Draft - September 2019



City of Brockville Active Transportation Plan



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Acknowledgements

Thank you to the following stakeholders for their involvement on this plan: Brockville Cycling Advisory Committee Brock Trail Committee Leeds Grenville and Lanark District Health Unit Residents of Brockville

Cover photo by Doug George

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Executive Summary

The City of Brockville Active Transportation Plan recommends initiatives, improvements, and new infrastructure facilities in the City of Brockville to support and encourage residents and visitors to walk and cycle as a feasible, convenient, and attractive way to get around the community. The plan is a long-term planning document, with recommendations for short-term (0-5 year), mid-term (5-10 year), and long-term (10-20+ year) implementation.

The City's compact urban form means that everyday destinations are not more than 8 kilometres away, making active transportation an easy way to get where you need to go. Despite this, only around 1% of people bike to work, and 11% of people walk. The city already has an extensive network of pedestrian facilities, such as sidewalks, but does not have a connected cycling network. The lack of a connected, low stress network of cycling facilities was cited as a top barrier preventing people from cycling in the city.

The plan was developed using best practice from Ontario and North America, with reference to the Transportation Association of Canada Geometric Design Guide for Canadian Roads and the Ontario Traffic Council Book 18: Cycling Facilities. The plan was developed based on best practices and a methodology which considered existing and planned facilities, the existing road network, and feedback from the public.

The public and stakeholders were engaged early on in the process through two pop-up style engagement events and an online platform that allowed people to add their comments to an interactive map. This round of engagement sought feedback on peoples' experiences with and barriers to using active transportation, in order to identify opportunities and challenges for the plan to address. Over 50 people were engaged during the pop-up events and 524 people participated on the online platform during this phase of engagement. A second round of public engagement included one pop-up event at the library, and sought feedback on the draft recommendations to identify any missing recommendations, or where the plan was especially successful at addressing the principles from the network development process. There were 43 responses to the survey, and 70 people attended the pop-up event during this phase.



City of Brockville | Active Transportation Plan

The plan provides a vision of a comprehensive cycling network and pedestrian improvements making active transportation a more attractive and feasible option for people to use as part of everyday life. The recommendations include 42 km of cycling spine routes which are connected, all ages and abilities facilities that reach every part of the City. This is complimented by 39 km of cycling connector routes which include a variety of facilities connecting people to spine routes and additional destinations throughout the City. The plan also includes recommendations for pedestrian network improvements, involving resolving existing gaps in the sidewalk network, pedestrian linkages to transit stops, and designation of enhanced pedestrian corridors, which will have improved pedestrian crossings and an improved public realm.

In addition to these new infrastructure facility recommendations, the plan includes policy recommendations including revisions to current by-laws, as well as new City policies, such as lengthening crossing time at signalized crossings near schools, retirement communities, and hospitals, and lowering speed limits City-wide, recognizing the impact that vehicle speeds have on the severity of pedestrian and cyclist-involved collisions.

Program recommendations in the plan recognize the social component of promoting and encouraging active transportation. The recommendations are split into four groups, Staffing and Funding, Scaling Up, Sprints, and Long Hauls to provide both short-term and longer-term initiatives for the City to pursue to support residents and visitors using active transportation. The recommendations consider the various stakeholders involved in leading and supporting activities such as bike rodeos for youth, distance mapping communication, and an open streets event.



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What is Active Transportation?

Active transportation includes any form of human-powered transportation, such as walking, jogging, cycling, wheeling, in-line skating, skateboarding, or ice skating, utilizing on and off-road facilities (City of Brockville Official Plan). People frequently use active transportation without thinking about it – walking down the street to the post office or a friend's house, or cycling with the family to the waterfront on a sunny Saturday in the summer.



Figure 1. Some examples of different people using active transportation for different purposes

Why is Planning for Active Transportation Important?

The City of Brockville has identified in previous planning studies that active transportation should be encouraged and a network of facilities that provide the opportunity for people to use active transportation should be expanded. Active transportation is important for building a great place to live, work, and play. In addition to being part of the City's vision, active transportation offers important benefits.

Health (Personal and Public)

- Active transportation allows people to be physically active throughout their day, integrated into their schedule
- 69% of Canadian adults and 91% of Canadian children and youth are not getting the recommended levels of daily physical activity (Colley et al. 2011)
- Numerous studies and recent research from across Canada have linked the lack of physical activity as a key contributor to Canada's high (and growing) obesity rates (Bryan and Katzmarzyk, 2011)
- It is estimated that if all Canadians engaged in 60 minutes of physical activity per day, 33% of all deaths related to coronary heart disease, 25% of deaths related to stroke, 20% of deaths related to type 2 diabetes, and 20% of deaths related to hypertension could be avoided (Warburton et al., 2007)
- Using active transportation provides people with more opportunity to be immersed in greenspace, which has positive impacts for an individual's mental health (Litman, 2013)

Access/Equity

- Significant portion of the population does not have access or the ability to drive a car due to age, disability, or economic factors
- Active transportation is a low/no cost way to get around
- People using public transportation most often use active transportation to get to public transit

Environment

- Active transportation has a lower environmental impact
- Increased use of active transportation can lower air and noise pollution compared to driving motor vehicles

Economic

7

- A city's bike-friendliness is a factor for people's decision to move there
- A healthier population has lower health care costs, saving taxpayer money
- People that use active transportation mean business. Numerous studies have identified the economic impacts of people walking and cycling, as well as tourism related economic impacts
- Reduces need for costly road expansion projects













Figure 2. The Brockville waterfront is a popular destination (Photo: Brockville Tourism)

Community Background

The City of Brockville is a small urban municipality on the St. Lawrence River in eastern Ontario. While the City is independent, it is also the county seat of the United Counties of Leeds and Grenville, which surrounds the City. The City is split into north and south areas by Highway 401. There are three roads that cross the highway; Stewart Boulevard, Ormond Street, and North Augusta Road. The Canadian National (CN) and VIA railways also run through the City, with

multiple at-grade crossings along both rail corridors.

The City has modest population and employment growth projections to 2031 of around 1-2%. The percentage of the population over the age of 65 is expected to grow by 7%.

- Population: 21,854 (2016)
- Land area: 20.8 km²
- Population density: 1023.6 residents per km²

Commuting Statistics

The small footprint of the City and dense land use lends itself well for trips to be made by active transportation modes. The longest distance one could travel in the City, from the southwest corner,

at St. Lawrence Park to the northeast corner at

North Augusta Road and Centennial Road is 8 km and at a leisure pace would take 30 minutes to cycle. Most trips would be shorter than this, with many services and amenities located in the central part of the City, as will be further explored in the Demand Analysis section.

- 73% of residents work in the City
- The average commute for residents is 16.1 minutes, which includes work in and outside the City

Commute Mode	Percentage
Car, truck, van - as driver	74.5%
Car, truck, van - as passenger	9.6%
Public transit	1.9%
Walk, bicycle and all other modes	14% (11.2% walk, 1.2% cycle)

Table 1. Commuting mode to work (Statistics Canada, 2016)

It is important to remember that the statistics in Table 1 only consider trips to work. There are many other types of trips people take throughout their daily activities that may be more suitable to use active transportation, such as visiting friends, running errands, or going for an evening walk.



Figure 3. Age groups as percentage of

Relevant Documents and Plans

Official Plan (2012)

The Official Plan refers to active transportation in specific objective under each of its four planning goals:

- A Sustainable, Healthy and Vital City
- An Economically Strong and Diverse City
- A High Quality of City Services and Amenities
- A Well-Planned and Responsive City

These planning goals include objectives that consistently refer to the need to support active transportation options in the City, such as "provide, enhance and encourage active transportation options throughout the City."

Section 5.2.5, Active Transportation Systems, specifically sets out a vision and policy for the city in relation to active transportation. Schedule 5 of the Official Plan shows existing active transportation facilities such as the Brock Trail and Waterfront Trail route, and identifies potential future routes that would create a network for active transportation travel. The text from Section 5.2.5 of the Official Plan and Schedule 5 map are included in Appendix 1 of this plan.

Sustainability Plan (2012)

The City of Brockville Sustainability Plan identifies the need for the City to encourage and increase the opportunity for active transportation throughout the City, including expanding the Brock Trail, increasing walkability, and developing an on-street cycling network. As part of the consultation for this plan, people were asked to rank the priority of various initiatives, of which a Transportation Master Plan (including active transportation) was identified as a priority. The plan acknowledges the creation of the Brock Trail Committee and Cycling Advisory Committee as positive initiatives towards accomplishing active transportation related goals and objectives.

Road Standards

The City of Brockville has standard cross sections for each kind of road within the City's road network. The standards establish the road width and features based on the road classification. Arterial, collector, and subdivision road standards have concrete sidewalks on both sides of the road, setback from the roadway by a boulevard. All the sidewalks in the standards are 1.5m wide. Cycling facilities are not included in the cross-section standards.

By-laws

Traffic By-law

The City's Traffic By-law outlines the City's laws and regulations related to traffic and transportation. The by-law includes definitions for pedestrians, motor vehicles, and vehicles which includes people cycling. The by-law also includes roadway prohibitions such as one-way streets (Section 19), and streets where no trucks are allowed (Section 23).

Parking By-law

The City's Parking By-law outlines laws and regulations related to parking. The by-law includes parking and stopping prohibitions such as the city-wide three-hour parking limit for on-street parking between 7 am and 11 pm (Subsection 81(a)).

The Brock Trail

The Brock Trail is a multi-use trail system that runs along linear parks and roadways from the St. Lawrence River to the northern boundary of the City. The trail system has mostly flat terrain. The Brock Trail Committee is an Ad Hoc Committee of Community Volunteers that was formed in 2011. The committee assists with the development, enhancement, and promotion of the trail system.



Figure 4. Adult and child cycling in Brockville (Photo: Alan Medcalf)

Public Engagement

Engaging with the public was identified as an important process for the development of the Active Transportation Plan. Public input was sought to better understand the experience of people currently using active transportation in Brockville, as well as barriers that discourage or prevent people from using active transportation. To inform the development of the plan, the first round of public engagement ran during the initial stages of the project, from December 2018 to the end of March 2019. A second engagement round sought public feedback on the draft recommendations of the plan from July to August 2019.

To reach a wide range of the public, different outreach methods and platforms were used. The intention of using pop-up style in-person events instead of conventional public meetings was to seek feedback from incidental participants (i.e., people walking by) in addition to participants who are actively involved. The event locations at community facilities supported participation from a broad spectrum of people, including people that may normally not attend public meetings. The event style facilitated deeper interactions with people, by allowing for one on one conversations for over 5 minutes as opposed to only hearing from people who choose to speak at public meetings. This allowed for conversations with people that were nuanced and in-depth to understand the variety of specific concerns people individually had. The in-person events and the online Social Pinpoint platform were promoted through promotional materials, social media and on the City's website, and was covered by the local media.

The following section summarizes the engagement approaches and events from both rounds of engagement. A summary of what was heard from the public during the first round is included in the Existing Conditions chapter. A summary of what was heard during the second round is included in the Network Development chapter. Appendix 2 includes materials used for the engagement and survey results.

First Round of Engagement

How We Engaged

Stakeholder Engagement

Many stakeholder groups were identified early on in the project and targeted to share their ideas and insights on issues related to active transportation in Brockville. Groups included:

- Brockville Cycling Advisory Committee
- Municipal Accessibility Advisory
 Committee
- Brock Trail Committee
- Laurier Citizens Group
- Leeds, Grenville, and Lanark District Health Unit

How do you get around Brockville?



We want to hear from you!

The City of Brockville is completing an Active Transportation Plan, to make walking and cycling around Brockville safer and easier.

To learn more about the plan and share your experiences and ideas, please visit: **www.brockville.com/activetransportation**

Figure 5. Cards were handed out at events and at locations around the city to encourage people to get involved

Pop-Up Events

City staff and members of the consulting team set up pop-up booths at the Winter Classic Alumni Game and at the Brockville Public Library. By setting up at these popular destinations, the project was given a higher profile by people who wouldn't necessarily know about the plan or have attended a dedicated public meeting on it. At the booths, people were asked to share their experiences, identify challenges and opportunities on the existing conditions map, and talk with staff.



Figure 6. Photos from the pop-up events at the library (left) and Memorial Centre (right)

Online Platform

The Social Pinpoint engagement platform was used to organize online engagement. The platform included information on different types of active transportation concepts with photos of examples. People could also place pins on an interactive map with the existing active transportation network. The pins were organized by themes including:

- Where I like to walk or bike to •
- Walking improvement idea
- Cycling improvement idea
- Walking improvement needed
- Cycling improvement needed
- General comment •

People could explain in detail on the pin. People were also able to view other people's pins and comments. People could also complete a survey on the website which prompted people to talk about how they get around Brockville, barriers they experience, and what they think the priorities are for this plan. The pins are presented on Map 1.

The following figure shows the summary statistics for involvement on the Social Pinpoint online platform. The stats show that there was a significant number of people who used the platform compared to other City online engagement efforts. Users spent an average of almost 11 minutes providing comments and engaging with the plan materials.

Stakeholder Engagement Summary



263 Comments

69 **Survey Responses**

Total Visits

655

Avg Time (min)

Figure 7. Summary of engagement on the Social Pinpoint platform



Figure 8. Screen captures from the platform showing various pins and a comment

MAP 1 PUBLIC ENGAGEMENT COMMENTS

BROCKVILLE ACTIVE TRANSPORTATION PLAN

PUBLIC COMMENT PINS

- ★ Where I like to walk or bike to
- Cycling improvement idea
- ▲ Walking improvement idea
- Cycling improvement needed
- ▲ Walking improvement needed
- General Comment

ACTIVE TRANSPORTATION NETWORK

- Brock Trail
- --- Previously Proposed Trail
- Railway Tunnel
- Secondary Trails
- Rail Trail
- Rail Trail Previously Proposed
- Painted Bike Lane
- Connecting Trails

DESTINATIONS

AND BOUNDARIES



- 🕅 Recreational Centres
- Parks

<u>alta</u>

- Waterbodies
- Brockville Boundary



Data provided by the City of Brockville. Map produced July 2019.



Second Round of Engagement

How We Engaged

The consulting team held a drop-in public engagement event on July 23rd, 2019 at the Brockville Public Library from 11 am to 7 pm. Notice about the event was provided on the City's website, in the newspaper, and stakeholders were notified to share the event with their organizations.

At the event, members of the consulting team were available to talk with people about the initial recommendations for the plan and the process used to develop the recommendations. The public was asked to comment on whether the recommendations achieved the principles set out for network development, and communicate their concerns. City staff also attended the event and engaged with the public. During the day, 70 people had discussions with the consulting team or staff. The engagement materials and a follow up survey were posted on the City's website for people that could not attend the event or want to add their feedback through an additional process.

An online survey was open to collect additional feedback until August 16th. The link was made available through the City of Brockville website. The survey received a total of 43 responses. People also submitted additional comments via email to City staff for consideration.



Figure 9. A photo from the July 23rd pop-up at the library

Existing Conditions

Existing Active Transportation Facilities

Brockville's existing active transportation facilities are described in the following section. They are described based on the network that they belong to; the Brock Trail, the sidewalk and walkway network, the cycling network, as well as a description on the existing types of road crossing treatments used in the City. These networks are illustrated on Map 2.

Brock Trail Network

The Brock Trail network is comprised of primary trails, secondary trails, and the railway tunnel. The trail network can be used by people using any active transportation mode, except in the railway tunnel and along the waterfront boardwalk where people are asked to walk their bikes. The Rail Trail is also part of the City's trail network. There are planned extensions to the Brock Trail which are shown on the Existing Conditions map.

At minor crossings, signed and marked pedestrian crossovers have been installed in some areas. Where the trail crosses busier roads,



Figure 10. Railway tunnel

activated pedestrian crossovers have been installed in some locations. While pedestrian crossovers give pedestrians priority, people cycling are required to dismount and walk across the intersection.

The primary Brock Trail network is currently 11.4 km in length with sections along the waterfront, out to St. Lawrence Park in the southwest, through the central part of the city, and north to Centennial Road on the central east side. The primary trail network is comprised of off-road and road adjacent facilities, and crosses roadways with various crossing treatments. The majority of primary trails are asphalt or concrete but there are also brick, wood, and gravel surface primary trails. The trail is not currently lit, but the Brock Trail Committee is working towards installing lighting on a section of the trail. The committee has also identified locations along the trail that are barriers to the accessibility of the trail. The trail is not currently cleared in the winter.

Secondary trails are short extensions or spurs that feed into the primary trails in the network. There are currently 1.4 km of secondary trails, which are all located south of Highway 401. Most secondary trails have an asphalt surface.

The Railway Tunnel is pedestrian pathway in a tunnel that formerly operated as a railway tunnel, and has historic importance as Canada's first railway tunnel. The tunnel is 525 m in length, travelling from the waterfront to just north of Pearl Street West. Primary trails connect to either end of the tunnel. The tunnel is closed during the winter.

The Rail trail is a narrow, dirt surface trail that connects to the primary trail at the railway tunnel and travels 520 m east on the south side of the CN railway to Ormond Street. The trail developed through cooperation with CN, by formalizing a well- Figure 11. Rail trail used path.



Sidewalk and Walkway Network

The City has an existing comprehensive sidewalk network, with around 108 km of sidewalk facilities. Most roads have sidewalks on both sides, but there are some main roads that only have sidewalks on one side of the road, such as North Augusta Road. Some areas of the City have no sidewalks, especially on the east side of the City and in the John G. Broome Industrial Park in the northeast corner of the City.

The City also maintains a network of pedestrian walkways, which are off-road paths that generally provide access between two roads that do not connect or to destinations such as parks or schools. There are currently 2.4 km of walkways across the City, with a many of them located in the north part of the City between Stewart Boulevard and Windsor Drive.

