APPENDIX 5

ACTIVE TRANSPORTATION PLAN REPORT

City of Brantford

ACTIVE TRANSPORTATION STRATEGY FOR THE 2014 TRANSPORTATION MASTER PLAN UPDATE

BACKGROUND REPORT

JULY 2014

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1. ACTIVE TRANSPORTATION

This report describes the development the active transportation (AT) strategy for the 2014 Transportation Master Plan (TMP) Update. It is divided into five (5) sections:

- Section 1.1 discusses the current role of walking and cycling in Brantford. It includes a summary of characteristics that present opportunities and challenges, and existing performance measures.
- Section 1.2 discusses the role of walking and cycling for the future. It includes a summary of supportive activities, potential setbacks and policy goals.
- Section 1.3 discusses the range of strategies to improve walking and cycling conditions in the City. It includes a review of past plans, progress to date, input from the public and new approaches.
- Section 1.4 outlines the proposed plan to increase walking and cycling mode share. It includes a discussion of recommendations for infrastructure, policy and programs.
- Section 1.5 outlines a strategy to implement the plan. It includes a summary of the recommended steps and action items.

1.1 Walking and Cycling in Brantford Today

Over 11,000 trips a day are made by walking and cycling in Brantford[1]. This number does not include recreational trips or those who walk or bike to access other modes of transportation, such as walking to a transit stop, station or parking lot. In comparison, walking and cycling may seem a small portion of over 200,000 trips per day made by Brantford residents. The patterns suggest that walking and cycling are not desirable or critical parts of the transportation network. However, a significant portion of these trips are made by children (and perhaps their parents too) as they walk to school. Another more discerning way to view these facts is to recognize that there is imbalance in the provision for walking and cycling in the City compared to other modes. This imbalance limits the options not only for those who do not drive or own a car, but also those with access to a vehicle and feel dependent on it.

The City of Brantford has many characteristics that are amenable for active transportation (AT). There are many connections within parks and open space that emphasize the appeal among residents to walk and cycle for recreation. The area around the Grand River boasts a trail system that attracts tourists and residents alike. Sidewalks are generally provided on both sides of the road in well-established communities. Designated bike lanes are provide for several continuous routes throughout the City such as on Hardy Road, Grey Street, Ballantyne Road, and the newly converted Eerie Avenue. The City has made great strides in implementing the Bikeway and Trails network proposed by the 2007 Update of the Transportation Master Plan (TMP). Since then, almost all proposed signed routes have been installed over the last 5 years. In the urban core, historic buildings and a compact street network lend to an environment that is conducive for active transportation trips; the high connectivity and pedestrian-scale streetscape are walk- and bike-

[1] According to the 2006 and 2011 Transportation for Tomorrow Survey

friendly qualities. In addition, there are on-going plans and initiatives within Brantford to provide other opportunities to encourage active transportation (see Section 1.2).

Despite these benefits, several challenges remain that degrade the appeal of walking and cycling for transportation in the City. Perhaps the most notable is the need for more high-quality AT infrastructure along the road network that is comfortable and convenient. Some communities lack sidewalks on both sides of the street. These residential areas are often structured with a curvilinear road network. The irregular blocks generally lead to lower connectivity (i.e. indirect routes and longer walking distances) to the nearest destination areas (as opposed to grid street networks seen in the urban core). While several bike lanes exist, many are located in the periphery of the City and none of these routes connect to the urban core where the amenable environment is likely to encourage higher levels of AT activity. Existing signed routes are typically routed indirectly and many proposed bike routes in the 2007 TMP are also indirect. This structure suggests inadvertently that direct connections are reserved as auto-oriented corridors.

Mode share is the key measure available to the City to evaluate the performance of planning for walking and cycling, and to evaluate the collective benefits and challenges for AT. Over the last 5 years, there has been relatively little growth in the AT mode share. In fact, the City experienced a minor decline in walk trips and a very slight increase in cycling trips. In 2006, the average AT mode share was 7.8% during the PM peaks period (7.2% for walking, 0.6% cycling). In 2011, it remained relatively stable at 7.5% (6.2% walking, 0.7% cycling)[2]. On the whole, these values suggest that a decided investment in walking and cycling is necessary to grow AT in the City.

1.2 Walking and Cycling in Brantford Tomorrow

In the 2007 TMP, the City set a target of 10% mode share of peak hour trips to be made by walking and cycling. Walking and cycling was envisioned as the preferred mode for trips 5km or less. The peak mode share has remained relatively stable for walking and cycling from 2006 to 2011. In 2006, only 8.6% of trips 5km or less were made by active transportation while trips by car comprised 87% of these short distance trips. In 2011, these figures shifted to 9.3% and 86%. These numbers show a positive shift of auto trips to walking and cycling (as well as transit); however a more aggressive change is needed to achieve the target.

The City of Brantford is undergoing and pursuing new initiatives that will support walking and cycling in the future. The Brant County Health Unit has developed recommended policies of the Official Plan review. Among these recommendations include: traffic calming to foster safer streets for pedestrian and cyclists, improved walkability to destination areas and recreation facilities, and design guidance following Complete Streets principles (including the call for the development of Complete Streets policy).

In established communities, the recommended policies encourage a City structure that will be more conducive to walking and cycling. Intensification is planned and concentrated around key corridors. Examples are King George Road and Park Street to the north, Colborne Street to the east; and Shellard Lane west of Conklin. In addition to the urban core and the Grand River trail system, these corridors provide dispersed destinations that discourage the need for longer trips, thus increasing the potential shift of auto to walk and bike trips. This urban form also complements the stable traffic patterns seen in established areas of the City. Excess roadway capacity can be reassigned to

[2] Data from the 2006 and 2011 Transportation for Tomorrow Survey

provide designated AT infrastructure. In fact, the total number of auto trips among Brantford residents has *decreased* by 3.6% from 2006 to 2011. The 2031 road network is set to experience additional, though moderate, decreases in traffic volumes during the PM peak hour for several thoroughfares (based on the proposed road network improvements). Examples include Fairview Drive, North Park Road, and Dalhousie Road and Colborne Street, west of Wayne Gretzky Drive. Several rail corridors through and to the downtown are undergoing decommission. These corridors provide an opportunity for the City to develop more rail trails (such as the existing TH & B rail trail).

In newer development, the City has the opportunity to accommodate active transportation in the road network and other corridors from new construction. Both the approved secondary plan for West of Conklin and the North of Shellard Neighbourhood and Recreational Plan are strong positive examples. Another area of anticipated is growth the Echo Plan neighbourhood. Grey Street is a good example of a walk- and bike-friendly street with sidewalks, bike lanes and other supportive features (e.g. lower posted speed, tree-lined boulevard, raised medians, mid-block crossings, etc.).

Despite these initiatives, several practices will present challenges to encourage walking and cycling in the City of tomorrow. One persistent challenge that is not unique to the City is the general perception that walking and cycling initiatives are solely pursued for recreational purposes, or that active transportation should only be accommodated on off-road trail systems. It is unsurprising that many people would prefer to walk and cycle on a network that is fully connected and physically-separated throughout the City. While it is important to recognize user preferences, the City is constrained for available off-road corridors for use exclusively for pedestrian and/or cyclists, especially corridors to connect the City east-to-west, and to the north area. In light of the 2031 horizon of this TMP Update, it will be necessary to consider high-quality cycling facilities along the road network and this task may require deliberate trade-offs between AT, transit and auto traffic.

In established communities, competing interests among residents can present a challenge in pursing AT initiatives. In the past, public pressure from specific groups or individuals has resulted in rescinded AT projects, despite approved plans, policies and a demonstrated need in the community. Examples are infill sidewalks (often due to resistance from individual landowners) or bike lanes via road diets (often from people who oppose the removal of a travel lane or on-street parking). These examples stake City-wide interest against individual communities or groups. These challenges can only become more prevalent as the City pursues the necessary investment in AT infrastructure. City staff will require strong policy, designated resources, and clear processes to overcome these challenges and support the accommodation and walking and cycling in the City.

In newer areas, the challenge for the City will be to apply the newer design practices that support walking and cycling to new subdivisions, commercial and industrial areas. The latest, best practices in design for pedestrians and cycling is rapidly evolving. New design treatments are being developed and tested throughout Ontario and North America. Design resources and training will be important tools to enable City staff to cultivate walk- and bike-friendly design in partnership with developers.

The goal of the AT strategy is for walking and cycling to be the preferred modes of transportation for trips 5km or less. The City of Brantford has set a target to reach 10% of PM peak trips by walking and cycling by 2031. The AT strategies proposed in this 2014 TMP Update is based on achieving this mode share target. These strategies are discussed in Sections 1.3 to 1.5.

1.3 Active Transportation Strategies for Brantford

This section reviews past strategies for active transportation, the progress to date and public input to refine the plan. Best practices and new approaches for Brantford area discussed to plan for walking and cycling.

1.3.1 PAST PLANNING FOR WALKING AND CYCLING

In 2000, the City of Brantford approved the *Multi-Use Trail / Bikeway Implementation and Design Plan* (2000 MUTB Plan). The plan focused on the development of a network based on the Multi-use Trail/Bikeway Concept. At the time, the existing network consisted of 37km of trails. The Concept identified 12 primary routes as well as 11 neighbourhood routes and connecting links. The 2000 MUTB Plan proposed to build an additional 42 km of multi-use trails and 83km of on-road bikeways at an estimated cost of $6.7M (1999 Dollars). The proposed on-road bikeways included signed routes, bike lanes, paved shoulders, and wide curb lanes. The 2000 MUTB Plan also provides information about design, maintenance practices and guidance to implementing the network by an advisory committee.

In 2007, the City updated its *Transportation Master Plan* (the 2007 TMP Update), which addressed walking as well as cycling and identified a new Bikeways and Trails Network. Since the 2000 MUTB Plan, much progress has occurred in the implementation of proposed off-road / trail facilities. Some challenges were recognised when implementing the proposed on-road facilities. Among these challenges is the perception that residents treat walking and cycling primarily as a recreational pursuit and that the on-road bikeways should not interfere with existing roadway capacity. The 2007 TMP Update proposed to build from the strong off-road network by: enhancing access to the trail system; and providing walk and bike infrastructure in new development areas. Over time, it was the intention of the 2007 TMP Update that this strategy encourages walking and cycling to be the preferred option for short trips. At the time, the combined mode share was 6% for trips to work. The 2007 TMP Update set out a vision to achieve a mode share for walking and biking of 10% of PM peak trips by 2031.

The 2007 TMP Update identified a recommended Bikeways and Trails Network Plan to replace the network proposed in the 2000 MUTB Plan. It was later included as part of the Official Plan. The network proposed 33.5km of multi-use trails and 86.9km of on-street facilities at an estimated cost of $12.0M. To accommodate pedestrian needs, the 2007 TMP Update also recommended the development of a Sidewalk Master Plan and annual sidewalk construction program to retrofit sidewalks on existing arterial and collector roads. However, no guidance was provided on the proposed scale or costs of the program. Aside from infrastructure needs, the plan made policy recommendations focused on:

- the promotion of walking and cycling by the City of Brantford among its facilities and to its employees;
- the accommodation of pedestrians and cyclists in new development areas; and
- the development and maintenance of the sidewalk network.

1.3.2 PROGRESS TO DATE

Since the 2007 TMP Update, the City has made good progress towards implementing active transportation infrastructure including:

- 46.7km of new sidewalks (including new development and reconstruction);

- 12.0km of new multi-use trails;
- 4.2km of bike lanes;
- 6.8km of shared use lanes; and
- 23.6km of signed routes;

No Sidewalk Master Plan or annual sidewalk retrofit program has yet to be developed. It is anticipated that most new sidewalks were built in new development areas**.** Given that the proposed sidewalk retrofit is intended only for arterial and collector roads, residential neighbourhoods that lack sidewalks may remain without sidewalks well into the future. In 2012, the City prepared its Sidewalk Policy to create a standard approach for public requests for sidewalks.

Approximately 76% (of the total length) of proposed facilities in the 2007 Bikeway and Trails network was built. A significant majority of these new facilities are signed routes, which provide low implementation cost. Given the cycling mode share, the evidence suggests that the signed routes have not sufficiently encouraged more cycling at a City-wide level.

