Town of Bridgewater
Active Transportation Plan
April 2020

town of BRIDGEWATER

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Executive Summary

The purpose of the Plan is to establish a vision, goals, strategies, and actions for improving active transportation (AT) policies, standards, infrastructure and programs in Bridgewater over the next 10 years. The plan is based in the principles of increasing the mode share of non-motorized transportation and reducing the town's overall greenhouse gas (GHG) emissions.

This document is broken into six parts:

Part 1: Introduction: outlines the Plan's purpose and objectives as well as the plan's development process. The plan guides staff and aims to accomplish the following objectives:

1. Update the policy framework for active transportation in Bridgewater
2. Increase awareness of active transportation in Bridgewater through promotion, education and community outreach
3. Improve the quality of active transportation with safe innovative design principles
4. Develop a safe and integrated active transportation network plan for Bridgewater
5. Set priorities for construction of active transportation infrastructure

Part 2: Vision and Goals identifies a vision to shape the overall future direction of the plan. The plan's vision is as follows:

"Walking, wheeling and cycling are safe, convenient and enjoyable ways to move around Bridgewater for users of all ages and abilities, and are a common part of everyday life."

Five supporting goals were developed to provide clear direction on how to achieve the Active Transportation Plan's vision. These are:

1. Improve safety for people using active transportation modes
2. Create more connections and places for walking, wheeling and cycling
3. Continue to build a culture of active transportation
4. Prioritize active transportation in the Town's capital and operations budget
5. Utilize active transportation to enhance quality of life as well as the quality of the natural environment

Part 3: Setting the Stage examines the economic, health, environmental, societal, and safety benefits of investing in active transportation infrastructure and supporting programs. It examines the Town of Bridgewater's demographic profile, including its comparatively high growth rate, as well as the supporting policy context, namely the goals and objectives

outlined in the Community Energy Investment Plan, Municipal Planning Strategy and Integrated Community Sustainability Plan.

Part 4: Community Engagement highlights the community engagement process used to develop this plan. In sum, the perspectives on walking and bicycling shared by residents were more about specifics for walking. Participants requested more sidewalks to improve connectivity, especially to schools and parks from residential neighborhoods as well as other important destinations. Participants also highlighted the need for sidewalk repair and maintenance, especially for wheelchair accessibility and to avoid elderly falls due to cracks and rough surfaces. A full summary of the engagement process and results can be found in the standalone "Community Engagement Summary" document.

Part 5: Strategies and Actions outlines three strategies:

1. Expand and Enhance the Active Transportation Network
2. Adopt Policy to Support Active Transportation
3. Encourage Walking, Rolling, and Cycling for People of All Ages & Abilities

Each strategy is followed by supporting actions to improve the active transportation network and programs within the Town.

The focus of the **"Expand and Enhance the Active Transportation Network"** strategy is to improve existing infrastructure and provide new infrastructure to enhance the connectivity of Bridgewater's network of pedestrian and bicycle routes to make walking and cycling safer and more comfortable for people of all ages and abilities. Establishing a complete and connected network of walking and cycling facilities is a fundamental part of making active transportation a convenient and attractive travel option in Bridgewater.

Examples of actions include updating Bridgewater's sidewalk requirements to provide high quality sidewalks on new roads, filling in gaps in the Town's sidewalk network, and developing a long-term cycling network plan. The recommended cycling network plan focuses on developing an All Ages and Abilities (AAA) network. Developing an AAA cycling network was identified by Bridgewater residents and stakeholders during the Active Transportation Plan engagement process as one of the most important ways to encourage more cycling trips.

The focus of the **"Adopt Policy to Support Active Transportation"** strategy is to provide guidance on how active forms of transportation can become more attractive and competitive transportation choices, by first making them as convenient as possible. Policy actions outlined in the plan that encourage using active modes of transportation include: developing requirements to provide secure bicycle parking and end-of-trip facilities for people cycling such as storage lockers,

showers and changing rooms; reducing speed limits on streets within the Town's jurisdiction; and amending land use documents to facilitate the development patterns that are conducive to active transportation use.

The **"Encourage Walking, Rolling, and Cycling for People of All Ages & Abilities"** strategy includes a range of actions that focus on education, encouragement, and raising awareness. Education and encouragement initiatives can include providing information to the public on the benefits of active transportation; hosting events to promote active transportation; and supporting programs that teach skills and awareness of road safety. Walking, rolling, and cycling education, encouragement, and awareness initiatives are important and cost-effective measures to enable residents to feel more safe and comfortable walking and cycling throughout Bridgewater, while encouraging increased use of active transportation facilities.

Approaches to increase awareness can include enhanced wayfinding and signage, trip planning tools, route maps, promotional campaigns, and public education campaigns.

Part 6: Implementation outlines the implementation and monitoring plan. It provides guidance on prioritizing the 20 kilometers of new and upgraded sidewalks, bike lanes, and enhanced trail sections to be installed over the next 10 years. As North American communities implement their active transportation networks, they often face significant challenges technically, politically and financially. Part 6 provides quick build strategies for implementing the proposed network quickly and cost effectively.

Appendix A provides an overview of the proposed active transportation network, and Appendix B introduces a best practice design guide for the proposed active transportation facilities. This section does not outline mandatory standards or requirements, rather, it provides recommended guidelines to assist the Town of Bridgewater in applying best practices to the planning, selection, design, implementation, and maintenance of active transportation facilities. This document reflects a synopsis of the existing best practices and research that has been compiled with the applicability of the Nova Scotia and Bridgewater context in mind. At the end of Appendix B, additional resources have been provided to assist the Town with subsequent phases of design and implementation of the proposed Active Transportation Network.

Contents

Part 1: Introduction

Bridgewater is a vibrant, livable and growing community along the South Shore of Nova Scotia. With a population of approximately 8,500 residents, Bridgewater is a diverse community home to a variety of unique settings, including a combination of both urban and rural land uses which have shaped the character of the community. The community has a relatively compact urban area and several existing recreational assets that make it a great place for walking and cycling. Bridgewater has an extensive network of trail facilities, largely built around the Centennial and LaHave River Trails, which are maintained by the Town of Bridgewater and form the backbone of the regional active transportation network. Bridgewater is committed to sustainability and recognizes the importance of active transportation to enhance community livability. In recent years, the Town has developed several plans and policies with a strong emphasis on ensuring it continues to grow as a sustainable community. Bridgewater has now built on these directions and projects to improve walking, cycling and other active mobility options by renewing its Active Transportation Plan. The Active Transportation Plan will guide Bridgewater's investments in active transportation (AT) over the next 10 years and the plan will be reviewed after five years.

The Town of Bridgewater has an existing Active Transportation and Connectivity Plan (ATCP), which was created in 2008. It was initiated by the vision of the Bridgewater Active Transportation Advisory Committee (BATAC) for a healthy, sustainable and vibrant community. The committee works towards implementing the existing plan and promoting AT in town. The committee is a key partner in the development of the new plan and meetings between the committee, staff and the consultants took place throughout the project timeline.

In order to stay consistent with Council's vision for Bridgewater and to refocus efforts for increasing AT infrastructure and use in town, a renewal of the plan was required. With the new AT Plan, Bridgewater aims to refocus efforts towards low-cost high-impact projects rather than large infrastructure projects. The plan aims to enhance connectivity within town, with the Town's transit system and with other communities. Creating this connected network will reduce barriers and improve access for all residents. The plan also focuses on the promotion of active transportation and educational initiatives to further encourage the use of AT by residents of all ages and abilities. This framework is guided by an overarching goal to increase mode share and decrease greenhouse gas (GHG) emissions.

The Town of Bridgewater is taking significant actions to dramatically reduce GHG emissions through municipal decisions on infrastructure investments around multi-modal transportation. Bridgewater's Community Energy Investment Plan (CEIP) outlines

an energy pathway for the Town that envisions 2% of the needed energy shift to come from clean and active transportation systems. The Town implemented a transit system in September 2017 and the AT Plan is another step in creating a cleaner, multi-modal future.

The plan establishes a vision and goals to improve active transportation, along with a series of strategies and actions. These strategies and actions provide holistic guidance regarding improvements to policies, standards, infrastructure and programming to make walking and cycling accessible, comfortable, and convenient transportation choices for people of all ages and abilities.

The Active Transportation Plan has been separated into 6 parts:

Part 1: **Introduction** highlights the overall purpose, process and public engagement activities that have taken place to develop the Active Transportation Plan.

Part 2: **Vision and Goals** outlines the plan's vision and goals, which build on Bridgewater's overarching plans and policies. The vision and goals will guide active transportation decision-making and actions in Bridgewater over the next 10 years.

Part 3: **Setting the Stage** outlines the analysis and considerations that shaped the plan's strategies and actions. This includes understanding the benefits of active transportation, connections to other relevant plans and policies, land use and demographic trends, and existing conditions for walking and cycling.

Part 4: **Community Engagement** highlights the engagement process undertaken in developing this plan. It outlines the general sentiment around active transportation in the Town, as well as the specific suggestions residents had for active transportation in Bridgewater.

Part 5: **Strategies and Actions** describes the long-term strategies and actions under the Active Transportation Plan.

Part 6: **Implementation** outlines the implementation and monitoring plan. The Active Transportation Plan's strategies and actions have been prioritized over the short-, medium- and long-term, and quick build strategies have been identified to facilitate expedited buildout of the proposed active transportation network.

1.1 Plan Purpose and Objectives

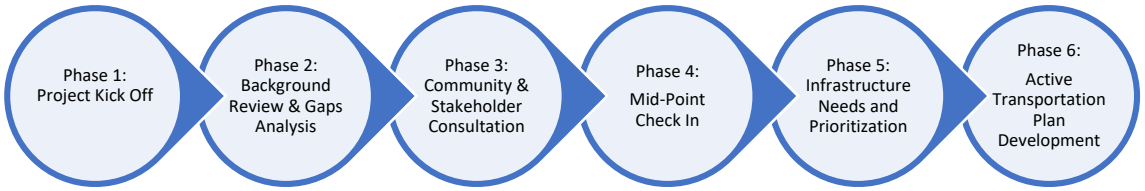
The Active Transportation Plan contributes to increased transportation options by improving the accessibility, comfort, convenience and safety of users. The purpose of the Plan is to establish a vision, goals, and corresponding strategies and actions for improving active transportation policies, standards, infrastructure and programs in Bridgewater over the next 10 years that help to increase the mode share of non-motorized transportation and reduce the towns overall GHG emissions.

The plan's goals, objectives and actions are based in the principles of low-cost high-impact solutions, improving the overall non-motorized transportation connectivity within the town, and designing infrastructure for all ages and abilities. The plan guides staff and aims to accomplish the following objectives:

1. Update the policy framework for active transportation in Bridgewater
2. Increase awareness of active transportation in Bridgewater through promotion, education and community outreach
3. Improve the quality of active transportation with safe innovative design principles
4. Develop a safe and integrated active transportation network plan for Bridgewater
5. Set priorities for construction of active transportation infrastructure

1.2 Plan Development Process

The Active Transportation Plan was developed over a six-phased timeline that began in spring 2019. The update to the Active Transportation Plan was an iterative process that involved exploring options, speaking with community members and stakeholders, drafting ideas, sharing initial results, refining the content, and then creating a final plan. The goal was to create an implementable action plan to guide investments in active transportation infrastructure and support programs to help make active mobility options safe, convenient and attractive transportation choices for people of all ages and abilities.



Part 2: Vision and Goals

2.1 Vision

As part of the Active Transportation Plan process, a vision and supporting goals have been developed to shape the overall future direction of the plan and serve as a basis from which improvements and investments are identified and prioritized. The vision and goals were created based on a combination of Bridgewater's existing commitments as described in several overarching plans and strategies as well as the community input received through the process.

VISION STATEMENT

"Walking, wheeling and cycling are safe, convenient and enjoyable ways to move around Bridgewater for users of all ages and abilities and are a common part of everyday life."

2.2 Goals

Goals were developed to help Bridgewater fulfill its vision. Goals are overarching, simple and succinct statements that are easily remembered and referenced. Five supporting goals have been developed to provide clear direction on how to achieve the Active Transportation Plan's vision. The goals were refined based on input received from the public and are intended to be achievable as part of the successful implementation of the Active Transportation Plan.

1. Improve safety for people using active transportation modes
2. Create more connections and places for walking, wheeling and cycling
3. Continue to build a culture of active transportation
4. Prioritize active transportation in the Town's capital and operations budget
5. Utilize active transportation to enhance quality of life as well as the quality of the natural environment

To support these goals, the plan includes several strategies and more detailed actions to improve active transportation in the Town. These are outlined in Part 5 of this plan. The implementation of these strategies and actions will help Bridgewater work towards achieving the goals of the Active Transportation Plan.

Part 3: Setting The Stage

3.1 What is Active Transportation?

Active Transportation refers to any form of human powered transportation. Examples include walking, running, non-motorized wheelchair use, cycling, skateboarding and inline skating.

3.2 Why Promote Active Transportation?

Investments in walking, cycling and other forms of active transportation result in a more balanced transportation system—one that is more accessible, cost effective and efficient in terms of infrastructure investments. Increased use of active transportation contributes to several of Bridgewater's strategic goals. There are also significant quality of life, health, safety and economic benefits associated with investing in active transportation.

Economic Benefits

Active transportation, as part of a balanced, efficient and accessible transportation system, is one of the drivers of success for economic diversity and prosperity. Walking- and bicycle-supportive communities can encourage residents to support local businesses. Neighbourhoods and destinations that are accessible and attractive for active transportation users attract more visitors, who will in turn be patrons of local services and amenities. Active transportation provides more choice for people traveling to work, which is essential for lower income individuals, youth, seniors and others who may not have access to a vehicle.

Health Benefits

Scientific evidence has found links between local investments in active transportation and increased rates of physical activity and healthier communities. Regular physical activity reduces the risk of early death and numerous chronic diseases. Physical activity has been proven to improve psychological well-being and prevents weight gain and obesity. While the benefits of physical activity have been well documented, low levels of physical activity in children and adults are still prevalent and continue to increase. Walking and cycling are some of the most affordable and accessible ways to add exercise to a daily routine.

Environmental Benefits

Cycling and walking helps to reduce vehicle trips, congestion, air pollution, and GHG emissions. Promoting walking and cycling also helps with efforts towards climate change mitigation while supporting the protection and improvement of the natural environment.

Societal Benefits

Active transportation facilities provide affordable and accessible transportation choices for people of all ages and abilities. High levels of active transportation use in a community is a strong indicator of sustainability and livability. Active transportation encourages social interaction, creates opportunities for face-to-face interactions with members of the community and builds trust, respect, understanding and a sense of co-operation among members of the community. Studies have shown that social interactions diminish when traffic levels increase and walking infrastructure decreases. These social connections are found to be particularly important for youth, as they can develop sustainable travel patterns at an early age that can continue later in life. These connections are also important for older adults, as they can stay active for longer, allowing them to maintain physical health but also social connections.

Safety Benefits

Making active transportation a more visible and viable choice results in reduced risk of collisions and a safer transportation system for all road users. Streets designed for slower vehicle speeds feel safer for vulnerable road users. Studies have shown that slower vehicle speeds exponentially increase survival rates for vulnerable road users. When active transportation rates increase, rates of collisions between vulnerable road users and motor vehicles decrease.

3.3 Community Profile

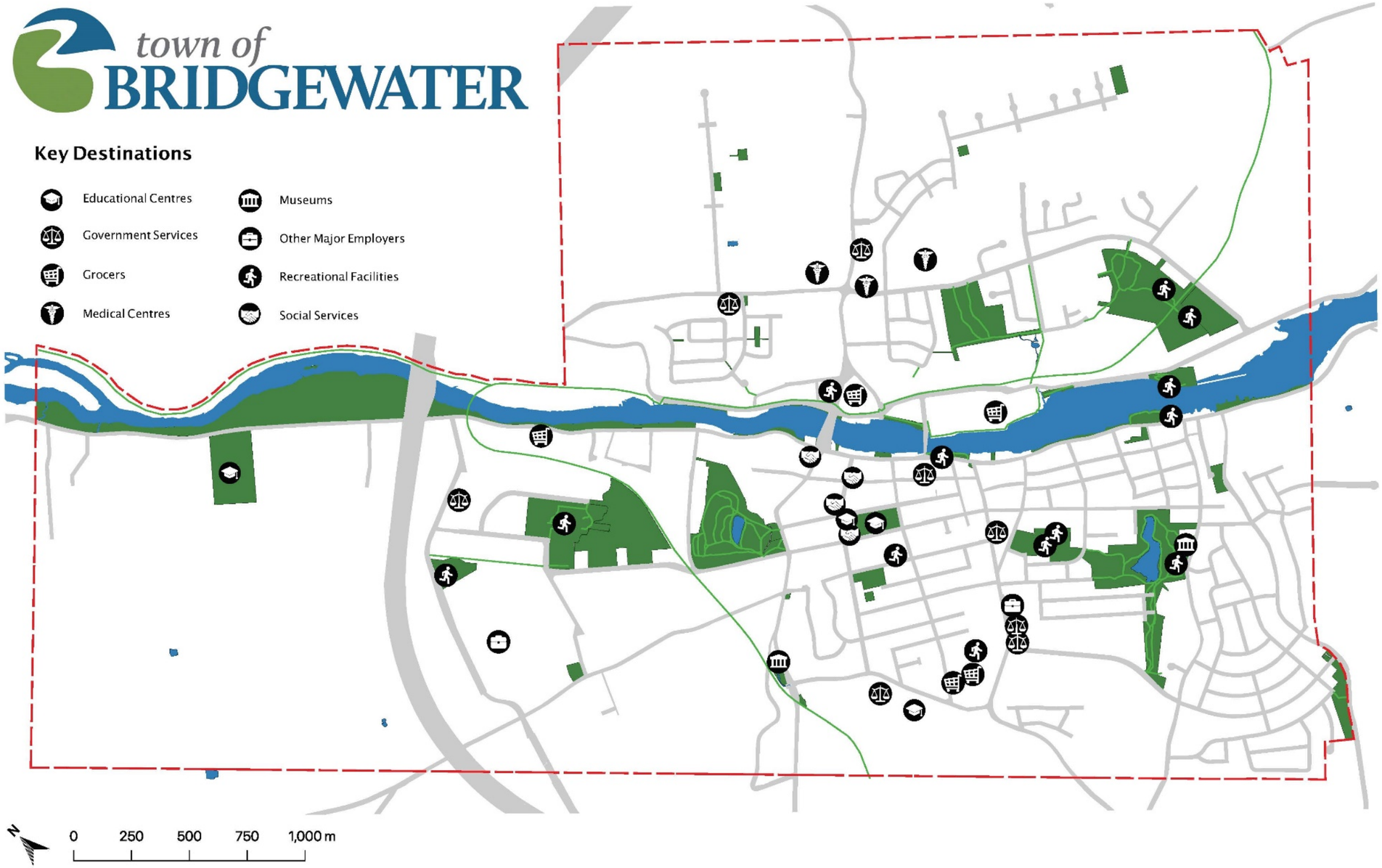
This section outlines the land use and demographic characteristics that influence transportation choices and travel patterns in Bridgewater. These characteristics were important considerations in the development of the Active Transportation Plan.

Land Use and Destinations

For the most part, Bridgewater neighbourhoods are low density, composed predominantly of single-family housing. Multi-unit developments within neighbourhoods are spread throughout the Town and are not clustered in a specific area.

Bridgewater's location provides residents with access to numerous natural amenities, including beautiful parks and trails, a scenic riverside, and abundant recreational activities. The community is home to major employment and regional destinations as well as numerous outdoor and tourism opportunities. Bridgewater is home to the South Shore's key knowledge centre in the NSCC Lunenburg Campus that helps create and sustain a strong economy, society and culture. These amenities and services are scattered throughout the Town, however the majority are located on collector or arterial streets. Figure 1 highlights the location of these key destinations.