Cycling Network

The City currently has one unbuffered painted bike lane that is under 800 m in length on King Street West from the western boundary to Rivers Avenue, connecting with the Brock Trail network. The City has also applied sharrow markings on a section of Water Street. Both these segments are part of the Waterfront Trail route, which travels across Ontario.

Network	Total Centreline Kilometres of Existing Infrastructure
Road	145.9
Sidewalk and Walkway	108.2
Brock Trail	13.8
Cycling	0.8

Table 2. Comparison of the length of Brockville's transportation networks

MAP 2 **EXISTING CONDITIONS**

BROCKVILLE ACTIVE TRANSPORTATION PLAN

ACTIVE TRANSPORTATION NETWORK

- Brock Trail
- --- Previously Proposed Trail
- Railway Tunnel
- Secondary Trails
- Rail Trail
- Rail Trail Previously Proposed
- Painted Bike Lane
- Sidewalks and Walkways
- Connecting Trails

ROAD AND RAIL NETWORK

- Highway
- Arterial Street
- Local Street
- Railway

DESTINATIONS AND BOUNDARIES

- School
- College or Private School
- **&** Recreation Centre
- Library
- General Hospital
- Retirement Community
- Parks
- Waterbodies
- Brockville Boundary



12 MIN WALK

<u>alta</u> Data provided by the City of Brockville. Map produced July 2019.



Crossings

The City has installed a number of pedestrian crossover (PXO) crossings along the Brock Trail. At PXOs, if a person is present, vehicles on the roadway must yield to the person crossing. There are different types of PXOs that are suitable for crossing different types of roadways. Some PXOs only have signage and pavement markings, while others such as the one at King Street West and Rivers Avenue also have an activated beacon for a person to press when they are crossing.

Many crossing locations in Brockville only have warning indicator signage (Figure 14). The signage is intended to alert people driving to expect people crossing. This signage does not give priority to people walking and cycling. Some crossings do not have pavement markings, so it is hard to identify where people are expected to cross the road.



Figure 12. Actuated pedestrian crossover (PXO) (Photo: Alan Medcalf)



Figure 13. Signed pedestrian crossover (PXO) (Photo: Conal Cosgrove)



Figure 14. Crossing warning signage on the Brock Trail at Brock Street

Existing Conditions Analysis

In order to plan and develop a successful network of well used active transportation facilities, the facilities need to connect to where people are going, and be attractive for use by a majority of the population. The following Demand and Level of Traffic Stress analyses consider the existing conditions that have a significant impact on the usage of active transportation facilities in order to leverage future investment.

Demand

Demand is illustrated on Map 3, representing where people live, work (or go to school), shop, play, and access transit. The map was developed by synthesizing population density, zoning, and land use data and defining areas based on the intensity of activities that are in that area. Key destinations and the existing active transportation network are overlaid on top. This allows for a comparison of how the existing active transportation network serves areas of demand. The map shows considerable gaps between areas of high population density, destinations, and the existing network.

In the downtown and south end, the Brock Trail can be used to help people travel closer to their destination, and the sidewalk network is well connected to help people travel throughout the area. At present, there are no cycling facilities for people to travel from the Brock Trail to destinations. The east end is particularly underserved, while there are schools, the hospital and other destinations.

In the north end, the majority of the population lives west of the Brock Trail. Schools are spread out west of Windsor Drive, with Ange-Gabriel on Kensington Parkway, St. John Bosco at Laurier and Windsor, Vanier on Vanier Drive, and Thousand Islands SS on Parkedale. Many major destinations are centred along Parkedale Avenue, including St. Lawrence College and Thousand Islands Mall. The industrial park east of the Brock Trail was identified as a popular destination for shopping and workplaces. There are no sidewalk facilities in the industrial park to support pedestrian travel. There are no east-west cycling facilities to support travel across

Where people live Where people play Where people shop Where people learn Where people work Where people take transit

travel.

Brock

facilitates

the north end, or to the

Trail,

which

north-south

Figure 15. Icons summarizing places that generate demand

Where is the demand?

MAP 3 LIVE, WORK, SHOP, PLAY DEMAND

BROCKVILLE ACTIVE TRANSPORTATION PLAN

LEVEL OF DEMAND



ACTIVE TRANSPORTATION NETWORK

- Brock Trail Primary
- Brock Trail Secondary
- Railway Tunnel
- Rail Trail
- Sidewalk or Walkway
- Painted Bike Lane
- Surrounding Trails

DESTINATIONS AND BOUNDARIES

- School
- College or Private School
- 🚺 Recreation Centre
- Library
- General Hospital
- Retirement Community
- Waterbodies
- Brockville Boundary



0 500 1,000 4 MIN BIKE 12 MIN WALK





Cycling Level of Traffic Stress

The cycling level of traffic stress (LTS) analysis summarizes the experience of cycling on roads based on the posted speed limit, number of lanes, and presence of existing cycling facilities. The LTS analysis considers these variables, with an output score for every road. The scores range from one – which has the lowest level of stress, to four – which has the highest level of stress. The LTS analysis completed as part of this study does not consider intersections or crossings. The analysis helps to visualize the experience of existing roadways to understand why people may not be cycling along certain roads.

Considering the results of the analysis on Map 4, the Brock Trail is the only facility that received an LTS score of one – or low stress. The Brock Trail acts as a good low stress spine throughout the City. Ormond Street received an LTS score of four north of Central Avenue. This stretch also has a score of one as this is where the Brock Trail is, providing a low stress facility adjacent to the roadway. Another location that had an improved LTS score because of an existing facility was on King Street West. The majority of the road scored three, but the section with painted bike lanes scored a two, as the facility lowers the stress. While many minor roads received a score of two, many roads that provide a direct route received a score of three or four.

Research has found that large segments of the population who are willing to cycle, do not cycle because the facilities are inadequate or non-existent and thus do not provide them with a feeling of safety. The LTS analysis provides insight by visualizing how people experience the network. The following image summarizes the relationship between the type of cycling facility, the LTS score, and the percentage of people willing to use the facility.



Figure 16. Graphic showing the relationship between LTS score, type of cycling facility, and the willingness of people to use the facility

DRAFT PLAN

MAP 4 LEVEL OF TRAFFIC STRESS

BROCKVILLE ACTIVE TRANSPORTATION PLAN

LEVEL OF TRAFFIC STRESS

- 1 Comfortable for all agesand abilities2 Comfortable for most
- adults 3 - Comfortable for confident adults
- 4 Uncomfortable for most

DESTINATIONS AND BOUNDARIES

School

- S College or Private School
- Recreational Centre
- Library
- 🕒 General Hospital
- Retirement CommunityParks
- Waterbodies

The Level of Traffic Stress (LTS) analysis displays the results of the bicycle LTS analysis, which score roads based ontheir number of lanes, posted speed limits, and existing cycling facilites to reflect the experience of using those roads for cycling.



 \cap

 Imetres

 500
 1,000

 4 MIN BIKE

 12 MIN WALK

Data provided by the City of Brockville. Map produced July 2019.



Gap Analysis

The Gap Analysis builds on the Demand and LTS analyses as well as the existing conditions and field review to identify where facilities do not exist or are insufficient in the City. There are three types of gaps which are part of the analysis:

- **Spot gaps** are localized obstacles or barriers to using a facility. They can exist throughout the length of a facility. Examples of spot gaps include a lack of curb ramp, an unmarked crossing, or an obstacle in the facility, such as a utility pole in the middle of the sidewalk. An example of a cycling spot gap is where no curb ramp exists providing access for people cycling onto a shared use path from the road. The person must dismount and wheel their bike over the curb, or risk falling trying to ride up or down the curb
- **Connection gaps** are areas between existing facilities where no facilities exist. This creates a barrier for people using active transportation modes. An example could be a sidewalk that ends a block before there is a crossing to another sidewalk. This situation might deter someone from walking to a destination. Otherwise, the situation may create an unpleasant or even hazardous travel experience
- **Network gaps** are areas where no facilities exist at all, and therefore act as a barrier to people traveling by active transportation modes to, from, within or through that area

By overlaying the Demand and LTS analyses with the Gap Analysis, additional gaps can be identified, such as roads with a high level of stress, or areas with a high level of demand, but a lack of facilities. The Gap Analysis map is included below as Map 5.



Figure 18. Narrow bridges on the Brock Trail were identified as spot gaps



Figure 17. Lack of maintenance or missing curb cuts can create connection gaps

MAP 5 **GAP ANALYSIS**

BROCKVILLE ACTIVE TRANSPORTATION PLAN

GAP TYPES



CYCLING NETWORK DESIGNATION

- Brock Trail
- ---- Previously Proposed Trail
- Railway Tunnel
- Secondary Trails
- Painted Bike Lane
- Sidewalk or Walkway
- Surrounding Trails

DESTINATIONS AND BOUNDARIES

C School

- College or Private School
- **Recreation Centre**
- Library
- **General Hospital**
- Retirement Community
- Parks

<u>alta</u>

- Waterbodies
- Brockville Boundary



4 MIN BIKE

Data provided by the City of Brockville. Map produced July 2019.



What We Heard

Throughout the first round of public engagement, we heard that many people are already walking and cycling to get around the City. People are walking and cycling to go to work or school, get groceries, see friends, or for recreation. While some people are using active transportation already, they acknowledged that there is a need for improvement as many roads and crossings in Brockville are not comfortable to bike on and gaps in the sidewalk network discourage walking.

"I live in this neighbourhood [north end] and would LOVE to bike to work downtown, but I don't feel safe without bike lane development."

Themes

The following themes were heard throughout the engagement process.

Destinations

• *Downtown* – Many people identified destinations throughout the downtown area that they like to walk and cycle to, including the library, arts centre, restaurants, and cafes

"I use this route [Brock Trail] to walk to work from Pearl Street West to downtown, it is a lovely walk and I really appreciate having the trail as a commuting option."

- *Mac Johnson Wildlife Area* Many people commented that it is challenging to get to the trails in the wildlife area as there is no connection on or across Centennial Road, or connection from the Brock Trail
- *Parkedale Avenue* This corridor was identified as a destination for many people, with many stores, the movie theatre, Thousand Islands Secondary School, and St. Lawrence College

Barriers

- *Speeding traffic* Vehicles going too fast, creating a stressful environment to walk and cycle in, was identified on roads throughout Brockville
- *Lack of infrastructure* Many people identified places they would like to go, but they feel unsafe doing so due to the lack of infrastructure for cycling
- *Spot gaps* Numerous locations were identified as being inaccessible or unsafe to use, whether it is due to bollards, poor maintenance, drainage issues, or lack of infrastructure, such as desired crossing locations
- *Winter maintenance* People feel unsafe or unable to walk and cycle in Brockville during the winter season due to inadequate winter maintenance

Many of the site-specific barriers were added to the Gap analysis.

"Would be great to have a bike lane extension from the North Brock trail head to the south entrance of MJWA. I bike this with my daughter and Centennial Road is always scary!"

"I would cycle to Superstore from the SW corner of town if this area was more cycling-friendly." "My family lives near King Street and my son wants to bike to school at TISS. Currently there is no safe route. Stewart Blvd is completely unsuitable for cycling and not an option. Using the Brock Trail safely gets him to the College. From the college to TISS, Parkedale or the sidewalks along it are dangerous for cycling. A series of bike paths along Laurier and Windsor starting at the soccer fields would be suitable to safely complete the trip. Consider too that some trips will be after dark."



Figure 19. Many people commented about the lack of clearing and drainage issues along the Brock Trail at the railway underpass

Survey Results

The survey on the online platform asked important questions regarding the direction and goals of this plan. The responses to those questions are shown below. What they show is a strong desire for the expansion of walking and cycling infrastructure that can be used by all ages and abilities. Improving maintenance is another priority identified through these questions. The complete results from the survey can be found in Appendix 2. A sample of survey results are provided below.



The top 5 themes that were identified as an important part of this vision were:

- 1. Needs for people of all ages and abilities to walk/bike around Brockville
- 2. Bike lanes and sidewalks that are located where people need to go
- 3. More options for walking, cycling, transit in a way that works together
- 4. More of a focus on bike lanes and sidewalks that are swept or winter cleared
- 5. Create opportunities for people to use the active transportation network year round

The top 3 focuses of this plan were identified as:

- 1. Expanding network proposing new walking and cycling facilities throughout the City of Brockville
- 2. Connectivity enhancing connectivity and crossings of existing facilities
- 3. Maintenance providing recommendations for maintenance of existing trails

DRAFT PLAN

Common Network Challenges

Within the public engagement feedback people identified reoccurring gaps or barriers, and made consistent recommendations for improvements to the existing network. The following table summarizes these common commented on issues and was used to strategically think about network development recommendations for the active transportation network to address these issues. This table is also helpful to consider for the user experience of the existing conditions and how to improve conditions through interventions and on-going maintenance.

Common Network	Details
Challenges	
Spot and Connection Gaps	Where sidewalk is missing Missing crossing to get to sidewalk on other side of roadway
	Narrow horizontal clearance on bridges for people riding bicycles Drainage or maintenance issues
Improvements to Existing	Requests to install crossrides to accommodate cycling
Crossovers	Requests to change type of crossover due to low motorist compliance
Requests for New Crossovers	Due to sidewalk only on one side of road, crossover provides safe, designated place to cross to sidewalk, adjacent street
	Places that were identified as desired crossing points, due to no nearby crossings and destinations
	Upgrading courtesy crossings
	Upgrading school crosswalks
Improvements to Intersections	Requests for more crossing time
	Requests for new pavement markings
	Requests to improve visibility at intersections
	Request to change signal at Ormond and Parkedale

Table 3. Common network challenges

Network Development

The development of an Active Transportation Network is based on a number of inputs: existing conditions; feedback from the public engagement process; and the technical analysis (demand, LTS and gaps). The Active Transportation Network (Schedule 5) from the Official Plan was also used as a starting point. Together these form the rationale for how the proposed network was developed.

This section will identify the types of active transportation facilities that are recommended in the plan. The facilities are summarized under Network Designations. The Network Designation categories distinguish the role that each segment plays in the network, in order to prioritize and build higher quality facilities where it has been identified there is a need to do so.

During the development of the plan, direction was given by the City for specific analysis related to the north end, focusing on the Laurier Boulevard and Windsor Drive area. Refer to Appendix 3 for additional information. The conclusions from the memo have been integrated directly into the active transportation network presented in this chapter and the Network Implementation chapter. For example, in the prioritization section, Laurier Boulevard from Kensington to Peden is recommended for short-term implementation.

Active Transportation Facility Types

The following section presents the available toolbox of facility options for walking and cycling. The recommendations provide a summary of the facility, but do not replace guidance documents relevant in Ontario for pedestrian and cycling facilities. The facilities are organized into three groups, based on the type of separation they provide from motor vehicle traffic. The guidance documents that should be referred to for recommended application and design considerations include:

- Ontario Traffic Council (OTC), Book 18: Cycling Facilities (2013 Update currently in progress)
- Ontario Traffic Council (OTC), Book 15: Pedestrian Crossing Facilities (2016)
- Transportation Association of Canada (TAC), Geometric Design Guide for Canadian Roads (2017)

Additional resources for the City to consider when designing pedestrian and cycling facilities are the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide and the Federal Highway Administration (FHWA) Small Town and Rural Multi Modal Networks guide.

Facility Type Category: Physically Separated

Sidewalk

Sidewalks provide dedicated space for use by pedestrians that is safe, comfortable, and accessible. They are physically separated from the roadway by a curb with an optional boulevard buffer space (paved or unpaved). Adding buffer spaces can make them a more comfortable place to walk as there is a further setback from the road. A street furniture and tree zone can be implemented to make the public realm more attractive and accommodating for people to use.



Figure 20. Sidewalk with a furnishing zone, Kelowna, BC

Multi Use Path and Multi Use Trail

Multi-use paths are located physically separated from motor vehicles by a large buffer or barrier and provide sufficient width and supporting facilities to be used by cyclists, pedestrians and other non-motorized users. Multi-Use Trails are generally located in parks or their own corridor.



Figure 21. Multi use path adjacent to a roadway, Waterloo, ON

Figure 22. Multi use trail in Ottawa, ON

Protected Bikeway

Protected Bikeways include Bike Paths (TAC) or In Boulevard Raised Cycle Tracks (Book 18) which are raised and adjacent to the roadway, as well as Protected Bike Lanes, which are onroad facilities with physical separation. These facilities enhance the user's feeling of comfort. The decision to implement a protected bikeway or a raised cycle track is project dependent and can be influenced by a variety of factors, such as on road space, space in right-of-way, utility locations, etc. At the master planning level, the emphasis is to be placed on indicating which roads should have physically separated facilities based on context and the role in the overall city-wide network. Once the need for a separated facility is determined and established

in policy, a decision regarding the specific type of facility to be included in construction can be made (i.e., the construction of an on-road protected bikeways versus an In Boulevard Raised Cycle Tracks).



Figure 24. On road protected bike lane, Peterborough, ON



Figure 23. Raised Cycle Track, Churchill Avenue, Ottawa, ON

Facility Type Category: Visually Separated

Unbuffered Bicycle Lane

Bicycle lanes designate an exclusive space for cyclists distinct from motor vehicle lanes. Bicycle lanes are marked with a solid white line between the vehicle lane and the bicycle lane, include a bicycle stencil and diamond, and are marked with dedicated signs.



Figure 25. Unbuffered bicycle lane, Brockville, ON (Google)
Buffered Bicycle Lane

Buffered bicycle lanes delineate additional separation between general traffic and people cycling, through the addition of a painted buffer. The buffer makes the facility more attractive for use by people with a wider range of experience and comfort riding bicycles. The buffer can also be achieved through narrowing road lanes to provide traffic calming.