1.3.3 PUBLIC INPUT

The study team consulted the public through consultation events, meetings with the Bikeway and Trails Advisory Committee (BTAC) as well as other stakeholders. The project website was used to communicate updates and progress on the study to the public. Below is a summary of the feedback that the study team received through each outlet. **Appendix A** includes more details about the public information centres (PICs).

1.3.3.1 Public Information Centre #1

PIC #1 was held on June 26, 2013. The purpose was to introduce the project and discuss issues and future vision for transportation to be addressed in the plan. The public was presented with existing AT facilities and the 2007 Bikeways and Trails network. Issues identified by the public are: the need for improve cycling routes, access to the southwest area, and pollution from, safe facilities to walk and bike, and the availability of mobility option. The accommodation of walking and cycling were seen as important alternatives to car ownership, especially given an aging population. Attendees were asked to identify the types of improvements, among suggested items, they believed were important to encourage more walking and cycling. Exhibit 1 shows the feedback from the public at PIC #1.

Exhibit 1: Public Feedback from PIC#1

Suggested improvement with positive responses (in order by level of agreement)
· Establish a network of on-road bike lanes specifically for cycling
· Establish bicycle parking facilities at key destinations such as retail or community centres and at workplaces
· A public awareness program encouraging cyclists and motorists to share the road
· A public awareness program encouraging cycling
· Enhancement of pedestrian environment (e.g. separation from cars, wider sidewalks)
· More frequent road crossings (e.g. crosswalks, signals)
· Extension of continuous sidewalk linkages
· Expand the existing network of off-road shared-use trails through parks and open spaces
· Encouraging more compact, mixed-use communities to allow people to live closer to where they work

1.3.3.2 Public Information Centre #2

PIC #2 was held on October 24, 2013 as a workshop to allow participants to provide more specific input in a discussion setting. Workshop tables were set up for each: active transportation, public transit and the road network. Exhibit 2 list the discussion questions for AT.

Exhibit 2: AT Discussion Questions at PIC #2

Discussion question for Active Transportation Workshop
1. What is your vision for walking and cycling in Brantford?
2. What do you think about the existing walking and cycling facilities in the City?
3. What do you think about the DRAFT changes to the Bikeways and Trail Network?
4. What else can the City do to encourage more walking and cycling?

From the discussion, the study team learned that Brantford residents envision walking and cycling as a means to be active and healthy on an active transportation network that is accessible, equitable and connected.

Many noted that the provision of new facilities, designed for all user types, is important. However, maintenance of existing facilities (such as the replacement of deteriorating sidewalks and snow clearance of trails) was also emphasized to allow full use of the network.

On-street facilities in the Bikeways and Trails Network were recognized as a necessary part of the network. However, participants noted past challenges and opposition to previous proposals by the City to provide bike lanes through road restriping (or road diets). It was suggested that more focus should be paid to trails in neighbourhood parks instead of connections to further established trails on the Grand River, as a means to provide local opportunities for active transportation. Decommissioned rail corridors were also recognized as opportune corridors for shared-use trails. The issue of separated space for pedestrians and cyclists was discussed for busier trails. The growing popularity of e-bikes and their use on trails was also a concern.

Street-scaping was identified as an amenity that would improve the road network for walking. In development areas, it was suggested that sidewalks are constructed in anticipation or prior to full build-out (instead of after-the-fact) to encourage and grow walking trips. This suggestion applies especially where the sidewalks would connect between already built-up areas.

1.3.3.3 Public Information Centre #3

PIC #3 was held on April 2, 2014 at the T.B. Costain / C Johnson Community Centre. Large format maps of the draft Bikeways and Trails Network was presented to the public for comment. Photo examples of the different types of AT facilities were provided as well as an introduction into the concept of Bike Priority Streets (see Exhibit 12: Bike Priority Streets - a staged approach in Section 1.4.2: Updated Bikeways and Trails Network)

Exhibit 3: AT Discussion Questions from PIC #3

Support for AT-related strategies
1. 13 out of 15 people support the strategy "Shift some of the local trip-making away from private auto to alternative travel modes"
2. 11 out of 13 people support the strategy "Continue to invest in active transportation to increase cycling and walking in Brantford"
3. 12 out of 13 people support the introduction of Buffered Bike Lanes as a new type of cycling facility in Brantford
4. 12 out of 13 people support the introduction of Buffered Bike Lanes as a new type of cycling facility in Brantford
5. 6 out of 9 people support the introduction of Super Sharrows as a new type of cycling facility in Brantford
6. 9 out of 12 people support the introduction of Bike Priority Streets as a new type of cycling facility in Brantford

1.3.3.4 Bikeway and Trails Advisory Committee and Other Stakeholders

The study team met with the BTAC and other interested stakeholders to solicit input on cycling issues and opportunities in the City. The BTAC was consulted in June 20, 2013 early in the study process to discuss key cycling issues in Brantford. A stakeholder meeting was held in August 28, 2013. Member of BTAC were also solicited for feedback of the draft Bikeways and Trails Network prior to PIC #3 in April 2014. Exhibit 4 is a summary of feedback from the BTAC and other interested stakeholders:

Exhibit 4: Feedback from the BTAC and other interested stakeholders

Feedback from BTAC and other interested stakeholders
Good examples of existing cycling routes in Brantford or elsewhere
Grey Street bike lanes
Multi-use trail on Powerline Road
Super sharrow treatment as applied to downtown Kitchener (green paint and sharrow symbols on busy, but lower speed roads)
Improvements for existing cycling facilities and routes
Maintain existing bike lanes (remove debris, align sewer grates perpendicular to travel path, repaint lines, etc.)
Provide more designated space for cycling on busier road (multi-lane arterials are uncomfortable to share space with motorists)
Consider traffic calming on Brantwood Park Road to lower speeds, existing shared use facility
Consider roundabout or other intersection treatments to facilitate crossing Clarence Road at Dundas Street / Elgin Street
Refer to updated design guidelines to address needs of users with a wide range of abilities
Consider extending Grey Street bike lanes along Garden Avenue as a north-south route

Feedback from BTAC and other interested stakeholders
Suggested routes for cycling network
More direct cycling routes, possibly on roadway corridors with designated space (existing routes on quiet streets are out of the way and inconvenient)
Improve north-south connections, there are a few existing connections over Hwy 403 (i.e. between Paris Road and Wayne Gretzky Parkway)
Convert old rail corridors to trails
Connect at boundaries to destinations outside Brantford (e.g. Paris via NW Trail / SC Johnson Trail)
Connect Bikeways and Trail Network to activity areas and employment destinations (existing network is focused on indirect recreational routes)
Integrate transition for off-road and on-road cycling routes
Focus on missing links for new cycling facilities
Develop shared-use trails on other sections of Powerline Road
Consider William Avenue as a low-traffic alternative to Brant Avenue, a destination with many commercial uses
Provide more direct routes from north-east area of the City to downtown (existing routes are circuitous)
Connect Pauline Johnson Collegiate to downtown
Other comments related to cycling
Provide more secure bike parking on City lots (e.g. bike lockers)
Develop policies that recognize walking and cycling with as a significant part in the transportation system
Consider more effective forms of traffic calming (i.e. unwarranted stop signs are not compatible or comfortable on cycling routes)
Involve public education within the plan (e.g. safety cycling, rules of the road, courtesy, etc.)
Consider Complete Streets policies as a platform to accommodate all modes of transportation
Establish regulation of e-bikes on trails (they pose safety concerns due to higher speed and quiet operation)
Take a proactive approach to the development of the Bikeways and Trails Network (i.e. not just relying on road reconstruction or resurfacing projects to develop cycling routes)

1.3.4 STRATEGIES FOR THE FUTURE

Compared to existing conditions, walking and cycling mode share must increase 2.5% during the PM peak period to reach the 2031 goals. Lessons learned (from previous planning efforts, progress since the 2007 TMP Update and public input) distinguish the need for a higher quality environment for walking and cycling. The development of high-quality walkways, bikeways and trails is critical in reaching the AT mode share target. Below are five (5) topics of evolving practices in active transportation planning that support walking and cycling as a safe, convenient and appealing option.

- Safe Places to Walk
- Cycling Safety
- Cycling as an Attractive Option
- Separate Space for Cyclists
- Comfort and Convenience for Pedestrians and Cyclists

Each principle is discussed in the context of developing an effective AT Strategy.

1.3.4.1 Safe Places to Walk

Streets without designated places to walk put people at risk. Pedestrians have a 45% likelihood of death when struck at 50km/h; likelihood rises dramatically to 85% when struck at 60km/hr. Residential areas with no sidewalks are show to have 23% of pedestrian crashes, but only 3% of pedestrian traffic[3]. Streets with missing sidewalks have more than double the pedestrian crashes than those streets with sidewalks on both sides: there are 2.6 times more crashes on streets with no sidewalks on both sides; and there are 1.2 times more pedestrian crashes on streets with no sidewalk on one side. In rural areas, paved shoulders reduce pedestrian crashes up to 80%. Therefore, sidewalks are needed on both sides of the road to improve pedestrian safety. Policies regarding sidewalks should not omit locations where there is low pedestrian activity or locations where there is already a sidewalk on one side of the street.

Best practices in North America[4] generally recommend sidewalks on both sides of the street. Only on an interim condition may it be acceptable to maintain sidewalks on one side. While streets with no sidewalks are a priority, sidewalks are needed on both sides of the road for all urban roads. In rural area, paved shoulders can provide a safe place to walk.

Pedestrian safety and increased walking activity are mutually beneficial. Providing safe places to walk encourages more people to walk and overall higher levels of walking are associated with regions that tend to have lower traffic fatalities[5]. People who are walking, in areas where there are more people walking, are less likely to be hit by a motorist[6]. Therefore, providing sidewalks on both sides of the street improves pedestrian safety while working towards the goal of increasing walking mode share.

1.3.4.2 Cycling Safety

Safety is a top consideration when developing a bike network. There is a key distinction between the facts of cycling safety and the perception of cycling safety. A common myth about cycling safety is that cycling on the street is not safe or less safe than riding on off-road facilities. Statistically, there is a higher incidence of cyclist collisions with motor vehicles or pedestrians on off-road facilities than on-road facilities at cross-streets and driveways, particularly in commercial areas[7]. Poor design of existing off-road facilities may be a contributing factor to this data. However, there is no clear evidence to support the idea that on-street cycling is not safe. The purpose of clarifying this myth is to ensure all options are considered in developing the Bikeways and Trails Network.

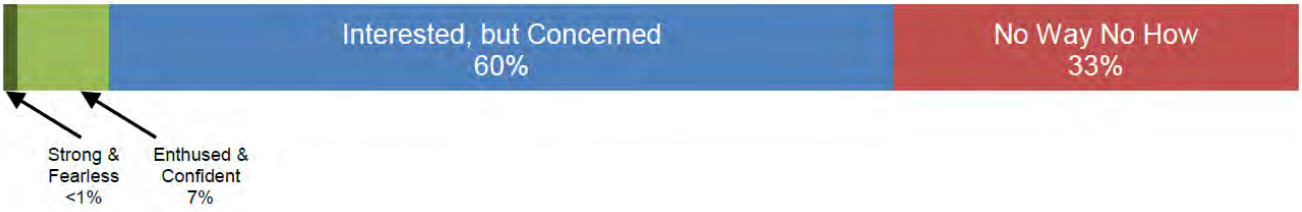
There is, however, a relationship between perception, ridership and the resulting safety. Cycling facilities that are perceived to be safer, arguably, encourage more people to cycle and communities with higher levels of cycling have fewer cycling fatalities[8]. A motorist is less likely to collide with a person bicycling if more people are cycling[9]. High-quality bikeways improve safety and predictability of behaviour between motorist and cyclists. Therefore, the development of the Bikeways and Trails network requires a balance of different types of well-designed facilities that will attract many different people to cycle.