Figure 1: Key Destinations

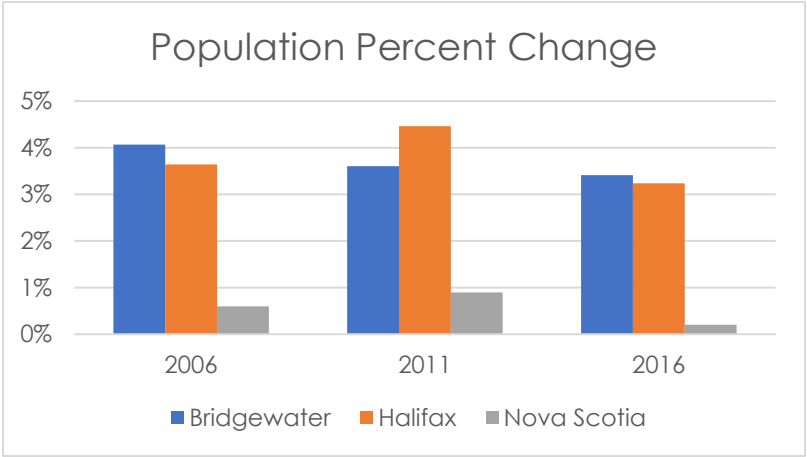


Demographics

Demographics play a significant role in influencing transportation choices and travel patterns. The following characteristics were key considerations when developing the Active Transportation Plan:

A GROWING COMMUNITY

Bridgewater is home to approximately 8,500 residents. Between 2011 and 2016, Bridgewater's population grew by approximately 3.5%. This moderate rate of growth is significantly higher than Nova Scotia as a whole. Increasing population growth in Bridgewater will continue to place increasing pressure on Bridgewater's transportation system.



A SMALL MUNICIPALITY

Bridgewater has a land area of 13.61 square kilometres, with a population density of approximately 626 people per square kilometre. The small area of the municipality, relatively high population density, and short distances between destinations makes it ideal for walking, rolling and cycling.

AGE OF POPULATION

As of the 2016 census, the average age of a resident was 46.8 years, one year younger than the surrounding Lunenburg County, but more than three years older than the province as a whole. Roughly 28% of Bridgewater's population is under 30 years of age. People in this age group tend to rely more on transit, walking, and cycling to access schools and services. Residents over 60 also make up a significant segment of the population, accounting for approximately 34% of the population. The needs and travel patterns of older residents are unique, therefore providing a range of mobility options is important to ensure that an aging population can participate in their communities at all stages of their lives, regardless of ability.

3.4 Policy Context

The Active Transportation Plan is closely linked to many of Bridgewater's key planning documents, and it helps to reinforce and further the goals and policies found in these documents. Many of these documents include broader aspirations for growth and provide specific directions on how walking, wheeling and cycling can become an integral part of Bridgewater's transportation system. Three municipal plans that played a particularly significant role in developing the Active Transportation Plan are the 2017 Community Energy Investment Plan, the 2014 Municipal Planning Strategy, and the 2010 Integrated Community Sustainability Plan.

The Town of Bridgewater is taking significant actions to dramatically reduce GHG emissions through municipal decisions on infrastructure investments including decisions around multi-modal transportation. Bridgewater's **Community Energy Investment Plan (CEIP)** has outlined an energy pathway for the Town that envisions 2% of the needed energy shift to come from clean and active transportation systems. The CEIP builds on the policies formed in the Municipal Planning Strategy and the Integrated Community Sustainability Plan and includes initiatives aimed at promoting active transportation. The CEIP outlines three overarching technical strategies to support a clean energy shift. The most relevant strategy to this active transportation plan is "Clean and Active Transportation Systems" which considers investing in public transit and active transportation infrastructure. The plan sets out the goal of 50% of short trips (1 km walking and 5 km biking) be completed through active transportation modes by 2050. The plan recommends a $4 million investment in clean and active transportation systems between 2018 and 2050. The Town implemented a transit system in September 2017 and this Active Transportation Plan renewal will be another step in creating a cleaner, more multi-modal future.

The Town of Bridgewater's **Integrated Community Sustainability Plan (ICSP)** was developed to guide future policy planning, municipal operations and community programming while fulfilling the Town's commitment to becoming a more sustainable community. The Integrated Community Sustainability Plan outlines the goal that people choose to use active transportation as the primary means of getting around town. The plan also outlines several actions for the town related to active transportation, including:

- Implement the recommendations of the Active Transportation & Connectivity Plan produced in 2008;
- Develop long term programming to encourage people and businesses to use more active transportation modes in their daily lives;
- Work with community partners to start a bicycle share or rental service for downtown Bridgewater; and
- Create a policy for Active Transportation street events.

Additionally, the plan outlines actions for the town to work towards with regional partners, including:

- Develop sustainable transportation strategies and accompanying policies at all levels of government;
- Establish dedicated funds to support regional sustainable transportation initiatives, especially active transportation and public transit programs;
- Connect trails and other AT infrastructure to pedestrian corridors in the Municipality of the District of Lunenburg and throughout the County;
- Increase education efforts for people who walk, roll, bike, and drive to improve public knowledge of the rules of sharing the road and road safety for all users; and
- Increase the number and types of transportation incentives and services available to different groups in Nova Scotia communities (e.g. households, businesses, non-profits, municipalities, etc.)

The **Municipal Planning Strategy (MPS)** includes a vision that "through sustainable land use planning and effective community design, the Town of Bridgewater fosters a vibrant and healthy community where people of all ages choose to enjoy their lives." The vision further states that citizens and visitors should enjoy the benefits of a thriving downtown, an abundance of regional services and employment opportunities, convenient and diverse neighbourhoods, a variety of housing and transportation options, attractive streetscapes and dynamic public spaces, rich built and natural heritage, and the efficient use of the town's shared infrastructure.

Other Bridgewater plans and initiatives that influenced the development of the Active Transportation Plan include:

- 2008 Active Transportation and Connectivity Plan
- 2019 Bicycle Nova Scotia Blue Route Hubs Bikeway Project in the Town of Bridgewater
- 2018 Economic Development Action Plan
- 2013 Downtown and Waterfront Master Plan
- 2016 Town of Bridgewater Transit Feasibility Study
- 2017 Bridgewater Transit Pilot Program Review
- 2010 & 2013 Active Transportation Community Survey

3.5 Existing Conditions

The analysis of existing conditions has been divided into two sections: Existing Conditions and Gaps Analysis. Existing Conditions includes a graphic description of existing bicycle facilities, transit routes and the existing trail network, while the Gaps Analysis inventories gaps in the bicycle and pedestrian network and missing facilities for people who walk, roll or cycle based on proposed networks. An analysis of existing conditions based on field work, comments from Town staff and the Bridgewater Active Transportation Advisory Committee, online resources, and through the examination of multiple sets of data was conducted.

Existing Sidewalk Network

Sidewalks form the backbone of a well-connected walking network for all users of all ages and abilities. Bridgewater's sidewalk network is quite complete downtown, and along the radial road network extending away from downtown. Some sidewalks are buffered from the adjacent roads by grassy strips, however many are separated from the roadway only by a curb.

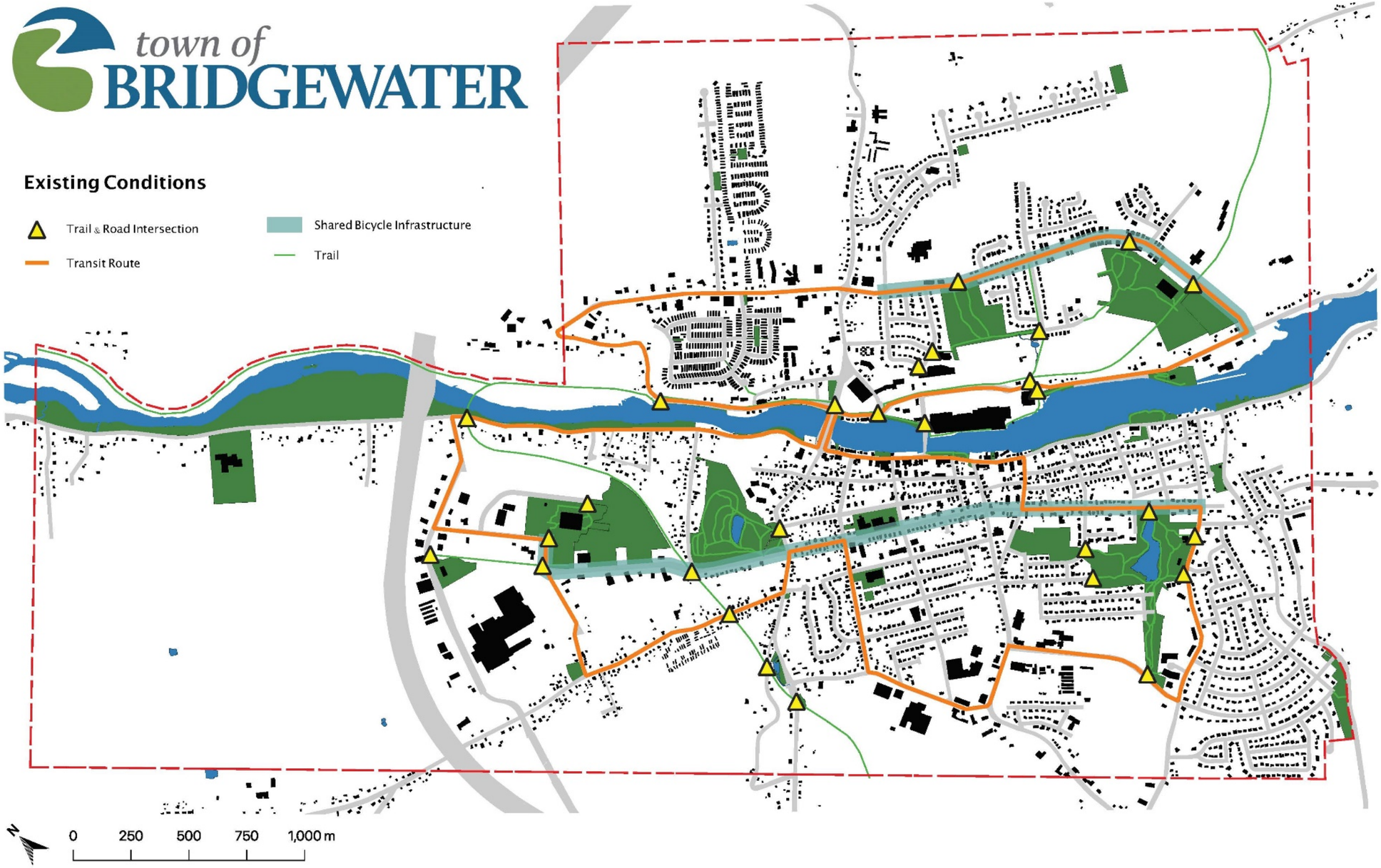
Sections of collector streets like York Street/Alexandra Avenue and Glen Allan Drive, lack a sidewalk on one side and local streets typically do not have sidewalks at all. Downtown, the retail environment and generous sidewalks along King Street creates a strong sense of place that draws shoppers, and diners from throughout the region. Bridgewater has outlined sidewalk requirements for new developments in its Subdivision By-law. Sidewalks on one side of the street are required for local street classifications, while sidewalks on both sides of the street are required for collector or arterial street classifications. However, many of Bridgewater's neighbourhoods were completed prior to the current subdivision by-law adoption so many local streets do not have sidewalks, while many arterial and collector streets only have a sidewalk on one side.

Existing Cycling Network

Bridgewater has an extensive rail trail system. The Centennial Trail, runs from the LaHave River to the town boundary eventually reaching Mahone Bay running East and connecting to the Bull Run Trail running west. It also runs along the LaHave River going north to the LaHave River Trail. The trail is composed primarily of crusher dust gravel, with the exception being the length that runs alongside LaHave Street, which is paved asphalt.

Bridgewater has a few, underdeveloped cycling connections. Shared lane markings along York Street and Alexandra Avenue transition into a 1" gravel pathway to connect with the Centennial Trail near Starr Street and continue to North Park Street. Additional shared lane markings exist along the entire length of Glen Allan Drive. Several minor trails systems exist on both sides of the LaHave River that act as key active transportation connections. These are composed primarily of 1" gravel and are not maintained in the winter, therefore they are not currently suited for bicycle travel. The existing cycling network is shown in Figure 2.

Figure 2: Existing Conditions



Gaps Analysis

A qualitative system gaps analysis was conducted based on field observations, existing planning documents and through the examination of GIS data, aerial imagery, and on-line mapping websites. The analysis includes existing rail trail and on-street networks and features Corridor Gaps, Linear Gaps, Spot Gaps, and intersections that are particularly challenging for people who walk, roll or bike. The analysis also provides an indication as to where the opportunities are for improving Bridgewater's active transportation network. This analysis informed the direction of the proposed active transportation network identified in Appendix A.

This analysis provides an understanding of which areas have the greatest need for improvements, which areas can benefit most from strategic investment, and which areas pose the greatest challenges to further developing a bicycling and walking network.

Corridor Gaps – These gaps are missing links of significant length, typically 1 kilometre or more, where bicycle/pedestrian facilities are desired but do not exist or are not adequate based on existing or future demand. They may correspond to a street corridor or a desirable route connecting neighborhoods, popular destinations, or to adjacent communities.

Linear Gaps – These gaps are missing segments in an otherwise connected facility, typically 400 metres or less. Linear gaps may also be barriers between destinations and routes. Significant linear gaps occur in the sidewalk network in many parts of Bridgewater, especially the more suburban/rural areas where homes were developed in the 1960's through the first decade of the 21st century.

Spot Gaps – These gaps are point-specific locations lacking facilities or other treatments to accommodate safe and comfortable travel for people who walk, roll, or cycle. This could range from a lack of crosswalk at a key location to a missing spur connection from a rail trail to an adjacent street or open space. There are various spot gaps within the pedestrian network throughout Bridgewater: a block lacking a sidewalk, a missing crosswalk at the end of a sidewalk stub, a worn path between a rail trail and adjacent street, a wide roadway with an unnecessarily long crosswalk, and intersections lacking proper accessible curb ramps.

Challenging Intersections – These are intersections that are particularly difficult or unsafe for people who walk, roll or cycle. This may be due to wide intersecting roadways, free right turns, large turning radii, confusing geometry, long crossing distances, lack of crosswalks, or inadequate traffic controls. There are challenging intersections sprinkled throughout the Town, with some of the most prominent being the intersections of Aberdeen/LaHave, King/Victoria, North/Aberdeen, High/Victoria, and High/Dufferin.

In aggregate, the various gaps form a key challenge to improving bicycling and walking conditions in Bridgewater. The following series of maps (Figure 3-5) represent gaps, opportunities and challenges in the Town of Bridgewater.