Figure 26. Buffered bicycle lane, Burlington, ON

Bicycle Accessible Shoulder

A shoulder is a paved area outside the general purpose travel lanes delineated by a continuous white line. Located on rural roadways, shoulders suitable for active transportation should be at least 1.5m wide and may include bicycle and/or pedestrian-oriented signing and striping. If the shoulder also serves as a breakdown lane for motor vehicles, there should be an additional unpaved portion of approximately 2.4 m in order for disabled vehicles to not block people from walking or bicycling in the shoulder. Parking for motor vehicles in the shoulder should be discouraged.



Figure 27. Bicycle accessible shoulder in Ottawa, ON

Facility Type Category: Mixed Traffic

Local Street Bikeway

Local street bikeways include a range of traffic calming treatments to improve conditions for cyclists and pedestrians on local streets. This typically includes signage and pavement markings, and varying degrees of vehicle speed and volume management. Potential traffic calming infrastructure includes speed humps, cushions or tables, traffic circles, lateral shifts (chicanes), or diverter median islands. Local street bikeways are also often referred to as neighbourhood greenways or bicycle boulevards.



Figure 28. A local street bikeway treatment to limit car through traffic in Portland, OR

Advisory Lane

Advisory lanes include a single bi-directional travel lane for motor vehicles bordered by shoulders. The shoulders are separated from the vehicle travel lanes by dashed white lane lines. When vehicles traveling in opposite directions meet, motorists enter the advisory shoulder to pass. This facility type has the effect of slowing down traffic, and better accommodates active transportation users within a constrained roadway width.



Figure 29. A street with advisory lane markings in Gibsons, BC

Shared Lane

The shared lane approach is based on how bicycles operate on roadways when no bike facility is present. People cycling share the lane with people driving motor vehicles. It is preferred that lanes are narrow, with sharrow pavement markings in the middle of the lane to encourage single file bicycle and motor vehicle traffic. Where wide lanes exist, people can cycle to the right of the lane, but this can encourage speeding motor vehicle traffic. The route can be signed to communicate to motorists to expect people cycling.



Figure 30. A street with a shared lane configuration in Ottawa, ON

Intersection and Crossing Projects

The following section provides a toolbox of treatments for intersections and crossings to improve the experience for all people using the facilities. The treatments improve conditions by clarifying and separating user movements, emphasizing user priority, and making crossings more conspicuous.

Intersections

Protected intersection

This intersection design reduces the number of conflict points, and shortens the crossing distance for cyclists and pedestrians. The corner safety island tightens the radii of turning cars, slowing down their movement. Further guidance and considerations are in NACTO's *Don't Give Up at the Intersection* (2019) and will be included in the OTM Book 18 update.

Signal separation

Separating cyclist and car intersection movements through signalization is another strategy to achieve separation by temporally separating their permissible movements.

Two-stage left turn box and jug handle

These intersection improvements clarify and support how cyclists can do a two-stage left turn. This prevents cyclists from having to move into the left lane and wait in the middle of the intersection for a gap in oncoming traffic.

Bike box

Bike boxes are marked areas to allow people cycling to come in front of traffic at a red light in order to

have priority at the signal, enabling a turning movement or priority across the intersection.



Figure 33. Bike box, Ottawa, ON



Figure 31. Protected intersection in Ottawa, ON



Figure 32. Bicycle only signal for separation, Ottawa, ON



Figure 34. A two-stage left turn box, Ottawa, ON

Crossings

Pedestrian crossover

Pedestrian crossovers give the person crossing priority to do so, as vehicles on the road are legally required to yield until the person has fully crossed the roadway. Pedestrian crossovers are often located mid-block between intersections with crosswalks or where trails cross the roadway. For more detailed guidance on pedestrian crossovers, see Ontario Traffic Manual Book 15.

Crossrides

There are three types of crossrides, which are crossing treatments that allow people riding bicycles to continue riding through the crossing when they have the right-of-way without having to dismount and walk their bicycle as required at standard crosswalks or pedestrian crossovers. They should be applied where dedicated cycling facilities cross roadways. A summary of the three types of crossrides is below.

• Combined crossride

Allows for cyclists to ride across a crossing. The combined crossride has pedestrian and

cyclist users sharing the space where pedestrians should walk in the middle, and cyclists to the outside

• Separated crossride

Enables cyclists to ride across intersections. Pedestrian and cyclists are separated

• Mixed crossride

Enables cyclists to ride across intersections. The crossing space is mixed, with pedestrians and cyclists sharing the space, without prompts to where each user should be within the crossride



Figure 35. Actuated pedestrian crossover in Brockville, ON



Figure 36. Signed pedestrian crossover in Brockville, ON



Figure 37. Signalized combined crossride, Ottawa, ON

Raised crossings

By raising the crossings, pedestrians and cyclists have a smooth at-grade path of travel. The raised crossing acts as a speed bump for motor vehicle traffic, slowing them down and identifying priority for people walking and cycling.

Medians

Medians provide a refuge space for people crossing the road to accommodate crossing the road in separate segments. Medians also act as a traffic calming feature by narrowing and redirecting vehicle traffic.

Curb extensions/bulbouts

Curb extensions or bulbouts are where the sidewalk is extending at crossings to narrow the crossing distance. By allowing people to be further into the field of vision of someone on the road, they can make the person crossing more visible. They also act as a traffic calming measure, by narrowing the roadway, encouraging vehicles to slow down.



Figure 38. Raised separated crossride, Ottawa, ON



Figure 40. Pedestrian crossing with median in Waterloo, ON (Google)



Figure 39. Curb extensions at crosswalks in Chase, BC

Plan Network Designations

The Brock Trail, Cycling Network, and Pedestrian Network represent the three networks which make up the complete Active Transportation Network. Each of these networks have designations or classifications which differentiate the different types of facilities and assigns the role that the route plays within the network.

Brock Trail

The Brock Trail designations are already identified in the existing conditions section of the plan.

- Primary
- Secondary
- Rail Trail
- Railway Tunnel

Cycling Network

The cycling network is presented in Map 6. There are two route designations that make up the network; spine and connector routes.

Spine Routes

Spine routes are made up of separated and low stress facilities. Spine routes should allow people to travel between the different areas of Brockville on a connected network. Spine routes can include the Brock Trail, as those segments of the Brock Trail satisfy the standards of the facilities outlined to be considered part of the network. Spine routes should have a higher priority for investment. Facilities that can be part of the Spine designated Cycling Network include:

- Multi Use Path and Trail
- Protected Bikeway
- Buffered Bike Lane
- Local Street Bikeway
- Advisory Lane



Principles of the Active Transportation Network

- Continue to invest in the Brock Trail
- Improve walkability on commercial corridors such as Parkedale Avenue
- Implement intersection and crossing improvements
- Focus on implementing improvements around schools
- Implement network in JG Broome Industrial Park
- Walking to transit
- East-west cycling connections
- Connections to adjacent communities
- Tourism

Connector Routes

Connector routes include cycling facilities that connect from neighbourhoods or destinations, and provide alternative routes. This may include alternative routes or facilities that connect to spine routes. Facilities or conditions that can be part of the Connector designated Cycling Network include:

- Multi Use Path
- Protected Bikeway
- Buffered Bike Lane
- Unbuffered Bike Lane
- Bicycle Accessible Shoulder
- Local Street Bikeway
- Advisory Lane
- Shared Lane

Spine Routes

- Reaches all parts of the city
- Connected network
- Corresponds with destinations and where demand is
- Higher order of protection for people on bikes
- Priority for investment

Connector Routes

- Helping people get to and from spine routes
- Lower priority for implementation, maintenance, and operations

Table 4. Total length of proposed cycling network designations

Cycling Network Designations	Total Kilometres
Spine	42
Connector	39
Total	81



Pedestrian Network

The pedestrian network is presented in Map 7. The pedestrian network varies from the approach used for the cycling network because as described in the Existing Conditions chapter, Brockville already has a very dense network of sidewalks. Therefore, the approach to improving the existing network focuses on specific deficiencies which are categorized by the three designations described below. The City should commit to completing on-going improvements to the existing sidewalk and walkway facilities as part of future reconstruction projects. These improvements could include widening sidewalks, accessibility improvements, additional crossings, and adding a boulevard to setback the sidewalk from the roadway.

Gap filler

Pedestrian facilities identified as gap fillers connect to existing facilities, resolving gaps that were identified as part of the gap analysis, as connection and spot gaps. These projects should be prioritized to resolve existing gaps.

Transit connection

Transit connections are pedestrian improvements that support people getting to or from transit stops.

Enhanced pedestrian corridor

This designation can be added to roads that should be a priority for pedestrian improvements, based on their adjacent land use, and the number of people walking along the road. Improvements can include prioritized maintenance, new crossing treatments, additional long-term improvements such as sidewalk setbacks to make the pedestrian experience more attractive and accessible to people using mobility devices.

MAP 7 PROPOSED WALKING IMPROVEMENTS AND NETWORK

BROCKVILLE ACTIVE TRANSPORTATION PLAN

PEDESTRIAN NETWORK IMPROVEMENTS

- Crossing or Intersection Improvement
- Enhanced Pedestrian Corridor
- Gap Filler
- ----- Transit Connection

DESTINATIONS AND BOUNDARIES

- School
- College or Private School
- 🔇 Recreational Centre
- Library
- General Hospital
- Retirement Community
- Parks

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- Waterbodies
- Brockville Boundary



4 MIN BIKE 12 MIN WALK

Data provided by the City of Brockville. Map produced July 2019.



Rationale for the Active Transportation Network

The network shows where cycling and pedestrian facilities should be implemented, and the role they play in the network based on their designation. Each proposed facility in the network was considered by the following variables:

- Existing facilities and previously planned
 - Acknowledged where investments have been made previously and future improvements, including the Official Plan, Capital Works projects, Brock Trail plans, and changing land use
 - Proposed routes complement the existing and planned Brock Trail system, with facilities proposed to get people to and from destinations via the trail system
- Public engagement
 - Considered pins added to specific locations and comments, as well as feedback from in person engagement events
- Analysis
 - Demand analysis developed a map defining areas based on their level of activity and demand based on origins, destinations, and feedback from public engagement. Applied routes to reach areas of higher demand, and destinations such as schools
 - For cycling facilities, a level of traffic stress analysis used a validated framework to categorize the existing conditions of roadways based on road lanes and posted speed limits. The implemented facility must consider how it will lower the current LTS score of the roadway, for example, implementing a shared use lane will not lower the LTS score on an arterial roadway. A protected bikeway or buffered painted bike lane is likely required to lower the LTS score
 - Gap analysis identified and categorized gaps in the existing walking and cycling networks into three categories: spot, connection, and area. New proposed routes sought to resolve existing gaps
- Role it plays in the network
 - Cycling routes were identified that provide direct connections to destinations.
 Proposed routes were considered for how they relate to other proposed routes, in terms of network frequency and coverage while also achieving a network that connects to important destinations and areas with high demand
 - Spine routes were designated at approximately an 800 m frequency to provide coverage across the city while also providing route options
 - As an example, from the south west corner of the city, the Brock Trail is identified as part of the spine, instead of King Street, because the Brock Trail is an existing off-road facility, that meets the goals and principles of the plan. Investment should be focused on improving its trail crossings. Adding cycling facilities to King Street would require more significant changes to the roadway
 - Pedestrian designations for improvements resolve gaps in existing network, support transit, and identify key corridors for improved pedestrian experience

What We Heard

During the pop-up event, attendees stated a range of interest in the plan. Many people from the north end community came specifically to learn about what the plan recommended for streets in their community. People commented with concerns about a variety of issues such as traffic speeding on Laurier Boulevard and Windsor Drive, the need to improve the Laurier and Windsor intersection, and a general preference towards in-boulevard raised cycle tracks as a type of bikeway facility. People generally preferred the level of separation and the aesthetics of this option.

From the online survey, the majority of respondents agreed that the principles for the active transportation network addressed the needs and concerns of Brockville residents and visitors. When asked if there were any missed opportunities with the presented recommendations, 34% of respondents could not provide any, or thought the recommendations were complete. One recommendation to lengthen walk signal timing at signalized intersections was noted and added to policy recommendations. Respondents identified the most important variables for project prioritization are improving safety for all users, connecting people to where they want to go, and a connected network. In terms of improvements for the Brock Trail, winter maintenance, lighting, wayfinding, improved crossings, and access to the trail were the most frequently cited recommendations.



Figure 41. A Brockville resident arriving at the library for the pop-up engagement event

Network Implementation

This chapter provides recommendations on how the projects that make up the active transportation network may be implemented. This includes the prioritization of the projects in the cycling network, a framework to implement pedestrian improvements, a discussion on cost estimating and planning for the costs associated with these projects, funding opportunities, and maintenance and operations considerations.

Implementation Opportunities

Projects can be implemented in a variety of ways. Projects can be implemented independently, or as part of planned capital works projects. The types of treatments used will likely depend on the type of project implementation. If a project is being implemented as part of a road resurfacing, more interim materials and treatments may be used. If the City is completing a road reconstruction, this presents an opportunity for a more holistic redesign of the street.

Capital Works Projects

The inclusion of active transportation projects as part of planned capital works project can be an effective way to implement projects, as it leverages savings through reduction of separate construction projects. Recommended projects from this plan should be reviewed regularly by staff to identify opportunities to align and coordinate projects with other planned capital works projects. Tying active transportation improvements into road resurfacing and road reconstruction provides greater opportunity to reconfigure and redesign road right-of-ways.

Interim Projects

The City should pursue interim implementation of projects if there are no plans for capital works projects in the matching implementation period. Interim projects involve redesigning the existing road right-of way with active transportation improvements without major reconstruction. The materials and elements used in interim installations can vary but should be installed to a standard that is appropriate to the expected lifespan of the installation until reconstruction can be achieved as part of a capital works project.

Pilot and Demonstration Projects

The City may consider implementing pilot or demonstration projects in order to quickly implement active transportation improvements. These projects should consist of materials that can easily be installed or removed such as paint and flexible delineator posts, and bollards. The projects can be useful to test out different variations of elements and road geometries prior to an interim or permanent installation.

Cycling Network Project Prioritization

The proposed cycling network represents the ultimate vision for the cycling network as part of the active transportation network. The proposed projects in the cycling network will ultimately be implemented over the next 20+ years. In order to guide the implementation of the projects that form the proposed networks, the projects have been assessed on their priority for implementation into three groups:

- Short-term (0 to 5 years)
- Medium-term (6-10 years)
- Long-term (11-20 years)

Projects are prioritized based on the role they play in the network and the principles established as part of the network development process, such as prioritizing projects that connect to or are part of the Brock Trail or Waterfront Trail, or projects that are spine routes. Recommendations for the prioritization of projects will also reflect the importance of resolving gaps or completing important connections to destinations such as school and areas where there is demand as identified in the Demand Analysis.

These criteria build on and address the feedback from the public during engagement where the following considerations were identified as the top priorities:

- Brock Trail Expansion and Improvements
- More sidewalks
- Physically separated bike lanes
- Intersection and crossing improvements

While some projects may be identified as high priority based on these criteria, the final prioritization will consider the complexity and feasibility of the project. It is acknowledged that more complex projects require sufficient time to undergo additional planning and design work.

The criteria used for prioritization are summarized in the following table.

Criteria	Detail for Priority
Designation	Part of Brock Trail
	Part of Waterfront Trail
	Spine route
Network Connectivity	Connects to Brock Trail
	Connects to Waterfront Trail
	Resolves identified gap
Origin and Destinations, and	Access to school
Demand	Access to Brockville General Hospital
	Access to high demand area
Complexity and Feasibility	Potential for pilot or demonstration project
	Potential for interim implementation
	Aligning with planned capital works project

	Table 5.	Proiect	prioritization	criteria
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The recommended prioritization of the cycling networks is summarized in Map 8. The total length of facilities recommended to be built based on priority are also summarized by network designation in the following table.

Network	Short-term	Mid-term	Long-term
Spine	22	10	8
Connector	7	16	16
Total	29 km	26 km	24 km

Table 6. Total kilometres of network by prioritization

Pedestrian Improvement Prioritization

Recommendations for pedestrian infrastructure improvements can also be prioritized for implementation based on variety of criteria. Criteria are listed below that represent some rationale to prioritize the implementation of recommended pedestrian improvements (Map 7).

Designation	Detail for Priority
Gap Filler	Gaps near schools, on LTS 3 and 4 roads, to other destinations should be highest priority.
Crossing Improvement	Based on adjacent destinations, reported conflicts at intersection, feasibility
Transit Connection	At stops near destinations
Enhanced Pedestrian Corridor	As feasibility permits

Table 7. Prioritization rationale for pedestrian designations

Generally, pedestrian improvements should be included as part of any planned capital works project, but could also be implemented on an interim basis. The Policy Recommendations chapter outlines a Complete Streets policy which summarizes a general vision for decision-making and reorienting of streets to incorporate improvements that will enhance the pedestrian experience.

MAP 8 **PROPOSED CYCLING** NETWORK PRIORITY

BROCKVILLE ACTIVE TRANSPORTATION PLAN

PRIORITY

- ----- Short-term
- Mid-term
- Long-term

DESTINATIONS AND BOUNDARIES

- School
- S College or Private School
- Recreational Centre
- Library
- **()** General Hospital
- Retirement Community
- Parks
- Waterbodies
- Brockville Boundary

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Project Costs

Brockville, like other cities around Ontario, is doing more to improve safety, comfort, and connectivity for pedestrians and cyclists. Brockville has already made significant steps with the new additions to the Brock Trail network and new PXO crossings. The City has a comprehensive sidewalk network which requires maintenance but also has areas for improvement.

