$16,000	Striping for Bike Lanes (\$/m) \$10.00 (\$/km) \$10,000	Price for both sides of the road, includes signs, stencils and edge line. The price assumes: - \$2,000 for painted lane line (\$1 per metre multiply 2 for both sides of the road) - \$3,900 for painted bike symbols (assumes \$250 per symbol, 13 symbols per linear km multiply by 2 for both side of the road) - \$2,500 for bike lane signs (assumes \$350 per sign and tab, 5 signs per linear km - spaced every 200 metres - multiply by 2 for both sides of the road) - \$3,900 for 'No Parking' signs (assumes \$150 per sign, 13 signs per linear km multiply by 2). Signs to be mounted on existing and new posts. Price depends on number of stencils and signs used.
1.11	Conventional 1.5m-1.8m Bicycle Lanes through Lane Conversion from 4 lanes to 3 lanes	linear KM	\$40,000	\$40,000	Road Diet Restriping (\$/m) \$25.00 (\$/km) \$25,000	Price for both sides. Includes grinding of existing pavement, markings, signs, painted markings. Assumes road is not be surfacing. The price assumes: - \$2,000 for painted lane line (\$1 per metre multiply 2 for both sides of the road) - \$3,900 for painted bike symbols (assumes \$250 per symbol, 13 symbols per linear km multiply by 2 for both side of the road) - \$2,500 for bike lane signs (assumes \$350 per sign and tab, 5 signs per linear km - spaced every 200 metres - multiply by 2 for both sides of the road) - \$3,900 for 'No Parking' signs (assumes \$150 per sign, 13 signs per linear km multiply by 2). Signs to be mounted on existing and new posts. Price depends on number of stencils and signs used. - \$6 to \$8 per linear metre for lane line removal (soda blasting). Price varies on markings to be removed on a multi-lane roadway. Remove soda-blasting cost component if the road is being resurfaced. The cost for resurfacing to be part of resurfacing project.

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Conventional and Separated Bike Lanes						
1.12	Conventional 1.5m-1.8m Bicycle Lanes in Conjunction with a New Road, or Road Reconstruction / Widening Project	linear KM	\$378,000	\$380,000	N/A	Price for 1.5m bike lanes on both sides of the roadway (1.5m x 2 sides = 3.0m). The price assumes: - \$1,980 for catch basin leads (\$55/m - assumes 50m catch basin spacing and 1.8m lead) - \$360,000 for asphalt and sub-base (\$55/m ² = 120 x 1.5m BL x 1000 x 2) - \$16,000 for signs, stencils and edge line The roadway project funds all other improvements.
1.14	Conventional 1.5m-1.8m Bicycle Lanes by Retrofitting / Widening Existing Road	linear KM	\$700,000	\$700,000	N/A	Price for both sides of the road, includes the cost for excavation, adjust catch basins, lead extensions, new curbs/driveway ramps, asphalt and sub-base, painted markings and signs.
1.15	Wide Bicycle Lane (2.0m - 2.5m BL) in Conjunction with New Road or Road Widening Project	linear KM	\$350,000	\$350,000	N/A	Price for both sides of the road, assumes 2.0m to 2.5m bike lanes on both sides of the roadway . Includes catch basin leads, asphalt, signs, painted markings and sub-base only.
1.16	Buffered Bicycle Lane with Hatched Pavement Markings - No Road Construction / Widening or Road Diet required	linear KM	\$19,000	\$19,000	N/A	Price for 1.5m bike lanes with 1m hatched buffer. The price assumes: - \$4,000 for painted lines (\$1 x 4000 metres of line paint) - \$1,000 for hatching paint (1000 metres) - \$3,900 for painted bike symbols (assumes \$250 per symbol, 13 symbols per linear km multiply by 2 for both side of the road) - \$2,500 for bike lane signs (assumes \$350 per sign and tab, 5 signs per linear km - spaced every 200 metres - multiply by 2 for both sides of the road) - \$3,900 for 'No Parking' signs (assumes \$150 per sign, 13 signs per linear km multiply by 2). Signs to be mounted on existing and new posts. Price depends on number of stencils and signs used
1.17	Buffered Bicycle Lane with Hatched Pavement Markings with Road Diet	linear KM	\$43,000	\$43,000	Road Diet Restriping to Buffered Bike Lanes (\$/m) \$35.00 (\$/km) \$35,000	Price for 1.5m bike lanes with 1m hatched buffer. The price assumes: - \$4,000 for painted lines (\$1 x 4000 metres of line paint) - \$1,000 for hatching paint (\$1000 metres) - \$3,900 for painted bike symbols (assumes \$250 per symbol, 13 symbols per linear km multiply by 2 for both side of the road) - \$2,500 for bike lane signs (assumes \$350 per sign and tab, 5 signs per linear km - spaced every 200 metres - multiply by 2 for both sides of the road) - \$3,900 for 'No Parking' signs (assumes \$150 per sign, 13 signs per linear km multiply by 2). Signs to be mounted on existing and new posts. Price depends on number of stencils and signs used. - \$6 to \$8 per linear metre for lane line removal (soda blasting). Price varies on markings to be removed on a multi-lane roadway.
1.18	Buffered Bicycle Lane with Hatched Pavement Markings - Assumes New Road or Road Reconstruction/Widening already Planned	linear KM	\$381,000	\$380,000	Add Buffered Bike Lanes (widen both sides by 4m) (\$/m) \$1324.94 (\$/km) \$1,324,940,00	Price for 1.5m bike lanes + 0.5m hatched buffers on both sides of the roadway (1.5m x 2 sides = 3.0m). The price assumes: - \$1,980 for catch basin leads (\$55/m - assumes 50m catch basin spacing and 1.8m lead) - \$360,000 for asphalt and sub-base (\$55/m ² = 120 x 1.5m BL x 1000 x 2) - \$19,000 for signs, stencils and edge line The roadway project funds all other improvements.