Figure 3: Corridor and Linear Gaps

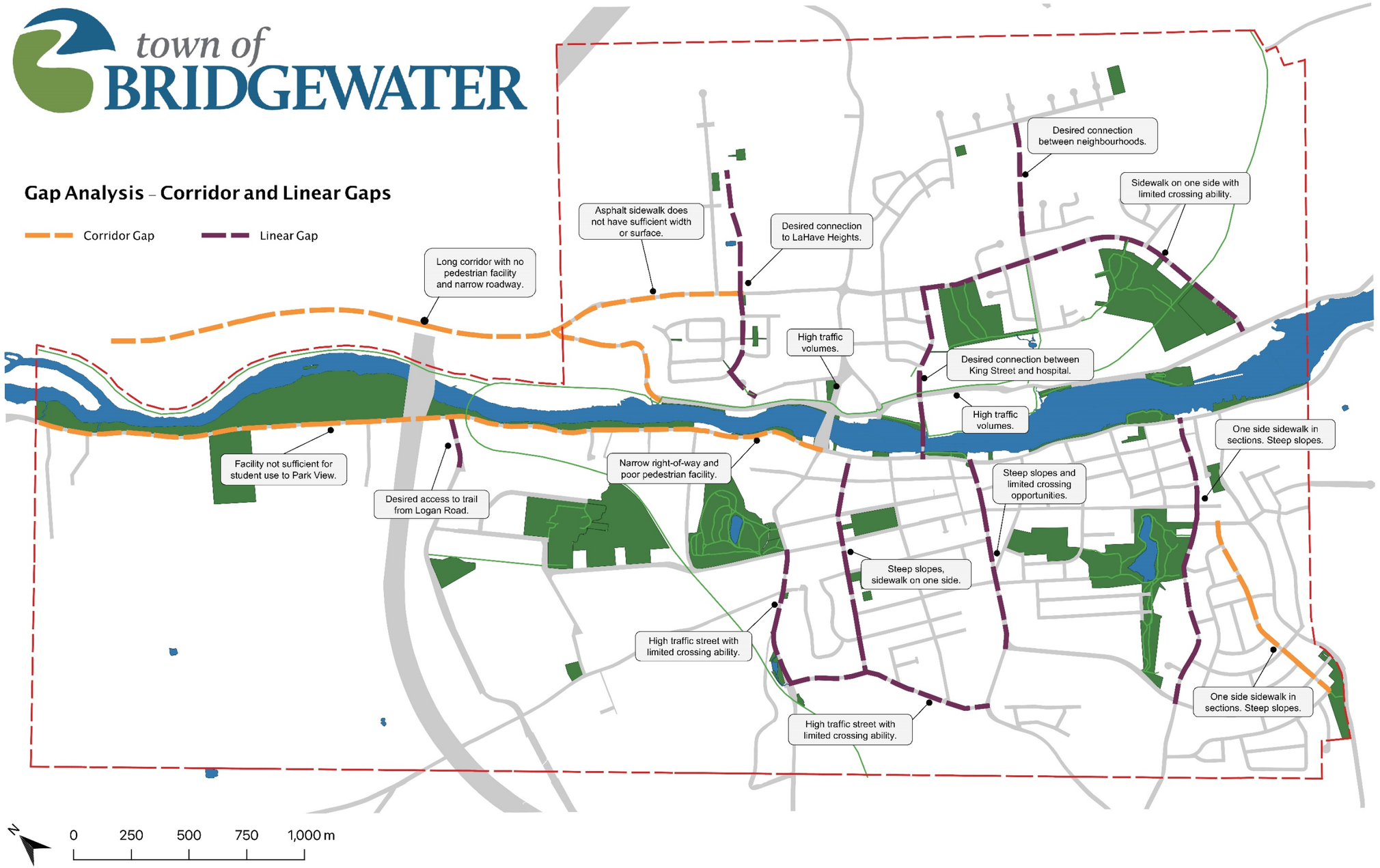


Figure 4: Spot Gaps and Challenging Intersections

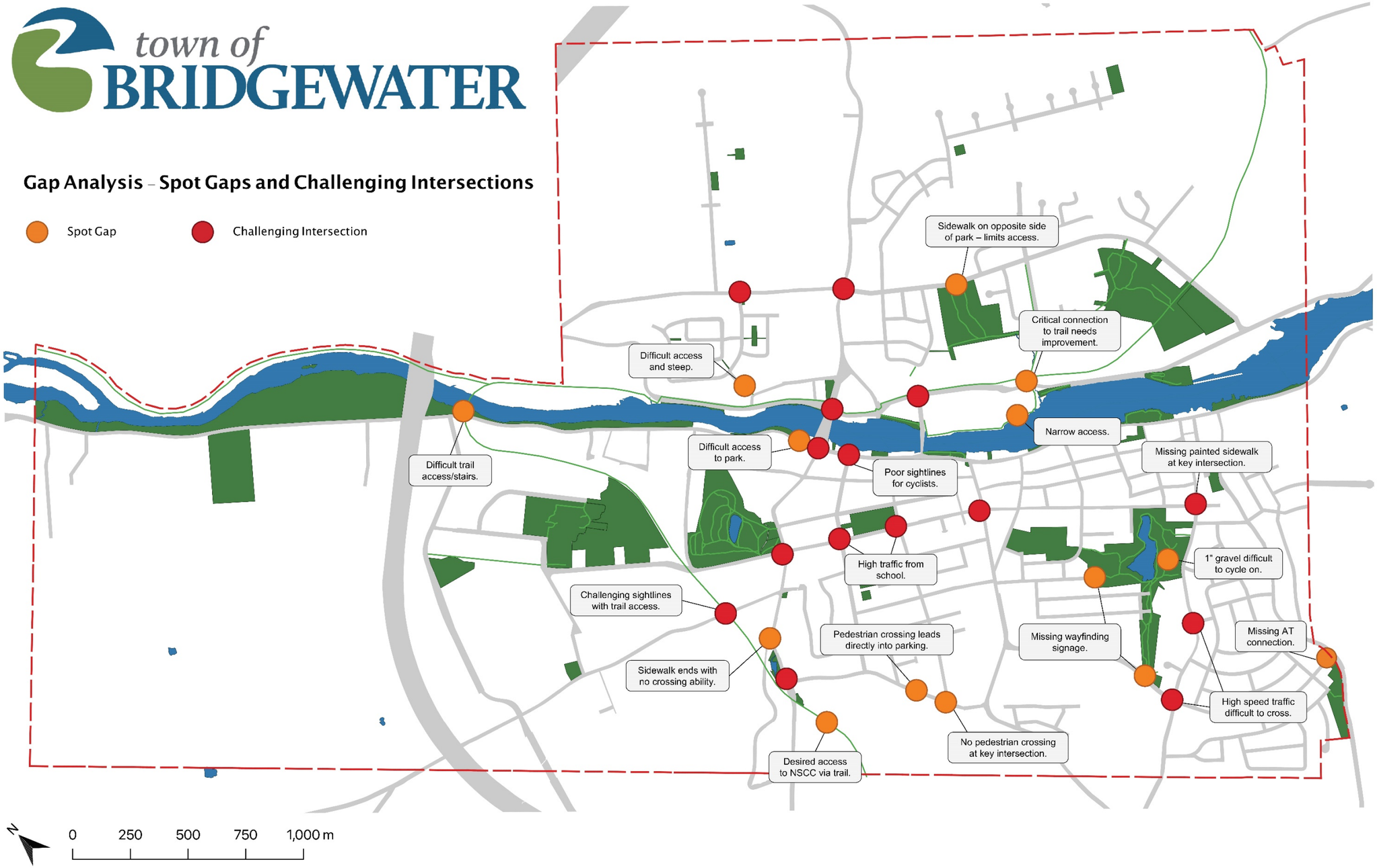
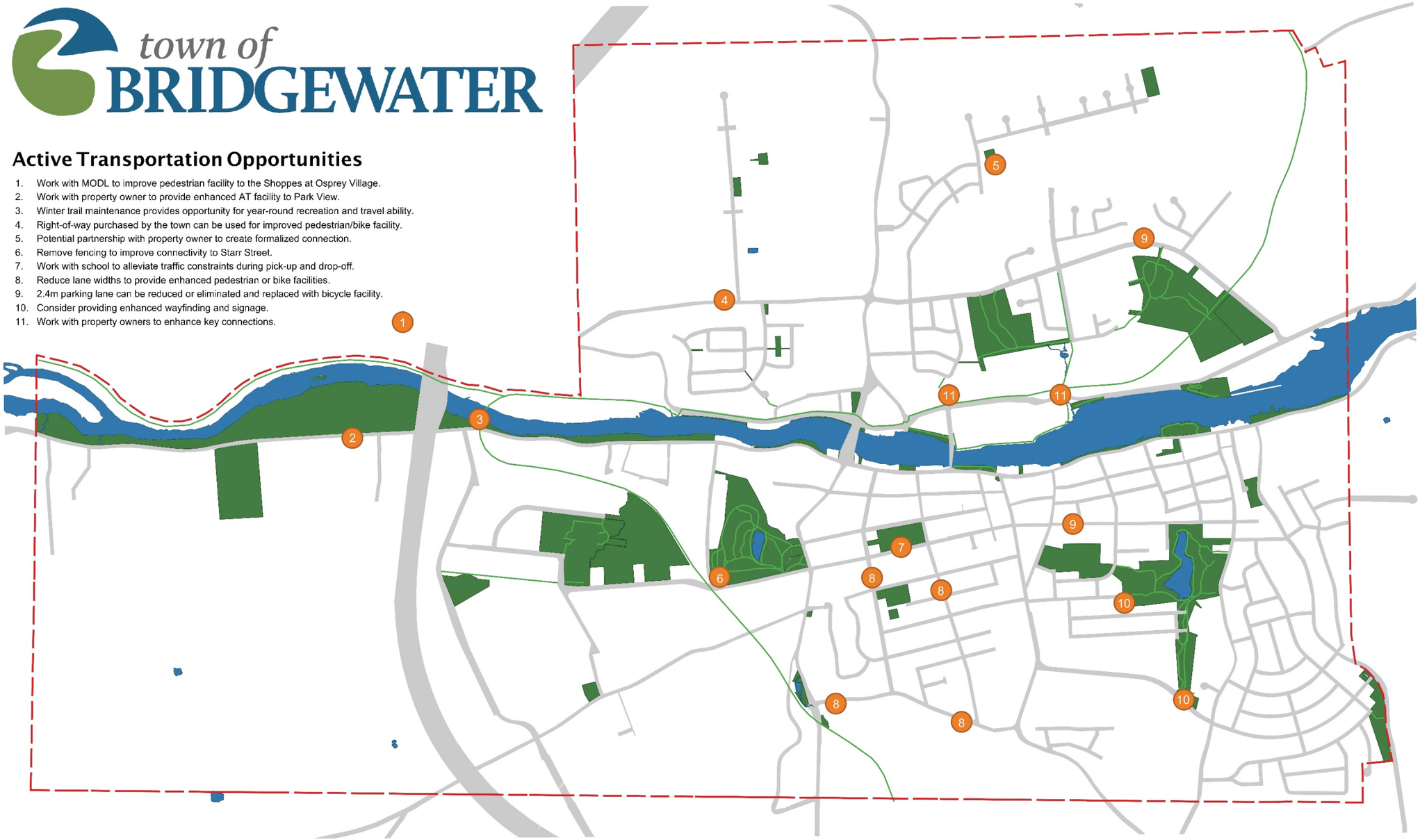


Figure 5: Active Transportation Opportunities

town of BRIDGEWATER

Active Transportation Opportunities

1. Work with MODL to improve pedestrian facility to the Shoppes at Osprey Village.
2. Work with property owner to provide enhanced AT facility to Park View.
3. Winter trail maintenance provides opportunity for year-round recreation and travel ability.
4. Right-of-way purchased by the town can be used for improved pedestrian/bike facility.
5. Potential partnership with property owner to create formalized connection.
6. Remove fencing to improve connectivity to Starr Street.
7. Work with school to alleviate traffic constraints during pick-up and drop-off.
8. Reduce lane widths to provide enhanced pedestrian or bike facilities.
9. 2.4m parking lane can be reduced or eliminated and replaced with bicycle facility.
10. Consider providing enhanced wayfinding and signage.
11. Work with property owners to enhance key connections.



Part 4: Community Engagement

As part of the immersive engagement scope, the project team conducted a four-day long consultation session, during which members of the project team lived in the community. This allowed the project team to fully immerse themselves in Bridgewater and develop a keen understanding of the goals, values, opportunities, and potential limitations for Active Transportation planning in the Town. In addition, an online engagement portal that that included a web survey and an interactive map-based feedback tool was developed and launched for the months of May and June 2019. The web survey was designed to elicit feedback on Bridgewater's AT system, including how well it works for users, recommendations for improvement and general feedback. The interactive map-based feedback tool allowed Bridgewater residents to report geographically specific issues or recommendations by providing a comment that is linked with a geographic location. This tool was available via smartphone and desktop. Data collected from the online engagement portal, web survey and community consultation week were analyzed and summarized to gain a firm understanding of the town's existing active transportation system on which to make informed, useful policy recommendations in the final active transportation plan.

In sum, the perspectives on walking and bicycling shared by residents were more about specifics for walking. Participants requested more sidewalks to improve connectivity, especially to schools and parks from residential neighborhoods as well as other important destinations. Participants also highlighted the need for sidewalk repair and maintenance, especially for wheelchair accessibility and to avoid elderly falls due to cracks and rough surfaces.

With respect to bicycling, people engaged do not, for the most part, feel that people who bike belong on the road, so the need for bike lanes on streets as well as off road multi-use paths was highlighted. We also understood this as an expression of need for a broad public information and education campaign to inform Bridgewater residents that a bicycle is a vehicle and as such belongs on the road. A full summary of the engagement process and results can be found in the standalone "Community Engagement Summary" document.

Part 5: Strategies and Actions

The Active Transportation Plan consists of three strategies and more detailed actions to improve active transportation. The implementation of these strategies and actions will help Bridgewater work towards achieving the vision and goals, of the Active Transportation Plan. The three strategies are: Expand and Enhance the Active Transportation Network, Adopt Policy to Support Active Transportation, and Encourage Walking, Rolling, and Cycling for People of All Ages & Abilities.

The Town of Bridgewater will consider active transportation facilities in the design and implementation of all infrastructure projects. This will require different internal departments, as well as external partners, to work collaboratively and share information on appropriate opportunities to incorporate different components of the Active Transportation Plan.

1. Expand and Enhance the Active Transportation Network

1.1 Revise the Design and Construction Standards using best practices to create a safe, accessible and comfortable environment for walking, cycling and rolling on new streets.

The Town should review and adopt current international best practices for multi-modal street design. The Town should focus on providing design standards for high quality bicycle facilities, both on-street and off-street, and pedestrian facilities, including facilities for people of all ages and abilities. The proposed network and example cross sections provided in Appendix A of this document provides baseline guidance of best practices for the development of updated Design and Construction Standards. However, the Town should revise to the standards of the 2017 Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads, the TAC Manual of Uniform Traffic Control Devices for Canada (MUTCDC) and the Canadian Standards Association (CSA) Accessible Design for the Built Environment.

1.2 Establish design criteria to maximize active transportation within existing streets to create a safe, accessible, comfortable environment for all ages and abilities.

Updates to existing streets cannot be done in a "one size fits all" manner, as there are varying constraints throughout town. The Town should create a design criterion that will be used when updating existing streets, to maximize active transportation and outline priorities when designing within constraints. The criteria should include recommendations and options to consider such as reducing lane widths, purchasing land, retaining and implementing street trees and

vegetation, and low-cost high-impact opportunities, and should require staff to consider the goal of the street within the larger street network.

1.3 Prioritize intersections, pedestrian crossings and sidewalks to update to create a safe, accessible and comfortable environment for all ages and abilities.

The Town should review intersections, pedestrian crossings and sidewalks in the Proposed Active Transportation Network and prioritize locations for updates. During this prioritization the Town should consider factors including the 10-year capital budget, existing conditions and accessibility needs. Improvements should include pedestrian signals, count down timers, accessible curb ramps, and tactile features.

Bridgewater should work to improve all existing and new traffic signals, so they have audible pedestrian signals and count down timers. Audible pedestrian signals communicate non-visual information for visually impaired pedestrians at signalized intersections. Countdown timers provide information to people walking with the amount of time left to safely cross the street. Bridgewater should refer to the Transportation Association of Canada's Manual of Uniform Traffic Control Devices for Canada (MUTCDC) for guidance on determining appropriate crossing times at intersections. Additionally, opportunities for advanced signal phasing for people walking, cycling and transit should be considered to improve safety and operations of these modes.

1.4 Identify crossing locations to be added, based on high pedestrian activity, key intersections and existing issues.

There are opportunities to increase accommodations for people walking and rolling at street crossings to make the environment safe and comfortable and to help encourage more people to walk and roll. To evaluate the need for new crossings the Town should use guidance from applicable provincial and national guidelines identified in Action 1.1. To streamline this process, Bridgewater's Active Transportation Committee should develop a list of additional crossing locations that are warranted or required to enhance the active transportation network; Planning and Engineering staff should validate the identified locations.

1.5 Adopt trail guidelines and classifications that facilitate walking, cycling and rolling, and consider accessibility, treatment, amenities and maintenance.

The Town should create classifications for the trail network and create guidelines for trails. The Town should consider design that is suitable for all ages and abilities, including the treatment type and amenities. Paving the path can increase accessibility to a larger population, such as to strollers, wheelchairs and rollerblades. Adding lighting can make the route easier and safer to use when it is dark outside, including in the winter, when it is dark in the early evening.

Seating type and location is important when creating a trail network that is suitable for all ages and abilities. Enhanced winter maintenance in certain sections should also be considered, as sections of the Centennial Trail form critical links to the rest of the proposed active transportation network.

1.6 Identify priority sections of trail that will enhance network connectivity, on which to begin updating according to the trail guidelines.

The Centennial Trail is a strong connector for active modes within Bridgewater, however there is potential to update the route further to improve it for active transportation. The Town should prioritize sections of the Centennial Trail for updates that are located within the "Enhanced Trail Sections" of the Proposed Active Transportation Network Map.

1.7 Work with the Province to provide safer and more convenient walking and cycling facilities on bridges.

The existing bridges have facilities for walking; however, they may not necessarily feel comfortable, safe or provide the most direct route. Bridgewater should continue to work with its partners to provide safer and more convenient walking and cycling facilities on the bridges. This includes ensuring facilities meet current TAC design standards in terms of width, clearance and appropriate railings.

1.8 Prioritize the installation of sidewalks and crossings along designated bus routes outside of the proposed active transportation network.

The relationship between active transportation and transit is clear as most transit users begin or end their trip by foot or bicycle. Filling gaps in the pedestrian network, as well as installing new crossings to provide more direct access to transit stops, should be a priority for Bridgewater. Any future changes or expansions of the bus route should incorporate the addition of sidewalks along the route. Existing sidewalk segments along the route should be updated with regards to the design criteria indicated in Action 1.2.

1.9 Ensure transit infrastructure is suitable for all ages and abilities, including through the provision of benches, shelters and lighting at transit stops.

Bridgewater should commit to enhancing the transit customer experience by ensuring that bus stops are accessible and by providing more benches, lighting, shelters and network information at stops. Improvements to bus stops should be prioritized at stops with the highest boardings and alightings, while considering transit's use by vulnerable populations, including seniors, people with disabilities, and youth.

2. Adopt Policy to Support Active Transportation

2.1 Update the Land Use By-law's requirements for bicycle parking and facilities in new developments.

Bicycle parking and end-of-trip facilities are critical to encourage people to cycle as a primary mode of transportation by providing a secure place to leave their bicycle and a place to tidy up and or change upon arriving at their destinations. There are two types of bicycle parking facilities:

- Bicycle Facility – Class I refers to a secure weather protected bicycle parking facility used to accommodate long-term parking, such as for residents or employees, usually within a room or covered, fenced area.
- Bicycle Facility – Class II refers to a short-term visitor bicycle parking facility which may offer some security and be partially protected from the weather. This is often a rack at a building entrance.

Bridgewater's Land Use By-law specifies the number of bicycle parking spaces required based on zoning and building size specifically for Class II facilities. In order to better accommodate the end of trip needs of people who bike, Bridgewater's bicycle parking requirements should be reviewed to consider best practices for adequate and secure bicycle parking. This can be achieved by amending the Town's Land Use By-law. This should include regulating the installation of additional end-of-trip facilities, requirements for Class I bicycle parking facilities, and considerations for cargo and family bikes. End-of-trip facilities to be considered should include changing rooms, receptacles for charging electric bicycles, showers, and storage space for equipment. These facilities can make cycling more convenient and help build a culture for active transportation within a specific development or place of employment.

2.2 Provide high quality bicycle parking and end-of-trip facilities at all Town owned and operated facilities, including parks.

Installing and improving existing bicycle parking and end-of-trip facilities at Town owned and operated buildings demonstrates leadership and reinforces to residents, developers and private business owners that bicycle parking is important. Adequate bicycle parking at recreation facilities and other municipal sites would benefit employees, residents and visitors and support access using active transportation. Providing bicycle parking and end-of-trip facilities would require identifying the type and quantity of facilities required and appropriate for each of the buildings. This can include the provision of short-term (Class II) facilities at locations and buildings that see a lot of visitor activity. Longer-term bicycle parking (Class I) and other end of trip facilities will be considered at locations where there are high concentrations of employees. Provision of both short- and long-term bicycle parking at civic facilities should be generally consistent with requirements for new developments.

2.3 Develop a plan to implement pedestrian wayfinding of streets, trails and open space, and create awareness of network connectivity through information and orientation.

Current wayfinding, signage and trip planning measures in Bridgewater are primarily focused on vehicles. Some pedestrian wayfinding and signage is present in Bridgewater parks, but is not cohesive. Bridgewater's website includes webpages dedicated to walking and cycling, which provide information on the existing networks, maps, and upcoming projects. The Downtown and Waterfront Master Plan contemplates pedestrian wayfinding and signage but hasn't been fully implemented. Expanding existing wayfinding, signage and trip planning tools for walking, rolling and cycling would enable people to identify facilities and destinations throughout Bridgewater.

2.4 Update Section 3.2.5 of the Land Use By-law to incorporate active transportation in the design for vehicular parking.

Parking lots and busy driveways can present barriers for people who walk, roll or cycle. The Town should review applicable by-laws, specifically section 3.2.5 of the Land Use By-law, "Design Standards for Vehicular Parking Areas", to allow new developments to incorporate active transportation within their property. Amendments to relevant policies and plans should require that items such as sidewalks and bicycle facilities be provided that connect the street to the main entry and bicycle parking areas.

2.5 Investigate opportunities to reduce speed limits on Bridgewater streets to 30km/h.

There is growing support from municipalities and organizations within Nova Scotia to update the posted motor vehicle speed limits. Most roads, by default, are posted as 50km/h streets. The Town of Bridgewater should pursue requesting that the Province reduce posted speed limits on select streets within the Town that have a design speed of 30km/h. This should be done in conjunction with improved road design that slows and calms traffic.

2.6 Support higher density and mixed-use developments through zoning regulations along transit and active transportation corridors.

Higher density and mixed-use developments can help support active transportation by providing more destinations within a shorter travel distance. Areas that contain a mix of commercial, institutional, and recreational uses, allow residents the opportunity to 'live, work, and play' in the same area and to move between activities conveniently on foot, by bicycle, or with transit. Bridgewater should consider including requirements for land uses and site design that encourage higher density, mixed use developments along streets in the proposed active transportation network as part of its Municipal Plan 5-year review.

2.7 Review and update current maintenance requirements for active transportation infrastructure including sidewalks, bike lanes, pathways and transit stops.

Currently, maintenance is largely based on historical records as well as complaints. Bridgewater has limited requirements for the removal of leaves and other types of road debris on bicycle routes. Snow clearing is prioritized on arterial streets, hilly residential streets, school zones and downtown parking spaces. The Town does not currently have a winter parking ban.

The Town should review and update current sidewalk maintenance program with the goal of providing a year-round accessible sidewalk network and provide additional guidance specific to on-street bicycle facilities, subject to Council approval. All sidewalks, paths to crosswalk buttons, and bus stops should have winter maintenance completed in a manner that reflects the priority of the road they are adjacent to, and in line with the forthcoming provincial accessibility standards. Priorities for winter maintenance will consider high pedestrian locations, sidewalks near schools, hospitals, nursing homes, and transit stops and finally all remaining sidewalks.

The Town will work towards a maintenance policy, taking into account the above-mentioned matters as well as priority level of service, which would include timeframes and focus on the criticalness of individual active transportation routes.

2.8 Develop a construction mitigation policy that provides guidance for accessible detours for people walking and cycling during construction and maintenance.

The Town should ensure accessible detours include adequate information and advance notice that a sidewalk, bicycle lane, or transit stop is closed or inaccessible and provide adequate detour information to bypass the construction zone. Signage should also display alternate routes and dates of closure. Bridgewater can require contractors to establish temporary paths where necessary and implement a penalty structure for those who do not comply. Detours should be provided for all users, including people using mobility aids. Current construction detour policies such as By-law 14 "Care of Streets" should be reviewed and new guidelines for contractors and municipal departments should be developed representing best practices for accommodating all active transportation users, particularly users with mobility and vision disabilities. Requirements for clear paths should be 1.8 metres.