Enhancing safety, comfort, and connectivity for cycling requires physically separated space depending on the roadway context and intersection treatments. The costs associated with the construction of protected bikeways include pavement markings, separator (concrete curb, planter, flexible delineator), signage, special pavement treatments (e.g. thermoplast), and additional traffic signals. NACTO's publication *Don't Give up at the Intersection* (2019) highlights the need to include intersection improvements as part of a successful project. Similar design consideration also applies to where cycling and walking facilities meet transit stops.

Often in Ontario, implementation of walking and cycling infrastructure occurs as part of a road renewal project. They are often coupled with improvements associated with AODA such as curb cuts, push buttons, and tactile walking strip indicators. Through this approach, obtaining independent costs associated to solely walking and cycling infrastructure becomes more challenging. Through a complete streets approach, cities consider costs for all transportation infrastructure in a more comprehensive manner.

Building over-sized roads with the intention that they provide use for walking and cycling is expensive and does not provide the additional benefits of a narrower roadway with dedicated walking and cycling facilities. The return on investment is lacking based on a variety of factors:

- The cost of the road base for motor vehicles costs significantly more than the base for walking and cycling facilities
- Wider roads correlate to the poorer safety and higher speeds travelled (Karim, 2015)
- A conventional roadway does not translate into a street where people of all ages and abilities are willing to cycle

This plan is about providing a mandate to develop complete streets on roads identified in the cycling and pedestrian networks. The plan provides the direction for how to consider what kind of improvements should be made to the street. The cost of building cycling facilities is often framed as a City committing to provide dedicated money each year for active transportation improvements. It should be recognized based on the above information that the cost is more appropriately framed as being a part of capital project funding, just as any conventional road improvements would be.

The City is already familiar with the costs for trails and sidewalks. Brockville has been improving these for a while now and has a handle on their cost. To support the City to plan for the construction of the active transportation network, high-level base costs have been included in Appendix 4.

Funding Opportunities

City Mechanisms

Development Charges

(Pending changes to the Development Charges Act through Bill 108)

It is recommended that the City of Brockville update the development charges by-law, to include fees as part of the Roads and Related Services charge. These funds could be dedicated towards the active transportation network.

Community Benefit Charge

As part of the changes through Bill 108, municipalities must prepare a background strategy identifying community facilities to be funded as part of this new charge. As it is replacing the parkland dedication mechanism, it would be most applicable for building and upgrading parts of the Brock Trail.

Grants and Other Funding Sources

BuildON - The BuildON is a provincial infrastructure funding program which has funded active transportation infrastructure such as sidewalks, trails, and bike lanes in urban and rural communities across the province.

Federal Gas Tax Fund - Gas tax is collected annually by the federal government. Jurisdictions receive a proportion of the federal dollars based on their populations through the Community Works Fund (Federal Gas Tax Program). The Gas Tax Program supports environmentally sustainable municipal infrastructure by funding projects that reduce reliance on motor vehicles.

Green Municipal Funds - The Federation of Canadian Municipalities (FCM) manages the Green Municipal Fund (GMF). Eligible capital projects include transportation that must demonstrate the potential to reduce vehicle kilometres travelled in a single occupancy vehicle by encouraging active transportation. Matched funds are required.

Infrastructure Canada - The programs of Infrastructure Canada are the Active Transportation Fund, New Building Canada Fund (NBCF) and the aforementioned Gas Tax Fund. Typically, the federal government contributes one-third of the cost of municipal infrastructure projects. Provincial and municipal governments contribute the remaining funds and, in some instances, there may be private sector investment as well. The NBCF supports projects of national, regional and local significance that promote economic growth, job creation and productivity. A number of active transportation projects and roadway and transit projects with active transportation elements have been funded through this program.

Volunteer and Private Sector - The City could seek out partnerships for funding plan recommendations. Funding for improvements and ongoing maintenance could be funded partially through volunteers and donations, either from individuals or service clubs and trail groups. Advertising on trail elements or development of a program for sponsorship could also be used to fund new infrastructure and improvements.

Maintenance and Operations

Maintenance and operations for roadways and other transportation routes typically fall under the following themes:

- Inspections
- Pavement sweeping/blowing
- Snow plowing/ice removal
- Litter removal
- Shoulder plant trimming (weeds, trees, brambles)
- Tree and shrub plantings, trimming
- Culvert, gutter and drainage grate inspection/repair
- Sign replacement
- Crack sealing and repair
- Pothole repair
- Pavement marking replacement
- Asphalt repaving and reconstruction
- Major damage response (washouts, fallen trees, flooding)

Existing City Policies and Practices

In the development of recommendations to improve maintenance and operations practices for the City's active transportation network it is important to first look at current practices:

Capital Works and Road Resurfacing

For road resurfacing the typical interval is between 20 to 30 years. Every fall, the City rates the road condition of every roadway using a modified version of the MTO system. The road condition assessment is used to determine which roads will be resurfaced the following spring, prioritizing the roads in Condition 5 first. The roads are assessed again in the spring to determine if road damage occurred during the winter months (potholes, snow plow damage, etc.)

General Maintenance

For street sweeping, a priority list has been established indicating the order of streets to be cleared. Pavement markings are done twice a year. All markings are repainted in the spring. Additional touching up of higher volume areas is done in the fall. In terms of landscaping, grass is cut weekly in most parks, and bi-weekly in other grass areas. Additional landscaping work is completed based on the type of landscaping. Some flower beds have seasonal dedicated staff that attend to pruning and watering. Less labour-intensive areas are addressed bi-weekly or as needed.

Winter Maintenance

For snow clearing, the City has a priority system based on road classification, traffic volumes (AADT), and road use (i.e., school zone, transit route, etc). A standard is in place for how much snow cover can be on a road before snow clearing is initiated. When the depth is reached, snow clearing begins starting with the highest class of roadway. In the event of prolonged snowfall and accumulation, a second pass is done on Class 2 roads before roads lower on the list are cleared for the first time.

For local roadways (class 4-6), the policy is to provide centre bare pavement when plowing snow. This results in the turning lanes not being plowed during the initial pass of these streets and results in snow accumulation along the curbs. Cycling facilities along the edge of pavement are not cleared during this initial snow plowing pass with the current winter maintenance policy.

Overall, active transportation infrastructure that can be plowed with a truck or snow plow is preferable from a maintenance perspective (as compared with a sidewalk plow). For sidewalks, the City begins to clear them once 2 inches of snow has accumulated. The priority for which sidewalks are cleared first is based on their location.

- 1st Priority is downtown core and arterial and collector roads
- 2nd Priority are school zones and transit routes
- 3rd Priority are residential streets
- 4th Priority is the Brock Trail

Minimum Maintenance Standards for Municipal Highways

In 2018, the Province of Ontario updated O. Reg. 239/02: Minimum Maintenance Standards for Municipal Highways, part of the Municipal Act (Province of Ontario, 2018). The updated regulation establishes non-prescriptive minimum maintenance standards for addressing snow accumulation on on-road and in-boulevard cycling facilities. The following table sets out the desired depth that snow should be equal to or less than, to provide a minimum bicycle lane width of either one metre or the actual bicycle lane width – whichever is less.

Class of Highway/Adjacent Highway	Depth	Time
1	2.5 cm	8 hours
2	5 cm	12 hours
3	8 cm	24 hours
4	8 cm	24 hours
5	10 cm	24 hours

Table 8. O. Reg. 239/02 Snow removal – Bicycle lane winter maintenance

Best Practice in Maintaining Active Transportation Infrastructure

Maintaining the network protects the public investment, ensures adequate safety levels, and supports a high quality of life for residents. Maintenance generally refers to the operations, repair, and service standards. When considering a budget for a project, the ongoing costs are often not included within that price tag. It needs to be recognized that these ongoing costs can be significant for any type of municipal infrastructure project, and must be included when making decisions about projects. Asset Management plans need to evolve as the city's policy and infrastructure changes. As such, new practices will have to be developed to respond to the new types of bikeways being recommended in this plan.

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Maintenance activities include but are not limited sweeping, snow plowing, weeding, litter removal, crack sealing and repair, sign replacement, pavement marking painting, landscape maintenance, repaving, and eventual replacement. Some of these activities must completed multiple times per year, while others are every 5, 10, or 20 years. Refer to Table 11 for recommendations on the frequency of various maintenance activities. Accounting and budgeting for this planned maintenance is important to ensure the ongoing quality of the facility.



Figure 42. Sweeping maintenance removes built-up debris on bike lanes, which can limit usable operating space of a bike lane

Maintenance Activity	Why	Frequency
Inspections	Ensure bikeway conditions are safe, elements and surface of bikeway are satisfactory	Seasonally
Pavement sweeping/blowing	Remove debris, gravel, and broken glass to provide a usable, safer bikeway surface	As needed, with higher frequency in the early spring and fall
Pavement sealing	Provides a flat, smooth surface and extends the roadway life by preventing further damage	As needed
Pothole repair	Potholes can pose a safety risk to people cycling. Providing a smooth, flat surface improves comfort and safety	Soon after report or inspection identification
Culvert and drainage grate inspection	Ensure that water is not pooling in/around bikeway. The drainage grates should have a pattern that bicycle tires cannot fit into	Before winter and after major storms
Pavement markings replacement	Replacing pavement markings maintains visual separation enhancing user comfort	As needed due to fading paint
Signage replacement	Ensure that signage is up-to-date, and is not damaged due to wear or vandalism	As needed when damaged
Shoulder plant trimming (weeds, trees, brambles)	Maintaining a usable clearway by removing overhanging and impeding vegetation	Seasonally as needed, with attention to the middle of growing season and early fall
Tree and shrub plantings, trimming	Replacing and trimming vegetation along bikeways makes it an attractive and usable facility	As needed every few years
Major damage response (washouts, fallen trees, flooding)	Ensure that bikeways are usable and free of damage and debris as soon as possible after a major weather event or incident along the bikeway	As soon as possible
Snow/ice clearing and removal	Clearing and removing snow and ice from bikeways ensures they are safe and comfortable to use year-round	See the following section for detailed winter maintenance recommendations

Table 9. Recommended cycling facility maintenance activities

Best Practice in Winter Maintenance

A significant barrier to people cycling year-round is that bicycle facilities are often not maintained, or if they are, they are low priority and are not reliably cleared, making them unpredictable and cycling a less attractive option for travel during winter. In Canada, there is latent demand for cycling through all seasons, under certain conditions, including separated facilities (Miranda-Moreno et al., 2013; Fisher, 2014).

Similar to the approach for roadways, identifying a winter priority network selects the most important routes to be cleared first after a snowfall event as well as receive an application of de-icing material in anticipation of a snowfall or freezing event. These routes often correspond with the routes with the highest volumes, that provide access to major destinations, such as schools, and the downtown.

Best practices for winter maintenance are dependent on the context of the city, and consider the type of winter weather and the types of bikeway facilities. In cities with consistent sub-zero temperatures, bicycle facilities are designed to have more room for snow storage. Snow removal operations are also common. In similar cities with regular freeze-thaw cycles, winter maintenance should focus on clearing access to drainage and de-icing strategies. Cycling facilities should be designed to accommodate the clearway of a snow operations vehicle. Clearway space is wider than the actual vehicle width to allow for a margin of error, preventing plow hits and damage to infrastructure.



Figure 43. The Laurier protected bike lane in Ottawa was designed to accomodate the width of sidewalk plows for winter clearing

The type of de-icing surface application depends on the city. Proactive de-icing in anticipation of a snowfall or freezing event has been found to reduce the need for plowing afterwards. There are a variety of de-icing materials that can be used, but their usage is dependent on their availability and the types of maintenance vehicles and applicators that the city has in its maintenance fleet. More detailed information on materials and other considerations can be found in the Alta Planning + Design, White Paper #2: Winter Bike Lane Maintenance (Alta Planning + Design, 2014).

Recommendations for Asset Management of Active Transportation Infrastructure

Based on the considerations and best practices available, there are a variety of recommendations for the City to consider related to the asset management and maintenance of active transportation infrastructure:

- 1. All new cycling facilities must include a program for maintenance funding as part of construction. These can include agency partnerships, developer paid maintenance mechanism, or other means
- 2. The City should develop an average cost for year-round maintenance of bikeways based on existing and new practices. Maintenance funding is vital to ensuring long term sustainability of the facility
- 3. Prioritize clearing of key active transportation routes such as Brock Trail segments and spine routes
- 4. The City should develop a Level of Service plan in order to identify equipment required to maintain the trail and bicycle facilities, the staff required and the materials needed. This would include a clear indication of any special maintenance needs for a specific design implemented (i.e., bicycle signal, green thermoplastic, type of surface)
- 5. Winter Maintenance requirements are also to be reviewed in the Level of Service document. This includes consideration by the City for a higher-level policy related to a winter priority network and a framework for winter maintenance of sections of the Brock Trail
- 6. The City should review its current fleet and equipment to determine if new or more equipment is required to provide adequate service snow accumulation on pedestrian and cycling facilities

Policy Recommendations

The City's policies, including by-laws are important to consider from an active transportation perspective to ensure that they reflect best practice, considering peoples' safety, comfort, and ability to access and use active transportation modes. The following section provides recommendations for specific City by-laws, as well as additional policy recommendations addressing sections of the Brock Trail, traffic speeds, and an overall Complete Streets policy.

Traffic By-Law

Recommended Revisions

1.24 Motor vehicle definition

The Province of Ontario is currently reviewing their definitions of motor assisted bicycles with the technological advancement and growing popularity of electric and electric assist bicycles and other micromobility devices such as scooters. The City should review the provincial definitions and adopt these definitions to align with other jurisdictions in the province. This will likely include removing motor assisted bicycles from the motor vehicle definition and adding new definitions to the by-law.

1.34 Sidewalk definition

The sidewalk definition currently encompasses the Brock Trail but only allows pedestrians. "Multi-use paths" should be added to the definitions, which are places where people walking, cycling, rollerblading etc. may do so, such as most segments of the Brock Trail. On multi-use paths, pedestrians have the right-of-way. This could be part of adopting provincially recognized facility terminology as recommended below. This ensures that multi-use paths and sidewalks will be recognized as different. Bicycles should not be permitted to use the sidewalk with exception of children. Additional recommendations about facility definitions are included in New Recommended Policies in Traffic By-law section.

9.2 Riding abreast on highway

Cycling is just one way to get around, and people cycling should not be restricted from cycling beside another person when it is feasible to do so, just as pedestrians currently do. Updated cycling facility guidance is taking into account in the design that riding beside someone should be feasible through the design of the cycling facility. Furthermore, if people cycling are allowed to "take the lane", there should be adequate space to ride beside another person cycling.



Figure 44. Side by side riding is a common way parents feel comfortable riding on a street with their children

8.2 No skateboards or rollerskating allowed to enter roadways

Skateboarding and rollerskating are two modes of active transportation that people may use either for everyday travel or for recreation. They are generally operated at speeds closest to a person riding a bicycle. They are also more enjoyable to use on smooth paved surfaces, instead of on sidewalks, which have joints. Therefore, it is recommended that these modes, as well as push scooters should be allowed to use roadways, whether for the purpose of a Brock Trail road crossing, or for travel down a street. Defining that they can use cycling facilities could resolve a lack of clarity around this issue as well.

9.4 Bicycle parking

Under subsection (a), "no person shall park a bicycle on any roadway, shoulder, bicycle route or combined facility." This by-law will need to be amended if the City decides to implement on-road bicycle parking corrals.

New Recommended Policies in Traffic By-law

Cycling Facility terminology

Reserved bicycle use - will have signage or pavement markings with the reserved diamond symbol to denote that the space is reserved for use by people cycling. By-law could define further that people rollerblading, skateboarding, using low speed micromobility devices, and people using mobility scooters may also use these facilities.

Mixed traffic facilities – Some cycling facilities do not include the provision of reserved space for people using bicycles, rather, they focus on enhancing the conditions for cycling on the road. These facilities should include signage and appropriate pavement marking denoting it is a bicycle route.

The City should adopt the language used in *Ontario Traffic Manual Book 18: Cycling Facilities* to ensure consistent language with other jurisdictions in Ontario

Signing of bike routes

The City should use the standards set out in the *Ontario Traffic Manual Book 18: Cycling Facilities* to determine the appropriate signing standards

Parking By-law Recommendations

71.6 Parking restricted within 6 m of crosswalk at all times

Ontario Traffic Manual Book 15: Pedestrian Crossing Facilities identifies parking and other sight obstruction prohibition within at least 30 m of crossings at stop controlled or yield controlled pedestrian crossings, and a 15 m stopping prohibition minimum as an optional component. The by-law could be updated to match these distances

The City should add parking restrictions at trail crossings and entrances. This could be 30 m parking and stopping prohibitions shall be added at formalized trail crossings, and trail entrances.

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Additional Policy Recommendations

Brock Trail "Walk Your Wheels" Segments

There are existing older segments of the Brock Trail, especially along the waterfront at Hardy Park and Blockhouse Island which are narrow, with limited sightlines and varying surface materials. These sections have also been identified as busy segments with high pedestrian traffic due to the destinations and events in the area. Ultimately, these sections should be rebuilt to current multi-use trail and AODA standards, similar to new segments of the Brock Trail. Another option would be to rebuild these segments as separated use trails, to separate pedestrian and wheeled traffic.

In the meantime, the City should designate the following segments of the Brock Trail as "Pedestrian Priority Zones". These areas do not prohibit use of bicycles, rollerblades, skateboards etc. but include signage emphasizing that people using these devices should travel slowly and yield to pedestrians. This acknowledges that some people may not be able to easily dismount and walk and use their device as a mobility support. The geometry of people walking their bicycle is also wider than someone riding their bicycle, so a requirement to "Walk Your Wheels" may further crowd the narrow segments of trail.