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Conventional and Separated Bike Lanes						
1.19	Buffered Bicycle Lane with Flex Bollards - Assumes Road Reconstruction/Widening Already Planned	linear KM	\$411,000	\$410,000	N/A	Price for 1.5m bike lanes + 0.5m hatched buffers + flexible bollards on both sides of the roadway (1.5m x 2 sides = 3.0m). The price assumes: - \$1,980 for catch basin leads (\$55/m - assumes 50m catch basin spacing and 1.8m lead) - \$360,000 for asphalt and sub-base (\$55/m ² = 120 x 1.5m BL x 1000 x 2) - \$19,000 for signs, stencils and edge line - \$30,000 for flexible bollards (\$150 per bollard, spaced every 10m) The roadway project funds all other improvements.
1.20	Buffered Bicycle Lane with Pre-Cast Barrier - Assumes New road or Road Reconstruction/Widening Already Planned	linear KM	\$471,000	\$470,000	N/A	Price for 1.5m bike lanes + 0.5m hatched buffers + flexible bollards+ pre-cast and anchored curb delineators. The price assumes: - \$1,980 for catch basin leads (\$55/m - assumes 50m catch basin spacing and 1.8m lead) - \$360,000 for asphalt and sub-base (\$55/m ² = 120 x 1.5m BL x 1000 x 2) - \$19,000 for signs, stencils and edge line - \$30,000 for flexible bollards (\$150 per bollard, spaced every 10m) - \$50,000 - \$60,000 pre-case curb delineators (\$250 / pre-case unit 2m length + \$7.5 / pins and anchoring. Assumes 2m long x 2 = 200-250 per km depending on intersections and driveways) The roadway project funds all other improvements.
1.21	Supply and install surface mounted flexible post delineators	each	\$110	\$110	N/A	
1.22	Standard precast concrete curb 178 mm high, 216 mm wide and 1.83 metre long	each	\$250	\$250	N/A	Approximately \$95,000 - \$100,000 per 1 linear kilometre. Assumes 70% of roadway to include physical delineation (700 metres per 1 linear kilometre): - 700 metres / 1.83 metres = 382.5 pre-cast concrete curbs - 382.5 x \$250 = \$95,000
1.23	Standard precast concrete curb 457 mm high, 457 mm wide and 3.05 metre long	each	\$1,380	\$1,380	N/A	Approximately \$315,000 - \$320,000 per 1 linear kilometre. Assumes 70% of roadway to include physical delineation (700 metres per 1 linear kilometre): - 700 metres / 3.05 metres = 229.5 pre-cast concrete curbs - 229.5 x \$1,380 = \$317,000
1.24	Standard precast concrete bullnose 457 mm high, 457 mm wide and 1.22 metre long	each	\$970	\$970	N/A	Approximately \$550,000 - \$560,000 per 1 linear kilometre. Assumes 70% of roadway to include physical delineation (700 metres per 1 linear kilometre): - 700 metres / 1.22 metres = 573.8 pre-cast concrete curbs - 573.8 x \$970 = \$556,557
Cycle Tracks						
1.25	Uni-directional Cycle Tracks: Raised and Curb Separated - In conjunction with existing road reconstruction / resurfacing project	linear KM	\$275,000 - \$500,000	\$500,000.00	N/A	Both sides. Assumes cycle track will be implemented as part of road construction. Could include minor utility / lighting pole relocations. Other components such as bike signals, bike boxes etc. are project specific and will impact unit price.
1.26	Uni-directional Cycle Tracks: Raised and Curb Separated - Widen Existing Roadway	linear KM	\$1,000,000 - \$1,500,000	\$1,500,000.00	N/A	Both sides. Assumes roadway will be widened / reconstructed for the purposes of adding a cycle track. Could include excavation, adjustment of catch basins, lead extensions, new curbs / driveway ramps, asphalt and sub-base, painted markings and signs.
1.27	Two Way Cycle Track - Retrofit Existing Roadway	linear KM	\$500,000 - \$800,000	\$800,000.00	N/A	One side. Includes construction but excludes design and signal modifications. Form of cycle track and materials as well as related components such as bike signals, upgrade/modification of signal controllers, utility/lighting pole relocations, bike boxes etc. are project specific and will impact unit price