3. Encourage Walking, Rolling, and Cycling for People of All Ages & Abilities

3.1 Work with partners to promote and encourage active transportation among residents and tourists through marketing programs and initiatives.

Communities around the world have focused on promoting active transportation positively through marketing and communications. Campaigns help break down myths and misconceptions regarding perceived barriers to active transportation, namely lack of time, health issues, weather, safety and security, age, and the feeling that active transportation is impractical. Additionally, promoting active transportation from a tourism perspective can provide a variety of benefits to the local economy. For example, bicycle friendly businesses can increase awareness about cycling by establishing initiatives that encourage visitors, as well as residents and employees, to cycle to shops and restaurants. Partnering with the Nova Scotia Health Authority, Bicycle Nova Scotia, and the Ecology Action Centre is a cost-effective way of improving education and awareness on the benefits of using active transportation.

3.2 Establish partnerships with organizations and businesses to assist in providing active transportation programming for all ages and abilities, including students traveling to school, older adults and people with disabilities.

In the past, Bicycle Nova Scotia and the Ecology Action Centre have partnered with municipalities to offer cycling skills courses and workshops for older adults, children and people with disabilities. These courses and workshops recognize that education is an important component of encouraging individuals who may be interested in using active transportation as a mode of transportation but do not feel confident to make it a part of their everyday lives. Bridgewater should work to partner with these groups and others to support education and training and encourage municipal workplaces and the public to participate.

Additionally, the Town should partner with local businesses to retrofit existing buildings to provide bicycle parking and other amenities such as storage and change room facilities to support employees' walking, wheeling, or cycling to work year-round.

3.3 Provide regular updates to the Bridgewater Active Transportation website to deliver positive messaging promoting active transportation.

Campaigns and community-wide communications through various forums such as social media, radio advertisements, online/website content and others can be effective tools for reaching out to Bridgewater residents, increasing awareness and interest in active transportation. Bridgewater already has a website dedicated to active transportation

and should regularly update the content on this website with news updates, project information and other materials and resources.

3.4 Support events and festivals that encourage walking and cycling.

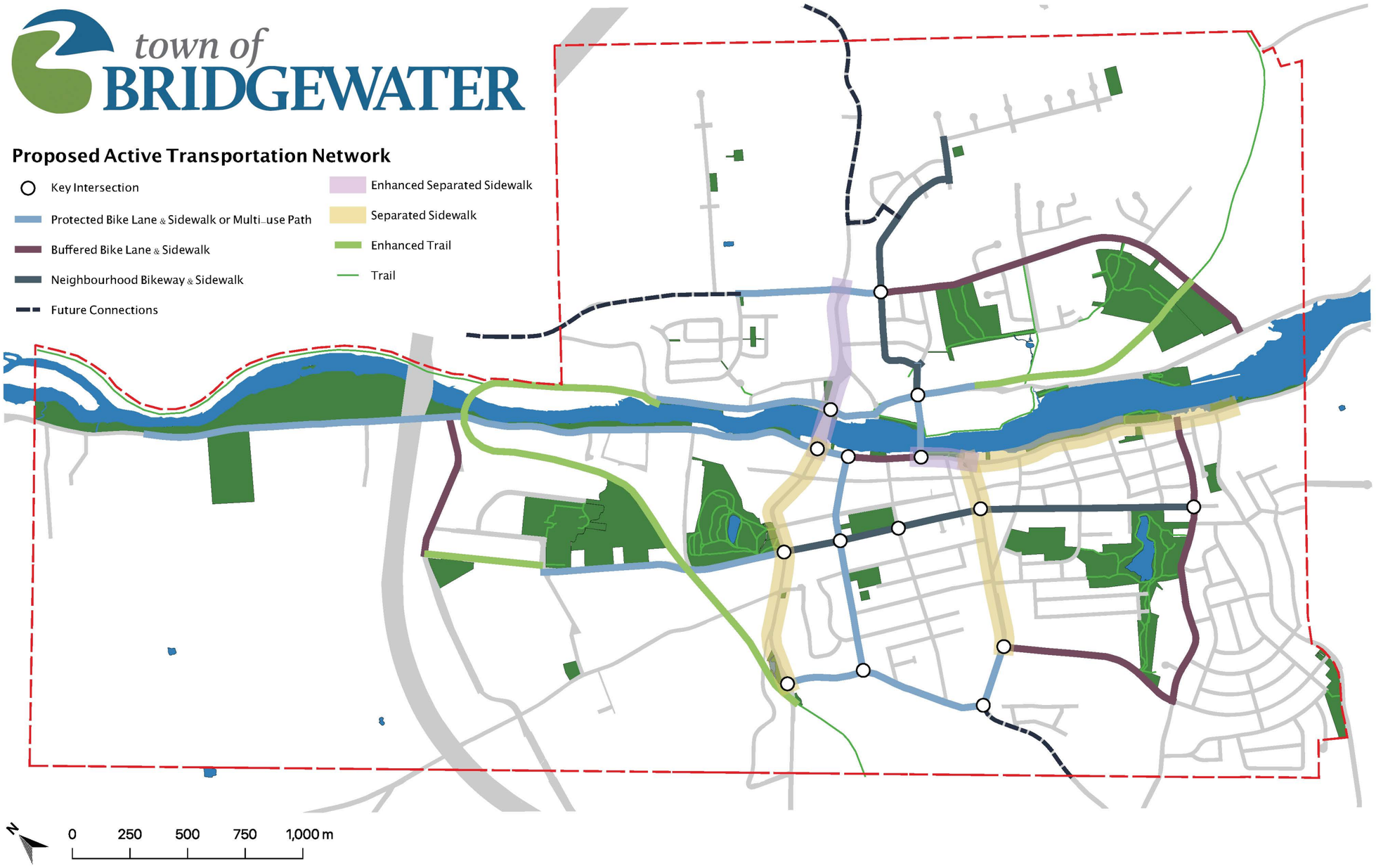
Bridgewater should continue to support events like Bike Week. These events celebrate walking and cycling and help to build a culture for active transportation, increasing momentum for active transportation. Bridgewater should also work with community associations and other groups to support and encourage walking and cycling programs.

Part 6: Implementation

6.1 Proposed Active Transportation Network

The proposed active transportation network, as outlined in Figure 6, focuses on creating a well-connected network throughout town, while taking into consideration potential upcoming capital projects. The network map includes the recommended treatment for each section as well as key intersections that should be improved to enhance the safety and comfort of the user. Best practice design guidelines can be found in Appendix B which include information on each of the treatments. Individual cutsheets detail the preferred changes for many sections of the network based on best practice, and can be found in Appendix A. Detailed design work must be completed when the project is undertaken, and the unique opportunities and constraints of each section will then be identified.

Figure 6: Proposed Active Transportation Network



6.2 Network Prioritization

The Active Transportation Plan includes a recommended long-term network of sidewalks, bicycle routes, off-street pathways and trails. This section outlines the approach to prioritizing each of these projects.

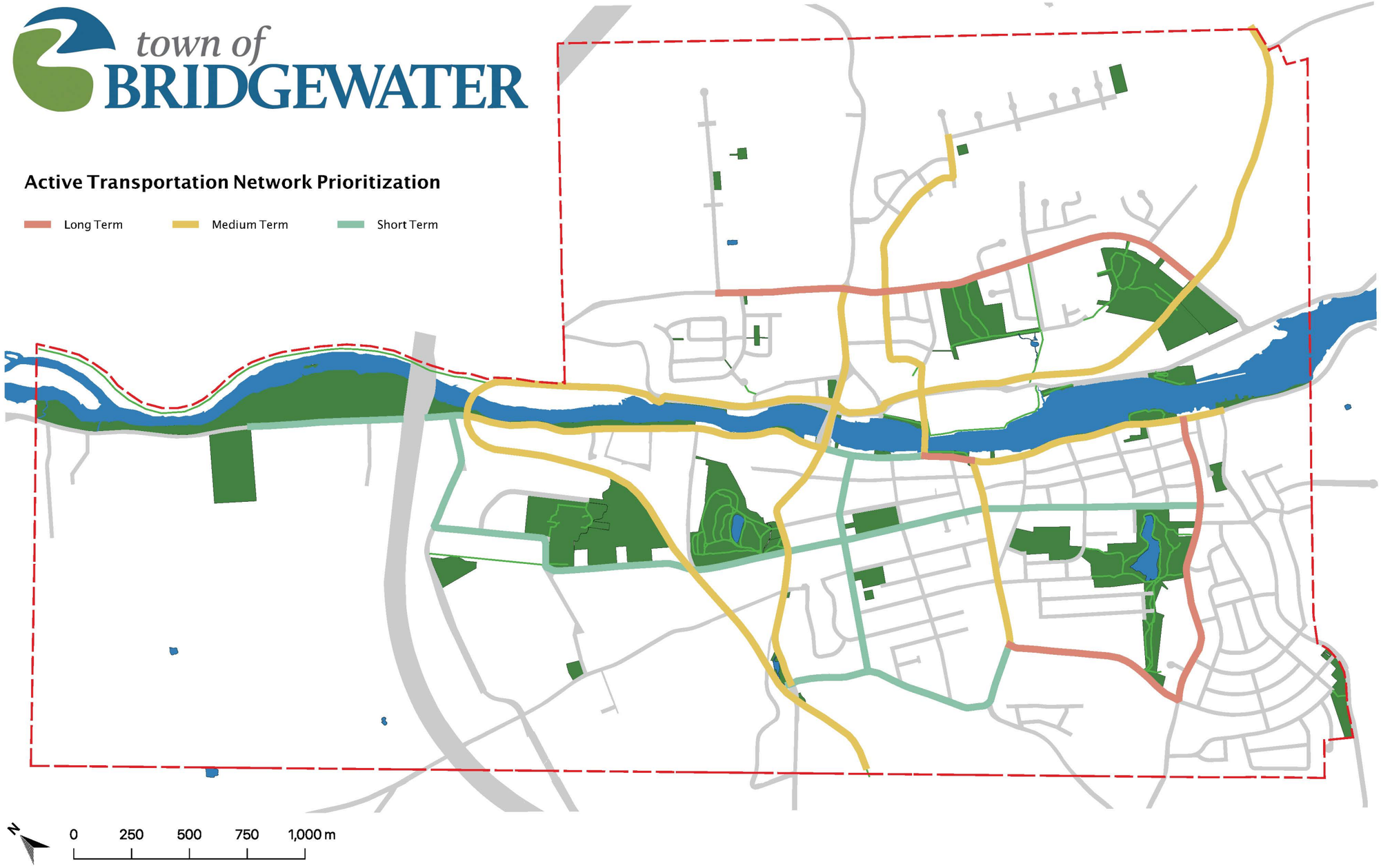
The Active Transportation Plan identifies approximately 20 kilometres of new and upgraded sidewalks, bike lanes and enhanced trail sections to create an active transportation network. This magnitude of improvement would require investment, and priorities have been established to focus improvements to high demand areas that either currently experience or have the potential to generate the highest levels of walking trips, to fill in network gaps, and to enhance the safety and comfort of people walking and biking throughout Bridgewater. To help identify the timeline for improvements, projects were assessed based on anticipated upcoming capital projects as well as the following criteria:

- **Improved safety from current condition** – How likely could this project improve the safety of people who walk, roll or cycle compared to the current condition of the street?
- **Connections to existing facility** – How will this project connect to existing active transportation facilities like sidewalks, trails, bike facilities, and transit?
- **Probability of shifting mode split from driving to active transportation** – How likely is this project going to facilitate Bridgewater residents' shift from driving to using active transportation?
- **Linkage to key destination** – How well does this project help to link the active transportation network to key destinations outlined in the Key Destinations Map (Figure 1)
- **Infrastructure Required** – How easily is this project able to be implemented quickly or cheaply?

Additionally, the relative costs of each project have been compared.

Figure 7 outlines the Active Transportation Plan network priorities based on these criteria.

Figure 7: Network Prioritization



6.3 Quick Build Strategies

As North American communities implement their active transportation networks, they often face significant challenges technically, politically and financially. Some of the issues and questions that arise when implementing bicycle networks include:

- Funding limitations and capital resources.
- Ensuring routes are connected to a larger network and destinations. This can be a challenge when communities are in the early stages of implementing their bicycle networks. Communities may not have the resources to build more than a few corridors at a time, and research suggests that significant increases in ridership do not tend to occur until a connected network of routes is established.
- Some residents and stakeholders may not believe in the potential to increase the number of bicycle or walking trips by installing new routes and may be concerned about the impact new infrastructure will have on traffic congestion, safety, or parking spaces.

These common issues have resulted in communities looking for ways to implement AAA facilities in a timely and cost-effective manner through 'quick build' strategies. There are several approaches to implementing active transportation infrastructure based on a continuum of implementation timelines:

Demonstration Projects are typically considered short-term (one or multi day) temporary installations that help to show new opportunities to enhance a street for walking or cycling. They are a great way to engage with the public and illustrate the impacts of a potential project. They may include, but are not limited to, demonstrations of protected bicycle lanes using traffic cones, improved crossings using sidewalk chalk and shared street events.

Pilot Projects often refer to a project that is used as a test case to evaluate factors such as feasibility, cost, safety, and improve upon the design before implementing the full-scale project or making it a permanent feature.

Interim Designs are permanent features that have been implemented quickly usually with low cost materials that can be adjusted and/or replaced easily (think flexible bollards instead of concrete curbs). This allows for design flexibility and opportunities to adjust as needed. An interim design can be used to build more of the network at a lower cost.

Permanent Installations require more time for planning, public engagement, and construction time. They include higher cost materials that are less flexible and intended for long-term durability.

If the project is introduced as a demonstration project or pilot project, it can ease tensions of those in opposition as they know the project is not being forced upon them. Additionally, there is relatively low financial risk if the facility does not perform well or is reverted to its previous design.

A key component of a Quick Build strategy is ongoing monitoring of performance based on several variables including:

- Levels of satisfaction;
- Safety for all road users including the number of collisions and perceived safety concerns;
- Economic impact on nearby businesses; and
- Demographics of who is using the facility

To help build out the pedestrian and cycling networks as cost-effectively and rapidly as possible, Quick Build strategies should be considered wherever possible.

To illustrate the ability to implement active transportation infrastructure quickly and relatively cheaply, the following table shows the approximate per metre cost of different active transportation separation features.

Separation Type		Cost
Bollard		$150 each – spaced 5m apart max
Adjustable Concrete Barrier		$135/m – spaced 2m apart on 50km/h roads (or continuous if speeds are between 50-60km/h)

Planters & Cones		$5 each for flowerpots $50 each for traffic cones Used for demonstration or pilot projects only.
Concrete Jersey		$350/m Generally, only used in higher speed locations (60km/h and above)
Line Paint		$2/m for longitudinal edge paint (single line) $2/m Yellow Solid Single Line $3/m Yellow Solid Double Centerline $12/m Stop Bars $13/m Crosswalks $19/m Zebra Crosswalk $18/m² Hatching $55/each Arrows $65/each Bicycle Symbols $55/each Sharrow Symbols

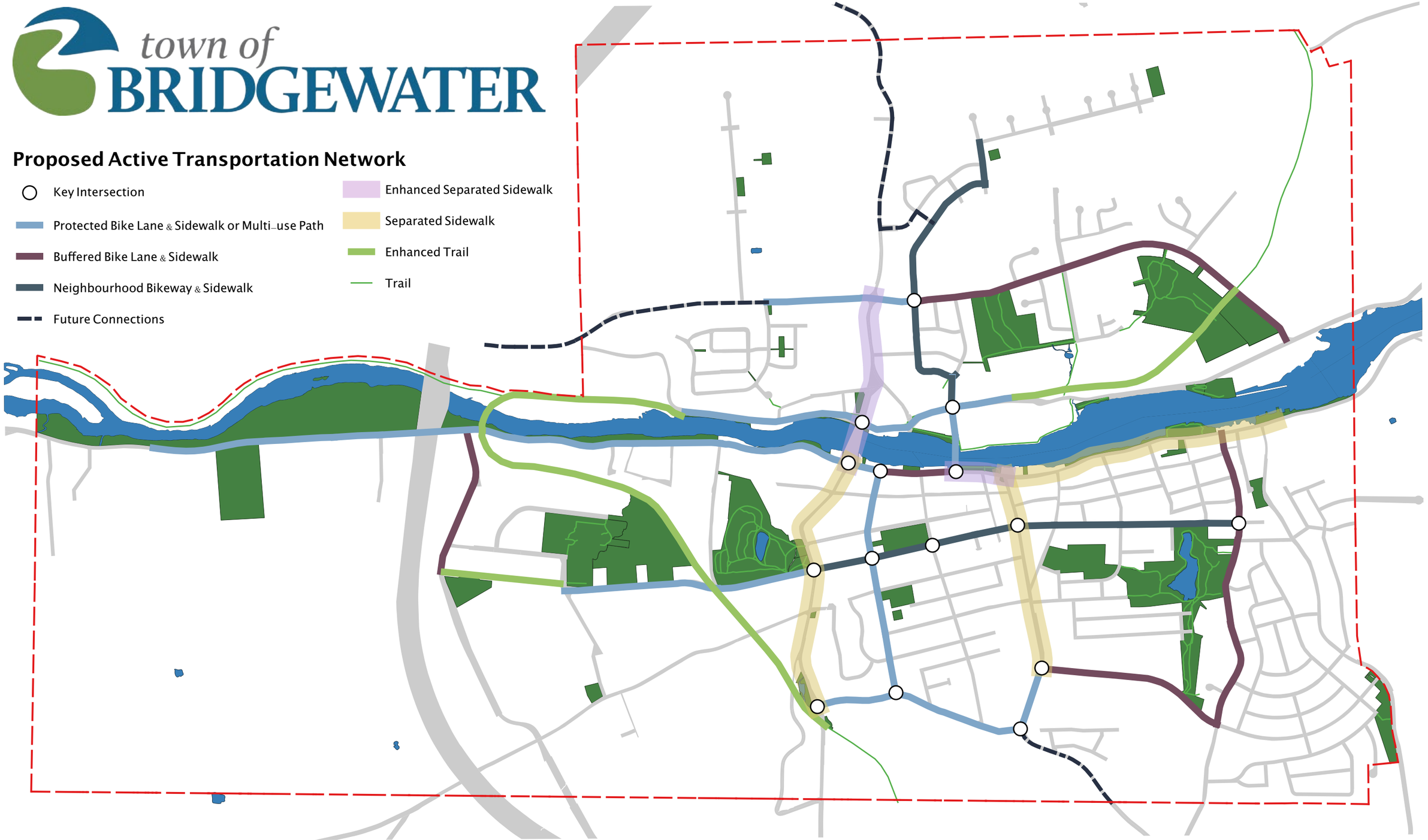
Appendix A
Active Transportation
Proposed Network

town of BRIDGEWATER

town of BRIDGEWATER

Proposed Active Transportation Network

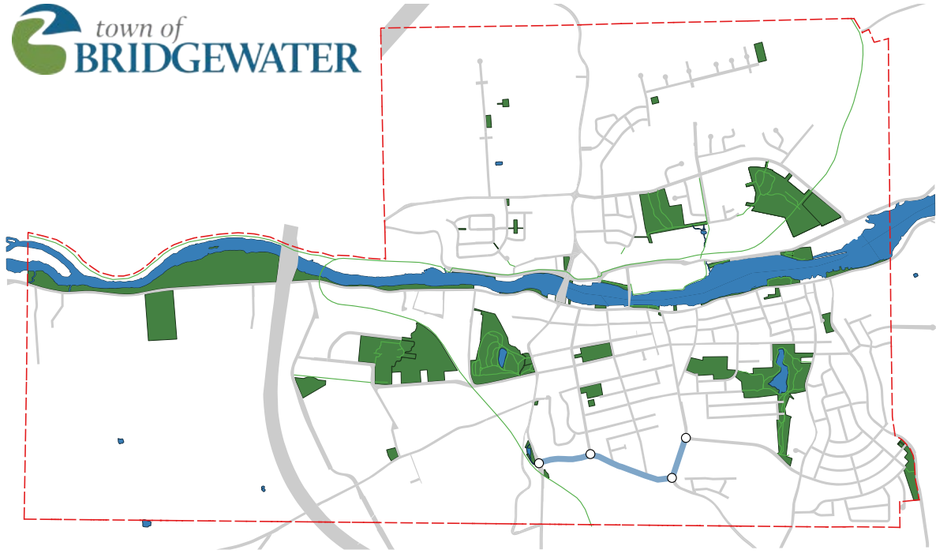
- Key Intersection
- Protected Bike Lane & Sidewalk or Multi-use Path
- Buffered Bike Lane & Sidewalk
- Neighbourhood Bikeway & Sidewalk
- Future Connections
- Enhanced Separated Sidewalk
- Separated Sidewalk
- Enhanced Trail
- Trail