[3] Knoblauch, R.L., B.H. Tustin, S.A. Smith and <.T. Pietrucha. Investigation of Exposure Based Pedestrian Areas: Crosswalks, Sidewalks, Local Street and Major Arterial Roads. Report No. FHWA ED-88-038, U.S. Department of Transportation, Federal Highway Administration, September 1988
[4] American Association for State Highway and Transportation Officials, 2012. Guide for the Design, Planning and Operation of Pedestrian Facilities.
[5] Surface Transportation Policy Partnership, www.transact.org. 2000.
[6] Jacobsen, P.L. “Safety in Numbers: more walkers and bicyclists, safer walking and bicycling” Injury Prevention 205-209. 2009.
[7] Ontario Traffic Council, 2013. Ontario Traffic Manual Book 28: Bike Facilities. Ministry of Transportation Ontario.
[8] Pucher, J. and Buehler, R., “Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany”, Transport Reviews, July 2008
[9] Jacobsen, P.L. “Safety in Numbers: more walkers and bicyclists, safer walking and bicycling” Injury Prevention 205-209. 2009.

1.3.4.3 Cycling as an Attractive Option

Not all potential cyclists are the same. There is a variety in the level of skills, mobility and attitudes amongst potential cyclists. A popular classification of potential cyclists (for transportation) is demonstrated in Exhibit 5.

Exhibit 5: Four types of Potential Cyclists



Each type of potential cyclists is described below:

- **Strong & Fearless:** represents a small portion of the population who will generally ride under any conditions.

- **Enthused & Confident:** represents people who are generally comfortable sharing the road with automobiles if appropriate facilities are provided, but prefer to use dedicated bikeways. In general, many people who currently cycle for transportation in Brantford can likely be classified as within this group (or the Strong & Fearless).

- **Interested, but Concerned:** represents the largest group of people who may be inclined to cycle if they felt safer – if cars were slower and routes were more comfortable. This group may include people who already bike recreationally or for short trips on local quiet streets, but are discouraged and unlikely to ride on busy streets where they must share the road with motorists. Many people who currently ride only on recreational trails in Brantford can likely be classified in this group.

- **No Way No How** represents people who express a disinterest in cycling and are assumed unlikely to cycle.

This idea of the "four types of cyclists" was popularized over the last seven years based on the experience in the City of Portland, Oregon. Many Canadian cities, both large and small, have recognized this idea and some have even surveyed their own residents. Other classification systems for types of cyclists have been proposed in other cities. However, the "four types of cyclist" model is widely recognized by professionals in the field of active transportation. It is referred to in several North American design guides, including the Book 18 of the Ontario Traffic Manual: Bike Facilities (OTM Book 18). The important message from this concept is that potential cyclists have a wide range of skills and comfort levels.

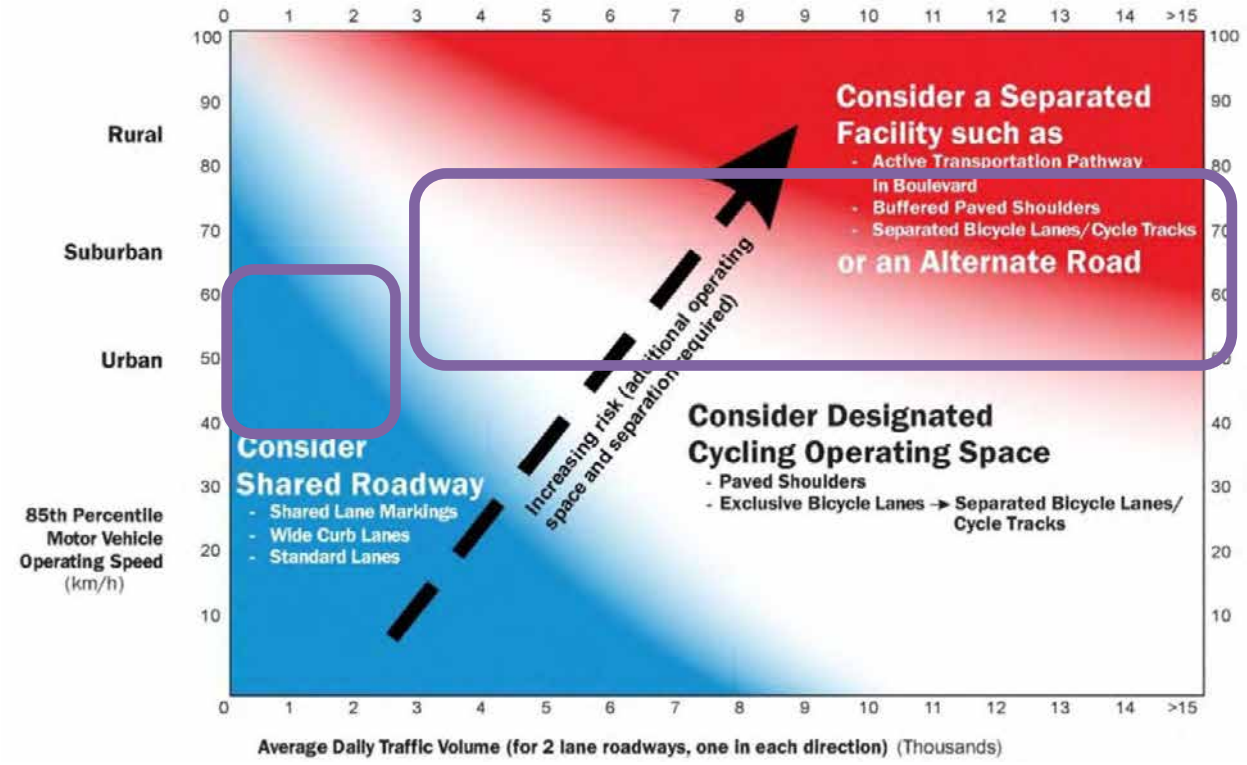
To make cycling a viable option, the proposed Bikeways and Trails Network must accommodate potential cyclists with varying skills and levels of comfort. The "Interested, but Concerned" group represents the largest portion of potential cyclists whom are most averse to uncomfortable traffic conditions. Addressing this group is a critical task in developing a network that will encourage people to cycle and will help reach the active transportation goals set out in the TMP.

1.3.4.4 Separate Space for Cyclist

Separate space for cyclists becomes more important on streets where volumes and speeds are higher. When speed and/or volumes are high, potential cyclists will feel unsafe and find it

uncomfortable to ride in mixed-traffic or shared-use facilities. Designated or separate space is typically recommended. Exhibit 6 demonstrates this concept in a pre-selection nomograph indicating a desirable bike facility based on speed and volume, as shown in OTM Book 18.

Exhibit 6: Desirable Bike Facility Pre-Selection Nomograph



Note that this pre-selection is Step 1 in a 3-step process. The following steps are a detailed review of multiple design criteria, including the application of design heuristics, and developing a rationale. Many factors must be considered when deciding on the appropriate type of bikeway for different routes and corridors. These factors include, but are not limited to: operating conditions, on-street parking, spacing of intersections and driveways, lane width, land use, etc.

In Brantford, the posted speed limit on most roads is 50km/h; however, many streets typically operate at a higher 85th percentile speed. At this speed, the threshold to consider designated space on the street (such as bike lanes) is when volumes are approximately 3,000 or more vehicles per day on a two-lane road. (Note that Exhibit 6 is based on international research and examples on a two-lane road. An approximate conversion for a 4-lane road of 6,000 vehicles per day may be considered; however, it is also important to consider the traffic mix of vehicles in the lane adjacent to the cycling facility).

Wide curb lanes and other shared-use facilities are more appropriate for streets with lower speeds and volumes, as represented by the purple box to the left in Exhibit 6. The box to the right in Exhibit 6 represents typical operation conditions on arterial and collector roads in the City. These criteria suggest that wide curb lanes are not appropriate for arterials roads where volumes or speeds are high. Based on existing volumes, there are several streets with existing or proposed wide curb lanes where it is more appropriate to provide designated or separate space (e.g. Colbourne Road, Erie Road, Tollgate Road / Fairview Drive.). The Bikeways and Trails network can be improved by

providing separate space for cyclists on arterial and collector roads where speeds and volumes are high.

1.3.4.5 Comfort and Convenience

Busy roads can be significant barriers, especially if there are no or few places to safely cross. Walking and cycling trips are generally shorter than trips by car. Pedestrians and cyclists are often more concerned about direct routes to their destinations, and more sensitive to long distances and to circuitous travel paths. Even streets with sidewalks on one side of the road are inconvenient and put people at risk because they put pedestrians in potential conflict as they are required to cross the road to access the sidewalk. Bikeways that are more comfortable along routes that are convenient encourage people to cycle. The Bikeways and Trails Network must be comfortable and convenient for pedestrians and cyclists. Therefore, it is important to provide sidewalks on both sides and high-quality bikeways that are direct and connected to key destinations.

In some corridors, the existing volumes suggest that there is excessive capacity on several multi-lane collector and arterial roads. Oftentimes, excessive capacity can encourage higher speeds, which is undesirable in residential areas. On multi-lane streets, lane reduction is cited as an effective design control for speed management in the ITE Recommended Practice: Design for Walkable Thoroughfares. Thus, these corridors are opportunities to provide designated space for cyclists on direct routes, by reconfiguring the roadway, while also improving conditions for pedestrians.

1.4 A Plan for Walking and Cycling in Brantford

1.4.1 FRAMEWORK FOR A SIDEWALKS RETROFIT PROGRAM

Map 1 shows the existing sidewalks in the City of Brantford. There are currently 541km of sidewalks and 13.8km of shared-use trails along the road network. In general, these sidewalks provide coverage along one or both sides of the road for the majority of streets in the City. However, there are some areas with a marked lack of sidewalks. These areas include:

- The residential neighbourhoods of Echo Place, Ava Heights / Golfdale, Greenbriar and Fariview north of Highway 403;
- The industrial and commercial area within the Braneida Industrial Park and the Northwest Industrial Area;
- Streets on or near the boundary of the City; and
- Select areas in other residential neighbourhoods generally along crescent streets and streets with no exit.

It is recommended that the City continue to develop a Sidewalk Master Plan. Both the 2007 TMP Update and the Official Plan call for the development of a Sidewalk Master Plan and sidewalk retrofit program. This program is limited to retrofitting sidewalks where missing only on arterial and collector roads. Several criteria were suggested for the development of an implementation plan. These factors include: proximity to schools or community centres, existing demand for walking, access to existing or planned transit routes and location within the downtown core. However, these factors alone are not enough to address underlying objectives of pedestrian safety, comfort, demand and access to transit. Exhibit 7 lists other criteria factors that can be used to support these objectives.

Exhibit 7: Updated and New Priority Criteria Factors for Sidewalk Retrofits

Objective	Criteria Factor	Rationale
Pedestrian safety and comfort	Lack of existing walkway on either side of the road	Streets with no sidewalks on one or both sides are shown to result in more pedestrian crashes than streets with sidewalks on both sides of the road
	History of pedestrian collisions	Past injuries and fatalities demonstrate a known safety issue
	Existing and future traffic volumes	Streets with higher volumes present more exposure to potential conflict between pedestrians and motorists
	Operating and/or posted speed	Pedestrians experience greater severity of injuries when struck by vehicles as a higher speed. Motorists travelling at higher speeds have less time to react to potential collisions
Pedestrian demand	Existing or future walking activity	Lack of pedestrian count data can stall implementation. Pedestrian activity can be estimated based on existing and planned land use in the adjacent area, density of people and employment (e.g. categories of low, medium and high)
	Concentration of destination areas	Destination areas are likely to have higher levels of travel activity, including walking. Special attention should be paid to connecting to the downtown and other intensification corridors
	Proximity to existing schools and community centres	Schools and community centres are known destination areas that serve targeted populations who may depend on alternative transportation (e.g. children, youth, seniors, etc.)
	Request from the public	Residents and local community provide valuable input about the neighbourhood conditions and demand for walking
Access to transit	Location on street with transit routes	Walking is a primary mode to access transit service
	Proximity to transit stop or station	Walkways to and from transit stops and stations address the 'last mile' of transit trips from door to door

It is recommended that the City continues to develop a Sidewalk Retrofit Program based on a points-based priority framework. The current Sidewalk Policy to identify and qualify a sidewalk retrofit project is reactive, requiring petitions to be initiated by the public. A petition questionnaire requires an individual from neighbouring dwelling units to self-identify their need as a 'Potential User'. This process can be inefficient and ineffective. Significant staff resources are required on a project-by-project basis. 'Potential Users' may falsely identify no need for a sidewalk due to conflicting interest (such as a new responsibility for snow clearance, loss of frontage / driveway space, etc.). In fact, these interests may provide an incentive for individuals to deny any need for safe pedestrian facilities even where evidence indicates otherwise (such as a history of pedestrian collisions or the proximity to a school or transit station). A priority framework can streamline the approach to more accurately evaluate pedestrian needs for sidewalk retrofits throughout the City.