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Active Transportation Paths and Multi-Use Trails						
1.28	Two Way Active Transportation Multi-use path within road right-of-way	linear KM	\$275,000 - \$375,000	\$375,000	N/A	3.0m wide hard surface pathway (asphalt) within road right of way (no utility relocations). Price depends of scale / complexity of project and if existing sidewalk is being removed (i.e. crushing of existing sidewalk and compacting for trail base).
1.29	Concrete Splash Strip placed within road right-of-way between Active Transportation Multi-Use Path and Roadway	m ²	\$150	\$150	N/A	Colour Stamped Concrete
1.30	Waterfront Multi-use Trail (Type 1 Trail)	linear KM	\$300,000 - \$400,000	\$400,000		4.0m wide hard surface (asphalt) in the waterfront / bayfront setting. 350mm granular base with 90mm asphalt depth. Assume a higher cost for specialty surfaces such as coloured stamped concrete, unit pavers.
1.31	Multi-use Trail (Type 2 Trail)	linear KM	\$250,000-\$300,000	\$300,000	3.0m Standard Active Transportation Pathway (\$/m) \$250.00 (\$/km) \$250,000	3.0m wide hard surface (asphalt) in a park setting. 300mm granular base with 90mm asphalt depth. Assume a higher cost for 350mm base depth where vehicular service access is required
1.32	Recreational Trail (Type 3 Trail)	linear KM	\$150,000-\$175,000	\$175,000		3.0m wide granular surface trail hard surface (asphalt) in a Park, Open Space or EPA setting. 150mm depth of base. Assume a higher cost for 350mm base depth where vehicular service access is required.
1.33	Natural Trail (Type 4 Trail)	linear KM	\$25,000-\$75,000	\$50,000		1.5m to 2.0m natural surface trail in an Open Space or EPA setting (e.g. earthen, grass, woodchips), with base depth of 0mm (uses existing soil as base). Assume higher cost where granular base is required to improve stability of trail surface. Where boardwalks are required, refer to 3.1 for unit cost information.
1.34	Stormwater Management Access Route (Type 5 Trail)	linear KM	\$225,000 - \$275,000	\$250,000		4.0m to 5.0m wide trail of topsoil and seed over 450mm granular base in an unfenced stormwater management block. Assume higher cost in locations where asphalt or other hard surface is required.
1.35	Hard Surfaced Off-Road Multi-Use Trail Outside of Road Right-of-Way in Urban Setting (Upgrade existing granular surface)	linear KM	\$150,000 - \$225,000	\$225,000	N/A	Includes some new base work (25% approx.), half of the material excavated is removed from site. Price depends of scale / complexity of project.
1.36	Granular Surfaced Off-Road Multi-Use Trail Outside of Road Right-of-Way in Urban Setting	linear KM	\$150,000 - \$165,000	\$165,000	N/A	3.0m wide, compacted stone dust surface normal site conditions. Price depends of scale / complexity of project.
1.37	Granular Surfaced Off-Road Multi-Use Trail Outside of Road Right-of-Way in Rural Setting (New)	linear KM	\$200,000	\$200,000	N/A	3.0m wide, compacted stone dust surface in complex site conditions (includes cost of clearing and grubbing). Price depends of scale / complexity of project.
1.38	Upgrade existing granular surface trail to meet 3.0m wide compacted granular trail standard	linear KM	\$75,000 - \$125,000	\$125,000	N/A	Includes some new base work (25% approx.) and an average of 20 regulatory signs per kilometre. Price depends of scale and existing trail conditions e.g. width, slope, location of trail, etc.
1.39	Off-Road Multi-Use Trail Outside of Road Right-of-Way on Abandoned Rail Bed	linear KM	\$80,000 - \$125,000	\$125,000	N/A	3.0m wide, compacted stone dust surface, includes signage along trail and gates at road crossings. Assumes ballast is still in place. Price depends of scale / complexity of project.
1.40	Granular Surfaced Multi-use Trail in a Woodland Setting	linear KM	\$175,000	\$175,000	N/A	2.4m wide, compacted stone dust surface. Price depends of scale / complexity of project.
1.41	Major rough grading (for multi-use pathway)	m ²	\$8.00	\$8	N/A	Varies depending on a number of factors including site access, disposal location etc.
2.0 PEDESTRIAN FACILITIES						
2.1	Sidewalk	linear KM	\$200,000	\$200,000	1.5m Sidewalk (\$/m) \$75.50 (\$/km) \$75,500 2.0m Sidewalk (\$/m) \$100.66 (\$/km) \$100,660	Assumed one side of the road. Price for 2.0m concrete sidewalk. Include site prep., select utility relocation and minor drainage modifications.