N

0 250 500 750 1,000 m

High Street at Victoria Road to Dufferin Street at Exhibition Drive



1.2km - Multi-Use Path

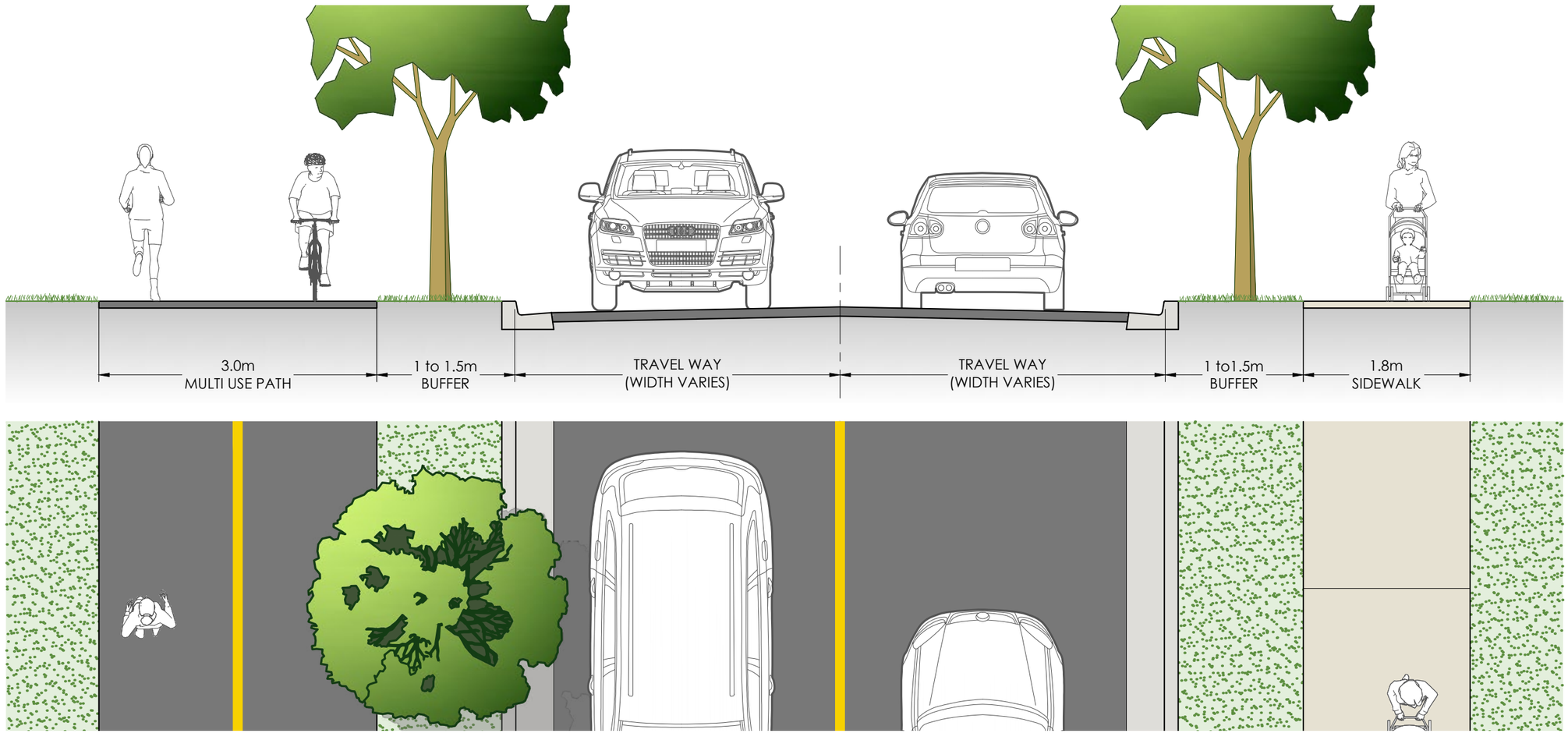
High Street is a collector roadway located on the west side of the Town. High Street connects to the Centennial Trail on its north end. This route connects the two primary east-west collector roads in the town: Victoria Road and Dufferin Street. This section of High Street is a primary commercial street that is also home to the NSCC Lunenburg Campus and the Provincial Law Courts. High Street carries a large volume of motor vehicle traffic, and this is clearly a dominating function of the road.

Preferred Treatment

Due to these high volumes, the 50km/h speed limit, and the road funciton, the appropriate facility type based on the Transportation Association of Canada (TAC) standards would be a multi-use path on one side of the street with a separated sidewalk on the other side of the street is the preferred treatment.

Minimum Design Details

- 3.0m wide Multi-Use Path
- 1-1.5m wide Vegetated Buffer
- 1.8m wide Sidewalk
- Vehicle travel width varies



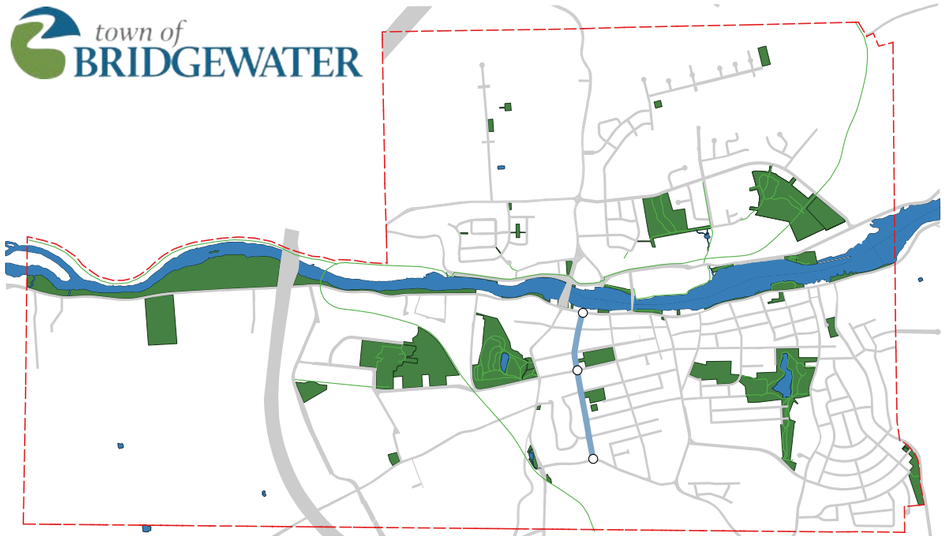
Empire Street

945m - Protected Bike Lane

Empire Street is a residential road that forms a strong east-west connection on the west side of town. Empire Street has steep grades as it approaches the LaHave River, and as it approaches High Street. The treatment at the steep grade needs to be carefully considered so people who cycle feel safe when they are going both up and down the hill. Empire Street is also a primary access point for Bridgewater Elementary and Junior High Schools.

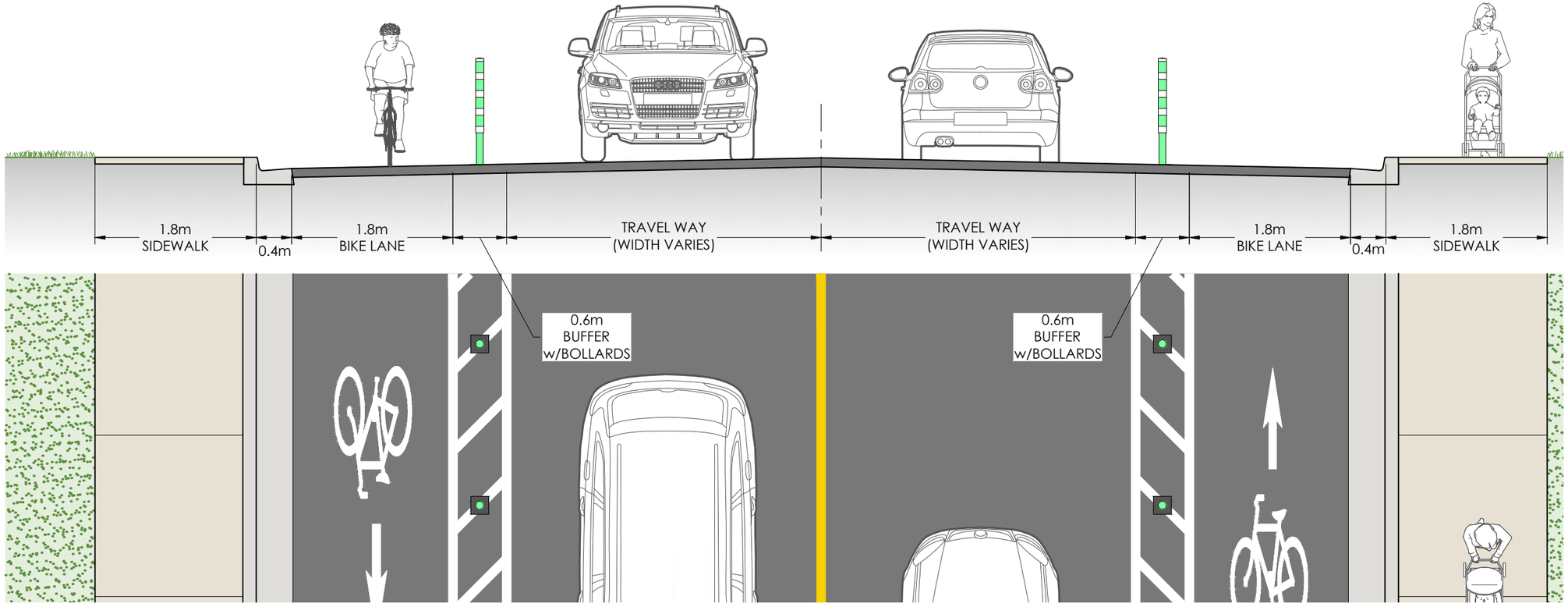
Preferred Treatment

These factors contribute to the selection of the preferred treatment option which is two uni-directional protected bike lanes and sidewalks on both sides of the street.



Minimum Design Details

- 1.8m wide Protected Bicycle Lane
- 1.8m wide Sidewalk
- 0.6m Buffer w/ Bollards
- Vehicle travel width varies



York Street and Alexandra Avenue

Alexandra Avenue and York Street are existing shared bicycle lanes. There is also an existing Town-owned trail located between Wentzell Drive and the Michelin plant that continues north from where York Street ends. There is potential to upgrade both the road and trail route to high quality active transportation standards.

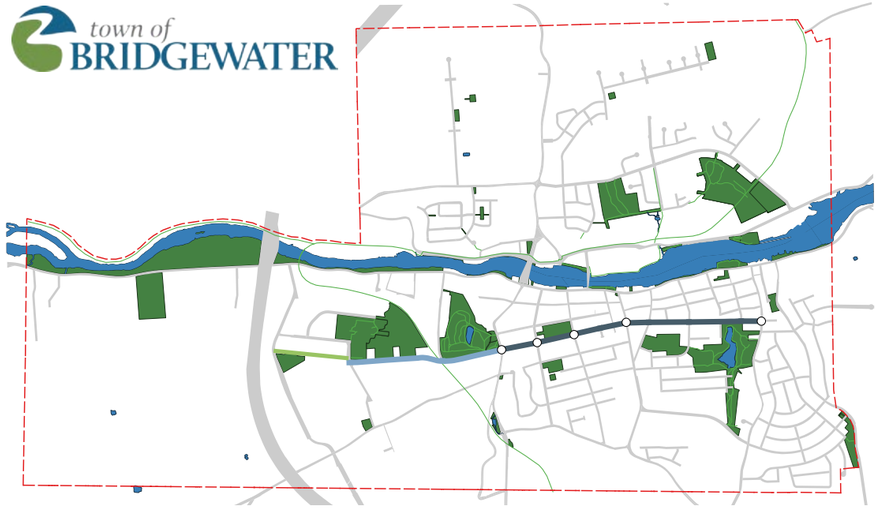
It is now recognized that shared bicycle lanes do not achieve the safety and comfort level to be attractive for cycling to the general population without significant traffic calming of a neighbourhood bikeway.

Preferred Treatment

South of Victoria Road, improvements should be made to create a neighbourhood bikeway. This would likely involve control of motor vehicle speeds, and potentially traffic diversion, depending on current traffic volumes. Upgrades such as bicycle actuation at the signalized intersections should also be considered.

North of Victoria Road, a multi-use pathway is the more appropriate facility to extend the corridor to Wentzell Drive and the LCLC. This portion links to the existing multi-use pathway that extends to the Michelin plant.

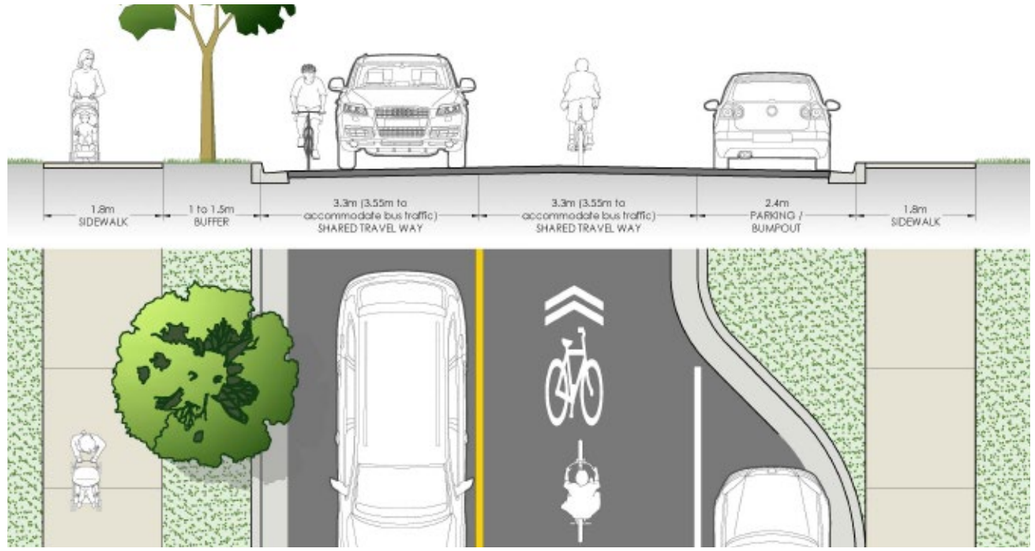
Upgrades to the existing trail located between Wentzell Drive and the Michelin plant should be considered as well. The trail should meet the guidelines for trails outlined in the Rick Hansen Foundation Accessibility Guidelines.



1.8km - Neighbourhood Bikeway (Alexandra Avenue)

Minimum Design Details

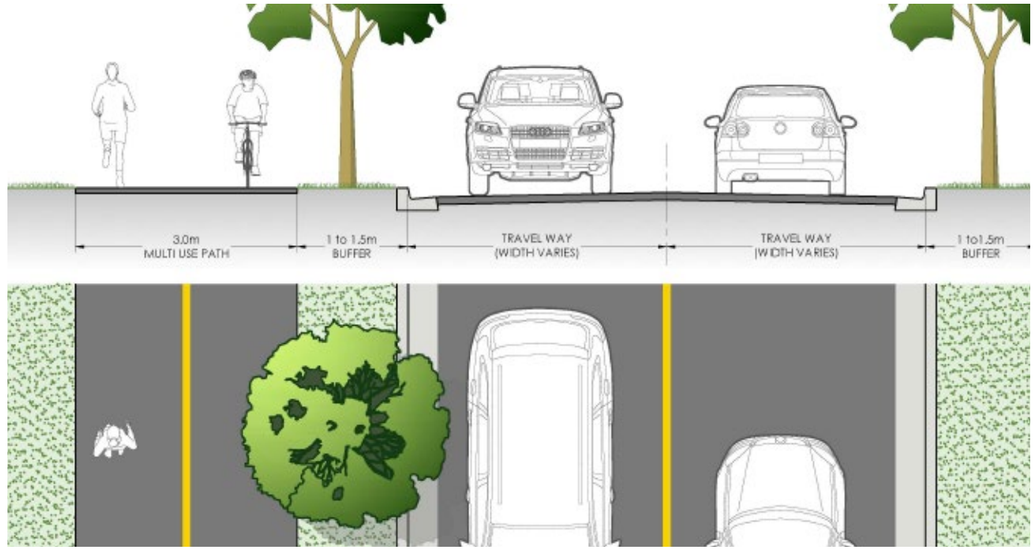
- Shared travel markings
- 1.8m wide sidewalk
- 3.3-3.55m vehicle travel way
- 2.4m parking aisle
- Curb bump outs at Intersections



1.0km - Multi-Use Path (York Street)

Minimum Design Details

- 3.0m wide Multi-Use Path
- 1-1.5m wide Vegetated Buffer
- Vehicle travel width varies

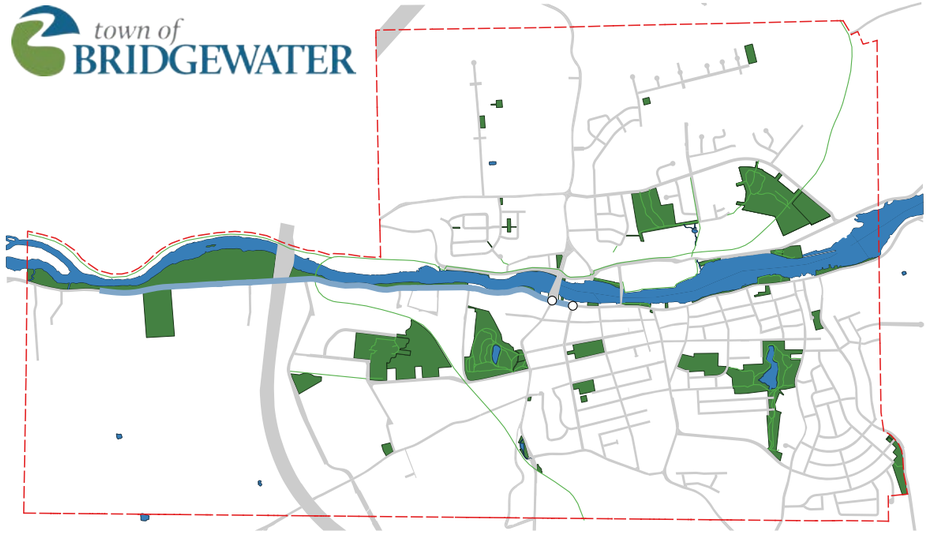


500m - Enhanced Trail Section

Minimum Design Details

- Minimum 1.6m clear width. 3m recommend
- Firm, Slip Resistant Suface

King Street (Park View Education Centre to Victoria Road)



2.6km - Multi-Use Path

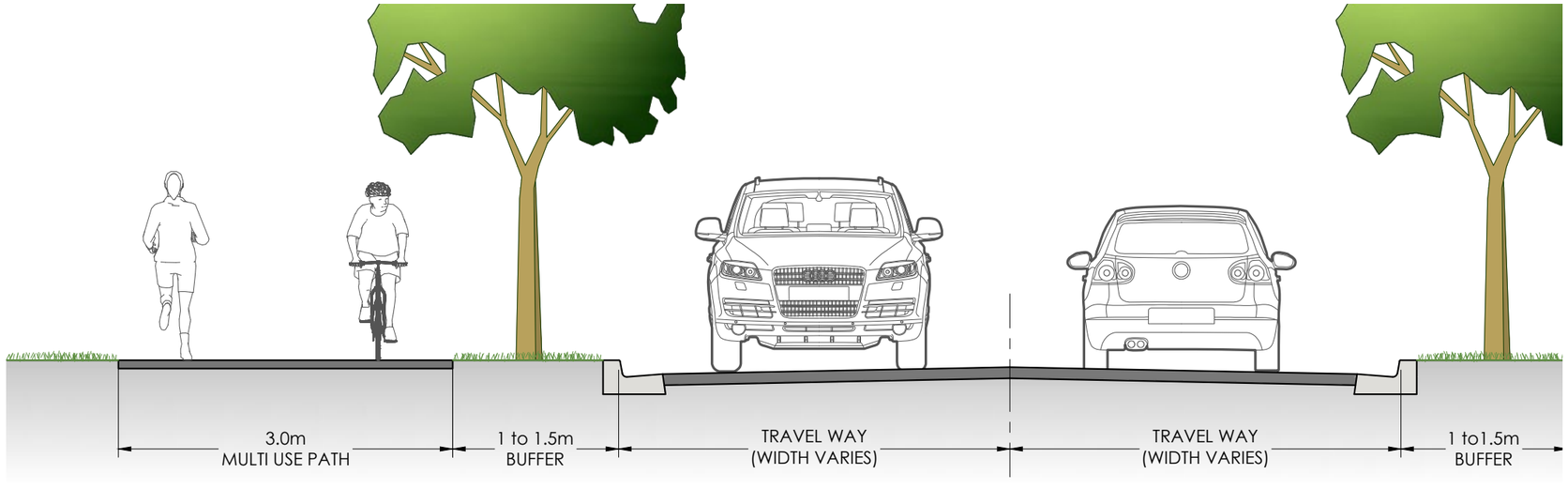
King Street is a busy roadway that provides critical connections, including access to Bridgewater's downtown and the bridges. It's also a section of longer distance routes, as it becomes Highway 331 to the south and connects to Lower Branch Road to the north. This proposed section of the network stems from community feedback to provide an active transportation connection from the Park View Education Centre to the Lunenburg County Lifestyle Centre (LCLC).