A framework to determine the priority of sidewalk retrofit projects is provided in Exhibit 8 based on these criteria. The framework is developed based on a points-based system; a higher number of points signify higher-priority. Note that precise details such the exact scale of points are intentionally omitted from the framework to provide flexibility to develop the Sidewalk Retrofit Program based on the available data and staff resources. The detailed development of the Sidewalk Retrofit Program can be prepared internally or as part of a Sidewalk Master Plan. However, it is important to note that a Sidewalk Master Plan is necessary to address needs beyond missing sidewalks. A comprehensive plan can also help outline policies and design guidelines, as well as develop Sidewalk Retrofit Program and funding strategies that affect pedestrians.

Exhibit 8: Points-Based Priority Framework for Sidewalk Retrofit Program

Objective	Criteria Factor	Framework
Pedestrian safety and comfort	Lack of existing walkway on either side of the road	Assign points for sidewalk missing one side, and more points for sidewalk missing on both sides of the road
	History of pedestrian collisions	Assign points per non-fatal injury, and more points per fatal injury
	Existing and future traffic volumes	Assign points based on a range of existing annual average daily traffic (i.e. more points for higher volume areas), and more points if AADT is forecasted to increase significantly
	Operating and/or posted speed	Assign points based a high posted speed (e.g. >50km/h) or operating speed (e.g. >65km/h) (i.e. more points for a higher speed area), and/or more points where operating speed data indicates a problem with speeding
Pedestrian demand	Existing or future walking activity	Assign points based on existing medium or high level of walking activity (i.e. more points for a higher estimated demand), and more points if activity is anticipated to increase significantly in the future (e.g. based on land use forecasts)
	Concentration of destination areas	Assign points based on medium or high concentration of destinations areas (i.e. more points for high concentration of destination areas) (e.g. using number of parcels of commercial or mixed use)
	Proximity to existing schools and community centres	Assign points if street is an access route to an elementary school (e.g. within 400m), a secondary school (e.g. within 800m), or a community centre (e.g. within 800m)
	Request from the public	Assign points if requested by the public and based on the level of positive support from the public (i.e. more points if supported by community)
Access to transit	Location on street with transit routes	Assign points per transit route that travels along the street
	Proximity to transit stop or station	Assign points if street is an access route to a transit stop (e.g. within 400m), and more points if it is an access route to a transit station

It is recommended that City pursue the development of a Sidewalk Master Plan to address:

- Accessible design for new sidewalks (as well as other walkways such as shared-use trails) and street crossings (such as for crosswalks, curb ramps, etc.);
- Supportive policies and programs (such as the sidewalk retrofit program, pedestrian amenities and streetscaping, long-term and winter maintenance, traffic calming, etc.); and
- Tourism, education and enforcement programs that promote walking (or active transportation) as the preferred mode of travel for trips 5km or less.

It is recommended that the City continue to pursue the development of a Sidewalk Master Plan and a Sidewalk Retrofit Program. This plan provides a points-based framework for the Sidewalk Retrofit Program, which can be further developed as part of a Sidewalk Master Plan. However, the Sidewalk Master Plan may also address accessible design, supportive policies and programs, and tourism, education and enforcement.

1.4.2 UPDATED BIKEWAYS AND TRAILS NETWORK

Map 2 shows the proposed Bikeways and Trails Network. There are currently 43.5km of on-road bikeways and 105km of off-road trails in Brantford. By 2031, the proposed Bikeway and Trails Network outlines a future network with 116km of on-road bikeways and 128 km off-road trails. This

target represents a 20% increase in off-road trails and 165% growth in the on-road network. Exhibit 9 is a summary of the network.

Exhibit 9: Existing, Planned and Proposed Facilities in the Bikeways and Trails Network

Bikeway or Trail Facility	Existing (km)	Planned[2] (km)	Proposed (km)	Future Total (km)
On-road Bikeway (centreline length)	43.5	21.7	97.8	115.6
Bike Lanes	10.3	-	33.6	43.9
Wide Shared Use Lane[1]	9.6	-	-	7.5
Signed Routes[2]	23.6	21.7	-	-
Buffered Bike Lanes	-	-	4.1	4.1
Bike Priority Street	-	-	12.7	12.7
Super Sharrow	-	-	1.5	1.5
Marked Shared Use Lanes			45.9	45.9
Off-road Trail (total length)	104.5	-	23.5	128.0
Boulevard Trails (adjacent to roadway)	17.6	-	18.5	36.1
Shared-Use Trail (non-roadway corridor)	43.5	-	2.9	46.4
Other park trail or pathway	43.4	-	-	43.4
Bikeway or trail connection	-		2.1	2.1

Notes:

1. Wide shared use lanes on arterial roads (2.1km) will be replaced over time with bike lanes
2. Map 1 shows signed routes planned in 2013 during the development of the proposed bikeways and trail network. All existing and planned signed routes will be replaced over time with marked shared use lanes, bike priority streets or alternative bikeway routes

The updated Bikeway and Trails Network proposes 72.1km of new on-road bikeway, 25.7km of updates to existing on-road bikeways, and 23.5km of new off-road trails. The majority of changes in the updated Bikeway and Trails Network are focuses on on-road facilities. There are a few new shared-use trails in the boulevard as key roads are widened or extended. This strategy is taken because there already is a strong presence of shared use trails on non-roadway corridors and few corridors are available for exclusive use by pedestrians and cyclists. A decided expansion of the Bikeways and Trails Network along the road network is necessary to connect each community.

The proposed updates are divided in four (4) groups:

1. **Upgrade existing and proposed signed routes with improved bike facilities such as marked shared-use lanes, bike priority streets or bike lanes, as appropriate.** The best practices to date recognize that a cycling and trail network should provide a clear, well-defined and comfortable environment for all anticipated users. The proposed upgrades to signed routes are focused on creating a more comfortable experience for a wider range of potential cyclists with different skills and comfort levels.

2. **Upgrade existing and proposed wide curb lanes on multi-lane / arterial roads to bike facilities with designated space for cyclists.** The best practices to date recognize that the interaction between cyclists and motorists is less comfortable when they are required to share space along a street with higher speed and volume. At minimum, designated space allows for separation between cyclists and motorists and is generally more appropriate in these conditions.

3. **Develop new facilities to accommodate both walking and cycling as part of the proposed road network improvements.** Road improvement projects provide a big opportunity to design a corridor appropriately for all users. The proposed AT facilities along these corridors are based on a context-sensitive approach of the corridor.

4. **Modify existing and proposed routes, or add new cycling facilities, as separate active transportation projects.** The best practices to date recognize that people prefer comfortable, direct and continuous connections. Cycling routes located on out-of-the-way side streets navigate along indirect and inconvenient routes. The proposed modified or new routes are intended to replace routes. However, it is important that existing routes should not be removed or planned routed should not be cancelled until a near-by alternative route is established.

Appendix B contains four (4) summary tables (as listed above) of the proposed route, on-road cycling or trail facility and extent.

Exhibit 10 is an overview of the types of facilities within existing the Bikeways and Trails Network.

Exhibit 11 is an overview of other new and upgraded types of facilities introduced into the proposed Bikeways and Trails Network.

One new type of facility that is prevalent in the proposed Bikeways and Trail Network is the Bike Priority Street. Many of these routes are generally located on existing or planned signed routes. The Bike Priority Street is not a type of facility with a single consistent treatment. Rather, many different types of treatments can be used to improve the route at staged levels of intensity as the route is developed. During the early stages of implementation, a Bike Priority Street will resemble a signed route (see Exhibit 11). However, additional treatments such as pavement markings, intersection treatments, traffic calming and eventually, traffic diversion are measures that can improve the cycling experience.

Exhibit 10: Existing Types of Facilities in the Bikeway and Trails Network

Facility Type	Context for Brantford	Example Photo
Existing Facilities		
Bike Lanes	▪ Proposed in Bikeways and Trails Network ▪ Typically located on urban roads where higher speeds and/or volumes merit separate space for cyclists	

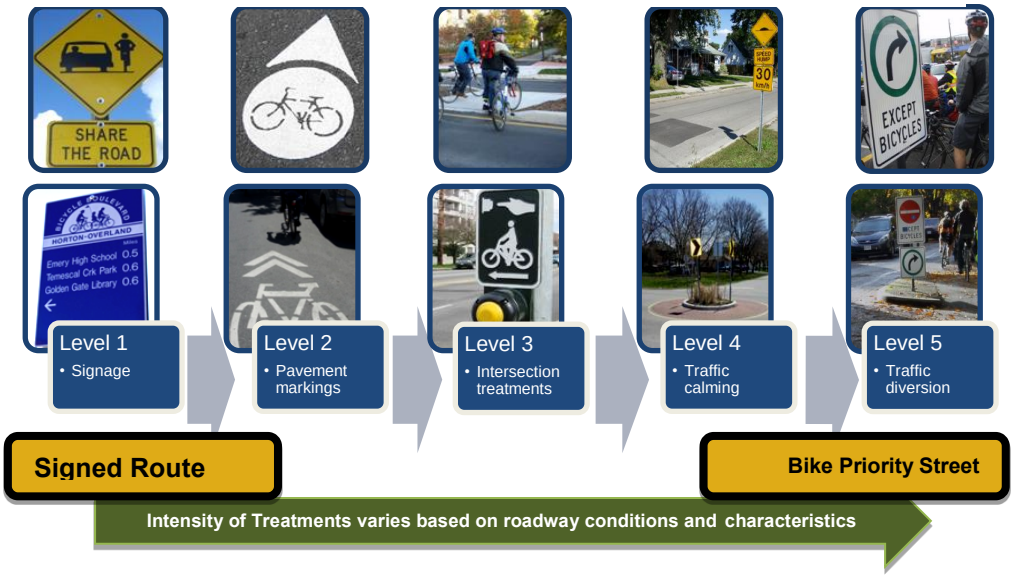
Facility Type	Context for Brantford	Example Photo
Existing Facilities		
Paved Shoulder	▪ Proposed in Bikeways and Trails Network ▪ Located in rural areas where higher speeds and/or volumes merit separate space for cyclists	
Wide Shared Use Lanes	▪ Not recommended in Bikeways and Trails Network on multi-lane or arterial streets with higher volume and/or speeds ▪ Acceptable on urban roads with lower speeds and volume that are appropriate for shared used between cyclists and motorists	
Boulevard Trail (roadway corridor)	▪ Proposed in Bikeways and Trails Network as part of some road network improvement projects, long-term projects or short connections between on-road routes ▪ Typically on urban roads where very high speeds and/or volumes merit physically separated space for cyclists ▪ Generally not recommended on corridors with high frequency of side streets and/or driveways	
Shared-Use Trail (non-roadway corridor)	▪ Proposed in Bikeways and Trails Network along decommissioned rail corridors ▪ Typically located through parks and opens space or along other easements such as hydro corridors, or abandoned rail corridors.	