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3.0 STRUCTURES AND CROSSINGS						
3.1	Pedestrian Boardwalk (Light-Duty)	linear m	\$1500 - \$2500	\$2,500	N/A	Structure on footings, 3.0m wide with railings. Price depends of scale / complexity of project.
3.2	Self weathering steel truss pedestrian / cyclist bridge	each	\$80,000	\$80,000	N/A	Average cost to construct a Self weathering steel truss pedestrian / cyclist bridge. These include includes Bridges, Boardwalk Crossings, and Overlook Locations
3.3	Feature Trail Bridge crossing over a valleyland / highway	each	\$2,500,000 - \$4,500,000	\$3,000,000	N/A	Depends on location, length and complexity of crossing as well as architectural detail.
3.4	Metal stairs with hand railing and gutter to roll bicycle	each	\$6,500	\$6,500	N/A	1.8m wide, galvanized steel (assumes 8ft between each landing).
3.5	Pathway Crossing of Private Entrance	each	\$1500 - \$2000	\$2,000	N/A	Adjustment of existing curb cuts to accommodate 3.0m multi-use pathway
3.6	Median Refuge	each	\$20,000	\$20,000	N/A	Average price for basic refuge with curbs, no pedestrian signals
3.7	Pedestrian and Cyclist Crossride	each	\$80,000	\$80,000	N/A	Average price for pedestrian and cyclist crossride
3.8	Mid-block Crossing	each	\$150,000 - \$180,000	\$180,000	N/A	Average price for new mid-block crossing
3.9	Intersection Pedestrian Signal	each	\$80,000	\$80,000	N/A	Average price for intersection pedestrian signal. Assumes partial rebuild of intersection for bike signals i.e. realignment of ducts and poles.
3.10	At grade railway crossing	each	\$120,000	\$120,000	N/A	Flashing lights, motion sensing switch (C.N. estimate)
3.11	At grade railway crossing with gate	each	\$300,000	\$300,000	N/A	Flashing lights, motion sensing switch and automatic gate (C.N. estimate)
3.12	Below grade railway crossing	each	\$500,000 - \$750,000	\$750,000	N/A	3.0m wide, unlit culvert style approx. 10 m long for single elevated railway track
3.13	Multi use subway under 4 lane road	each	\$1,000,000 - \$1,200,000	\$1,200,000	N/A	Guideline price only for basic 3.3 m wide, lit.
3.14	Retaining Wall	m ²	\$1,200	\$1,200	N/A	Face metre squared
3.15	Trail facility underpass	each	\$500,000	\$500,000	N/A	Blended unit cost for the construction of a an underpass for trail facilities
4.0 BARRIERS AND ACCESS CONTROL FOR MULTI-USE TRAILS OUTSIDE OF THE ROAD RIGHT-OF-WAY						
4.1	Lockable gate (2 per road crossing)	each	\$4,000	\$4,000	N/A	Heavy duty gates (e.g. equestrian supported step over gate). Price for one side of road - 2 required per road crossing. Typically only required in rural settings or city boundary areas
4.2	Metal offset gates	each	\$2,000	\$2,000	N/A	"P"-style park gate
4.3	Removable Bollard	each	\$500 - \$750	\$750	N/A	Basic style (e.g. 75mm diameter galvanized), with footing. Increase budget for decorative style bollards
4.4	Berming/boulders at road crossing	each	\$1,200	\$1,200	N/A	Price for one side of road (2 required per road crossing)
4.5	Granular parking lot at staging area (15 car capacity-gravel)	each	\$45,000	\$45,000	N/A	Basic granular surfaced parking area (i.e. 300mm granular B sub-base with 150mm granular A surface), with precast bumper curbs. Includes minor landscaping and site furnishings, such as garbage receptacles and bike racks.
4.6	Paige wire fencing	linear M	\$60	\$60	N/A	1.5m height with peeled wood posts
4.7	Chain link fencing	linear M	\$90 - \$110	\$110	N/A	Galvanized, 1.5m height
5.0 SIGNAGE						
5.1	Regulatory and caution Signage (off-road pathway) on new metal post	each	\$150 - \$250	\$250	N/A	300mm x 300mm metal signboard c/w metal "u" channel post
5.2	Signboards for interpretive sign	each	\$2,400	\$2,400	N/A	Does not include graphic design. Based on a 600mm x 900mm typical size and embedded polymer material, up to 40% less for aluminum or aluminum composite panel
5.3	Staging area kiosk	each	\$2,000 - \$10,000	\$10,000	N/A	Wide range provided. Price depends on design and materials selected. Does not include design and supply of signboards
5.4	Signboards for staging area kiosk sign	each	\$1,500 - \$2,000	\$2,000	N/A	Typical production cost, does not include graphic design (based on a 900mm x 1500mm typical size and embedded polymer material). Up to 40% less for aluminum or aluminum composite panel
5.5	Pathway directional sign	each	\$350 - \$500	\$500	N/A	Bollard / post (100mm x100mm marker), with graphics on all 4 sides
5.6	Pathway marker sign	each	\$250	\$250	N/A	Bollard / post (100mm x100mm marker), graphics on one side only
5.7	Pathway marker sign	linear KM	\$1,000	\$1,000	N/A	Price for both sides of the path, assumes one sign on average, per direction of travel every 0.5 km
5.8	Bike sign	each	\$300 - \$500	\$300 - \$500	N/A	Price for one side of road.
6.0 BICYCLE PARKING INFRASTRUCTURE						
6.1	Bicycle rack (Post and Ring style)	each	\$150 - \$250	\$250	N/A	Holds 2 bicycles , price varies depending on manufacturer (includes installation).
6.2	Bicycle rack (U style)	each	\$600	\$600	N/A	Holds 2 bicycles , price varies depending on manufacturer (includes installation).
6.0 BICYCLE PARKING INFRASTRUCTURE CON'D						
6.3	Bicycle rack	each	\$1,800	\$1,800	N/A	Holds 6 bicycles, price varies depending on manufacturer (includes installation).
6.4	Bicycle Locker	each	\$3,000	\$3,000	N/A	Price varies depending on style and size. Does not include concrete mounting pad.
6.6	Bicycle Corral (one parking space with bollards)	each	\$1,500 - \$2,900	\$2,900	N/A	Price may vary from \$1,500 (galvanized finish with the mad shield corrosion warranty) to \$2,900 (stainless finish with the mad shield corrosion warranty) for one parking space.