Preferred Treatment

Due to high traffic volumes and vehicle speeds, a multi-use path facility is appropriate for this section of King Street. The proposed multi-use path would connect the Park View Education Centre, Centennial Trail and the LCLC. This section of Bridgewater's Active Transportation Network may require coordination with adjacent landowners to develop. This project will require an improved connection of King Street to the Centennial Trail that is suitable for bicycles, as the current conection is a staircase.

Minimum Design Details

- 3.0m wide Multi-Use Path
- 1-1.5m wide Vegetated Buffer
- Vehicle travel width varies



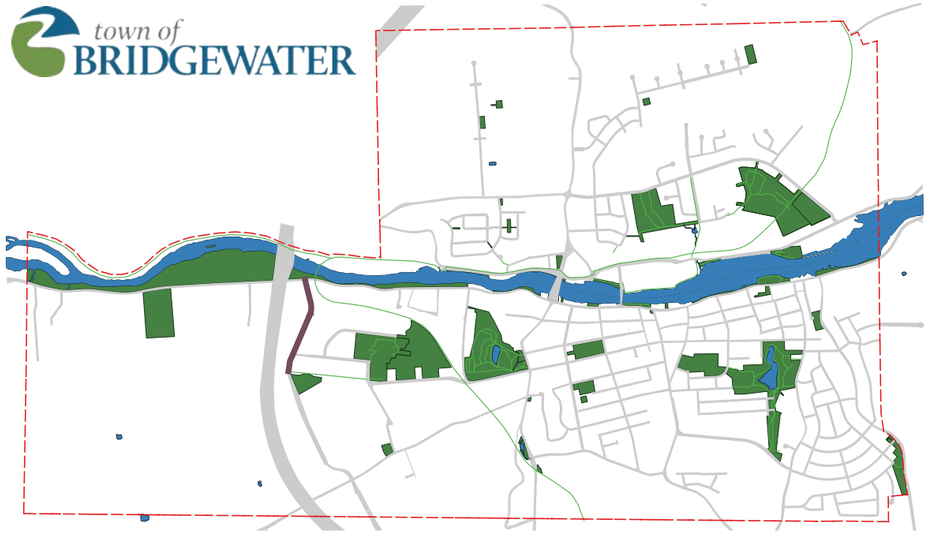
Logan Road from Wentzell Drive to King Street

620m - Buffered Bike Lane

Logan Road is being considered for road improvements in the near future. The open drainage ditch would be piped and covered. This provides ample room for active transportation facilities. As Logan Road is generally less steep, and traffic volumes are considerably lower compared to other east/ west connectors in Bridgewater, it is an ideal candidate for separated sidewalks and buffered bike lanes.

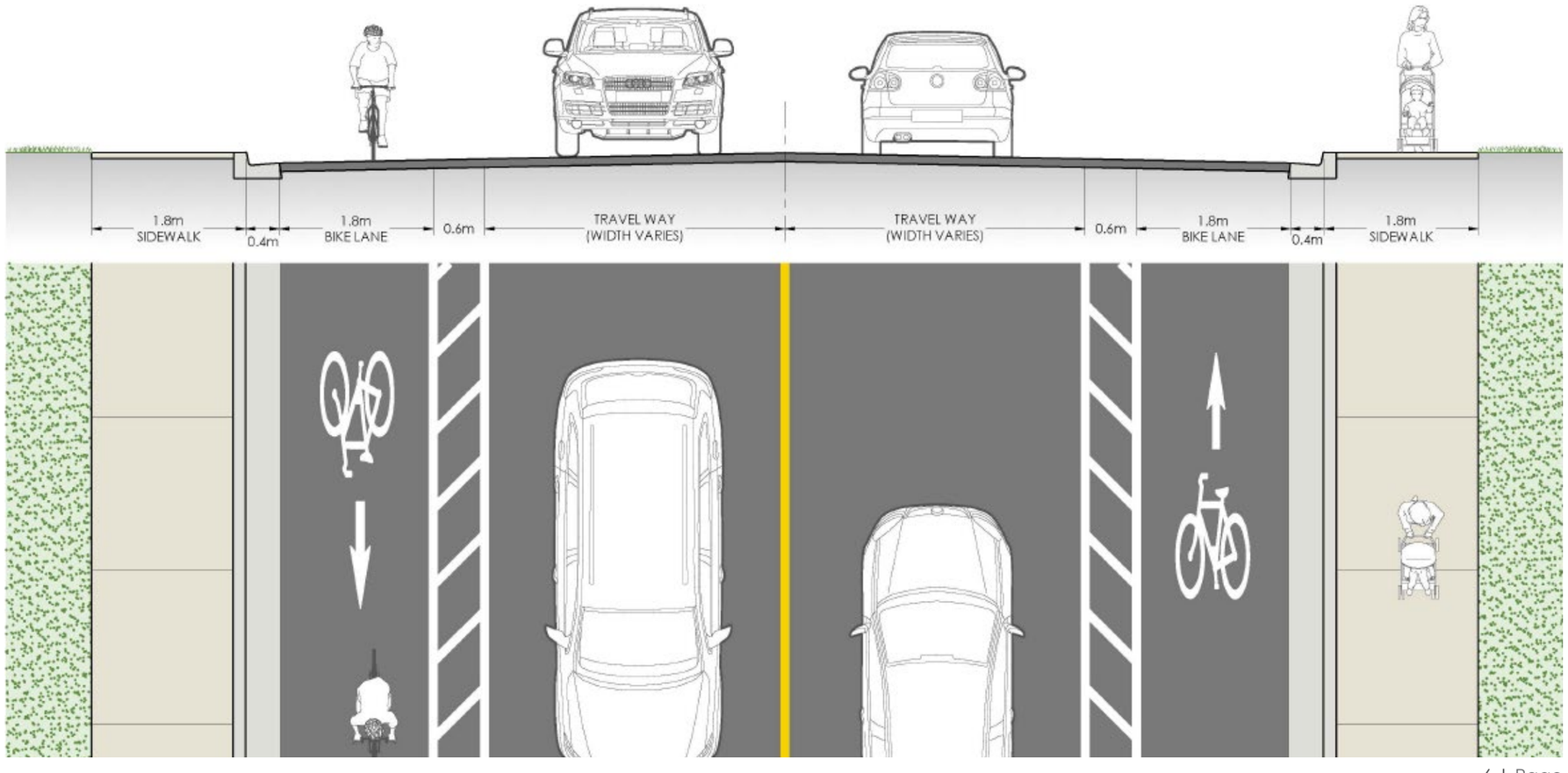
Preferred Treatment

The preffered treatment of separated sidewalks and buffered bike lanes provides an alternative connection between the Park View Education Centre and LCLC, particularly in winter when portions of the Centennial Trail are covered in snow. Additionally, separated sidewalks on both sides of the street should be considered during the road improvement process.



Minimum Design Details

- 1.8m wide Painted Bicycle Lane
- 1.8m wide Sidewalk
- 0.6m Painted Buffer
- Vehicle travel width varies



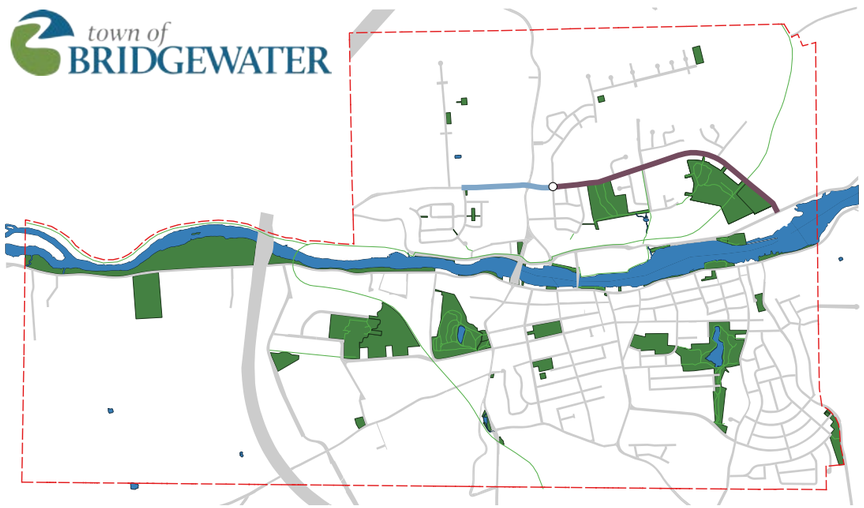
Glen Allan Drive and North Street

Glen Allan Drive from Lahave Street to Nafthal Drive is currently a designated "shared bicycle lane". It is a key route for the east side of Bridgewater as it connects to numerous residences as well as destinations, including the dog park and hospital. There are also several existing town-owned trails that connect from Glen Allan Drive to LaHave Street.

The area along North Street and Glen Allan Drive between Nafthal Drive and Seasons Drive contains many commercial amenities as well as some of the Town's highest population densities. There are limited existing active transportation connections in this area and generally high traffic volumes along this section of North Street.

Preferred Treatment

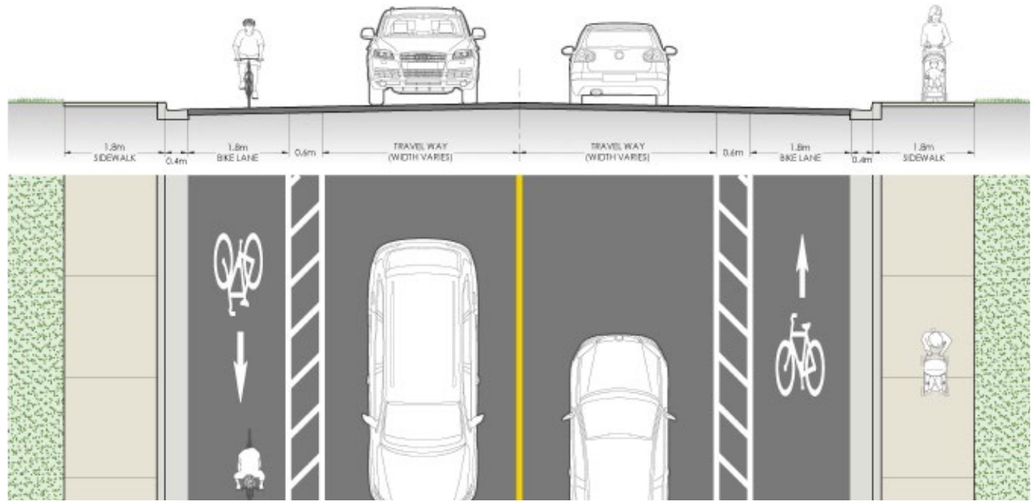
The preferred treatment is either protected bike lanes or buffered bike lanes. It is now recognized that shared bicycle lanes do not achieve the safety and comfort level to be attractive for cycling to the general population. The 2018 Annual Average Daily Traffic on Glen Allan Drive near LaHave Street was 2260 veh/day. While the traffic volume may be reasonable for shared bicycle/car operation, there are several characteristics that would favour implementing a designated space for cycling. The first is that it is unlikely to be reasonable to reduce the speed on the road to 30 km/h, the desirable maximum speed for shared operation, because there is no alternate route for cars. The second is that Glen Allan Drive is an incline, one that is particularly steep near LaHave Street.



620m - Buffered Bike Lane (North Street)

Minimum Design Details

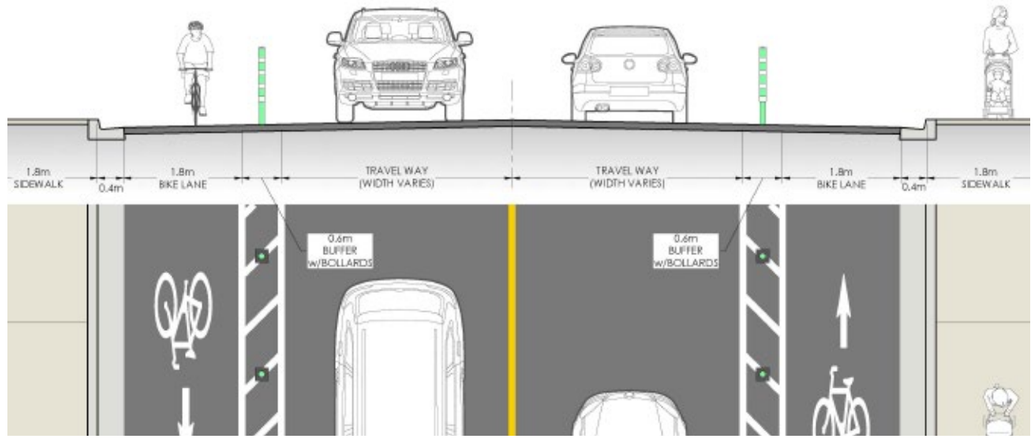
- 1.8m wide Painted Bicycle Lane
- 1.8m wide Sidewalk
- 0.6m Painted Buffer
- Vehicle travel width varies



1.4km - Protected Bike Lane (Glen Allan Drive)

Minimum Design Details

- 1.8m wide Protected Bicycle Lane
- 1.8m wide Sidewalk
- 0.6m Painted Buffer w/ Bollards
- Vehicle travel width varies



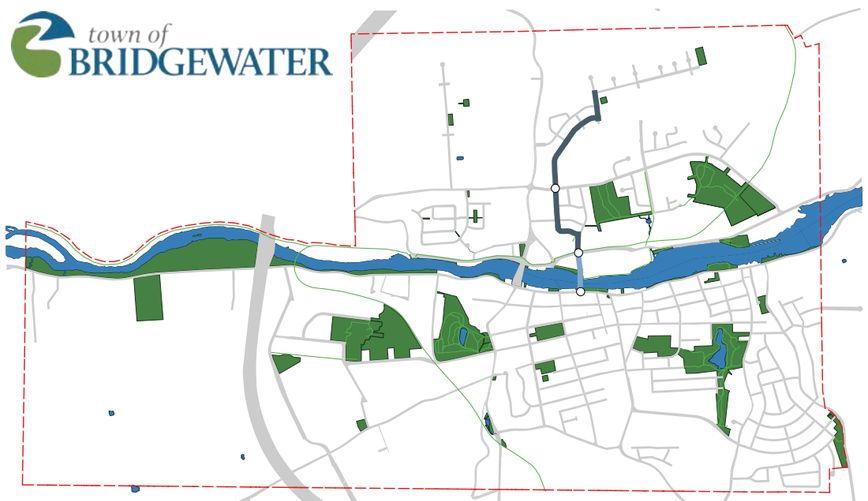
MacNeil Drive/Nafthal Drive and the Old Bridge

MacNeil Drive and Nafthal Drive run east/west on the east side of town. These streets run parallel to a portion of Aberdeen Road and link residential neighbourhoods to the hospital, and the Bridgewater Mall via a multi-use path.

Preferred Treatment

Formalizing this connection with a neighbourhood bikeway treatment and separated sidewalks is critical to the growth of active transportation use on the east side of town. This connection was selected as an alternative to Aberdeen Road to provide a traffic calmed, and less steep alternative for active transportation use while still maintaining access to essential services.

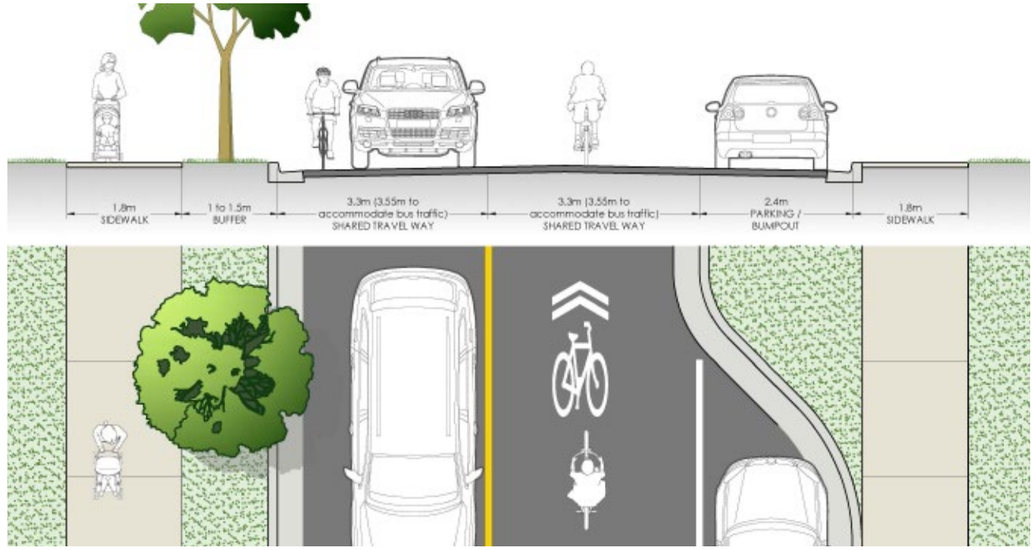
The second piece to this route is to work with the provincial government to retrofit the old bridge to accommodate higher pedestrian volumes and improved bicycle access. The Downtown and Waterfront Master Plan proposed a cantilevered multi-use path on one side until a third bridge is installed. A third bridge is no longer a viable option; however, the cantilever solution remains as a potential solution to enhancing pedestrian and cycling connectivity between the east and west sides of town. Retrofitting the bridge willl require working with the Province to achieve the desired outcome.