Walk Signal Timing

The City should review walk signal timing at signalized intersections to ensure that there is sufficient timing for people to cross roadways, using Section 3.4.1 of *OTM Book 15: Pedestrian Crossing Facilities* as a guide. At intersections with high pedestrian usage, as well as near retirement communities, hospitals, and schools, the City should consider increased signal timing, through a slower walking speed of 0.8 m/s.

Courtesy Crossings

The City should upgrade existing courtesy crossings to pedestrian crossovers where possible, to prioritize pedestrians and make pedestrian priority more common to reduce the confusion between courtesy crossings and pedestrian crossovers.

Complete Streets Policy/Lens

The City should adopt a complete streets policy that mandates that all users and uses of road rights-of-way are factored into decision-making for road improvements. The NACTO Urban Street Design Guide (2013) emphasizes this approach to thinking about how streets can provide variety of benefits if designed to better accommodate them. These uses could include:

- People walking/using a mobility device
- People using transit
- People cycling
- People driving a car

- Movement of goods
- Ecological functions
- Economic functions
- Social functions

Examples of other Canadian municipal complete street policies can be found at <u>www.completestreetsforcanada.ca</u>. Road improvements such as reduction of curb radii, medians, traffic calming elements can support the increased function of the roadway for various functions.

Lower Speed Limits

The default posted speed limit is 50 km/h. Lowering the posted speed limit to 30 km/h would increase survivability in the event of a crash (Hussain, Q., et al., 2019). Geometric additions may be necessary to design the road for the lower speed limit. Facility selection for cycling facilities is informed in part by a roadway's posted speed limit and average annual daily traffic (AADT). This means that lower speed limits could reduce the need for physical separation or painted buffers between people cycling and people driving.

Plan and Install Short-term Demonstration Projects

Demonstration projects, also called "tactical urbanism" or "pilot projects" are infrastructure projects that are installed for short periods of time, using interim materials. Demonstration projects offer chances for members of the public to test out infrastructure designs that are not

already found in their community or on a particular street. Examples of active transportation infrastructure that work well for demonstration projects include curb extensions (also called "bump outs"), pedestrian refuge islands, and bike lanes. Demonstration projects should be installed in highly visible locations where previous plans and/or residents have identified walking or cycling needs. School routes work well for demonstration projects. Projects located on school property should include coordination with the school administration.



include coordination with the school *Figure 45. An example of an interim curb extension project* administration. *in North Dakota to shorten pedestrian crossing distances*

Install Bike Parking

Not having a reliable, convenient place to park a bicycle, is a barrier to people using their bicycle as part of everyday trips. To build on and compliment the new bicycle parking that is required as part of the Zoning by-law under section 3.9, the City could consider working with property managers, businesses, and institutions, the City should install long-term and short-term bike parking at existing stores, schools, transit stops, and other destinations. The City could use bulk purchasing to lower the cost of bike parking racks, then through a program, provide the parking to businesses and property managers, as well as for use at City owned destinations. The Association of Pedestrian and Bicycle Professionals *Essentials of Bike Parking* (2015) should be used as guidance for the types, styles, and spacing dimensions of bicycle parking.



Figure 46. Short-term staggered wheelwell secure style racks in a parking spot in Toronto

Programming for Active Transportation

In order to create a community where active transportation is commonplace, a city should not merely focus on building new infrastructure – there should also be concerted effort to encourage behaviour change and educate residents about how to use that infrastructure in a safe, legal manner. Brockville is fortunate to have a broad coalition of stakeholders working together to make walking, cycling and wheeling more accessible to all residents, which has resulted in some successful programs being developed within the community. In this chapter, we will explore how Brockville can build on those previous successes, capitalize on the strong community that has already coalesced around active transportation and build new supports to get more people walking, cycling and rolling.

This chapter will present recommendations for new programs and policies that could be implemented in Brockville to help to foster the creation of a strong culture of active transportation in the City. The new and expanded programs that are presented here are based on examples from around North America where communities have made great strides towards being among the most bicycle and pedestrian friendly jurisdictions in North America.

Programming Stakeholder Map

In Brockville, many stakeholder agencies play a role in promoting active transportation. For the purposes of this report, stakeholders will be classified as **primary stakeholders** – those whose mandate and purpose is directly related to the overall goals of the Active Transportation Plan, and **secondary stakeholders** – groups who support active transportation but may not see support for walking, cycling and wheeling as core to their operations.

Stakeholder name	Description
City of Brockville	The City of Brockville provides support to many of the ongoing efforts to improve active transportation in the City. Whether it is engineering support for new designs, institutional support for some of the various municipal advisory committees or operational support for events in the community, the City has a significant role to play.
Brockville Cycling Advisory Committee (BCAC)	The BCAC organizes and delivers several events each year, including a Slow Ride event and Coffee Rides
Brock Trail Committee (BTC)	A committee of community volunteers tasked with the Mission to assist in the further development, enhancement and promotion of the Brock Trail within the City of Brockville.
Leeds, Grenville and Lanark District Health Unit (LGLDHU)	Injury Prevention and Physical Activity are key elements of the Health Unit's mandate, which supports active transportation within the communities of Leeds, Grenville and Lanark. The Health Unit plays an active role in expanding knowledge about active transportation and creating programs to make active transportation safer and more accessible
Walking School Bus Committee	Funded by the Ontario Active School Travel Fund, the Walking School Bus initiative in Brockville aims to provide three schools in the community with a healthy, safe and active way for children to get to school.

Table 10. Primary stakeholders

Brockville Police Service (BPS)	Extensive work on road safety and community outreach has been done by the BPS, including assisting with many events and hosting numerous educational events such as bike rodeos and youth bike clinics.
Cycling Without Age Brockville	Recently purchased their second Trishaw, providing access to residents of an assisted living facility to get out and enjoy the community by bike
Eastern Ontario School Mountain Bike Challenge (EOSMBC)	Though not located in Brockville, this annual event draws heavily from the Brockville area, hosting more than 100 students each year for a mountain biking event.

Table 11. Secondary stakeholders

Stakeholder Name	Description
Brockville Municipal Accessibility Advisory Committee	Provides feedback and assistance to make Brockville more accessible to all
Employment and Education Centre (EEC)	Works with clients to help in employment placement, including the provision of assistance in navigating transit and other transportation options to ensure access to employment
Every Kid in our Community	A coalition of agencies dedicated to ensuring that youth are healthy and successful in Brockville
Tourism Brockville	Promotes cycling and events taking place within Brockville with the goal of attracting more visitors to the region
Eastern Ontario YMCA	Delivers physical activities throughout the Eastern Ontario Region, including in Brockville.



Figure 47. Brockville Police Services worked with the Brockville Cycling Advisory Committee to lead the Slow Ride event (Photo: Doug George)



Figure 48. One of the Cycling Without Age Brockville bikes (Photo: Doug George)

Existing Conditions

Currently there are several programs already underway within Brockville to support active transportation. In this section, we document the existing programs and identify the lead agencies responsible for them. This section will also document some of the programs that have been run in Brockville in the past, but are not currently active.

Program	Description	Responsible Stakeholders
Slow Ride	A family-friendly cycling event designed to showcase	Lead: BCAC
	the Brock Trail	Support: Brock Trail Committee, BPS, Brockville Fire Department, Local businesses
Coffee Rides	Slow, social rides that start and end at a local coffee shop	BCAC
Eastern Ontario School Mountain Bike Challenge	Youth-focused mountain bike event at Limerick Forest	Lead: EOSMBC team Support: BCAC
Cycling Without Age	Trishaw bikes allow residents of assisted living facilities to get out as a passenger on a bike ride	Lead: Cycling Without Age Committee Support: BCAC
Walking School Bus	Students meet at a central location and walk together to school in a supervised, safe environment	Health Unit, BCAC City of Brockville, BPS
Tourism Brockville promotions	Local routes and attractions, including the 1000 Island Parkway and the Frontenac Arch Biosphere Reserve, are all linked on the Tourism Brockville website	Tourism Brockville
Safety Walk	Brockville Police lead walks with students to showcase different safety features – crossing train tracks, water safety, bike safety etc.	Lead: BPS Support: Health Unit
Brockville Police Safety Campaigns	Information shared in the community about new pedestrian crossovers, rules of the road and bike safety	BPS
Bike Rodeos	Basic bike handling and rules of the road offered to children in school and at special events	BPS
Community interventions by Brockville Police	In some areas of the City, BPS has engaged in more intensive relationship building with local youth, including offering bike maintenance clinics and safety equipment giveaways for youth in need.	BPS
Bike Valet at Special Events	At special events, bike valet service provided attendees with a safe, staffed option to park their bike	BCAC
Brockville Library Bike Loan Program	Three "Bibliobikes" are available for loan at the Brockville Library, including a lock and a helmet, for up to 2 days to library card holders over the age of 18	Brockville Public Library

Table 12. Existing and past programs

Cycling Encouragement and Assistance	The Employment and Education Centre has purchased bikes from the Brockville Police Service's annual auction, and has made them available to clients. They have also helped to winterize the bikes and plan routes for clients	Employment and Education Centre
--------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------

Brockville's existing programming to support active transportation is extensive – highlighting the strong and growing interest in increasing access to active transportation within the community. With some new institutional supports for active transportation in Brockville, the community could well become a leader among its peers in Ontario with regards to active transportation programming.

Programming Recommendations

Brockville's active transportation programming is the result of strong partnerships and dedicated volunteers, all of which would be significantly bolstered by the provision of both staffing resources at the City level and promotional budgets for events and organizations who work to foster a stronger culture of active transportation. This section will outline suggestions for new programs to support active transportation, and is divided into 4 groups: **Staffing and Funding**, which lays the foundation for the remaining groups; **Scaling Up**, which identifies existing programs that could be expanded to reach a larger segment of the population in Brockville; **Sprints**, which are short-term actions that could be added to the City's programming portfolio; and **Long Hauls**, which have the potential to provide transformational change within Brockville, but may require time to get started.

Staffing and Funding

Key to the implementation of this section of the Active Transportation Plan will be the provision of additional staffing resources to help in the coordination of new and existing programming efforts. It is suggested that the City create a part-time, seasonal Active Transportation Coordinator position, potentially as a March-October Contract to assist in the delivery and coordination of these programs. A similar position was established in Saugeen Shores, Ontario, which resulted in the rapid development of new programs and supports for active transportation in that community.

In addition to expanding the staffing capacity for active transportation at the City, it is suggested that the City create an Active Transportation Programming budget to support the work of the BCAC, Brock Trail Committee and other stakeholders in a more formal way. This budget can be used to deliver educational messages, train cycling instructors, invest in new bike parking and more as directed by the BCAC, City Staff and other stakeholders. It is suggested that the City start with an annual budget of \$20,000 for programming to support active transportation measures, with the potential of increasing the budget as the culture of active transportation in Brockville grows.

Scaling Up

All of the programs suggested in this section are programs that either currently or have previously existed in Brockville. The capacity to deliver these programs is already in place, but some of the stakeholders may not have connected to see how each could support the work of the other with regard to each individual program. This section is meant to serve as a guide for how stakeholders can connect with one another within Brockville to take the existing programs that they have and make them more successful and impactful.

Bike Valet

With the large number of special events and festivals that take place in Brockville, particularly those that take place in the downtown area where parking space is limited, there is very strong potential to use Bike Valet as a means of both reducing parking burden at events and inducing new riders to try cycling within Brockville. Consider requiring bike valet at every special event in the City as part of the special events permitting process, especially during the period of time when the AT Coordinator is on staff in the City. Host bike valet at the local farmers market to build awareness of the service at larger events, and consider offering incentives such as discounted entry for those who use the service to help build up the usage as the program becomes more well known.

Lead Agency: BCAC and City of Brockville Active Transportation Coordinator

Support Agencies: Local High Schools (to provide students for volunteer hours), Brockville Tourism, Brockville Farmers Market

Bike Rodeos

The Brockville Police Service has the capacity to deliver bike rodeos within the community, but in order to do so effectively, there is a need for other stakeholders to assist in the planning and set up of the events. This would be an ideal place for the BCAC and other stakeholders to collaborate, providing logistics support and additional human resources for the delivery of bike rodeos in the community.

Lead Agencies: BPS and BCAC - BCAC to organize logistics and set up, BPS to deliver Bike Rodeos

Support Agencies: Local Schools, Public Health

Cycling Mentorship

The Employment and Education Centre (EEC) and the BPS already have strong existing relationships with many individuals and community organizations, including the at the Bartholomew Hub. One of the biggest hurdles to getting someone to start a habit of active transportation is the lack of knowledge of safe routes, and the overestimation of the amount of time that it will take to travel to a destination by bike. With Brockville's compact geography, virtually any trip that starts and ends within the City limits can be done in 20 minutes or less by

bike, making cycling a much more efficient alternative to transit or taxis. Working with the BCAC to offer mentorship to individuals through the EEC, the BPS and the Bartholomew Community Hub where BCAC members help individuals to plan a safe route from their home to their regular destinations (work, grocery stores, community hubs, schools) and ride with them once or twice a week to help them learn the route and the rules of the road. Consider pairing this with the EEC's previous efforts to provide clients with bikes, providing them with mentorship in addition to equipment to make cycling an easier and safer choice.

Lead Agencies: **EEC**

Support Agencies: BCAC to provide cycling mentors, BPS to provide access to bikes from bike auction, Bartholomew Hub Staff to identify potential clients as mentees

Slow Ride / Social Rides

The growth of the Brockville Slow Ride shows that the community is keen to see an increase in social activities involving active transportation. It is suggested that the City work with the BCAC and the Active Transportation Coordinator to offer social rides on a biweekly or weekly basis during the summer. Consider promoting the rides through the bike valet at the Farmers' Market, and ensure that rides are hosted regularly so that people can come to expect that the events will happen.

Lead Agencies: BCAC and Brockville Active Transportation Coordinator

Support Agencies: Brockville Tourism, Local BIAs, BPS, Brockville Fire Department

Sprints

The programs listed in the "Sprints" section are those that can be instituted quickly, and with little expenditure of new resources. They can help to generate an increased sense of collaboration between stakeholders, and can help to generate momentum for active transportation that can help to translate into broader community support for new initiatives.

Stress Mapping and Distance Mapping

With Brockville's compact geography, most trips made in town are easily doable in under 20 minutes by bike, and many destinations lie within a 30 minutes walk of most areas of town. One of the challenges with promoting active transportation is that residents often assume that walking or cycling to a destination will take much longer than it actually does_(Sims et al., 2018). That knowledge gap can be fixed, however, by promoting the large area of town that lies within a 5, 10 and 15 minute bike ride of popular destinations like the Downtown Core, Community Centres, the waterfront, Brockville General Hospital and the schools in the community. An excellent example of these types of visual displays can be found below, from the City of Peterborough. Consider creating similar maps and posting them in prominent locations to show residents that riding their bikes or walking to their destinations would be a healthy, quick option to get around the community. Consider taking this initiative one step further, highlighting the "low stress" routes for people cycling and the accessible routes for people walking or wheeling, to provide people with an easy visual reminder of the most comfortable way to access their destination using active means.



Figure 49. "It's Closer Than You Think" Map from the City of Peterborough

Lead Agencies: BCAC, BMAAC and Brockville Active Transportation Coordinator

Supporting Agencies: BIAs, Brockville Tourism

Bike Month

As this plan moves forward, hosting a Bike Month in Brockville is a great way to bring cycling to a much larger audience. Expanding the number of events and programs offered during one single month can help to create a conversation about cycling in the community and can provide the push for people to get back on their bikes and give cycling a try in a way that events interspersed throughout the cycling season cannot. Maximizing the number of events during Bike Month can help to target the "interested but concerned" population of potential riders in Brockville, and can build a strong sense of community around cycling. Consider partnering with partners at the LGLDHU, the local Rotary Club and local bike shops to offer weekly guided bike tours around Brockville during Bike Month, and expand the offerings of events to ensure that June is a month-long celebration of cycling in Brockville. Consider hosting the Annual Slow Ride at the end of Bike Month as a finale, and a way to culminate the success of the month.

Bike Month Planning guide

Planning and delivering a Bike Month doesn't have to be a huge undertaking. By bringing different partners and interested community members together, a community can create a great Bike Month without placing the burden of organizing multiple events on any one stakeholder.

Step 1: A Bike Month Committee

The most important aspect of a good Bike Month is to have multiple stakeholders participating. By spreading out the work across many partners, you can create a full Bike Month schedule without unduly burdening any one organizer. Suggestions for stakeholders to invite to your Bike Month Committee are:

- Local Cycling Clubs
- Local Bike Shops
- BCAC
- Brockville Police Service
- Public Health
- Municipal Events / Active Transportation Staff
- Large Employers
- Service Clubs (Rotary, Lions, etc.)

It is suggested that you begin hosting Bike Month Committee meetings in March or April to give the group enough time to plan events during late May and June.

Step 2: Build your Calendar

A great Bike Month can be achieved with as few as 4 events over the span of the month – one event each week can help to keep cycling on the agenda and give residents multiple opportunities to engage in cycling in a positive way. Consider "bookending" your Bike Month with more significant events – for example, a complimentary Bike to Work Day Breakfast at City Hall to start the month and a Brock Trail Slow Ride to end it. Intervening events can be smaller and easier to organize – for example, host a community coffee shop tour, a trail ride, a bike repair workshop or a "dust off your bike" event where bike mechanics volunteer their time to be on-site for basic repair (inflating tires, greasing chains) for bikes that have been in the garage for a little bit too long. For more ideas about events that could be hosted, see these <u>Bike Event "Recipe Cards"</u> for inspiration. Empower interested residents to plan and lead the rides to reduce the planning burden on municipal staff.