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7.0 LIGHTING AND UTILITIES						
7.1	Pathway Lighting	per 25 m	\$5,000	\$5,000	N/A	Includes cabling, connection to power supply, transformers and fixtures.
7.2	Relocation of Light / Support Pole	each	\$4,000	\$4,000	N/A	Adjustment of pole offset (distance between pole and roadway).
7.3	Relocation of Signal Pole / Utility Box	each	\$8,000	\$8,000	N/A	Adjustment of pole offset (distance between pole and roadway).
8.0 PAVEMENT MARKINGS						
8.1	Sharrow Symbol	each	\$400	\$400	N/A	Price for thermoplastic paint. Sharrow symbol with green pavement marking
8.2	Bike Symbol	each	\$250	\$250	N/A	Price depend on volume
8.2	Line Painting	linear M	\$1	\$1	N/A	Price for thermoplastic paint.
8.2	Removal of Line Painting	linear M	\$6 - \$8	\$6 - \$8	N/A	N/A
9.0 OTHER						
9.1	Bike Box	each	\$1,500	\$1,500	N/A	Price may vary depending on road cross-section (e.g. two lane roadway, four lane roadway, etc.). Price includes installing a bike box on the approach of an intersection using a bike stencil and thermoplastic e.g. green surface treatment (\$250 / each). Price also include estimate to move stop-bar back to provide space for bike box.
9.2	Clearing and Grubbing	m ²	\$15	\$15	N/A	
9.3	Bench	each	\$1,000 - \$2,000	\$2,000	N/A	Price varies depending on style and size. Does not include footing/concrete mounting pad
9.4	Safety Railings / Rubrail	linear M	\$300	\$300	N/A	1.4m height basic post and rail style
9.5	Small diameter culvert	each (6 m)	\$1,200	\$1,200	N/A	Price range applies to 400mm to 600mm diameter PVC or CSP culverts for drainage below trail
9.6	Flexible Bollards	each	\$110	\$110	N/A	Should be placed at 10m intervals where required. Cost depends on product type used.
10.0 Land Acquisition						
10.1	Former Barrie - Commercial	m ²	\$670.14	\$670.14	N/A	Cost per square metre for the City of Barrie to acquire land for the purposes of constructing an AT facility
10.2	Former Barrie - Residential	m ²	\$510.00	\$510.00	N/A	
10.3	Former Barrie - Industrial	m ²	\$384.54	\$384.54	N/A	
10.4	Secondary Plan Area - Commercial	m ²	\$335.07	\$335.07	N/A	
10.5	Secondary Plan Area - Residential	m ²	\$382.49	\$382.49	N/A	
10.6	Secondary Plan Area - Industrial	m ²	\$326.86	\$326.86	N/A	
11.0 Non-winter months Maintenance						
11.1	In-boulevard Trail	linear KM	\$1,685	\$2,310	N/A	Regular Trash receptacle emptying, bench maintenance, lighting repairs, graffiti removal, inspections, resurfacing, grading, weed control, sign maintenance, infrastructure cleaning
11.2	Cycle Track	linear KM	\$5,450	\$6,050	N/A	Litter removal as needed, hazard inspections, erosion repairs, sign maintenance
11.3	Buffered Bike Lane	linear KM	\$6,850	\$7,650	N/A	Litter removal as needed, hazard inspections, erosion repairs, sign maintenance
11.4	Bike Lane	linear KM	\$5,450	\$6,050	N/A	Litter removal as needed, hazard inspections, erosion repairs, sign maintenance
11.5	Signed Bike Route with Sharrows	linear KM	\$1,750	\$4,410	N/A	Litter removal as needed, hazard inspections, erosion repairs, sign maintenance
11.6	Signed Bike Route	linear KM	\$260	\$260	N/A	Litter removal as needed, hazard inspections, erosion repairs, sign maintenance
11.7	Buffered Paved Shoulder	linear KM	\$6,260	\$7,660	N/A	Litter removal as needed, hazard inspections, erosion repairs, sign maintenance
11.80	Waterfront Multi-use Trail (Type 1 Trail)	linear KM	\$10,000.00	\$20,000.00	N/A	Regular Trash receptacle emptying, bench maintenance, lighting repairs, graffiti removal, inspections, resurfacing, grading, weed control, sign maintenance, infrastructure cleaning
11.81	Multi-use Trail (Type 2 Trail)	linear KM	\$2,500.00	\$4,000.00	N/A	Trash receptacle emptying 2x per month, bench maintenance, inspections, resurfacing, grading, weed control, sign maintenance, hazard inspections, brush pruning and tree work
11.81	Recreational Trail (Type 3 Trail)	linear KM	\$1,250.00	\$1,500.00	N/A	Litter removal as needed, hazard inspections, erosion repairs, sign maintenance, brush pruning, tree work
11.83	Natural Trail (Type 4 Trail)	linear KM	\$750.00	\$1,000.00	N/A	Litter removal as needed, hazard inspections, erosion repairs, sign maintenance, brush pruning, tree work
11.84	Stormwater Management Access Route (Type 5 Trail)	linear KM	\$1,250.00	\$1,500.00	N/A	Litter removal as needed, hazard inspections, erosion repairs, sign maintenance, brush pruning, tree work
11.9	Sidewalks	linear KM	\$2,550	\$2,550.00	N/A	