Facility Type	Context for Brantford	Example Photo
Existing Facilities		
Signed Route	▪ Upgrades to marked shared use lanes, bike priority streets or bike lanes, proposed as part of the Bikeways and Trails Network ▪ Acceptable on urban roads with lower speeds and very low volumes that are appropriate for shared used between cyclists and motorists ▪ Generally not recommended	

Exhibit 11: New and Upgraded Types of Facilities in the Bikeway and Trails Network

Facility Type	Context for Brantford	Example Photo
New and Upgraded Facilities		
Buffered Bike Lanes	▪ Proposed in Bikeways and Trails Network along multi-lane, higher-speed arterial roads ▪ Typically located on urban roads where very high speeds and/or volumes merit the need for more separation between cyclists and motorists	
Super Sharrow	▪ Proposed in Bikeways and Trails Network along streets with consistent high volume and low speed (such as the downtown core) ▪ Sharrow with enhanced treatments such as coloured paint to create a highly visible presence ▪ Generally located along constrained urban streets with limited options to provide separate space and where excessive speed is not anticipated	 Photo credit: Robert Wilson
Bike Priority Streets	▪ Proposed in Bikeways and Trails Network along new routes and to upgrade some signed routes ▪ Designed to provide comfortable and direct cycling route along lower volume urban streets that serve as alternate corridors to busy roads ▪ Typically implemented with phased improvement using a combination of measures including signage, pavement markings and traffic calming in a phased approach (see Exhibit 12) ▪ Not recommended on main thoroughfare for motor vehicle traffic or transit routes	

Exhibit 12: Bike Priority Streets - a staged approach



Pavement markings help ensure a higher visibility and awareness of the cycling route, including guidance of anticipated travel paths for the cyclist. Intersection treatments such as raised medians, signalized crossings or bike detection can help cyclists cross major streets. Traffic calming helps reduce speed and volumes, adding to a more comfortable and attractive route. In the long-term, traffic diversion can emphasize the priority for cycling on the street by treatments that allow cyclist movement while limiting motorist access (e.g. exit/entrance only restrictions, one-way conversions with exceptions of cyclists, restricted through traffic using barrier treatments). In general, Bike Priority Streets are not compatible with roads that act as main thoroughfare or roads that serve transit routes.

It is recommended that the City develop the updated Bikeways and Trails Network. The updated network proposes 72.1km of new on-road bikeways, 25.7km of upgraded facilities on existing on-road bikeways, and 23.5km of new off-roads. The proposed upgrades are divided into four (4) groups: upgrade existing and proposed signed routes; upgrade existing and proposed wide curb lanes on multi-lane and/or arterial roads; develop new cycling facilities as part of the proposed road network improvements; and modify existing and proposed routes, with new cycling facilities as a separate active transportation projects.

1.4.3 BETTER DATA ABOUT WALKING AND CYCLING

The City-wide mode share for active transportation is the only measures of performance currently used by the City to monitor walking and cycling activity. The lack of detailed data for pedestrians and cyclist restricts the ability to realistically assess the impact of the AT strategy. For example, it is likely that new bikeways and trail facilities may increase safety and the walking and cycling activity in the surrounding area. However, it is difficult to monitor this impact without better data at the corridor-level.

Below are strategies to increase and improve the quality of data available about walking and cycling in the City:

- Maintain a record of manual counts surveys conducted for pedestrian and/or cyclists count (e.g. counts conducted as part of traffic calming studies);
- Consider the development of screenlines for active transportation and to conduct cordon counts to monitor annual travel patterns of pedestrians and cyclists (e.g. boundary of downtown, Wayne Gretzky Parkway trail over Hwy 403, Dike Trail bridges over the Grand River, etc.) Screenlines can be identified in consultation with the Bikeway and Trails Advisory Committee and other stakeholders;
- Invest in low-cost automated counter technology to conduct surveys of pedestrian and cyclists counts at key locations over longer periods (e.g. to assess daily, weekly and seasonal variation);
- Update requirements for turning movement count surveys: cyclists should be counted as a separate vehicle class (currently cyclists are counted as part of the vehicle total if located on the road and as a pedestrian if located on the sidewalk);
- Monitor annual progress towards implementing the Sidewalk Retrofit Program (e.g. km of retrofitted sidewalks, km of arterial and collector roads with no sidewalks on either side);
- Monitor annual progress towards implementing the Bikeways and Trail Network (e.g. km of new and updated bikeways and trails, % of existing facility as % of total planned);
- Monitor annual data for collision involving a pedestrian and/or cyclists; and
- Monitor public engagement on active transportation issues (e.g. count number of requests for retrofitted sidewalks, improvements for cyclists, etc.).

It is recommended that the City investigate strategies to improve the quality for walking and cycling data available to monitor the impact of the AT strategy. Several strategies are provided to improve the quality of count data for pedestrians and cyclists. Other options include monitoring the progress of the Sidewalk Retrofit Program and implementation of the Bikeways and Trail Network. Collisions involving pedestrians and cyclists can be monitored over time. Public engagement can also be monitored.

1.4.4 WALK AND BIKE-FRIENDLY PRACTICES

Building a walk and bike-friendly Brantford requires more than simply building the infrastructure. The accommodation of active transportation is not a singular process. The City must encourage awareness for pedestrians' and cyclists' needs as part of regular transportation planning activities. This section discusses some policies and practices in the City that can be improved to be more walk and bike-friendly.

It is recommended that the City review its Sidewalk Policy, Traffic Calming Policy and Transportation Impact Study Guidelines to reflect walk and bike-friendly practices. Detailed recommendations discussed in the next sub-sections and are outlined in the Implementation Strategy.

1.4.4.1 Sidewalk Policy:

The Sidewalk Policy recognizes the importance of public engagement in addressing community needs by requiring consultation with residents prior to installation of a retrofitted sidewalk. The current policy also uses community feedback as the basis for identifying pedestrian needs. Consultation should remain an important part of the process. However, the identification of pedestrian need and 'Potential Users' can be improved based on the criteria factors discussed in the points-based priority framework (Section 1.4.1 provides a discussion).

1.4.4.2 Traffic Calming Policy

The Traffic Calming Policy recognizes the challenges and limited public awareness regarding the effectiveness of all-way stops and a signed-only reduction of speed limits. (Unwarranted use of these measures is not sufficient to address underlying issues). As part of the policy, traffic calming objectives include the reduction of travel speeds and traffic infiltration thus discouraging non-local traffic and encouraging a reduction in traffic volumes.

Traffic calming is one of the treatments recommended for Bike Priority Streets that can improve these types of cycling routes. With these treatments, the establishment of a Bike Priority Street can raise awareness of the street as a cycling route and potentially discourage traffic infiltration by auto vehicles. Therefore, this policy can support bike-friendly practices by including an exception for cyclists when referring to volume reductions on non-local traffic.

Priority ranking of the traffic calming needs is based on existing traffic volumes and speeds. It also refers to collision data, lack of sidewalks and school crossing needs. The Traffic Calming Policy can support walk and bike-friendly practices with more emphasis on the lack of sidewalks and reference to the Bike Priority Streets in the priority ranking

1.4.4.3 Transportation Impact Study Guidelines

The Transportation Impact Study Guidelines recognizes the importance of accommodating multi-modal transportation, namely, auto vehicles and transit. There are requirements to identify and provide a pedestrian circulation plan; however there is little guidance with respect to addressing cycling access to the development site. The guidelines can be improved to support a more walk- and bike-friendly community by identifying existing and proposed bikeways and trails.

As with auto and transit patterns, the guidelines would benefit from reference to the existing and anticipated level activity from pedestrians and cyclists. This information may not always be available as count data (discussed in 1.4.3); however, other cursory information can provide some context to the proposed development. For example, proximity to the downtown or other intensification corridors can signal a higher growth in pedestrian and cyclist activity. Higher density in the surrounding area may signify a strong potential for short trips (5km or less), for which by policy, walking and cycling are the preferred modes. This level of analysis would help ensure new developments and redevelopments support a walk- and bike-friendly environment.

1.5 Implementation Strategy

1.5.1 A BUDGET FOR SIDEWALK RETROFITS

Designated, recurring funding is necessary to implement the Sidewalk Retrofit Program. The current process to fund individual sidewalk retrofit projects can be inefficient. Attention from Council is required to approve sidewalk retrofits on a project-by-project basis. There is the risk that less engaged neighbourhoods are overlooked even when there is a clear lack of and need for sidewalks.

A priority framework can streamline the process not only by identifying need areas, but by providing guidance on how to allocate funding City-wide. The framework helps free up time required from Council to assess the trade-offs of each individual project. Instead, it provides a transparent policy-based approach to review proposed sidewalk retrofit projects on a multi-year and City-wide level.

The objective of the Sidewalk Retrofit Program is to address pedestrian needs for safe places to walk by ensuring there are sidewalks on both sides of the road for all urban streets in the City. Based on existing conditions (see Exhibit 13), at least 259km of retrofitted sidewalks are required to ensure there are sidewalks on both sides of all existing urban roads throughout the City. The cost to install a retrofitted sidewalk can range from to $200,000 to over $350,000 per kilometre depending on site conditions (such as the need to relocate utilities). These figures equate to an estimated total cost of $69.9M total, or $4.11M per year, (in 2013 dollars) over the 2031 horizon. Notably, commitment to this level of investment is beyond the resources available to the City without resulting in a significant compromise to other City services and programs. Therefore, the City requires a strategy to manage the scope of the Sidewalk Retrofit Program.

Exhibit 13: Streets with No Sidewalks on One or Both Sides

Road Classification	Total length of road with sidewalk missing		Total length of missing sidewalks (km)
	on one side (km)	on both sides (km)	
Arterial Roads	12.4	11.5	35.4
Collector Roads	6.9	17.0	40.9
Total Arterial and Collector Roads	19.3	28.5	76.3
Local Roads	19.3	81.5	182
All Roads	38.6	110	259

In the 2007 TMP Update, it was proposed to limit the program only to arterial and collector roads. This limited scope still results in a significant investment with the estimated total at $20.6M, or $1.21M per year, (in 2013 dollars) over the 2031 horizon. However, many need areas are located along local residential roads (e.g. neighbourhoods with a marked lack of sidewalks, proximity to schools, and speeding issues etc.).

Another approach is to ensure all roads at least have a sidewalk on one side. This scope results in a total of $29.7M, or $1.75M per year, (in 2013 dollars) over the 2031 horizon. However, a busier street with sidewalks on one side may identify a higher need and priority over a local street with no sidewalks.

Instead, it should be recognized that the Sidewalk Retrofit Program requires an on-going investment to realize the ultimate long-term objective to provide sidewalks on both sides of the road for all streets. As a first step, arterial and collector roads with no sidewalks on both sides of the road may form the preliminary list of projects as part of the Sidewalk Retrofit Program (the priority assessment is the second step).

Arterial and collector roads with sidewalks only on one side may be added to the preliminary list when:

- There is a request from the public; or
- At least, two criteria factor indicates a significant need for sidewalks.

Projects on local roads may be added to the preliminary list when:

- There is a request from the public; or
- There are no sidewalks on both sides AND at least one other criteria factor indicates a significant need for sidewalks.

It is recommended that the City use a points-based priority framework to guide the funding allotment and implementation of the Sidewalk Retrofit Program. The third step of the process is to refine the proposed list of sidewalk retrofit projects based on other constraints. The priority framework itself only provides an assessment of pedestrian needs (i.e. safety and comfort, demand and access to transit). However, other considerations will be important in implementing sidewalk retrofits such as project feasibility and costs, as well as potential alignment with redevelopment or other capital projects. Similar to the Capital Works Program, an annual or 10-year list of sidewalk retrofit projects may be developed by City staff based on the priority framework and other constraints identified through infrastructure management.

The extent of the proposed program will depend on the annual budget allotted by the City to address sidewalk retrofit projects. Exhibit 14 provides an estimated scope of the Sidewalk Retrofit Program based on several budget scenarios. The allocated budget relies on the level of commitment by the City to the Sidewalk Retrofit Program and available resources. This budget can be determined in consultation with appropriate City departments and/or as part of a Sidewalk Master Plan.

Exhibit 14: Example Annual Budget and Scope of Sidewalk Retrofit Program

Annual Budget	Potential Length of Retrofitted Sidewalks
$100,000	250 m to 500 m
$250,000	700 m to 1.2 km
$500,000	1.4 km to 2.5 km
$800,000	2.3 km to 4.0 km

It is recommended that the City allocate a designated annual fund for the Sidewalk Retrofit Program and that a points-based priority framework is used to guide the allotment to individual sidewalk retrofit projects. Step one of the implementation plan is to develop a list of projects for the Sidewalk Retrofit Program based on existing arterial and collector roads where sidewalks are missing on both sides. Additional projects may be added to this list if requested by the public or other issues are identified. Step two is to apply the priority framework. Step three is to refine the list of proposed sidewalks retrofit projects based on other constraints in infrastructure management.