Step 3: Promote your Events

Producing a printed calendar of events to distribute around the community can help to reach residents that might not know about the events otherwise. Be sure to make use of the networks of your key stakeholders, including BCAC and the members of your
Bike Month Committee, to spread the word. Publish each event to the Bike Month website (if you have one), and work with local partners to produce a regional Bike Month Calendar.

Step 4: Evaluate

Be sure to document the results of your Bike Month. Track the number of people that attend the events, gather feedback from them about where they heard about the event and what types of things they would like to see in the future. This type of feedback can be a significant benefit when planning subsequent Bike Months!

Lead Agencies: BCAC, Brock Trail Committee and Brockville Active Transportation Coordinator

Supporting Agencies: Service Clubs, BPS, BIAs and local businesses, Brockville Tourism, LGLDHU

Cycling Instructor Training

In order to deliver high-quality cycling education, it is recommended that the City invest in training for new cycling instructors for the first 2 years of this plan. By training certified instructors, Brockville will ensure that courses are taught in a consistent fashion that meets existing cycling education standards. In order to deliver cycling education throughout the community, it is recommended that the City invest in **2 cycling instructor** training courses within the first 2 years of this plan, training up to a maximum of 12 Instructors. Having a large instructor pool will provide Brockville with the option to run new cycling education programming into the future, and is an investment in the long-term sustainability of the City's educational efforts.

In order to be able to deliver cycling education in an effective manner to a variety of audiences in the Community, it is recommended that the town focus on training at least one instructor from the following groups:

- Women
- Seniors
- School teachers
- BPS Officers
- Bilingual residents
- Town Parks and Recreation Staff
- EEC Staff

By having each of these groups represented in the pool of certified instructors, the City increases the likelihood that the various communities represented within Brockville can find a cycling course that is being taught by someone that they can relate to.

Lead Agencies: BCAC, Brockville Active Transportation Coordinator

Supporting Agencies: LGLDHU, Eastern Ontario YMCA, BPS, EEC

Long Hauls

Bike Share

Bike Share systems have evolved very rapidly in the past 5 years, and are now flexible enough to accommodate cities of any shape or size. With its small geographic size and relatively high density, Brockville could be an excellent candidate for a small-scale bike share program. The latest version of the ITDP Bikeshare Planning Guide, updated in 2018 is a good primer to reflect the changing nature of bike share systems (ITDP, 2018).

Open Streets

Open Streets events are expanding across North America, giving residents a chance to experience their community at a more human scale. An Open Streets Event is different from a traditional street festival in that the priority for the event is



Figure 50. Dockless bike share bikes in Kingston, ON

not constant activity along the corridor, but rather the creation of a temporary linear "park" along public spaces that are normally used primarily for moving motor vehicles. Best practices for Open Streets Events are to create activity nodes connected by stretches of road or trail that are closed to vehicular traffic, providing residents with the space to move, explore and enjoy their community at a human scale. Look to incorporate the Open Streets idea into existing community events which already focus on the pedestrian and community experience, and to create new opportunities for Open Streets events where community members can explore their City on foot or by bike. For more information about best practices for Open Streets Events, see this guide produced by 8-80 cities here: http://www.healthiestpracticeopenstreets.org/.



Figure 51. More frequent open street events could help engage residents and visitors with how they get around the City (Photo: Brockville Tourism)

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Appendix 1. Official Plan

- 4. The City shall achieve higher transit usage by supporting improvements in service, convenient access and good urban design, including the following:
 - i. minimizing walking distance to planned and existing transit stops through measures such as the provision of walkways, sidewalks and more direct street patterns;
 - ii. connecting transit stops directly to sidewalks and adjacent buildings in the Downtown and Central Waterfront Area;
 - iii. providing bus bays, transit shelters and bus loops with sufficient lighting;
 - iv. directing medium- and high-density urban development to transit corridors;
 - v. creating a system of parking and drop-off facilities for commuters;
 - vi. providing transit service on mid-block collectors;
 - vii. giving priority to pedestrian and cycling access to transit through site plan control by providing access to transit facilities, on-site cycling facilities, and on and off-road trails and cycling routes; and
 - viii. requiring all new development applications to demonstrate the proposal's approach to mobility and transit.
- 5. The City shall encourage the Township of Elizabethtown-Kitley to work with the City to provide a viable transit services for individuals traveling into and within the City.

5.2.5 ACTIVE TRANSPORTATION SYSTEMS

A shift towards active lifestyles and increasing demands for sustainable modes of transportation presents a need for a useful and accessible walking and cycling network in the City. This Plan recognizes that bicycle and pedestrian trails and paths contribute to healthy communities and supports such sustainable modes of travel. The City encourages the development and enhancement of pedestrian and shared use of non-motorized trails and bicycle routes.

It shall be the policy of the City that:

1

2

3

4

5

- 1. The City shall work towards providing safe bicycle and pedestrian paths, both separated from the roadway, on existing and proposed roads, on abandoned rail corridors, and within parks and open spaces, as appropriate.
- 2. The City shall consider adapting roads to provide safer travel for bicycles and pedestrians on road pathways, where feasible and appropriate.

- 3. The City shall undertake to complete connections along the Brock Trail, including the Waterfront Trail System, and to interconnect existing walking trails and bicycle paths to the Brock Trail, where feasible and appropriate to provide continuous trail system linkages. Routes should provide continuous access between both the north and south-ends of the City in Neighbourhood and Neighbourhood Development Areas, Parks and Open Space Areas, Institutional Areas, the Downtown and Central Waterfront Areas, and Mixed Use and Commercial Areas.
- 4. The City shall undertake to complete extensions to the Brock Trail at the west and the north to the Mac Johnson Wildlife Area.
- The City shall promote accessible and convenient trail systems within a reasonable distance from the all of the City's larger Parks and Open Space Areas and from the Downtown and Central Waterfront Area.
- 6. The City shall ensure that trail and path systems provide places to sit, and include the use of diverse paving, high quality landscape materials, and pedestrian scaled directional lighting.
- 7. The City shall promote aesthetically pleasing trail systems, particularly for recreational purposes. Particular attention shall be given to trail systems associated with natural assets including the waterfront, parks, and natural features.
- The implementation of trail systems shall be feasible given the consideration of the costs and benefits associated with the route selection. This shall take into consideration healthy lifestyles, sustainability, and the quality of neighbourhood character.
- 9. The City shall encourage the integration of bicycle path and walkway systems into the design of transportation facilities by including facilities such as sufficient and protected bicycle storage areas at places of employment and major community, institutional, educational, cultural and shopping locations, where appropriate.
- 10. The City shall implement and operate an effective trail system maintenance program.
- 11. The City shall promote opportunities for public access to the waterfront and the development of a continuous waterfront trail system and open space linkages along the St. Lawrence River.
- 12. The City shall support the creation of the primary bicycle network as identified on Schedule 5.

5.2.6 RAIL SYSTEMS

The City supports the continuation of a safe and efficient railway network within the City and the rail station as an intermodal facility. Development adjacent to railways shall be carefully controlled to eliminate land use conflicts and ensure the safe and continued operation of the rail line.



BROCKVILLE			
official plan			
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Schedule 5			
Active Transportation Network			
Legend			
Brock Trail			
Future Brock Trail			
Potential Spine Cycling Routes			
Potential Neighbourhood Cycling Routes			
Waterfront Trail			
Provincial Highway			
Railway			
===== Future Roads			
U U.5 1			
Schedule will be read and interpreted in conjunction			
with the Official Plan in its entirety.			
Approved by MMAH February 9, 2012			

Appendix 2. Public Engagement Materials and Results

Brockville Active Transportation Plan



The City of Brockville wants to make it safer and more convenient for residents to walk, cycle and access transit within the community.

Whether it's your neighbour going for an evening walk, a family biking to the park, walking down the street to the store, taking the bus to work, or children walking to school, people use active transportation for a variety of trip types.

The plan will propose new infrastructure and outline where improvements should be implemented to support people walking and cycling. Some examples of improvements are shown on the other side of this page. The plan is not about one street in particular, but focused on how all the walking and cycling infrastructure in Brockville works as a network.

The City wants to promote active transportation because it:

- Supports health and well-being
- Is inclusive of different ages and abilities
- Is a fun way to get around
- Reduces congestion
- Has lower environmental impacts (noise and air pollution)

We want to hear from you!

- Where are places that you walk or bike to?
- > Where do you want to walk or bike to?
- What are things that prevent or discourage you from walking and biking?
- Where are these barriers?

You can share your thoughts on our interactive map!

Learn more about the plan and share your experiences and ideas at: <u>www.brockville.com/activetransportation</u>

For more information contact Matt Locke, 613-342-8772 or mlocke@brockville.com



Walking along the Brock Trail



People walking along King Street



What are examples of walking and cycling improvements?

To help think about what improvements for walking and cycling could look like, here are some examples:



Multi-use Pathway (Ottawa, ON)



Raised Cycle Track / Bike Path (Kelowna, BC)



On-road Protected Bike Lane (Hamilton, ON)



Buffered Bike Lane (Toronto, ON)



Unbuffered Bike Lane (Ottawa, ON)



Traffic Calming (Kelowna, BC)



Sidewalk with Furnishing Zone (Toronto, ON)



Pedestrian Crossover (Brockville, ON)



Raised Crossing of Pathway (Ottawa, ON)





















What should be the top 3 focuses of this plan?

- 1. Expanding network proposing new walking and cycling facilities throughout the City of Brockville
- 2. Connectivity enhancing connectivity and crossings of existing facilities
- 3. Maintenance providing recommendations for maintenance of existing trails

Memorandum



45 Spencer Street, Unit 101 Ottawa, ON K1Y 2P5 (613) 319-0336 www.altaplanning.com

Re:	City of Brockville Active Transportation Plan – North End Spine Network Concept Memo
	Nataliya Pekar, EIT., Alta Planning + Design
Cc:	Conal Cosgrove, P.Eng., Director of Operations, City of Brockville
From:	Kate Whitfield, P.Eng., MCIP, RPP, Alta Planning + Design
То:	Matt Locke, Supervisor of Transportation Services, City of Brockville
Date:	September 26 th , 2019

Introduction

The City of Brockville is developing an Active Transportation (AT) Plan in order to address community needs for all non-motorized forms of transportation. The North End is a part of this plan. Defined loosely by the borders of Parkedale, Stewart, Centennial, and N Augusta, the North End has schools, churches, community centers, and residential, commercial, and industrial zones. The area already has active transportation assets, particularly the Brock Trail that connects Parkedale to Centennial. There are also challenges, including high accident intersections and higher stress cycling conditions. This memo will evaluate the North End for cycling improvement opportunities through evaluation of existing conditions, public engagement, and materials developed by the Brockville Cycling Advisory committee and provide a strategic approach to the northern streets as part of an overall goal for a connected and accessible network for all ages and abilities in the City of Brockville.

Background

The Laurier and Windsor corridors have been discussed from a planning level for cycling facilities for some time. The City's Official Plan (2012) identified Laurier Boulevard and Windsor Drive as "Potential Spine Cycling Routes". The Brockville Cycling Advisory Committee identified Laurier Boulevard as a "Quiet On Road or Bicycle Lanes Cycle Route" and Windsor Drive as an "Experienced On Road Cycle Route" as part of their planning exercise. A resident petition was developed by a group of residents that were opposed to a proposal for bike lanes on the street. A resolution was achieved by having the Active Transportation Plan specifically review these corridors and include the group opposed to the bike lanes as a stakeholder.

Active Transportation Network

The AT Plan includes a Proposed Cycling Network Map as well as additional background information on how the network was developed (i.e., existing conditions, related municipal policy, community engagement, and technical analysis). As represented in the network map, two designations are used to establish the network. These are the Spine Network and the Connector Network and are defined below.

Spine Network

- Reaches all parts of the city
- Is a connected network
- Corresponds with origins (demand) and destinations
- Has higher order of protection for people on bikes
- Is a priority for investment

Connector Network

- Helps people to get to and from the Spine network
- Is a lower priority for implementation, maintenance, and operations

Overall, using the Spine and Connector designations, the creation of the active transportation network is based on a set of principles which reflect priorities for the City of Brockville. These principles are to

- Continue investment in the Brock Trail
- Improve walkability on commercial corridors such as Parkedale
- Implement intersection and crossing improvements
- Focus on implementation around schools
- Implement a network in JG Broom Industrial Park
- Support walking to transit
- Implement east-west cycling connections
- Support connections to adjacent communities
- Consider tourism opportunities

Spine Network

In the North End, there are a number of streets to be designated as part of the Spine Network. These routes were selected based on the criteria defined above, namely developing a connected network with direct routes to and from key areas of demand, with a focus on reaching schools. The Spine Network in the North End also compliments a larger network with decision-making ensuring that cycling routes are available at regular intervals and that they correspond to priorities developed in the Official Plan Schedule 5. The Spine Network designates priority for investment and maintenance and includes a range of potential higher-order and standard facility types, these are multi-use trails, multi-use paths, protected bikeways, buffered bike lanes, or local street bikeways.

Purpose of the Memo

Given that the Cycling Network includes a number of North End streets as Spine routes, this memo will present concepts to visualize options for these streets. In addition to facility options, the memo will provide a strategic path forward on implementation and impacts, particularly for Windsor and Laurier. The analysis shown will place the North End in context, detailing existing conditions, summarizing engagement feedback, and providing options for next steps that prioritize connectivity, higher quality cycling facilities, intersection improvements, best practices, and safety for all. A particular focus is placed on clear east to west and north to south connectors, strengthening tie-ins to the Brock Trail, and prioritizing investments to streets that connect origins to destinations such as schools, shopping centers, churches, and recreation areas. These streets are shown in Figure 1 below.



Figure 1: Draft Proposed Cycling Network

North End in Context

The following summary of existing conditions in the North End is a combination of both derived data on volumes, roadway conditions (Table 1), and general analysis, as well as information gathered from engagement.

Category	Laurier	Windsor	
Road Classification	Arterial Street		
Speed Limits	50 km/h	50 km/h,	
	52.5 km/h 85 th percentile speed	40 km/h: 32.8 m north of Parkedale to 4.5 m	
		south of Peden when safety zone lights flashing ⁱ	
AADT	7000+	5000+	
Trucks Prohibited	Stewart to California ⁱⁱ		
Snow Clearing	High Priority – bare at 24 hours past storm completion, 5 cm max before plowing ⁱⁱⁱ		
Intersections	Pedestrian Crossover at Bridlewood	Signalized at Parkedale	
	Signalized at Stewart and at California		
	4-way stop at Windsor		
Courtesy	Kensington – east side	Durham – north side	
Crosswalks	Dana – west side	Cuthbertson – south side	
	Flanders – west side		

Table 1: Existing Roadway Conditions in the North End

Bus Routes ^{iv}	Blue Route – hourly from 7 am to 6 pm	Blue Route
	on weekdays, 9 am to 6 pm on Saturday,	Yellow Route – hourly weekdays from 7 pm to 9
	15-minute peak period routes	pm
	6 school bus stops	
Road Width	Approximately 13 m curb to curb	Approximately 13 m curb to curb
	11 m between Kensington and Peden	
	7.5 m section east of California	
Sidewalks	No sidewalk: Bridlewood to California	No sidewalk: Centennial to MacKenzie
	One side: Peden to Bridlewood	One side: MacKenzie to Cuthbertson
	Both sides: Stewart to Peden, 44 m west	Both sides: Cuthbertson to Parkedale
	of Windsor	
Pavement	Good to Excellent	Fair
Condition ^v	Poor from C.P.R. to Broome	Good to Excellent from Duke to Centennial
Parking ^{vi}	No Parking At Any Time:	No Parking At Any Time:
	41 m W of Stewart to W Limit of St (S)	21 m S Bethel Christian Church to 45 m N (E)
	45 m W of Peden to Stewart (N)	Durham to 49 m N (E/W)
	53 m W of Stewart to W Limit of St (N)	Durham to 9.5 m S (E/W)
	Windsor to 23.5 m Westerly (N)	Laurier to 36 m S (W)
	Briarwood to 38.4 m W (S)	PXO at Cuthbertson to 18 m N (W)
	No Stopping Anytime:	Laurier to 60 m S (E)
	27 m E of Borden to 32 m E (S)	Parkedale to Peden (W)
	Windsor to 59 m W & to 37.5 m E (S)	
	Windsor to 57.5 E (N)	
	No Stopping for 7 am to 5 pm M-F	
	28 m E of Borden to 33 m E (S)	

Along the Laurier and Windsor corridors the roadway cross-section varies, but a sample of the existing condition is depicted in Figure 2. There are varying traffic signs conveying instructions to drivers and pedestrians, of particular note is a "high accident intersection" sign at Windsor and Laurier. There is also a Canadian Pacific Railway crossing near the Brock Trail. The City of Brockville has defined parking rules outside of specific prohibitions defined in Table 1, these are no parking within (a) 6 m of a crosswalk and (b) 3 m of any fire hydrant, or, where signs are on display, (a) within 30 m of a pedestrian crossover on both sides, (b) within 50 m or less of an intersection, and (c) within 50 m of a crosswalk at a signalized intersection, within 15 m of a signed bus stop, or 3 m of a railway crossing, or, where signs are on display, within 50 m or less of an intersection^{viii}.





Engagement with residents and citizens yielded information regarding the way people use the streets and move through the North End. On church days and for events, high parking utilization is reported by residents. Similarly, visitors to the soccer fields at Memorial Park park on the south side of Laurier east of Windsor. Movement to schools is highly concentrated between Kensington and the three schools west of Windsor and south of Laurier, these are St. John Bosco Catholic School, Vanier Public School, and Thousand Islands Secondary School. The comments provided correspond well to the completed Demand Analysis shown in Figure 3. For more information about the demand map, refer to the AT Plan.