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Active Transportation and Trails Network Costing
Table 1 - Unit Price Schedule

This table provides an overview of the estimated unit costs for active transportation facilities, structures and crossings and other elements of an active transportation and trails network. All unit prices exclude tax, contingency, design and approvals costs.

ITEM	DESCRIPTION	UNIT	2018 MMATMP Unit Price Range /	Unit Price for Route Calculation	Previous 2014 MMATMP Unit Price	COMMENTS/ASSUMPTIONS
12.0 Winter months Maintenance						
12.0	In-boulevard Trail	linear KM	\$6,750	\$12,500	N/A	Ploughing and gritting in winter
12.1	Cycle Track	linear KM	\$13,500	\$25,000	N/A	Ploughing and gritting in winter
12.2	Buffered Bike Lane	linear KM	\$1,000	\$1,000	N/A	Ploughing and gritting in winter
12.3	Bike Lane	linear KM	\$1,000	\$1,000	N/A	Ploughing and gritting in winter
12.4	Waterfront Multi-use Trail (Type 1 Trail)	linear KM	\$6,750	\$12,500	N/A	Ploughing and gritting in winter
12.41	Multi-use Trail (Type 2 Trail)	linear KM	N/A	N/A	N/A	Some sections may be candidate for winter maintenance (e.g. key school routes, community centres, etc)
12.42	Recreational Trail (Type 3 Trail)	linear KM	N/A	N/A	N/A	No winter Maintenance
12.43	Natural Trail (Type 4 Trail)	linear KM	N/A	N/A	N/A	No winter Maintenance
12.44	Stormwater Management Access Route (Type 5 Trail)	linear KM	N/A	N/A	N/A	No winter Maintenance
12.5	Sidewalks	linear KM	\$6,750	\$12,500	N/A	Ploughing and gritting in winter

Notes:

1. Unit Prices are for capital cost estimates only and include installation but exclude contingency, design and approvals costs (unless noted). Unit price reflect 2019 dollars and are based on projects in southern Ontario.
2. Estimates do not include the cost of property acquisitions, signal modifications, utility relocations, major roadside drainage works or costs associated with site-specific projects such as bridges, railway crossings, retaining walls, and stairways, unless otherwise noted.
3. Assumes typical environmental conditions and topography.
4. Applicable taxes and permit fees are additional.