1.5.2 BIKEWAYS AND TRAILS NETWORK IMPLEMENTATION PLAN

Exhibit 15 shows the total length and estimated costs of the proposed facilities in the network. The total estimated costs is $11.1M (2013 dollars) to implement 72.1km of new bikeways, 25.7km of upgraded facilities on existing routes, and 23.5km of new off-road trails.

Appendix B lists proposed projects by phase and estimated cost (in 2013 dollars).

Appendix C lists the unit costs used to prepare the estimated costs.

Map 3 illustrates the recommended phasing and implementation plan for the Bikeways and Trails Network. Several factors were critical in developing the phasing and implementation. Priority of the proposed routes were assessed based on: the lack of safe and comfortable routes for cycling in surrounding area, its ability to connect isolated communities, its ability to attract a wider range of the potential cyclists, project complexity, estimated costs and timing of related road improvement projects.

Exhibit 15: Summary of Proposed Facilities in Bikeways and Trails Network

Bikeway or Trail Facility	Proposed (km)		Costs ($000)
On-road Bikeway (centreline length)	**97.8**	**$**	**6,194**
Bike Lanes	33.6	$	3,777
Buffered Bike Lanes	4.1	$	1,440
Bike Priority Street	12.7	$	480
Super Sharrow	1.5	$	39
Marked Shared Use Lanes	45.9	$	458
Off-road Trail (total length)	**23.5**	**$**	**4,932**
Boulevard Trails (adjacent to roadway)	18.5	$	4,068
Shared-Use Trail (non-roadway corridor)	2.9	$	736
Bikeway or trail connection	2.1	$	128
Total		**$**	**11,125**

There are three (3) phases to implement the proposed Bikeways and Trails Network:

1. **Short-term (0 to 5 years):** Routes included in this phase represent those that provide a critical link to connect all areas of the City and to provide a core network that connects to key activity areas such as downtown. There is some emphasis to routes that can be quickly implemented such as marked shared lanes on residential streets and roads with excess capacity (i.e. by restriping the road with bike lanes). Projects related to a road improvement were phased according to the proposed road improvement project.

2. **Medium-term (5 to 10 years):** Routes in this phase represent those that complement the core network of existing / short-term routes. It may also include other critical links that are higher costs or require a more detailed analysis to implement. Examples are routes that require widening or road reconfiguration on arterial roads to accommodate on-street facilities. Projects related to a road improvement were phased according to the proposed road improvement project.

3. **Long-term (10+ years):** Routes in this phase represent remaining links that will enhance the Bikeways and Trails Network. Some routes may represent a lower priority; however some routes are anticipated over the long-term due to other restrictions such as necessary coordination with other municipalities, project complexity, and estimated costs. Projects related to a road improvement were phased according to the proposed road improvement project.

Exhibit 16 and Exhibit 17 summarize the length and costs of the proposed Bikeways and Trails Network, respectively.

Exhibit 16: Summary by Length of proposed Bikeway and Trails Network by Phase

Bikeway or Trail Facility	Total (km)	Short-term: 0 to 5 years	Medium-term: 5 to 10 years	Long-term: 10+ years
On-road Bikeway (centreline length)	**97.8**	**32.1**	**39.0**	**26.7**
Bike Lanes	33.6	10.6	17.3	5.8
Buffered Bike Lanes	4.1	2.0	-	2.1
Bike Priority Street	12.6	5.4	4.5	2.7
Super Sharrow	1.5	1.5	-	-
Marked Shared Use Lanes	45.9	12.6	17.3	16.0
Off-road Trail (total length)	**23.5**	**7.1**	**3.2**	**13.2**
Boulevard Trails (adjacent to roadway)	18.5	6.4	2.0	10.1
Shared-Use Trail (non-roadway corridor)	2.9	0.7	0.8	1.5
Bikeway or trail connection	2.1	-	0.5	1.6

Exhibit 17: Cost Summary of proposed Bikeways and Trails Network by Phase

Bikeway or Trail Facility	Costs ($ 000)	Short-term: 0 to 5 years	Medium-term: 5 to 10 years	Long-term: 10+ years
On-road Bikeway (centreline length)	**$ 6,193**	**$ 1,153**	**$ 2,357**	**$ 2,683**
Bike Lanes	$ 3,777	$ 668	$ 2,015	$ 1,094
Buffered Bike Lanes	$ 1,439	$ 114		$ 1,325
Bike Priority Street	$ 480	$ 206	$ 170	$ 104
Super Sharrow	$ 39	$ 39	-	-
Marked Shared Use Lanes	$ 458	$ 126	$ 172	$ 160
Off-road Trail (total length)	**$ 4,932**	**$ 1,578**	**$ 646**	**$ 2,708**
Boulevard Trails (adjacent to roadway)	$ 4,068	$ 1,400	$ 437	$ 2,231
Shared-Use Trail (non-roadway corridor)	$ 736	$ 178	$ 194	$ 364
Bikeway or trail connection	$ 128	-	$ 15	$ 113
Total	**$ 11,125**	**$ 2,731**	**$ 3,003**	**$ 5,391**

It is recommended that the City implement the proposed Bikeways and Trails Network according to the Phasing and Implementation Plan. There are three (3) phases of the implementation plan. In the short-term, the plan proposes to build 32.1km of on-street bikeways and 7.1km of trails. In the medium-term, the plan proposes to build 39.0km of on-street bikeways and 3.2km of trails. In the long-term, the plan proposes to build 26.7km of on-street bikeways and 13.2km of trails.

The estimated cost to implement the network is $11.1M (in 2013 dollars) to build a total of 72.1km of new bikeways, 25.7km of upgraded facilities on existing routes, and 23.5km of new off-road trails over the 2031 horizon.

1.5.3 SIDEWALK POLICY

It is recommended that the City revise the Sidewalk Policy to reflect the proposed Sidewalk Retrofit Program and points-based priority framework. The priority framework eliminates the need for petitions from the public to identify projects for retrofitted sidewalks. Instead, the City may take a proactive approach to identify and pursue retrofitted sidewalk projects. The City may continue to receive requests from the public for projects on local roads and document support from the community. However, the assessment of pedestrian need will be based on the priority framework instead of relying on public engagement. Further review of the Sidewalk Policy is subject to the proposed Sidewalk Master Plan.

1.5.4 TRAFFIC CALMING POLICY

It is recommended that the City revise the Traffic Calming policy to:

- Include an exception for pedestrians and cyclists in reference to discouraging non-local traffic and reducing traffic volumes;
- Recognize the mutually beneficial role of traffic calming and 'Bike Priority Streets';
- Update the Priority Ranking to emphasize (i.e. assign more points for) the lack of sidewalks on one or both sides of the street; and
- Update the Priority Ranking to include (i.e. assign points for) the location adjacent to an existing or proposed 'Bike Priority Street'.

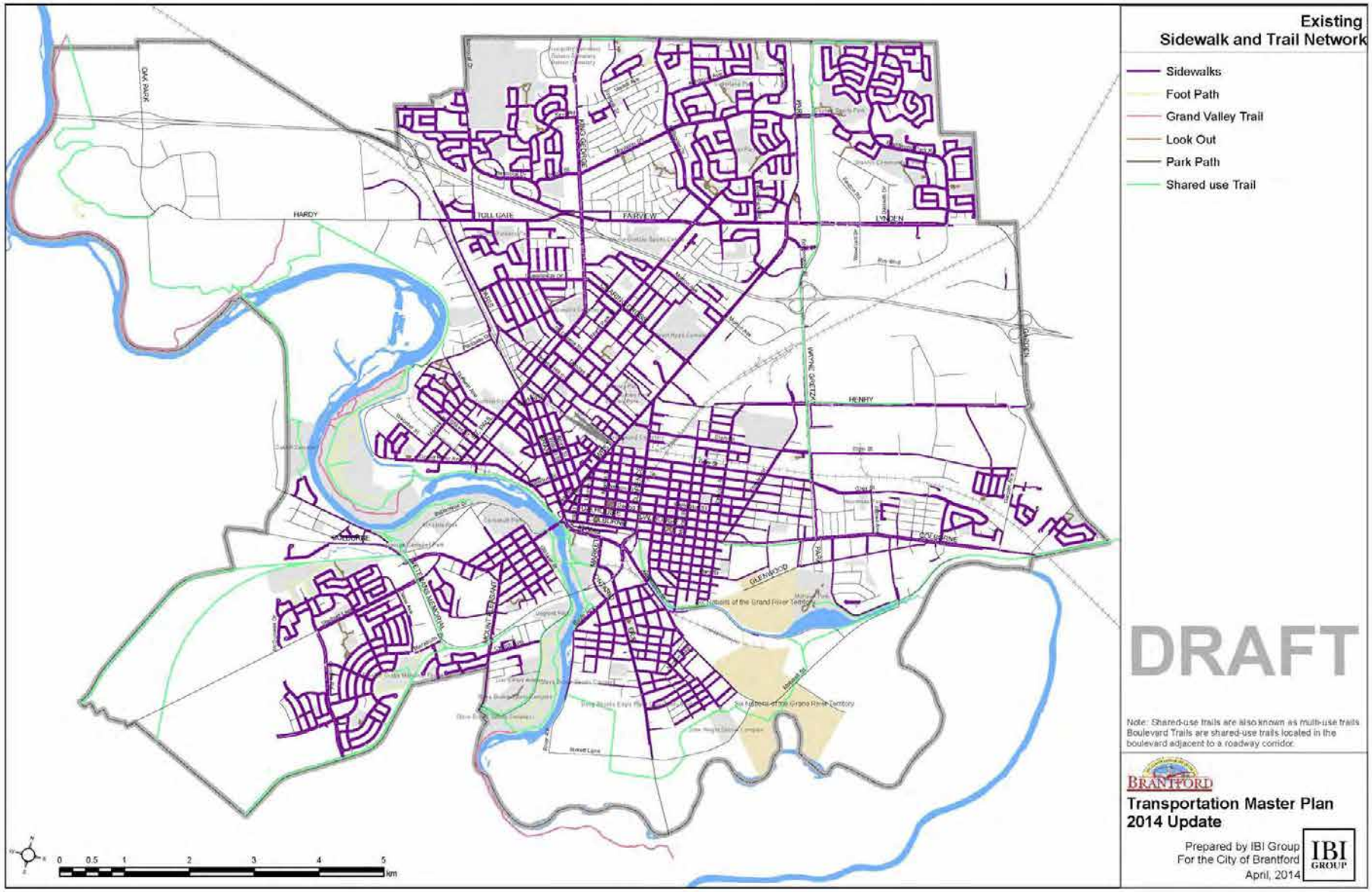
1.5.5 TRANSPORTATION IMPACT STUDY GUIDELINES

It is recommended that the City revise the Transportation Impact Study Guidelines to:

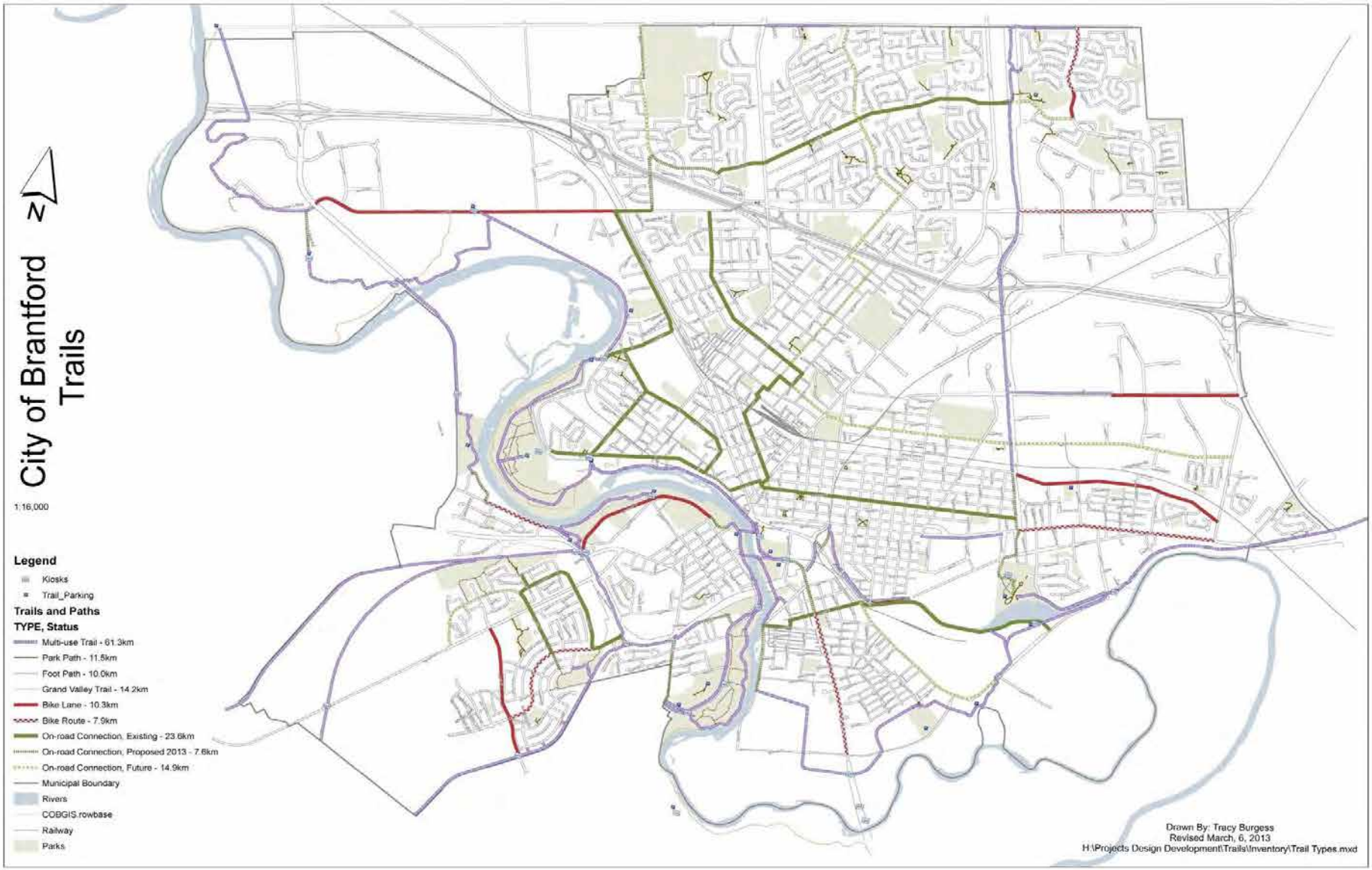
- Recognize the existing and proposed Bikeways and Trail Network as part of the transportation system;
- Include an evaluation or estimate of the level of pedestrian and cycling activity including the surrounding area and on the proposed site;
- Include recommendations to address access for cyclists as well as pedestrians; and
- Ensure all references of "Traffic Impact Study" are replaced with "Transportation Impact Study" to reflect the intended multi-modal nature of the transportation system.

City of Brantford
ACTIVE TRANSPORTATION STRATEGY FOR THE
2014 TRANSPORTATION MASTER PLAN UPDATE

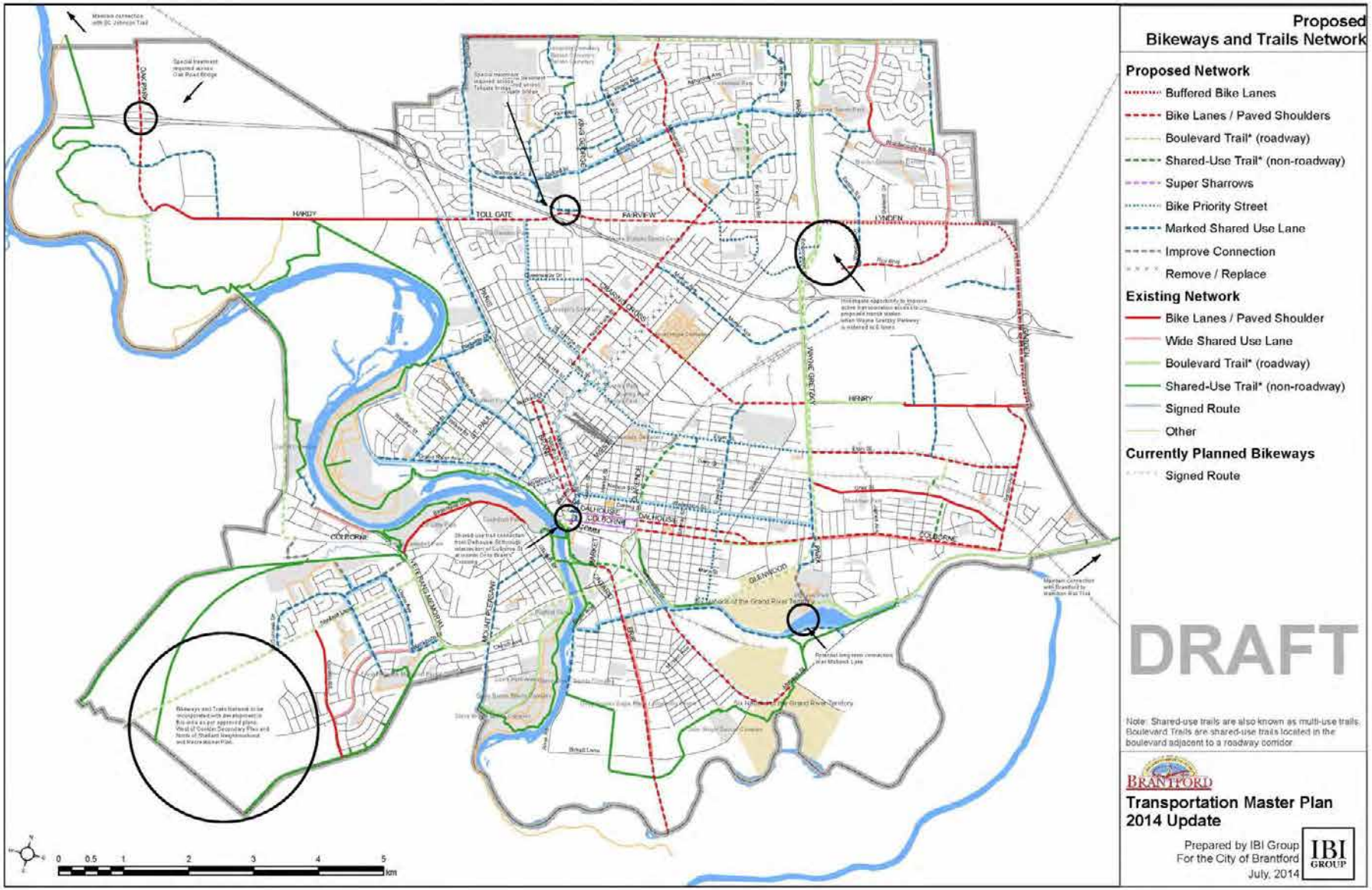
Map 1: Existing Sidewalks in Brantford



Map 2: Existing Bikeways and Trails Network



Map 3: Proposed Bikeways and Trails Network



APPENDIX 1: UNIT COSTS

Bikeway or Trail Facility	Unit Costs (per km)	Comments
Bike Lanes		
New bike lanes as part of road widening or new road	$ 460,000	Additional cost of design, asphalt, granular, base, markings and signage. Assumes road project pays for curbs, catch basin leads, and road pavement structure. (If no additional pavement required, cost for painting and signage only would be $10,000)
Retrofit bike lanes on one-way street (reconfigure 4 or 3 lane road)	$ 11,000	Repainting only (include removal of existing lines and turn lane arrows, repainting of line markings, addition of bike lane symbol ever 200m and bike lane signs ever 300m). Note that any proposed on-street facility that involves the reconfiguration of the roadway will require an analysis of potential impacts to traffic operation.
Retrofit bike lanes on one-way street (reconfigure 4 or 3 lane road)	$ 26,000	
Retrofit bike lanes on 4-lane road (reconfigure to 2 through lanes and	$ 43,000	
Retrofit bike lanes on 5-lane road (reconfigure to narrow lanes or remove median lane)	$ 49,000	
Widen to add bike lanes as part of resurfacing or reconstruction	$ 210,000	Additional cost of design, asphalt, granular, base, markings and signage. Assumes adequate base does not exists (i.e. no additional width of depth required)
Buffered Bike Lanes		
New bike lanes as part of road widening or new road	$ 620,000	Additional cost of design, asphalt, granular, base, markings and signage. Assumes road project pays for curbs, catch basin leads, and road pavement structure. (If no additional pavement required, cost for painting and signage only would be $20,000)
Retrofit bike lanes on 5-lane road (reconfigure to narrow lanes or remove median lane)	$ 57,000	Repainting only (include removal of existing lines and turn lane arrows, repainting of line markings, addition of bike lane symbol ever 200m and bike lane signs ever 300m)
Widen to add buffered bike lanes as part of resurfacing or reconstruction	$ 280,000	Additional cost of design, asphalt, granular, base, markings and signage. Assumes adequate base does not exists (i.e. no additional width of depth required)
Bike Priority Street		
Retrofit and existing road with "sharrow" pavement markings, signage and other treatments	$ 38,000	Cost of bike priority streets can range from low to high depending on range of priority treatments. This estimate assumes same elements as retrofit shared use bikeways, bike detection or other crossing treatments at major intersections.
Super Sharrows		
Retrofit and existing road with "sharrow" pavement markings, green thermoplastic box, and signage	$ 26,000	Assumes bicycle and double chevron and green thermoplastic box every 75m and "Share the road" signs every 300m
Marked Shared Use Lanes		
Retrofit an existing road with "sharrow" pavement markings and signage	$ 10,000	Assumes bicycle and double chevron every 75m and "Share the road" signs every 300m
Boulevard Trail		
Construct a new 3.0m wide asphalt trail adjacent to roadway	$ 220,000	Costs of excavation, granular, asphalt, restoration, design and crossing treatments at major intersections.
Shared-Use Trail or Improved Bikeway/Trail Connection		
Construct a new 3.0m wide asphalt trail in boulevard or non-roadway corridor	$ 250,000	Costs of excavation, granular, asphalt, restoration, design and crossing treatments across roadways.