1.3km - Neighbourhood Bikeway

Minimum Design Details

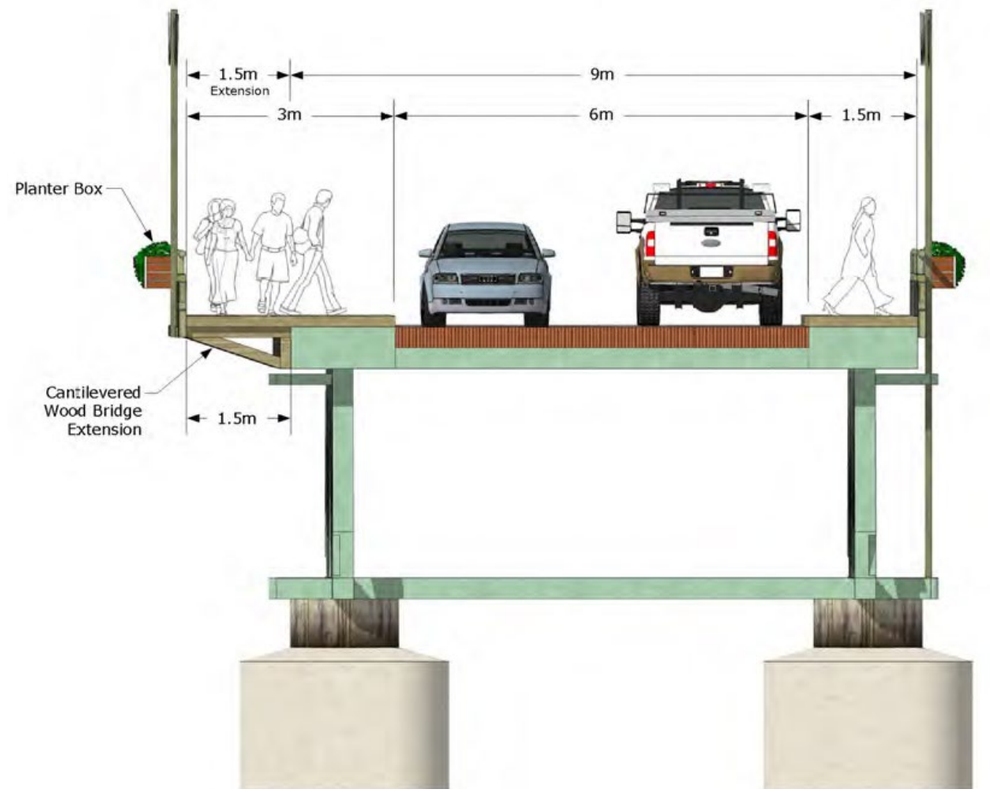
- Shared travel markings
- 1.8m wide sidewalk
- 3.3-3.55m vehicle travel way
- 2.4m parking aisle
- Curb bump outs at Intersections



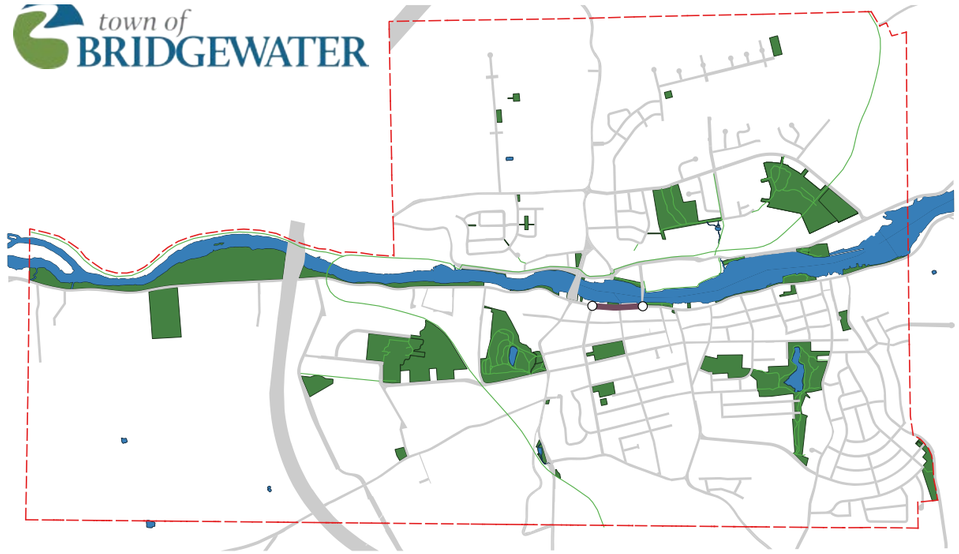
Old Bridge Retrofit

Minimum Design Details

- 3.0m wide Multi-Use Path
- 1.5m wide Sidewalk
- 6m Vehicle travel width



King Street between Empire Street and the Old Bridge



300m - Buffered Bike Lane

King Street is a vital cycling connection because it leads to the downtown area and provides access to the bridges. With streetscaping on King Street scheduled for the future, this presents a once in a lifetime opportunity to improve conditions for cycling.

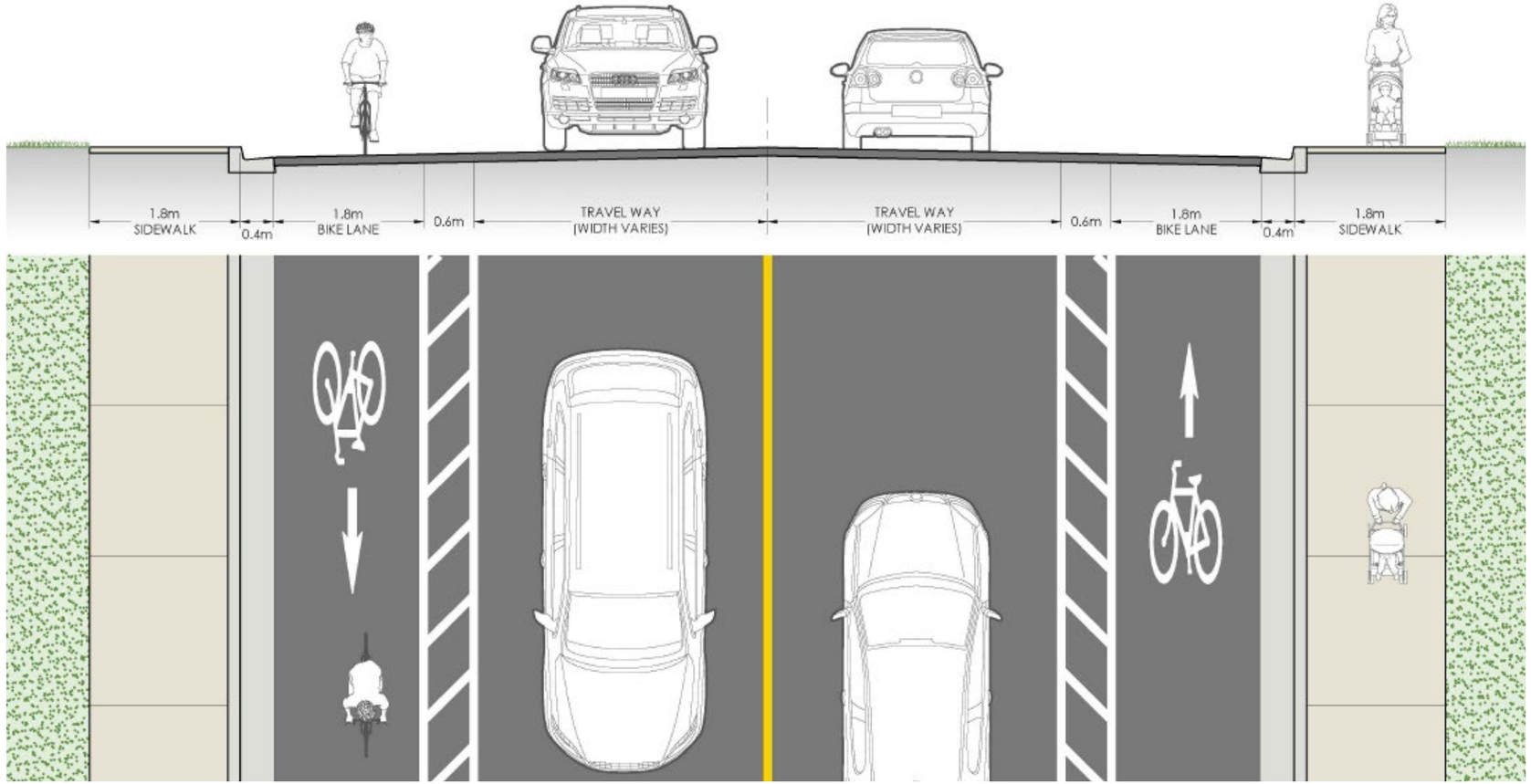
Both Empire Street and Dominion Street are being considered for repaving/sidewalk and storm/ sanitary upgrades. Streetscaping on King Street will also be an upcoming capital project. By designing and constructing the facility along with existing plans for road upgrades, there's potential for cost savings.

Preferred Treatment

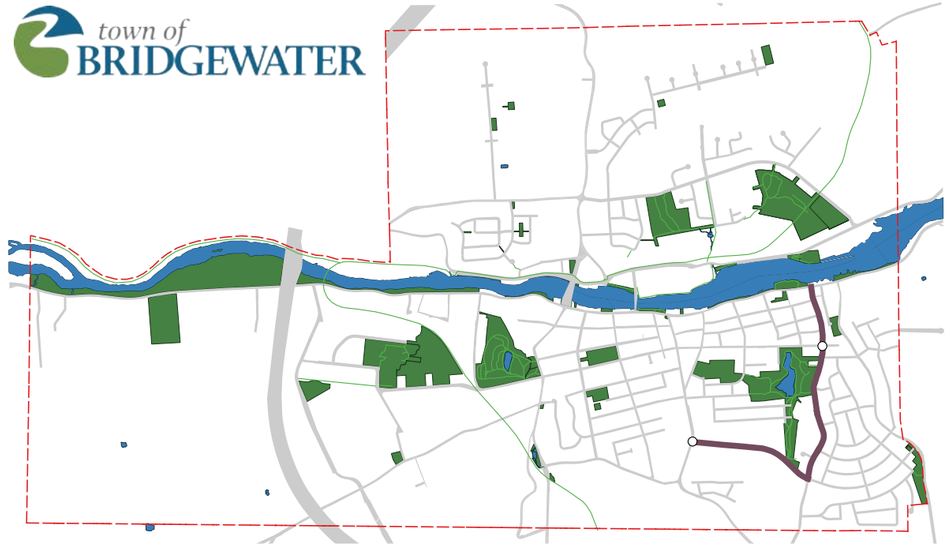
A buffered bikeway facility would be sufficient if other traffic calming measures are incorporated in the streetscaping plan.

Minimum Design Details

- 1.8m wide Painted Bicycle Lane
- 1.8m wide Sidewalk
- 0.6m Painted Buffer
- Vehicle travel width varies



Exhibition Drive and Jubilee Road



2.0km - Buffered Bike Lane

Jubilee Road forms a critical east/west link between King Street, High Street, and Alexandra Avenue. The road is flanked on both sides by residential development, a large subdivision on the south side and multiple multi-unit dwellings on the north side. Jubilee Road is also generally less steep than other east/west connectors.

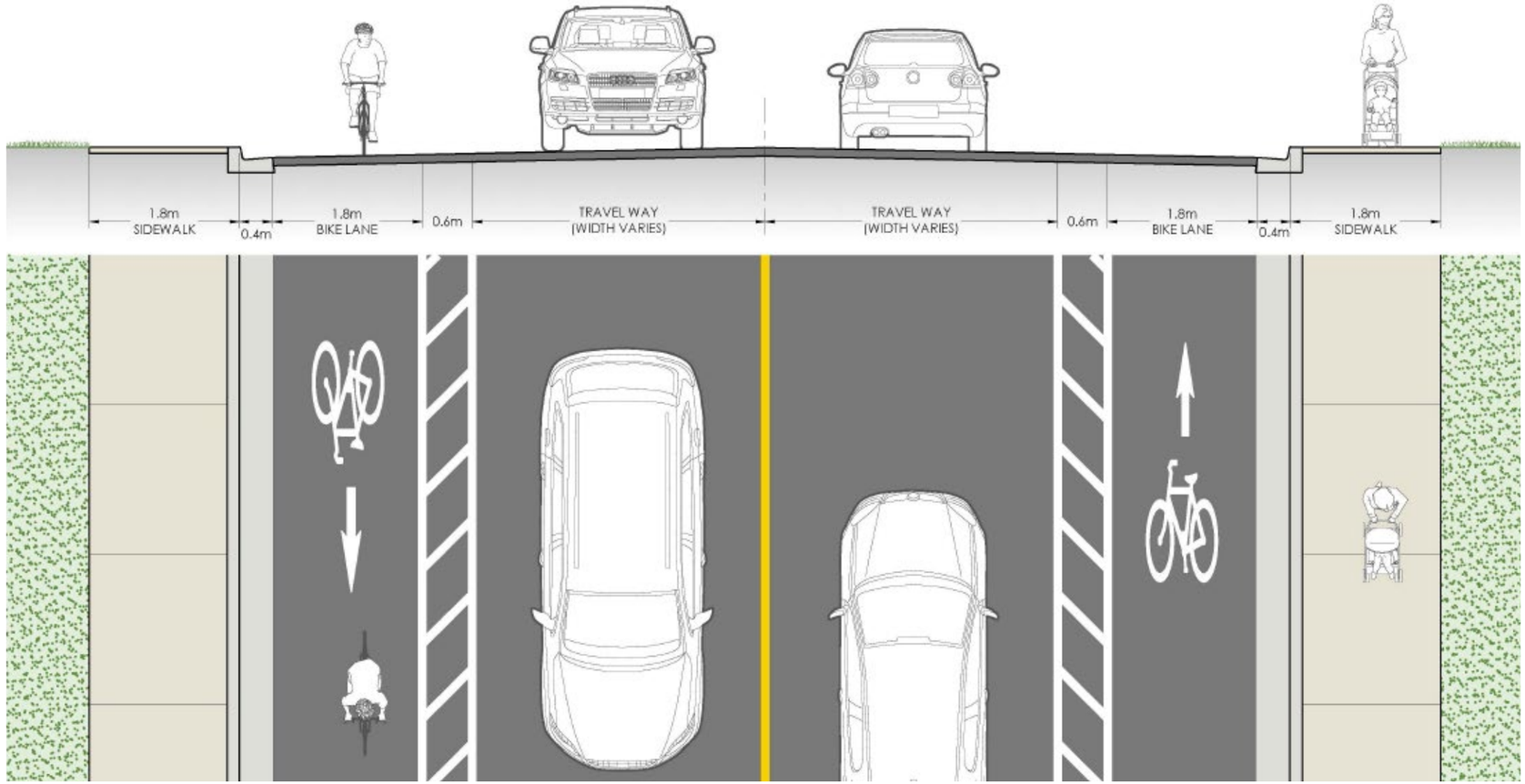
Exhibition Drive creates a critical link between High Street, the commercial portion of Dufferin Street, and Jubilee Road. While not currently fully developed, much of Exhibition Drive is zoned Medium or High Density Residential or Institutional. Adequate active transportation facilities should play a critical role as this area develops.

Preferred Treatment

A buffered bike lane facility with separated sidewalks on both sides is adequate for this area based on traffic volumes and road right of way width. As this area develops, the Town should consider upgrading the facility type to a fully protected bikeway.

Minimum Design Details

- 1.8m wide Painted Bicycle Lane
- 1.8m wide Sidewalk
- 0.6m Painted Buffer
- Vehicle travel width varies



Separated Sidewalks

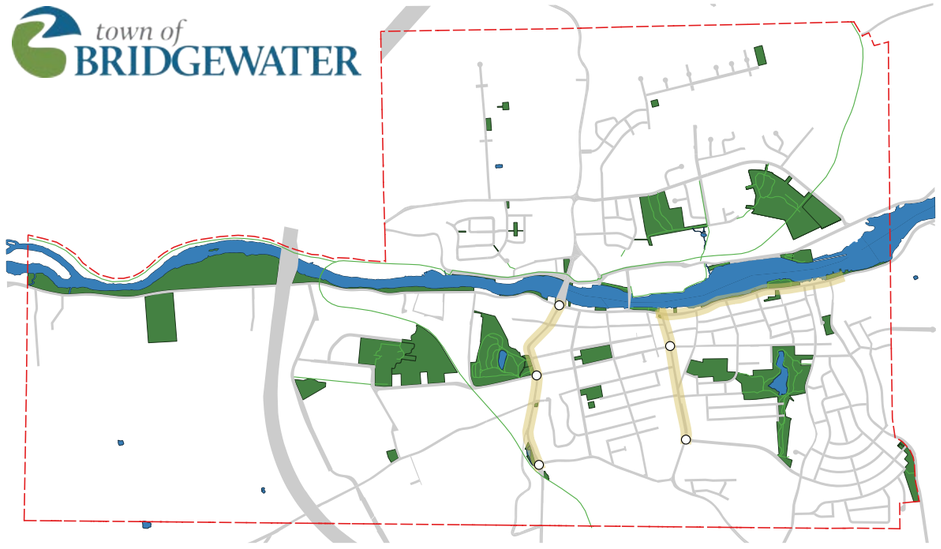
4.5km - Separated Sidewalks

Victoria Road from King Street to High Street, Dufferin Street from King Street to High Street, and King Street from Dufferin Street to Pine Street are critical arterial streets in the Town of Bridgewater. They act as a major east/west and north/south connectors on the west side of town.

Current sidewalk conditions on Dufferin Street and Victoria Road are poor. Some concrete sidewalk sections exist on one side of the street; however the majority of sidewalk segments are composed of asphalt paving, at grade with the street or not existent. The King Street sidewalk improvement portion of the network seeks to provide sidewalks on both sides of the street on these critical portions of King Street. This allows residents to walk and roll to Downtown Bridgewater and connect with the existing and proposed sidewalk network.

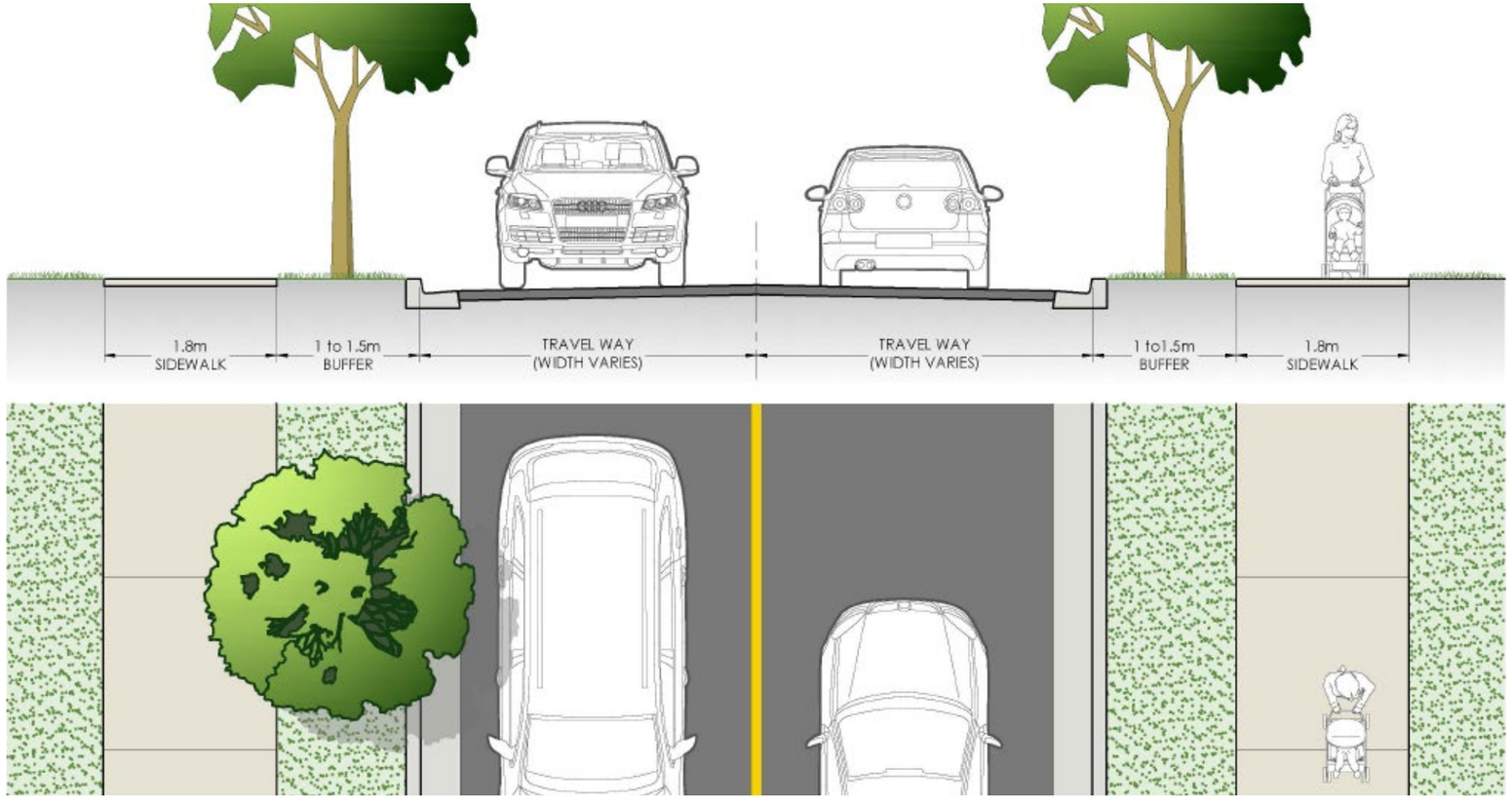
Preferred Treatment

This proposed network project seeks to standardize and prioritize the sidewalks to meet minimum material and width standards for an accessible built environment. Sidewalks will be separated, above grade and built with concrete pavers or similar.