Summary of AT and Trails Network Costing

Table 2 - Estimated Capital Costs by Facility Type and Phase¹

		Short Term 2019 - 2023 (5 years)			Medium Term 2024 - 2031 (7 years)			Long Term 2032 - 2041 (10 years)			Full Build 2019 - 2041 (22 Years)		
		Length (KM)	(%)	Estimated Cost	Length (KM)	(%)	Estimated Cost	Length (KM)	(%)	Estimated Cost	Length (KM)	(%)	Estimated Cost
Cycling Facilities	--- Signed Routes	34.8	30.8%	\$51,659	1.1	1.5%	\$1,183	0.3	0.6%	\$407	36.2	15.3%	\$53,248
	--- Urban Shoulders	4.3	3.8%	\$13,795	0.0	0.0%	\$0	0.0	0.0%	\$0	4.3	1.8%	\$13,795
	--- Paved Shoulders	0.0	0.0%	\$0	0.0	0.0%	\$0	0.0	0.0%	\$0	0.0	0.0%	\$0
	--- Bike Lanes	33.4	29.6%	\$566,519	35.7	51.4%	\$1,118,443	1.2	2.2%	\$18,261	70.3	29.8%	\$1,703,224
	--- Buffered Bike Lanes	30.5	27.0%	\$946,201	24.4	35.2%	\$1,661,829	25.2	47.1%	\$337,637	80.2	34.0%	\$2,945,666
	--- Cycle Tracks	10.0	8.9%	\$5,018,417	8.2	11.8%	\$4,098,065	26.8	50.1%	\$12,731,399	45.1	19.1%	\$21,847,880
	Total	113.1		\$6,596,590	69.4		\$6,879,519	53.6		\$13,087,703	236.0		\$26,563,813
												Percent of network total 49% 27%	
Multi-use Facilities	Feature Bridge (incl... Contingency, Design, HST)	0.0	0.0%	\$0	0.0	0.0%	\$889,680	0.2	2.2%	\$4,852,800	0.2	0.5%	\$5,742,480
	--- In-Boulevard Pathways	11.9	100.0%	\$4,451,322	15.4	100.0%	\$5,765,140	9.0	97.8%	\$3,381,685	36.3	99.5%	\$13,598,147
	Total	11.9		\$4,451,322	15.4		\$6,654,820	9.2		\$8,234,485	36.5		\$19,340,627
												Percent of network totals 8% 20%	
Trails	Off-road Trails	1.4	85.6%	\$261,567	31.5	92.9%	\$6,005,353	30.5	89.3%	\$5,676,942	63.4	91.0%	\$11,943,862
	Hiking Trails	0.2	14.4%	\$53,988	2.4	7.1%	\$242,039	3.6	10.7%	\$182,108	6.3	9.0%	\$478,134
	Trail Bridges (incl... Contingency, Design, HST)	1		\$129,408	19		\$2,458,752	14		\$1,811,712	14		\$4,399,872
	Trail Underpass (incl... Contingency, Design, HST)	1		\$808,800	2		\$1,617,600	1		\$808,800	1		\$3,235,200
	Total	1.6		\$1,253,763	33.9		\$10,323,743	34.1		\$8,479,563	69.6		\$20,057,069
												Percent of network totals 14% 20%	
Sidewalks	--- Sidewalks	24.8	100.0%	\$5,313,327	47.4	100.0%	\$10,147,466	70.3	100.0%	\$15,866,107	142.5	100.0%	\$31,326,900
	Total	24.8		\$5,313,327	47.4		\$10,147,466	70.3		\$15,866,107	142.5		\$31,326,900
												Percent of network totals 29% 32%	
Outreach	Programs	\$50000 per year over 5 years		\$50000 per year over 7 years		\$50000 per year over 10 years						23 years of outreach programming	
	Total	\$250,000		\$350,000		\$500,000						\$1,100,000	
		Short Term Totals		Medium Term Totals		Long Term Totals						AT Network Totals	
		151.3		\$17,865,002		166.0		\$34,355,549		167.3		\$46,167,858	
Percent of network total		31%		18%		34%		35%		35%		47%	
				Previous 2014 TMP Horizon									
				TMP Updated Horizon									
												Total Cost	
												\$150,211,754	
												Design & Approvals ¹	
												30.0%	
												\$25,173,257.12	
												Contingency 1	
												30.0%	
												\$25,173,257.12	
												Outreach (per year cost)	
												\$50,000	
												\$1,100,000.00	
												HST	
												1.8%	
												\$1,476,831.08	

Notes:

1. The estimated capital cost to implement the active transportation and trails network is based on unit prices (refer to the yellow highlighted rows in Table 1). Unit prices are for capital cost estimates only and do not include contingency, design or approvals costs. However, Construction Contingency (30%), Design and Engineering (15%), City Project Management (5%), Contract Administration and Site Inspection (10%) are included in the total network costs. Although unit prices reflect 2019 dollars, they will vary based on current market demand, inflation and pricing. The estimated costs for trails is subject to change as the City is currently completing their Trails Master Plan.

2. Fields in RED are editable

**Barrie Multi-Modal Active Transportation Master Plan (MMATMP)
Active Transportation and Trails Network Costing**

Table 3 - Estimated Capital Costs by Funding Type³

Facility Type	Total Network Costs	Included in Current Capital Plan ⁴	Adjusted Cost	Growth Funding	Existing Benefit
Cycling Facilities	\$45,904,440	\$9,289,930	\$36,614,510	\$90,580,002	\$39,351,971
Trails	\$20,057,069	\$0	\$20,057,069	\$18,123,349	\$1,970,474
Pedestrian Facilities	\$31,326,900	\$6,299,535	\$25,027,365	\$48,140,674	\$2,533,720
Sub Total	\$97,288,409	\$15,589,465	\$81,698,944	\$156,844,025	\$43,856,164
Bridge/Underpass &	-	-	-	\$9,410,409	\$5,067,143
Total	-	-	-	\$166,254,434	\$48,923,307
				\$215,177,741	

Global Development Charge (%)	
85%	General Growth Rate
65%	General Partial Growth Rate
95%	Sidewalk Growth Rate
85%	Former Barrie Trail Growth Rate
95%	Secondary Plan Area Trail Growth Rate

Additional Costing Growth Rates (%)	
65%	Feature Bridge Growth Rate
65%	Trail Bridge Growth Rate
65%	Trail Underpass Growth Rate
65%	Outreach Growth Rate

Notes:

3. The estimated capital cost to implement the active transportation and trails network is organized into two funding categories:

Growth Funding Projects (Projects in the Secondary Plan Area): Assumes projects will partially funded by development charges and includes routes within the City's secondary plan areas (Salem Secondary Plan Area and Hewitt's Secondary Plan Area). The City's Official Plan identifies the location of secondary plan areas (<https://www.barrie.ca/City%20Hall/Planning-and-Development/Pages/Official-Plan.aspx>). This does not include costing for active transportation / cycling routes located on major and minor collector roads within the City's secondary plan areas.

Existing Benefit Cost: Assumes projects will not be funded through development charges and will require general tax base or other level of government to fund implementation. These routes are intended to serve density within existing areas of Barrie and could include routes located on local roads within local neighbourhoods.