Figure 3: Excerpt from City of Brockville Demand Analysis

Engagement Results

Discussions on the installation of cycling infrastructure on Laurier and Windsor have been underway for a number of years. Written submissions to municipal staff, delegations, and committee reports have been utilized as background material for the development of the overall AT Plan. During the consultation process for the plan, additional feedback was obtained through stakeholder meetings, pop-up engagement events, on-line consultation (including an online interactive map), and additional written submissions to municipal staff. The following is a high-level summary of the feedback received:

- General concerns of
 - Speeding on Laurier and Windsor
 - o High volume of vehicles on the streets
 - o Trucks on both corridors despite restrictions
 - o Volume, frequency, and safety for school buses
 - o Unsafe conditions at intersection of Laurier and Windsor
- Also heard that
 - School walking groups have challenges getting to their drop-off points
 - People want an option to be able to comfortably cycle downtown
 - Parking is utilized during events, at places of worship, and south side of Laurier at soccer fields
- Cycling infrastructure concerns of
 - o Driveway access implications
 - Safety when reversing out of driveways
 - o Loss of street parking for holidays, visitors and service vehicles and which side will have parking
 - o Damage to property due to cyclist collisions with parked vehicles
 - Accommodation of ambulances, fire trucks, and school buses
 - Winter maintenance and access for snow ploughs
 - Garbage bin placement
 - Fading of paint for cycle lanes
 - How the parking lane will function alongside bike lane when parking is not utilized
 - Aesthetics of a bikeway and whether it will look nice
- Infrastructure comments that
 - o Existing volumes do not warrant cycling infrastructure
 - Cyclists should ride on sidewalks
 - Existing conditions do not pose a problem for cycling and there are no bike-related accidents
 - Wide shared lanes are sufficient for cycling
 - There is not a clear interest in adding sidewalks where they are not currently placed
- Public suggested interventions and ideas to
 - o Define parking bays to narrow the road
 - o Install raised cycle tracks
 - o Ban trucks
 - Increase speed enforcement
 - o Use greenbelt behind houses north of Laurier between Kensington and Fitzsimmons Drive
 - Signalize intersection of Laurier and Windsor
 - o Install crossover at Laurier and Kensington for school crossing
 - o Implement multi-use pathway on east side of Windsor
 - Use bi-directional over parking protected (note: parking protected is seen as unsafe and complicated)

Approach to North End

The following section will summarize technical guidance used to develop recommendations, discuss the approach to concept development, and present concept maps for the key North End streets.

Guidance Documents related to Cycling Facility Selection

Before presenting the various concepts for the North End streets, a brief discussion focused on guidance documents has been prepared. These documents represent best practice and inform concept development.

Transportation Association of Canada

The Transportation Association of Canada (TAC) published an updated Geometric Design Guide (GDG) for Canadian Roads in 2017^{ix}. The TAC GDG Section 5.4 provides a selection framework for bikeway facilities. The GDG defines a "design user group" for which design recommendations are intended. This design user group "represents the broader range of bicycle riders for whom many municipalities and provinces/territories are striving to design appropriate bicycle facilities" and "typically embodies the widest practical range of ages and abilities." The GDG references AASHTO's "Casual and Less Confident" riders and Rick Geller's "Interested but Concerned" riders to define the majority of cyclists and the design user group. Such cyclists typically only ride on low-traffic streets or separated paths and feel significant barriers to riding on shared roadways. Planning for this defined user group is consistent with an approach to build facilities for all ages and abilities.

Figure 4 (Figure 5.4.1 in TAC GDGCR) utilizes motor vehicle speeds in identifying a suitable facility. Black-shaded ranges identify a suitable facility while grey-shaded ranges may be appropriate dependent on context such as vehicle volumes for which additional guidance is provided below. The speed used is the roadway posted speed and motor vehicle volumes used in this framework are average daily traffic in both directions of the roadway. For facilities on roads with 40-50 km/h (see Table I for information on Windsor and Laurier), black-shaded areas are shown for protected bike lanes and bike paths / multi-use paths. Generally, higher speeds correspond to increased separation for cyclist safety and comfort.



Figure 4: Excerpt from TAC Geometric Design Guide for Canadian Roads (2017)

For motor vehicle speeds between 30 to 50 km/h, the GDG states that "cyclists should be separated from motor vehicle traffic by a painted line at a minimum" and for 4000 veh/day or more (see **Table 1**), "protected bike lanes or bike paths/ multi-use paths are more suitable." Moreover, if there are heavy vehicles including transit buses, protected bike lanes or bike paths / multi-use paths should be used. For motor vehicle speeds of greater than 50 km/h, "cyclists should be separated from motor vehicle traffic by a physical barrier or be placed outside of the roadway cross-section."

Ontario Traffic Manual Book 18, Cycling Facilities

The Ontario Ministry of Transportation published the Ontario Traffic Manual Book 18, Cycling Facility in 2013 (OTM Book 18)^x. OTM Book 18 Chapter 3 includes a Bicycle Facility Selection Tool. OTM Book 18 recognizes that separation of cyclists and motor vehicles becomes increasingly important as traffic volumes and operating speeds increase. The selection and design of a cycling facility is a three-step process with guidance provided in steps 1 and 2:

- Step 1: Pre-select desirable bicycle facility type based on motor vehicle operating speed and ADT through a nomograph shown in Figure 5
- Step 2: Incorporate site-specific conditions to determine appropriateness of pre-selected facility

For a suburban environment with speeds (85th percentile) greater than 50 km/h, and volumes above 5000 AADT, the nomograph is generally in the red space, indicating consideration of an alternate road or separated facility such as an active transportation pathway in boulevard, buffered paved shoulders, or separated bicycles lanes or cycle tracks.



Figure 5: OTM Book 18 Facility Pre-Selection Nomograph

For Step 2, OTM Book 18 identifies primary and secondary design criteria to aid practitioners in making contextsensitive decisions. These criteria are summarized in a series of tables with recommendations provided corresponding to existing conditions. The following is a summary of primary and secondary criteria meant to provide a basic overview of Book 18 guidance, for all criteria and further information, refer directly to OTM Book 18 Chapter 3. An important note to address is the suggestion of wide curb lanes as an option in certain circumstances such as insufficient availability of space. In all scenarios, wide curb lanes are presented as a compromise or secondary option, where bike lanes or separated facilities are not feasible. Wide curb lanes are not cycling facilities in themselves, nor are they representative of a strategy to support cycling for all ages and abilities. Ultimately, they do not adhere to the principles of the Spine Network for priority investment and high order facilities.

Key relevant guidance is summarized below:

- **85**th **percentile motor vehicle operating speeds** (OTM Book 18 Table 3.1): for 50 to 69 km/h speeds an exclusive operating space for both bicycles and motor vehicles is recommended
- Motor vehicle volumes (OTM Book 18 Table 3.2): for 2000 to 10,000 vpd some level of formal bicycle facility is recommended
- Function of street, roadway or highway (OTM Book 18 Table 3.3): mobility roads such as arterials and major collectors recommend some level of formal bicycle facility such as a bicycle lane or separated facility

The following secondary criteria are also notable:

- Anticipated users in terms of skill (OTM Book 18 Table 3.8): child cyclists require separated facilities free of conflicts with motor vehicle traffic. Separated facilities should be considered near schools, parks and neighbourhoods
- Level of Bicycle Use (OTM Book 18 Table 3.9): low bicycle volumes (<10 per hour) wide curb lanes may be adequate in some cases. However, practitioners should carefully consider whether the low bicycle volumes represent a lack of cyclist demand or inadequate existing facilities
- Function of Route within Bicycle Facility Network (OTM Book 18 Table 3.10): new route that provides access to a neighbourhood, suburb or other locality should have bicycle lanes and separated facilities
- **On-street parking**: (OTM Book 18 Table 3.12): Parallel on-street parking is permitted but demand is low: Opportunities to remove, restrict or relocate parking in favour of providing bicycle lanes should be considered

Concept Development Assumptions and Options Discussion

Concept maps have been prepared for the North End Streets with a particular focus on Laurier and Windsor. There were a number of variables factored into the development of the concepts as presented. Primarily, it was understood based on public feedback that a proposal for an on-road protected bikeway (Figure 8) would be a challenging starting point. A similar assumption was made for raised cycle tracks along the full length of Laurier and Windsor, in addition to the cost-prohibitive nature of such a project in the short-term (Figure 13). However, raised cycle-tracks are a strong consideration for the long-term when their construction can be bundled with road reconstruction or sewer work. Significant public concerns regarding parking availability were a primary consideration in concept development and broad removal of parking was not a starting point. Where space permitted for provision of both parking and safe, accessible cycling facilities, parking was maintained. Information from engagement on key parking locations, as well as careful consideration of safety (ex. side street visibility), were also included in decision-making. With these challenges and considerations in mind, the following concepts provide a plan for installing on-road protected bikeways on the path towards raised cycle-tracks.

Ultimately, the concepts had to satisfy the requirement to design for all ages and abilities according to best practice. On-road protected bikeways with curbside parking and a painted buffer are not adequate for Laurier and Windsor and will not satisfy this standard (Figure 6). Due to the lower utilization of on-street parking, empty parking bays will prompt cyclists to ride near the curb as opposed to within the designated bike lane. The same result will occur with any exclusive use of paint to delineate a bike lane or shared lane, once the paint ultimately fades, the benefits of a dedicated facility will disappear and cyclists will ride near the curb. As such, some form of physical separation within a bikeway buffer is necessary on Windsor and Laurier consistent with recommendations from TAC GDG and MTO Book 18. While a bi-directional bikeway on one-side of a two-way road is not best practice, it can be an option depending on driveway position, type and position of intersections, land use, and need for an interim measure.



Figure 6: On-Road Protected Bikeway with Curbside Parking and Painted Buffer^{*i}

Overall, there is potential to see these concepts as a Complete Streets project and not a bikeway project, where benefits are widespread for pedestrians, traffic calming, street beautification, and safety for all modes.

Elements of the Concept Maps

In development of concept maps, which are found at the end of this memo, the roadway has been broken down into segments with corresponding proposals for each section. The segments were developed using the following rationale:

- The current roadway condition (i.e., parking permissions)
- The relationship of the segment to Existing Pathways and Key Roadway Connections
- The position of key intersections
- The potential to address issues identified through engagement (including the online interactive map)
- Ideas around implementation (i.e., logical start and end, sufficient length)

The segments are identified and described with a variety of labels. **Existing Pathways** have been highlighted on the maps to reflect an existing city asset where a gain could be made by improving the connection to this space. **Key Roadway Connections** are identified based on connections to a school, a direct path to another part of the City (ex. from Laurier to Peden to Windsor to Parkedale), a designated Connector or Spine route in the AT plan, and results of the live, work, and play analysis. **Intersection Concept** denotes where ideas are proposed for existing intersections to improve connectivity. For example, a change from a stop-controlled intersection with courtesy crossing to a 3-way stop-controlled. The concepts presented are high-level and would require additional engineering evaluation, but ideas shown here emphasize potential for improved connectivity and safety for all modes.

The legend includes a reference to where there would be changes to the existing parking condition. Where the red line is not shown and on-street parking is currently permitted, the concept plan represents no change. Specific reference to key parking rules in the parking by-law are included in the existing conditions summary.

Cycling Facility Selection

Several options are available for each type of street, with option selection reflecting best practices and existing conditions with regards to speeds and volumes. It is important to note that for a bikeway to meet the criteria of a Spine route in the AT Plan, a higher order cycling facility is required (i.e., multi-use trails, multi-use paths, protected bikeways, buffered bike lanes, and local street bikeways). For several segments, removal of parking on at least one side is necessary for provision of adequate space for all modes in accordance with best practice. The number of parking spaces removed would be confirmed as part of a detailed design process.

Segment 1 – Laurier: Kensington to Peden

The proposal for Segment 1 is as follows (refer to Map 1):

- North side Protected Bike Lane (note: parking currently not permitted from 45 m west of Peden to Stewart)
- South side Parking Protected Bike Lane (note: maintains existing parking on south side)

The focus for **Segment 1** is improving connectivity between Kensington and Peden, both of which provide key connections to schools in the area. During the engagement process, this section was identified as having a higher volume of school travel. Parking would be maintained along this segment with the exception of a section 45 m east of Peden to Peden as restrictions currently apply to 45 m west of Peden to Stewart on the north side. Map I includes an option to extend this segment westward which would bring cyclists closer to Stewart, as well as providing connections to and from residential areas along Tupper and a pathway to Brockmount Place. A concept is highlighted for the intersection of Kensington and Laurier to improve pedestrian access by implementing a full stop-controlled intersection. Public engagement included such a suggestion with reference to high volumes of school crossings and a desire for safer connections.

Figure 7 below includes a representative cross-section of the proposed bikeway and Figure 8 shows a sample photo.



Figure 7: Representative Cross-Section of Physically Separated Parking Protected Bikeway and Buffered Bike Lanes



Figure 8: Parking Protected Bikeway with Physical Separation (Middle St, Portsmouth, NH)

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The absence of permitted parking on the north side creates an opportunity for the City to implement an on-road separated bikeway in the near term. The north side would have a buffered bike lane with some form of physical separation and the south side would have a parking protected bike lane (also with physical separation within the buffer). Implementation on this corridor would allow for the City to evaluate installation of this type of facility and monitor impacts of material selection, installation and maintenance. Residents would experience using such a cycling facility from a variety of perspectives (riding a bike, walking, driving a car or bus, and parking a car).

Segment 2 - Laurier: Peden to Dana

The proposal for Segment 2 is as follows (refer to Map 2):

- North Side Parking Protected Bike Lane (note: maintains existing parking on north side)
- South Side Protected Bike Lane (note: parking removal chosen for south side due to visibility concerns at side streets and existing stopping restrictions)

The focus for **Segment 2** is improving connectivity to Peden, Borden and Dana via Laurier. Extension to Dana from Peden provides further school connections to Vanier Public School and St. John Bosco Catholic School via Borden and a pathway to the east. On-street parking would no longer be permitted on the south side. Currently, there are no-stopping restrictions 28 m east of Borden to 33 m easterly from 7 am to 5 pm from Monday to Friday. The south side was chosen for parking removal due to considerations for visibility at side streets and existing parking restrictions. Intersection improvements are also suggested for the corridor. Curb radii adjustments at Peden and Borden would reduce pedestrian crossing distances and slow vehicles down as they complete right turns. At the intersection of Dana and Laurier, an all-way stop is proposed to improve safety for at the existing courtesy crossing.

Figure 7 above is applicable to this section with the exception of the parking protected bikeway being positioned on the north side of the street. Figure 9 shows a conceptual plan view near Borden and Dana.



Figure 9: Conceptual Plan View of On-Street Parking Protected and Protected Blkeway

Segment 3 – Laurier: Dana to Windsor

The proposal for Segment 3 is as follows (refer to Map 2):

- North Side Protected Bike Lane (note: parking removal due to curb space restrictions)
- South Side Protected Bike Lane (note: parking removal due to curb space restrictions)

The focus for **Segment 3** is providing an improved connection to Windsor drive from Laurier as Windsor is designated as a key north/south route in the Spine Network. On-street parking would no longer be permitted on either side due to space restrictions at the curb. Due to the curvature of the street and the frequency of narrow driveways, parking cannot be accommodated on this segment. Currently, there are restrictions on both the north and south sides in the approaches to Windsor, specifically 23.5 m west of the intersection on the north side (no parking) and 59 m west of the intersection on the south side (no stopping). Intersection improvements are also suggested for the intersection of Windsor and Laurier, specifically to provide signalization, based on its designation as a high accident intersection (roadway signage) and numerous expressions of concern from the public through engagement. However, a warrant and traffic analysis should be done. **Figure 10** shows a representative cross-section.



Figure 10: Representative Cross-Section of Physically Separated Buffered Bike Lanes (No On-Street Parking)

Segment 4 – Laurier: Windsor to Briarwood

The proposal for **Segment 4** is as follows (refer to **Map 3**):

- North Side Protected Bike Lane (note: parking removal due to side street access and existing parking restrictions)
- South Side Parking Protected Bike Lane (note: parking to remain)

The focus for **Segment 4** is providing an improved connection along Laurier to Millwood, Briarwood, and westerly to Windsor. Millwood is included in the AT Plan and provides key connections to St. Lawrence College and a direct route to Parkedale. On-street parking would no longer be permitted on the south side. The south side is proposed to lose parking due to side street visibility as well as bus stops for the Blue Line which runs eastbound for Segment 4. Existing parking restrictions are present for 37.5 m east from Windsor on the south side, and 57.5 m east on the north side as well as 27 m west of Briarwood on the south side. Stopping is also restricted within 15 m of a signed bus stop. Curb radii adjustments are proposed for Millwood, Linden, and Briarwood to reduce pedestrian crossing distances and slow vehicles on right turns.

Figure 7 shows a representative cross-section.