APPENDIX 2: BIKEWAY & TRAIL PROJECTS

STREET	FROM	TO	LENGTH	2014 TMP UPDATE Proposed Facility	TIMEFRAME
Group 1: Upgrade existing and (previously) proposed signed routes with improved bike facilities such as marked shared-use lanes, bike priority streets or bike lanes, as appropriate. The best practices to date recognize that a cycling and trail network should provide a clear, well-defined and comfortable environment for all anticipated users. These proposed upgrades to signed routes are focused on creating a more comfortable experience for a wider range of potential cyclists with different skills and comfort levels.					
Ava Avenue	Hardy Road	Parkside Drive / Brant Street	1.5 km	Marked shared use lanes (existing signed route)	In 5 years
Albion Street / William Street	Church Street	Bedford Street	1.1 km 1.2 km	Remove / replace existing signed route on Pearl Street to Niagara Street with bike lanes on this one-way couplet	In 5 years
Balmoral Street	Powerline Road	Oxford Street	1.2 km	Marked shared use lanes (existing signed route)	In 5 years
Dunsdon Street / Oxford Street	King George Street Balmoral Drive	Brantwood Park Road King George Street	1.6 km	Marked shared use lanes (existing signed route)	In 5 years
Erie Avenue	Cayuga Avenue	Market Street	1.1 km	Bike lanes (2014 planned signed route)	In 5 years
Memorial Drive / Baxter's Street / Fallingford Drive / Edmond Street	North Park Street	Wayne Gretzky Parkway	2.1 km	Bike priority Street	In 5 years
Mount Pleasant Street	Veteran's Memorial Parkway	Richardson Street	0.6 km	Marked shared use lanes	In 5 years
Oak Park Road	Hardy Road	SC Johnson Trail	0.5 km	Marked shared use lanes (2014 planned signed route)	In 5 years
Wellington Street	Church Street	Park Road South	2.7 km	Bike priority street	In 5 years
Blackburn Drive	Diana Avenue	Veteran's Memorial Parkway	0.3 km	Marked shared use lanes (existing signed route)	5 to 10 years
Dundas Street	North Park Street	West Street	1.1 km	Bike priority street (2014 planned signed route from Sydeham to West)	5 to 10 years
Elgin Street	Wayne Gretzky Parkway	Garden Avenue	1.3 km	Bike lanes (2014 planned signed route)	5 to 10 years
Ewing Drive	Balmoral Drive	Toll Gate Road	0.5 km	Marked shared use lanes (2014 planned signed route)	5 to 10 years
Greenwich Street	Greenwich Street	Greenwich Street	2.2 km	Marked shared use lanes (existing signed route)	5 to 10 years
Memorial Drive	North Park Street	Powerline Road	2.1 km	Bike lanes as part of road reconfigurations from 4 to 3 lanes, or 4 to 2 lanes with designated parking (planned signed route)	5 to 10 years
Mount Pleasant Street	Gilkison Street	Veteran's Memorial Parkway	0.7 km	Marked shared use lanes (2014 planned signed route)	5 to 10 years
Flanders Drive	McGuiness Drive	Franklin Grobb Memorial Forsest	1.9 km	Marked shared use lane (existing signed route)	5 to 10 years
Park Road South / Glenwood Drive	Grey Street	south of Mohawk Park	1.1 km	Marked shared use lanes (2014 planned signed route) Potential long-term connection over Mohawk Lake to Greenwich Street	5 to 10 years
River Road	Strathcona Avenue	Grand River Trail	0.8 km	Marked shared use lanes (2014 planned signed route)	5 to 10 years
St. George Street	Toll Gate Road	North Park Street	1.6 km	Bike priority street (existing signed route)	5 to 10 years
Strathcona Avenue / Forest Street / Cayuga Street	River Street	Mohawk Street	1.1 km	Marked shaerd use lanes (existing signed route)	5 to 10 years
Diana Avenue	Shellard Lane	Blackburn Drive	0.7 km	Marked shared use lanes (existing signed route)	10 to 20 years
Dufferin Avenue	Parkside Drive	Grand River Avenue	1.6 km	Marked shared use lanes (existing signed route)	10 to 20 years
Elgin Street	West Street	Wayne Gretzky	1.1 km	Bike priority street (2014 planned signed route)	10 to 20 years
Grand River Avenue	Waterworks Park Trail	Dufferin Avenue	1.7 km	Marked shared use lanes (existing signed route)	10 to 20 years

STREET	FROM	TO	LENGTH	2014 TMP UPDATE Proposed Facility	TIMEFRAME
Kerr-Shaver Terrace	Oak Hill Trail	Oakhill Drive	0.3 km	Marked shared use lanes (2014 planned signed route)	10 to 20 years
McGuiness Drive	Shellard Lane	St. Patrick's Drive	1.9 km	Marked shared use lanes (2014 planned signed route)	10 to 20 years
Mohawk Street	Greenwich Street	Morrison Road	2.0 km	Bike lanes (2014 planned signed route, previously proposed as wide curb lane)	10 to 20 years
Morrel Street	Grand River	Dufferin Avenue	0.9 km	Marked shared use lanes (existing signed route)	10 to 20 years
Morton Avenue	North Park Street	east terminus	2.3 km		10 to 20 years
St. Patrick's Drive	Flanders Drive	Diana Avenue	0.7 km	Marked shared use lanes (existing signed route)	10 to 20 years
Group 2: Upgrade existing and (previosuly) proposed wide curb lanes on multi-lane / arterial roads to bike facilities with designated space for cyclists. The best practices to date recognize that the interaction between cyclists and motorists is less comfortable when they are required to share space along a street with higher speed and volume. At minimum, designated space allows for separation between cyclists and motorists and is generally more appropriate in these conditions.					
Colborne Road	Wayne Gretzky Parkway	Garden Avenue	2.1 km	Bike lanes as part of road reconfigurations from 5 to 3 lanes (existing wide shared use lanes)	In 5 years
Erie Avenue	Birkett Lane	Cayuga Street	2.3 km	Bike lanes (existing wide shared use lanes)	In 5 years
Fairview Road	King George Street	West Street	2.7 km	Bike lanes as part of road reconfigurations from 4 to 3 lanes (existing wide shared use lanes)	In 5 years
Lynden Road	West Street	Garden Avenue	3.4 km	Buffered bike lanes as par of road reconfiguration from 5 lanes to 4 lanes (subject to safety and collision history analysis) or road widening	In 5 years
Tollgate Road	Paris Road	King George Road	1.2 km	Bike lanes as part of road reconfiguration from 4 to 3 lanes, except at	In 5 years
Group 3: Develop new facilities to accommodate both walking and cycling as part of the proposed road network improvements. Road improvement projects provide a big opportunity to design a corridor appropriately for all users. The proposed AT facilities along these corridors are based on a context-sensitive approach of the corridor.					
Clarence Street	Greenwich Street	Elgin Street	1.5 km	Multi-use trail along converted rail corridor (north of Dalhousie Street)	In 5 years
Shellard Lane	City boundary	Veteran's Memorial Parkway	3.3 km	Multi-use trail on north side (and sidewalk on south side)	In 5 years
Veteran's Memorial Parkway	Mount Pleasant Road	Wayne Gretzky Parkway	1	Bike lanes and multi-use trail on south side as part of 4-lane road widening and extension	In 5 years
Henry Street Road Extension	West Street	Wayne Gretzky Parkway	1.5 km	Bike lanes as part of road extension	5 to 10 years
Oak Park Road Extension over the Grand River	Hardy Road	Colborne Road	1.4 km	Bike lanes as part of 4-lane widening and extension	5 to 10 years
Wayne Gretzky Parkway	Colborne Street	Lynden Road	3.6 km	Multi-use trail on the east side as part of 6-lane widening	10 to 20 years
Group 4: Modify existing and proposed routes, or add new cycling facilities, as separate active transportation projects. The best practices to date recognize that people prefer comfortable, direct and continuous connections. Cycling routes located on out-of-the-way side streets navigate along indirect and inconvenient routes. The proposed modified or new routes are intended to replace routes. However, it is important that existing routes should not be removed or planned routed should not be cancelled until a near-by alternative route is established.					
Adams Boulevard / Middleton Street	Elgin Street	Henry Street (loop)	2.0 km	Add marked shared use lanes	10 to 20 years
Brant Street	Ava Street	St. Paul Avenue	0.7 km	Add multi-use trail on west side	In 5 years
Buchanan Crescent / Easton Road / Woodyatt Drive	Dunsdon Street	neighbourhood park trail	1.4 km	Add marked shared use lanes	5 to 10 years

STREET	FROM	TO	LENGTH	2014 TMP UPDATE Proposed Facility	TIMEFRAME
Charing Cross Street	King George Street	West Street	1.6 km	Change proposed multi-use trail to bike lanes and extend to North Park Street	5 to 10 years
Charlotte Street	Dalhousie Street	Colborne Road	0.1 km	Add marked shared use lanes	In 5 years
Colbourne Street / Dalhousie Street	Clarence Street	Colborne Road	2.0 km 1.3 km	Add bike lanes on one-way couplet	5 to 10 years
Colbourne Street / Dalhousie Street	King Street	Clarence Street	0.8 km 0.7 km	Add super sharrows in downtown core	In 5 years
Dundas Street	Clarence Street	North Park Street	1.1 km	Remove / replace signed routes on St. George (north of North Park Street) with bike priority street on Dundas Street	10 to 20 years
East Hydro Corridor	Brantwood Park	Powerline Road	1.0 km	Change proposed multi-use trail in East Hydro Corridor (northeast area) to a combined marked shared use lanes and multi-use trail via Hackney Ridge / Ludlow Crescent / Dante Crescent / Coulbeck Road	10 to 20 years
Fen Ridge Court / Ferrero Boulevard	Northwest trail	Hardy Road	2.2 km	Add marked shared use lanes	5 to 10 years
Francis Street / White Oak Boulevard	Dunsdon Street	Powerline Road	1.5 km	Add marked shared use lanes	10 to 20 years
Forsythe Avenue	King George Road	Francis Street	0.5 km	Add marked shared use lanes	10 to 20 years
Garden Avenue	Lyden Road	Henry Street	2.0 km	Add paved shoulders and/or bike lanes	10 to 20 years
Garden Avenue	Henry Street	Colborne Road	1.8 km	Add paved shoulders and/or bike lanes	5 to 10 years
Henry Street	West Street	Wayne Gretzky Parkway	1.5 km	Add bike lanes as part of road extension	5 to 10 years
Kent Road / Summerhayes Crescent	Balmoral Drive	Powerline Road (via Olivetree Road and Casson Lane)	2.8 km	Add marked shared use lanes	In 5 years
McMurray Street / Wells Avenue	Albion Street / Bedford Street	North Park Street	0.6 km	Remove/replace indirect signed route on Niagara Street / Broad Street / Grand Street with: bike priority street	In 5 years
North Park Street	Dundas Street Morton Avenue	Morton Avenue Memorial Drive	2.4 km	Add bike lanes as part of road reconfiguration from 4 to 3 lanes and change from signed route to bike lanes	In 5 years
North Park Street / Blackfriar Road	Memorial Drive North Park Street	Blackfriar Road Park Street	0.4 km 0.9 km	Change to marked shared use lane to North Park Street Add marked shared use lanes on Blackfriar Road	5 to 10 years
Oak Park Road	City boundary	Highway 403	1.0 km	Add bike lanes as part of reconstruction / resurfacing	10 to 20 years
Oak Park Road	Highway 403	Hardy Road	1.0 km	Add bike lanes as part of reconstruction / resurfacing	5 to 10 years
Palmerstone Avenue / St. Paul Avenue / St. James Street	Brant Street	Albion / William	0.7 km	Add marked shared use lanes Connect multi-use trail	In 5 years
Powerline Road	Balmoral Drive King George Road	King George Street Coulbeck Road	1.3 km 2.4 km	Maintain paved shoulder / bike lanes Maintain multi-use trail as a long-term opportunity	10 to 20 years

STREET	FROM	TO	LENGTH	2014 TMP UPDATE Proposed Facility	TIMEFRAME
Queensway Drive	St. George Street	King George Road	0.6 km	Add bike priority street	5 to 10 years
Rawden Street	Mohawk Canal Trail	Henry Street	2.5 km	Add bike priority street	5 to 10 years
Roy Boulevard	Woodyatt Drive	Lyden Drive	2.2 km	Add bike lanes	10 to 20 years
Sinclair Boulevard	Garden Avenue	west terminus	0.8 km	Add marked shared use lanes	10 to 20 years
Somerset Road	Balmoral Drive	King George	0.7 km	Add marked shared use lanes, connection to Fairview Road	In 5 years
Strathcona Avenue / Cayuga Street	River Street	Greenwich Street	1.5 km	Add marked shared use lanes	5 to 10 years
Waterloo Street	Grand River Avenue	Albion Street	0.4 km	Remove / replace signed route on Church Street (which is one-way westbound) with a marked shared use lane	5 to 10 years
Varadi Avenue	King George Road	Francis Street	0.3 km	Add marked shared use lanes	5 to 10 years
CN Rail Trail #1	south of Icomm Drive Bruce Street	Bruce Street Elgin Street	1.5 km 0.3 km	Convert to multi-use trail adjacent Clarence Street Add marked shared use lanes via Murrary Street	In 5 years
CN Rail Trail #2	Greenwich Street		1.1 km	Convert to multi-use trail south of Greenwich Street	5 to 10 years
CN Rail Trail #3	Waterworks Park Trail	Grand River Avenue / Dikes Trail	1.5 km	Convert to multi-use trail north of Webster Street	10 to 20 years