The following assumptions were applied when calculating the proportion of growth funding and existing benefit for routes included in the City's active transportation and trails network:

Routes in secondary plan area

- Assumes projects will be 85% funded through development charges and 15% of projects will be funded through the general tax base or other sources. Includes routes located within the Salem Secondary Plan Area and Hewitt's Secondary Plan Area.

Projects in former Barrie

- Assumes projects will be 65% funded through development charges and 35% of projects will be funded through the general tax base or other sources.
- Assumes that all signed bike routes in former Barrie will not be funded through development charges and will require additional sources to fund implementation.

Sidewalks

- Assumes all sidewalks will be 95% funded through development charges and 5% will be funded through the general tax base or other sources.

Trails in former Barrie

- Assumes all trails in former Barrie will be 65% funded through development charges and 35% will be funded through the general tax base or other sources. Alternatively, trails located within the City's secondary plan areas will be 85% funded through development charges and 15% will be funded through general tax base or other sources.

Outreach

- Any supportive outreach and programming that has been identified (refer to section 3.3 for details) to support active transportation and trails in Barrie assumes 65% of funds will be provided through development charges and 35% of the cost will be funded through the general tax base or other sources.

4. The City's current Capital Plan was reviewed to identify roadway and infrastructure projects that included active transportation improvements. The Capital Plan identifies the total estimated cost for a planned roadway / infrastructure project. As such, unit prices highlighted Table 1 were used to develop cost estimates for active transportation facilities along corridors with capital works planned. Should the City have detailed costing information for capital active transportation improvements identified as part of other roadway / infrastructure projects, the Barrie TMP 2019 cost estimates can be updated accordingly.

Table 4 - Summary of Estimated 2014 MMATMP Capital Costs and 2019 TMP Costs⁵

Facility Type	Length (KM)	Estimated Cost
	2019 TMP	
Cycling Facilities	272.3	\$64,965,987
Trails	69.8	\$20,093,822
Pedestrian Facilities	142.5	\$50,674,394
Additional Costs ⁶	n/a	\$14,477,552
Total	484.7	\$150,211,754
2014 MMATMP		
Cycling Facilities		\$154,700,000
Multi-use Facilities	Refer to 2014 MMATMP	
Pedestrian	for network details	\$65,000,000
Total		\$219,700,000
Percent Change from 2014 to 2019		
Cycling Facilities		- 58.0%
Multi-use Facilities	N/A	
Pedestrian		8.1%
Facilities & Trails		
Total Cost	N/A	- 31.6%

Notes:

5. The estimated capital cost to implement the active transportation and trails network is significantly lower in 2019 compared to 2014 due to the unit prices and assumptions applied. For example, the 2014 MMATMP identified a unit price of \$1.3 million per kilometre to implement buffered bike lanes which includes road reconstruction to accommodate the buffered bike lanes. As part of the 2019 MMATMP, buffered bike lanes are only recommended on roads that would require remarking / paint (\$10,000 to \$15,000 per kilometre), or in conjunction with other planned roadway projects (\$290,000 per kilometre). It is recommended that facility types such as cycle tracks or in-boulevard multi-use pathways be implemented above the curb, if and when a roadway is reconstructed. The cost to implement a cycling facility above the curb when the roadway is reconstructed is more cost-effective than reconstructing a road only for the purpose of adding bike lanes. As part of the 2019 MMATMP, the unit price used to implement cycle tracks in conjunction with planned roadway projects is \$250,000 to \$500,000 per kilometre (less than the 2014 MMATMP \$1.3 million per kilometre for buffered bike lanes).

6. Additional Costs include the "Feature Bridge" and its related studies, all trail bridges and underpasses and the AT strategy outreach



The City of

Barrie

CITY OF BARRIE

TRANSPORTATION MASTER PLAN

Active Transportation Strategy | June 2019

Technical Appendix B4 – Simcoe County TMP, Active Transportation Network Concept



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**FIGURE 9.2.6-1
ACTIVE TRANSPORTATION NETWORK CONCEPT
COUNTY OF SIMCOE TRANSPORTATION MASTER PLAN UPDATE**



Legend

Existing Routes¹

- Off-Road Route
- On-Road Route on County Road
- On-Road Route on Local Road

Proposed Routes

- Proposed Off-Road Route
- Proposed On-Road Route on County Road
- Proposed On-Road Route on Local Road

Connections

- Intra-Municipal Connection
- Inter-Municipal Connection

Road Network

- Highway
- County Road
- Local Road

Other

- School
- Existing Canoe Launch
- Proposed Canoe Launch
- Bruce Trail
- Georgian Bay Cycling Route²
- Trans Canada Trail³
- Active Railway
- Abandoned Railway
- Park / Recreation Area
- Provincial Park
- Conservation Area
- County Forest
- Urban Area
- Property Parcel
- Watercourse
- Municipal Boundary
- CFB Borden

1. Data Source: Simcoe County
 2. Data for the Georgian Bay Cycling Route shows a preliminary conceptual alignment which includes segments that are currently existing and proposed. Data Source: Manitoulin Island Cycling Advocates (MICA).
 3. The Trans Canada Trail includes segments that are currently existing and proposed. Data Source: Trans Canada Trail Foundation.