Segment 5 – Laurier: Briarwood to Bridlewood

The proposal for Segment 5 is as follows (refer to Map 4):

- North Side In-Boulevard Bi-Directional Trail (Note: shoulder removed, potential to incorporate sidewalk)
- South Side South side parking remains for soccer field access

The focus for Segment 5 is providing a connection along Laurier to the Brock Trail and Bridlewood, both of which are incorporated in the AT Plan. The Brock Trail is an established route running from the North End to the lake and satisfies an expressed desire for routes into downtown from the engagement. This corridor is a candidate for a separated bi-directional trail due to absence of intersections along the stretch. Several factors determine whether to locate the facility on the north or south side, including available right-of-way, existing sidewalk, ditches, utility poles, and community feedback. The configuration shown removes shoulder parking on the north side, retaining it on the south side due to feedback indicating frequent use for access to the Goldie Christopher Ball Park Soccer Fields. Locating the facility on the north side also provides an opportunity to extend safe pedestrian access with a sidewalk or a multi-use path from workplaces (438 and 458 Laurier) to transit stops. Switching the position of the trail and parking is also an option that can be explored in future detailed design. Another option is to provide both parking and the trail on the south side, utilizing an opportunity to acquire space from soccer fields property, where not constrained by the ditch. If the design were to remain within the existing right-of-way, it would likely result in needing to shift the centreline of the roadway to accommodate the trail, parking, and a lane of traffic on the south side. Moreover, where parking is placed beside a trail, a buffer is required between the two to prevent vehicle encroachment onto the trail and to protect from dooring. Consideration must also be made to ensure feasibility of extending the bi-directional trail east past the fields to California Avenue. Detailed design will need to address constrained areas in all configurations due to a row of utility poles on the north side and ditches on both the north and south sides.

Intersection improvements may be warranted for Briarwood to allow for a safe transition between a unidirectional and a bi-directional facility. Both controlled and uncontrolled crossings would be an option for this transition. Implementing a controlled crossing, such as stop/yield signs or intersection pedestrian signals (IPS) would provide cyclists (and pedestrians) the right-of-way, resulting in a more comfortable condition for all ages and abilities. In such a scenario, a crossride would be provided with the addition of bike signals at an IPS. OTM Book 12 and OTM Book 15 should be consulted for whether traffic signals are warranted. While controlled crossings provide comfort on roads with higher speeds, they are costly and may introduce delay. At an uncontrolled crossing, where cyclists do not have the right-of-way and must look for gaps in traffic, a crossride or green surface treatment would not be provided, but a median refuge island can be considered to reduce crossing distances. While uncontrolled crossings for cyclists may be implemented adjacent to a PXO, this option does not require vehicles to yield to cyclists. Contextual factors regarding speed, crossing distance, sight distance, and volumes all contribute to whether an uncontrolled crossing is appropriate.

Figure 11 below shows a representative cross-section.





Segment 6 – Laurier: Bridlewood to California

The proposal for Segment 6 is as follows (refer to Map 5):

- North Side In-Boulevard Bi-Directional Trail (Note: shoulder removed, potential to incorporate sidewalk)
- South Side South side shoulder remains

The focus for **Segment 6** is providing an improved connection to along Laurier to California. California is included in the AT Plan and provides connections to commercial and industrial workplaces, retail and amenities both north to Centennial and south to Parkedale. A bi-directional trail is proposed on this segment to provide continuity easterly from Briarwood and due to absence of high-volume intersections or driveways. Bi-directional bike paths often offer installation cost-savings. There is also an opportunity to bundle provision for pedestrian on the north side to provide access to transit stops from workplaces along Laurier. Parking within the shoulder would be removed on the north side. However, the impact is reduced given dedicated parking provided by workplaces along Segment 6 as well as existing parking and stopping restrictions 50 m west from the signalized intersection at California and 50 m east from the railway crossing. Additional options for placement of the cycling facility and parking are explored in Segment 5.

Figure 11 above shows a representative cross-section.

Segment 7 – Windsor: Laurier to Peden

The proposal for Segment 7 is as follows (refer to Map 6 and Map 7):

- East Side Parking Protected Bike Lane (note: parking maintained)
- West Side Protected Bike Lane (note: parking removed)

The focus for **Segment 7** is providing an improved connection to along Windsor from Laurier to Peden. Access along Windsor to Durham and various pathways provide connections to Vanier Public School on the west side and two places of worship on the east side. On-street parking would no longer be permitted on the west side to allow space for implementation of uni-directional bikeways. Parking restrictions are already in place on the west side 36 m south of Laurier, 49 m north of Durham and 9.5 m south of Durham, and 18 m north of the PXO at Cuthbertson. Intersections improvements are also proposed for Durham St. Durham currently has a courtesy crossing across Windsor which can be altered to an all-way stop to provide safer crossing for access to schools and places of worship nearby.

Figure 6 shows a representative cross-section.

Segment 8 – Windsor: Peden to Parkedale

The proposal for Segment 8 is as follows (refer to Map 7):

- East Side Parking protected bike lane (Note: parking remains)
- West Side Protected bike lane (Note: parking removed)

The focus for **Segment 7** is providing an improved connection to Peden and Parkedale alone Windsor. Peden is included in the AT and provides connections north to Laurier and to Thousand Islands Secondary School. On-street parking would no longer be permitted on the West side to provide continuity from Laurier and due to existing restrictions from Peden south to Parkedale. Intersection improvements are proposed at Peden where no current crossing exists and Peden is stop-controlled. An all-way stop would provide safer connections for pedestrians and cyclists.

Figure 6 shows a representative cross-section.

Note on Implementation

For the North End plan, there is an opportunity to install incrementally. One incremental approach is to implement the plan in phases on priority corridors. This will allow for cost-efficiency as well as providing an opportunity for the City to evaluate decisions for material selection, installation, and maintenance while giving the public a chance to experience use of the facility from a variety of perspectives (cyclist, walker, driver, etc.). Segment 1 from Kensington to Peden with the optional extension, and Segment 2 from Peden to Dana on Laurier provide an opportunity for initial implementation of an on-road separated bikeway in the near term due to significant engagement focus on school routes and safety at crossings, as well as minimal parking and fewer driveway impacts. Another location that is a candidate for a phased approach due to proximity to schools and reduced parking and driveway impacts is Segment 8 from Peden to Parkedale on Windsor. Moreover, the intersection of Windsor and Laurier and implementation near Bridlewood and the Brock Trail on Segment 5 and Segment 6 provide opportunities for intersection improvements and broader connections to the City and existing assets.

As previously mentioned, another incremental approach is to install protected buffered bikeways with the intention to transition to raised cycle tracks upon road reconstruction or sewer work. Targeting full reconstruction opportunities for raised cycle tracks is consistent with treatment of these corridors in the Spine Network as high-priority and warranting higher order cycling facilities that accommodate all ages and abilities. Ultimately, the final phase would resemble the representative section in Figure 12 but several options would be available, including different boulevard treatments and different variations of sidewalk availability depending on the existing condition and type of cycling facility. Photo examples of raised cycle tracks are seen in Figure 13.



Figure 12: Representative Cross-Section of Raised Cycle Tracks with Parking on one Side - Full Road Reconstruction



Figure 13: Raised Cycle Tracksxiixiii

Separation Treatments for On-Road Protected Bikeways

The following section shows examples of physical separation options through photos. Separation types include parking lane, flex bollards, planters, precast concrete curb, cast-in-place concrete curb, rubber curb, jersey barriers, guide rail. A cycle track would have a mountable curb or a barrier curb. Figure 14 and Figure 15 provide examples of integration of bikeways with driveways where Figure 14 shows a parking protected bikeway at a driveway with physical separation, and Figure 15 shows a protected bikeway at a driveway without parking.



Figure 14: Parking Protected Bikeway at Driveway with Physical Separation in Winnipeg (Google Maps)



Figure 15: Buffered Bike Lane at Driveway with Physical Separation (Google Maps)^{xiv}



Figure 16: Planters (Demonstration Project)^{xv}



Figure 17: Multi-Use Path with Curb and Grassy Boulevard (City of Waterloo)



Figure 18: Cast-in-Place Concrete Curb



Figure 20: Rubber Curb^{xvii}



Figure 19: Flex Bollards + Plastic Curb^{xvi}



Figure 21: Pre-Cast Concrete Curb


Figure 22: Guard Rail

Figure 23: Jersey Barrier (SFMTA)



Figure 24: Landscaping + Surface Treatment + Parking Protected (Rosemead Blvd in Temple City)

Conclusion

The City of Brockville has requested a memo detailing concepts specific to the North End as an extension of the AT Plan. Development of the concepts drew heavily from principles established in the AT plan, particularly its designation of Spine and Collector routes, as well as an assessment of existing conditions in the North End, feedback from the public, and a technical analysis. Priority was placed on addressing and mitigating concerns expressed in engagement, namely those of speeding, unsafe crossings, and parking concerns. Suggestions have also focused on leveraging opportunities to provide cost-efficient options, take an incremental approach to providing a cycling network, and bundle opportunities for cycling improvements with improvements for safety and pedestrian infrastructure. By analyzing two key corridors within the Spine Network, Windsor and Laurier, segment by segment, the conceptual plan has visualized options for these streets. In short, the following two key recommendations are reflected in the memo:

- **Recommendation 1**: Development of a bikeway facility for **Segment 1** and option for **Segment 2** in the short term with the rationale that installation on these routes would
 - Connect where people live to schools and beyond
 - o Have minimal parking impacts due to existing restrictions
 - Allow people to experience a protected bikeway
 - o Provide a chance for the City to learn from implementation
- Recommendation 2: Progression towards including further segments with significant opportunities for connections to schools and minimal parking impacts, specifically the intersection of Windsor and Laurier, Segment 8 from Peden to Parkedale on Windsor, and development of connections near Bridlewood and the Brock Trail on Segment 5 and Segment 6 in order to
 - Incorporate intersection improvements
 - Connect to the rest of the City
 - Begin to consider implications of transition from interim measures to full raise cycle tracks

The recommendations presented are an acknowledgement of the need for the road to change. While raised cycle tracks are the ultimate target for Windsor and Laurier as part of the Spine Network, this goal will not occur overnight. Yet, the existing condition or implementation of painted lanes will not result in meaningful change or facilities that encourage bike riding, particularly among the "Interested but Concerned" who comprise the majority of the population. The AT Plan is a long-term vision, but achievable and incremental steps can be taken in the near-term to provide feasible and safe routes to school, libraries, places of worship, to the Brock Trail, or into downtown. Improving the street for cycling is an opportunity for slowing speeds, improving intersections for safety and access, street beautification, and extending pedestrian and transit access. In the end, a cycling plan for the North End is a chance for a Complete Streets approach where changes can provide benefits for all modes.

^{iv} City of Brockville. "Conventional Transit System."

^v City of Brockville. Traffic By-Law.

vi City of Brockville. Parking By-Law. (Amended March 2017)

^{vii} Ibid.

^{viii} Ibid.

^{ix} Transportation Association of Canada. *Geometric Design Guide for Canadian Roads*. (2017)

^x Province of Ontario. Ontario Traffic Manual Book 18. (2013)

xi ZICLA. "Understanding Bike Lanes." https://www.zicla.com/en/blog/bike-lanes-types/

^{xii} Maus, Jonathan. *The new cycle track on Cully*. May 19th, 2011. BikePortland, https://bikeportland.org/2011/05/19/riding-portlands-first-real-cycle-track-on-cully-blvd-53320

^{xiii} Google Maps

- xiv City of Burlington. "Union Street Protected Bicycle Lane." https://www.burlingtonvt.gov/DPW/UnionStreetPBL
- ^{xv} BikeNWA. "2018-2019 Pilot Projects." https://www.bikenwa.org/pilotprojects/#anchor-fay
- xvi City of Burlington. "Union Street Protected Bicycle Lane."

xvii BikeNWA. "2018-2019 Pilot Projects."

ⁱ City of Brockville. *Traffic By-Law*. (Amended May 27th, 2018) ⁱⁱ Ibid.

ⁱⁱⁱ City of Brockville. "City of Brockville – Snow & Ice Control."

https://brockville.com/index.cfm?ID=193&FAQID=183&showtext=no

https://brockville.com/images/sitepicts/Brockville%20Transit%20Map%202016.pdf



EXISTING: KENSINGTON STOP-CONTROLLED + COURTESY CROSSING

CONCEPT: ALL-WAY-STOP

KEY CONNECTIONS TO: - WINDOR DR - THOUSAND ISLANDS SECONDARY

Metres



EXISTING: All-WAY STOP CONCEPT: SIGNALIZED + CURB EXTENSIONS OR PROTECTED INTERSECTION



8783 588

WINDSOR DR CONCEPT SHOWN ON MAPS 6 & 7





MAP 4: LAURIER BLVD NEAR BRIDLEWOOD DR



----**SEGMENT 5 CONCEPT: NORTH SIDE - BOULEVARD BI-DIRECTIONAL TRAIL** (Note: Shoulder removed)

(Note: South side parking remains for soccer field access)

LAURIERBLVD

SEGMENT 5

370 m

EXISTING: PEDESTRIAN CROSSOVER

EXISTING TRANSITION FROM RURAL CROSS-SECTION (EAST) TO URBAN CROSS-SECTION (WEST)

Goldie Christopher Ball Park -Soccer Fields

TO:

0









Appendix 4: Facility and Unit Costing

To support the City of Brockville in planning for active transportation projects, this appendix includes costing resources. Facility costs are shown in Table 1 with associated assumptions regarding the scope of work. In addition, unit costs are shown in Table 2 to provide detail and allow for flexibility in altering facility costs depending on site or corridor-specific context.

The costs associated with the construction of protected bikeways include pavement markings, separation treatments, signage, thermoplastic, and additional traffic signals. Curb re-alignment and drainage works are associated with capital works project for road reconstruction or resurfacing.

Facility	Cost (per km, as part of road	Notes & Assumptions		
	reconstruction)			
Local Street Bikeway	\$65,000	 Sharrows every 75 m "Bike Route" sign every 400 m Speed humps every 150 m One installation of a mid-block choker or intersection diverter Excludes readway restripting (centerline removal) 		
Protected Bikeway: In- Boulevard Cycle Track	\$580,000	 I.8 m asphalt cycle track including sod, clearing, granular) Bicycle stencil every 200 m Bicycle signals (3 intersections per km) Includes utility relocation contingency Bicycle lane signs every 100 m Green Bike Lane treatment at intersections, assume 20 m x 2 m, 10 installations/km Excludes intersection reconstruction 		
Protected Bikeway: Protected Bike Lanes	\$210,000	 Bike lane and buffer including 3 m of paint per m Bicycle stencil every 200 m Bicycle lane signs every 100 m Bicycle signals (1 intersection per km) Concrete curbs and flexible delineator posts, assuming 30% gaps due to driveways and roadways Green Bike Lane treatment at intersections, assume 20 m x 2 m, 10 installations/km Excludes road restriping/lane conversion and intersection reconstruction 		
Buffered Bicycle Lane	\$70,000	 Bike lane and buffer including 3 m of paint per m Bicycle stencil every 200 m Bicycle lane signs every 200 m Excludes roadway tie-ins, road restriping/lane conversion 		
Multi-use Path or Multi-use Trail	\$390,000	 Solid yellow centre lane line for full length Shared use pathway signs every 200 m 3.0 m wide asphalt path (including sod, clearing, granular) Includes utility relocation contingency Excludes roadway tie-ins, lighting, access management (bollards) 		
Advisory Bike Lane	\$30,000	 Bicycle Stencil every 200 m "Bike Route" sign every 200 metres Bike lane markings and centerline Excludes regulatory signage 		
Unbuffered Bicycle Lane	\$40,000	 Bike lane line Bicycle stencil every 200 m Bicycle lane signs every 200 m Excludes roadway re-stripping/lane conversion 		

*all estimates include both sides of the road for uni-directional facilities

*all costs include contingency, engineering, contract administration, traffic control, and testing/external cost minimum unless otherwise specified

Table 2: Unit Costs (2019)

Feature	Unit	Unit Cost	Notes & Assumptions
Hydro Pole Relocation - Small with Wooden Post	each	\$ 10,000.00	\$10,000 to relocate wooden hydro poles is the minimum price, any other utilities on the pole the price will increase
Hydro Pole Relocation - Large with Concrete Pole	each	\$ 15,000.00	
Hydro Box Relocation	each	\$ 20,000.00	
Fire Hydrant Relocation	each	\$ 5,500.00	
Streetlight Relocation	each	\$ 7,500.00	
Bus Stop Relocation	each	\$ 5,000.00	
Pavement Marking	m	\$ 5.00	Striping, Thermoplastic
Bicycle Stencil Pavement Marking	each	\$ 250.00	Thermoplastic
Bicycle Signal Installation	per intersection	\$ 25,000.00	Mounted to existing signal pole
Signage Installation	each	\$ 300.00	
Concrete Sidewalk	m ²	\$ 77.00	
Diverter/Mid-Block Choker	each	\$ 15,000	Depend upon size, drainage, and landscaping infrastructure. Minimum cost shown for mid-block choker, one corner for bulb-out/curb extension/diverter
Rumble Strip	m	\$ 6000.00	
Pavement Marking Removals	m	\$ 3.00	
Asphalt Cycle Track (incl. sod, clear out, and granular)	m ²	\$ 82.50	
Installation of Speed Humps	each	\$ 2,500.00	
Clearing and Grubbing	m ²	\$ 8.00	
Replacement of Trees	each	\$ 500.00	Includes planting a single tree for every tree removed regardless of the size of tree removed
Guiderail Removal and Installation	m	\$ 180.00	
Retaining Wall	m ²	\$ 1,000.00	
Pre-cast Concrete Curbs & Flexible Delineator Posts	per m	\$ 45.00	Parking stops placed end-to-end (1.8m x 0.3m), plus two flex posts for every six curbs on one side of road
Green Bike Lane Treatment	m ²	\$ 60.00	CycleGrip Max thermoplast
Contingency (10%)			
Engineering (10%)			Includes engineering design
Contract Administration (5%)			
Traffic Control (5-10%)			
Testing/External Costs (min.			Includes engineering during
\$15,000)			construction
Utility Relocation (10%)			Applied to multi-use paths and in- boulevard cycle tracks