Minimum Design Details

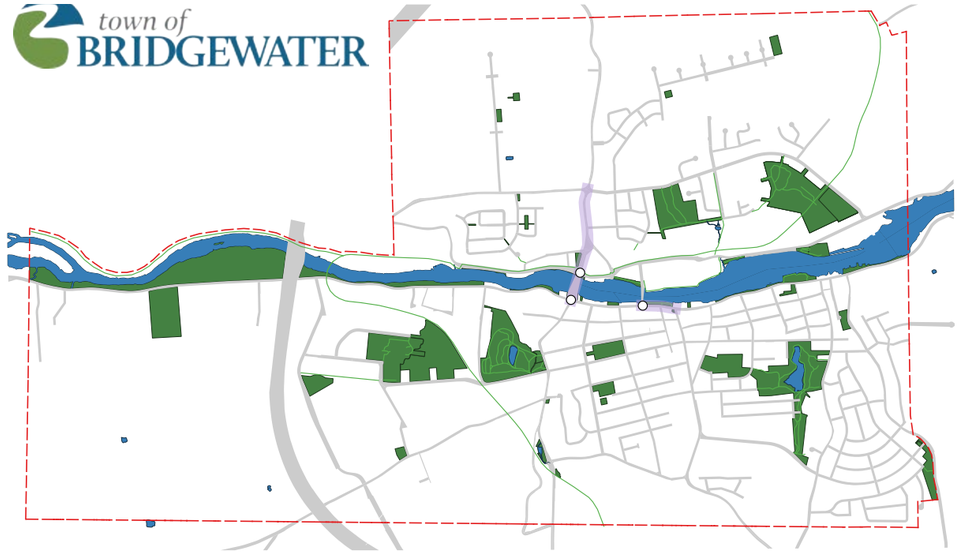
- 1.8m wide Sidewalk
- 1-1.5m wide Vegetated Buffer (where width is not constrained)
- Vehicle travel width varies



Enhanced Separated Sidewalks

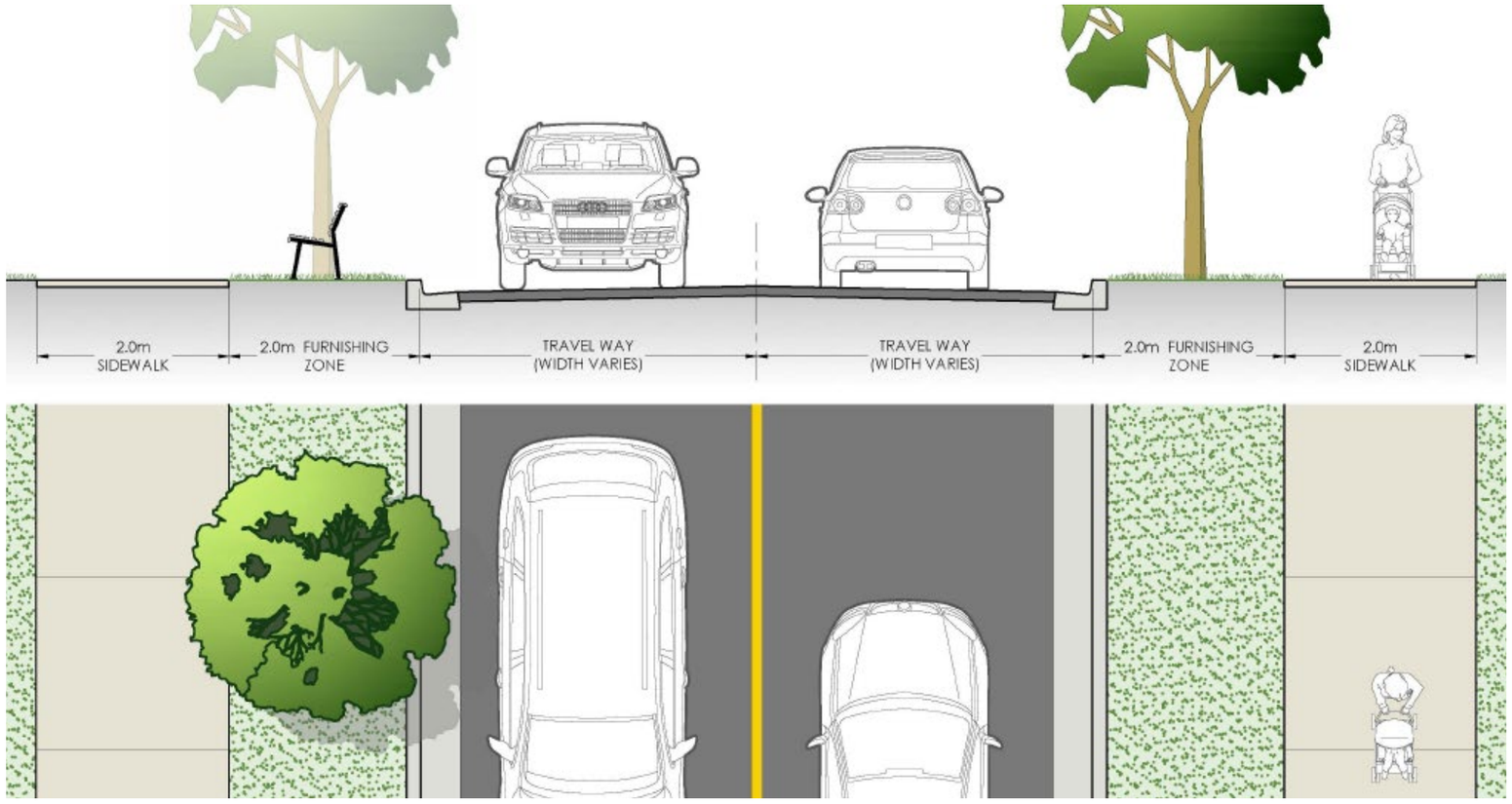
2.0km - Enhanced Separated Sidewalk

In areas of high traffic volumes and speeds, where there is significant commercial or institutional activity, enhanced separated sidewalks should be considered. Enhanced separated sidewalks provide a frontage zone to allow storefronts to spill out onto the street with sidewalk patios and planters, and an amenity zone allows for pedestrian seating, lighting and trash receptacles. Aberdeen Road and King Street are key candidates for this type of facility. Current land use is not conducive to walkable streets, particularly Aberdeen Road. However, future land use designations and zoning by-laws should consider street-oriented land uses that complement this type of facility.



Minimum Design Details

- 2.0m wide Sidewalk
- 2.0m Furnishing Zone
- Vehicle travel width varies



Appendix B

Active Transportation

Best Practice Design Guide

town of BRIDGEWATER

Guidance Framework

This section does not outline mandatory standards or requirements. Rather, it provides recommended guidelines to assist the Town of Bridgewater in applying best practices to the planning, selection, design, implementation, and maintenance of active transportation facilities This document reflects a synopsis of the existing best practices and research that has been compiled with the applicability of the Nova Scotia, and Bridgewater context in mind. At the end of each section, additional resources have been provided to assist the Town with subsequent phases of design and implementation of the proposed Active Transportation Network.

This guide is separated into three parts:

1. Pedestrian Facilities
2. Bicycle Facilities
3. Intersections

1. PEDESTRIAN FACILITIES

PEDESTRIAN FACILITIES

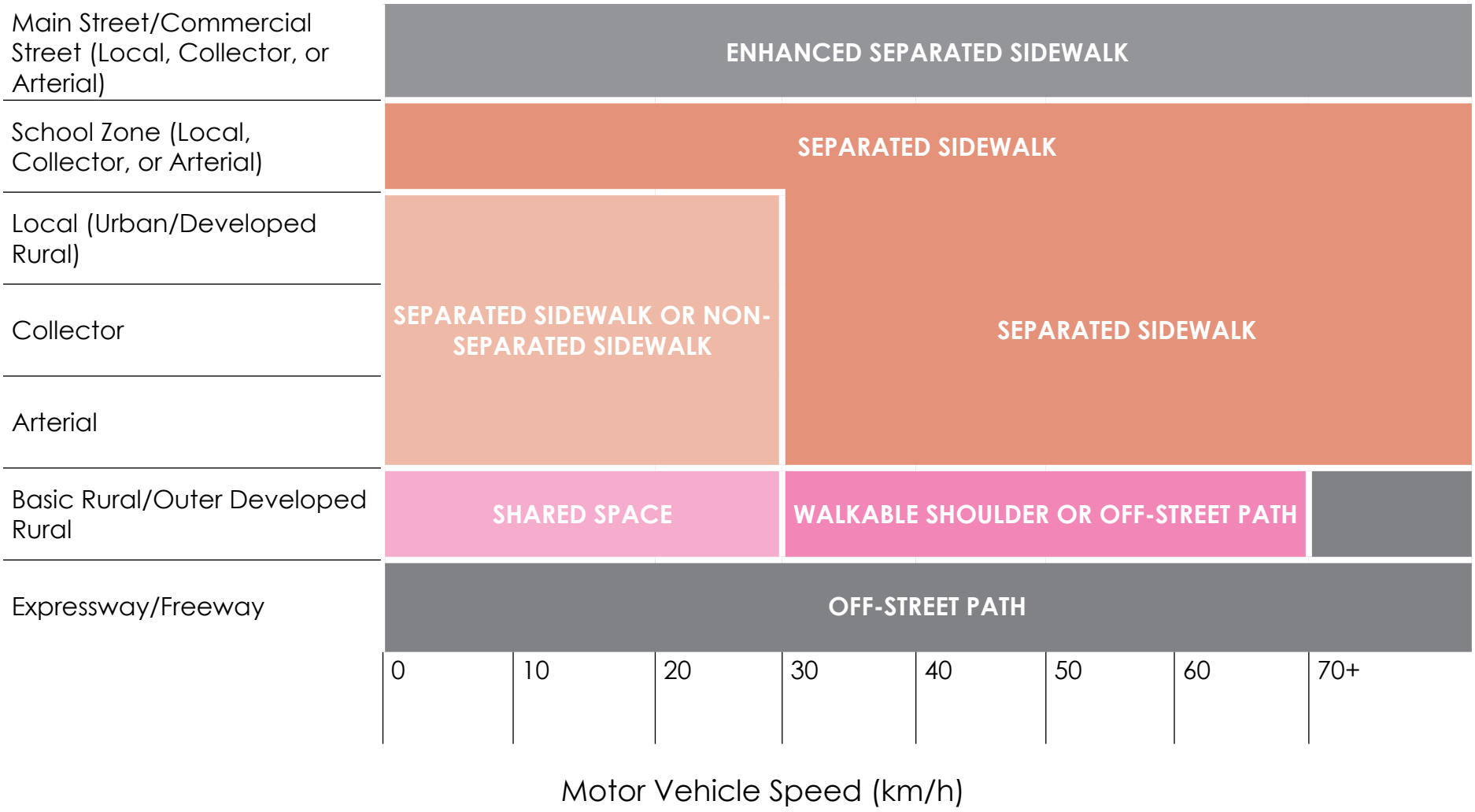
Streets can be divided into a series of zones that each serve a dedicated purpose, such as providing space for through traffic, accommodating people walking or cycling, or the installation of street furniture. Figure 1 shows the range of zones in an urban street setting. These are examples only – not all streets will contain each zone, and there are many street designs in both urban and rural settings. The placement and the geometry of the zones is flexible and dependent on available right-of-way, road class, and land use.

Figure 1-Sidewalk Zones

Pedestrian Facility Decision Matrix

Figure 2 shows the Pedestrian Facility Selection Decision Support Tool, which outlines when each type of pedestrian facility may be appropriate. This decision support tool is based on motor vehicle speeds and road service classes, with some additional context added based on land-use context.

Figure 2 - Pedestrian Facility Selection Decision Tool



Pedestrian Facility Types

Figure 3 shows a spectrum of pedestrian facility types. These have been divided into all ages and abilities facilities and supporting facilities. In general, supporting facilities should be applied sparingly and only if design constraints require them. Each type of facility is described below.

Off-Street Pathway: Pathways that are physically separated from the road including multi-use pathways and separated bicycle and pedestrian pathways.

Enhanced Separated Sidewalk: A wide separated sidewalk with ample space for pedestrian movement, sidewalk utilities, and placemaking opportunities.

Separated Sidewalk: A furnishing zone, defined as defined as the section of the sidewalk between the curb and the through zone in which street furniture and amenities, such as lighting, benches, newspaper kiosks, utility poles, tree pits, and bicycle parking are provided, separates the pedestrian zone from the roadway. This enhances pedestrian safety and comfort while providing space for sidewalk utilities and amenities.

Non-Separated Sidewalk: The Pedestrian Through Zone is located directly next to the roadway, but is physically separated from the roadway by a curb.

Walkable Shoulder: If no formal sidewalk is provided, a shoulder may be provided. This type of facility is not considered appropriate for people of all ages and abilities.

Figure 3 -Facility Types

Location

Sidewalks are recommended on all types of urban roads. Ideally, sidewalks should be provided on both sides of the road in order to enhance pedestrian network connectivity, provide full accessibility, and limit unnecessary road crossings. However, this may not be necessary if there are not pedestrian destinations present on one side of the road or if traffic volumes and speeds are sufficiently low. Fugire 4 outlines recomended pedestrian facilities based on traffic speed ansd road type. Where appropriate, an off-street pathway can take the place of a sidewalk.

Additional Guideance

Sidewalk Dimension Guidelines

Figure 4 - Pedestrain facilities by road type

Land Use Context	Road Type	Separation**	Desirable Width (m)	Constrained Limit (m)*
Single Family Residential	Local	Non-Separated or Separated	1.8	1.5
	Collector/ Arterial	Separated	1.8	1.8
Multi-Family Residential	Local	Non-Separated or Separated	2.1	1.5
	Collector/ Arterial	Separated	2.4	1.8
Industrial	Any	Separated	2.1	1.8
Commercial	Any	Separated	2.4-3.0	2.1
Area of high pedestrian activity***	Any	Separated	3.0-4.0	2.4

Slope	Requirements
</= 5.0%	None
> 5.0% to 8.3%	Landings should be provided every 9.0 metres
>8.3%	Alternative accommodation recommended

Driveways

Where driveways cross a sidewalk they create conflict points between pedestrians and vehicles. Additionally, ramps that extend into the sidewalk can be challenging for people with mobility devices to navigate. Driveways crossing sidewalks should be limited. Where this is not possible, several design considerations can be applied as shown below.

Driveway Crossing of Separated Sidewalk

Driveway Crossing of Non-Separated Sidewalk

Driveway Crossing of Non-Separated Sidewalk (Wrapped Around Driveway)

* The absolute minimum width of the Pedestrian Through Zone is 1.5 metres, which should only be used under constrained conditions for distances under 100 metres.
** Non-separated sidewalks are not recommended on collector, arterial, or industrial roads. If non-separated sidewalks cannot be avoided due to site constraints, a minimum of 0.5 metres may be added to the width to provide extra separation from motor vehicles.
*** Areas of high pedestrian activity have peak pedestrian volumes of 400 pedestrians/15-minute period, as per Table 6.3.1. in the TAC Geometric Design Guide for Canadian Roads (2017).

2. BICYCLE FACILITIES

Facility Types

A number of bicycle facility types have the potential to be suitable for people of all ages and abilities, depending on the design and context. Other facilities, such as bicycle accessible shoulders, are never considered suitable for people of all ages and abilities but may serve as a supporting facility that enhances the overall active transportation network. Wherever possible, best practice is to strive to provide all ages and abilities facilities. These facilities are described below and shown in Figure 5.

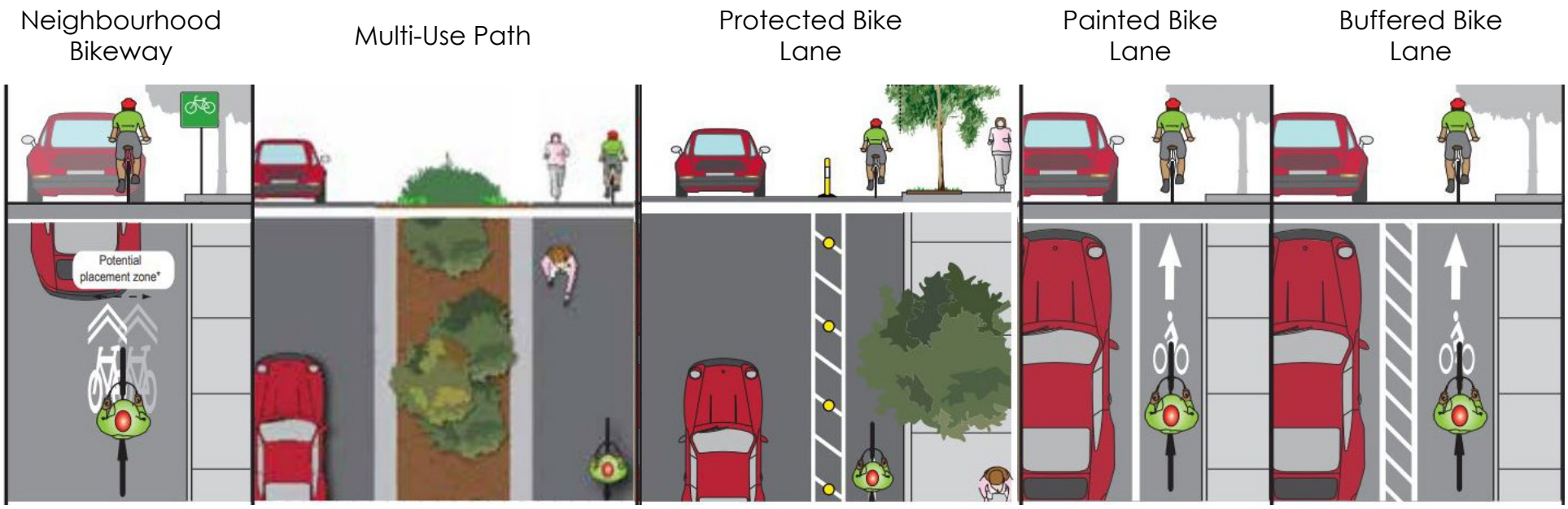
Neighbourhood Bikeways: Streets with low motor vehicle volumes and speeds that are suitable for motor vehicles and people cycling to share the road. Neighbourhood bikeways may include treatments such as signage, pavement markings, traffic calming, and traffic diversion to prioritize bicycles and make the facility comfortable for people of all ages and abilities.

Multi-Use Pathways: Off-street facilities that are shared between people walking, cycling, and using other forms of active transportation such as skateboarders and in-line skaters.

Protected Bike Lanes: Separate travel lanes designated exclusively for bicycle use and other forms of active transportation (such as in-line skating, using kick scooters, and skateboarding, where permitted) that are physically separated from motor vehicles and pedestrians by vertical and/or horizontal elements.

Painted or Buffered Bicycle Lanes: Separate travel lanes designated exclusively for bicycle use that are delineated by a painted line and, in some cases, a painted buffer area.

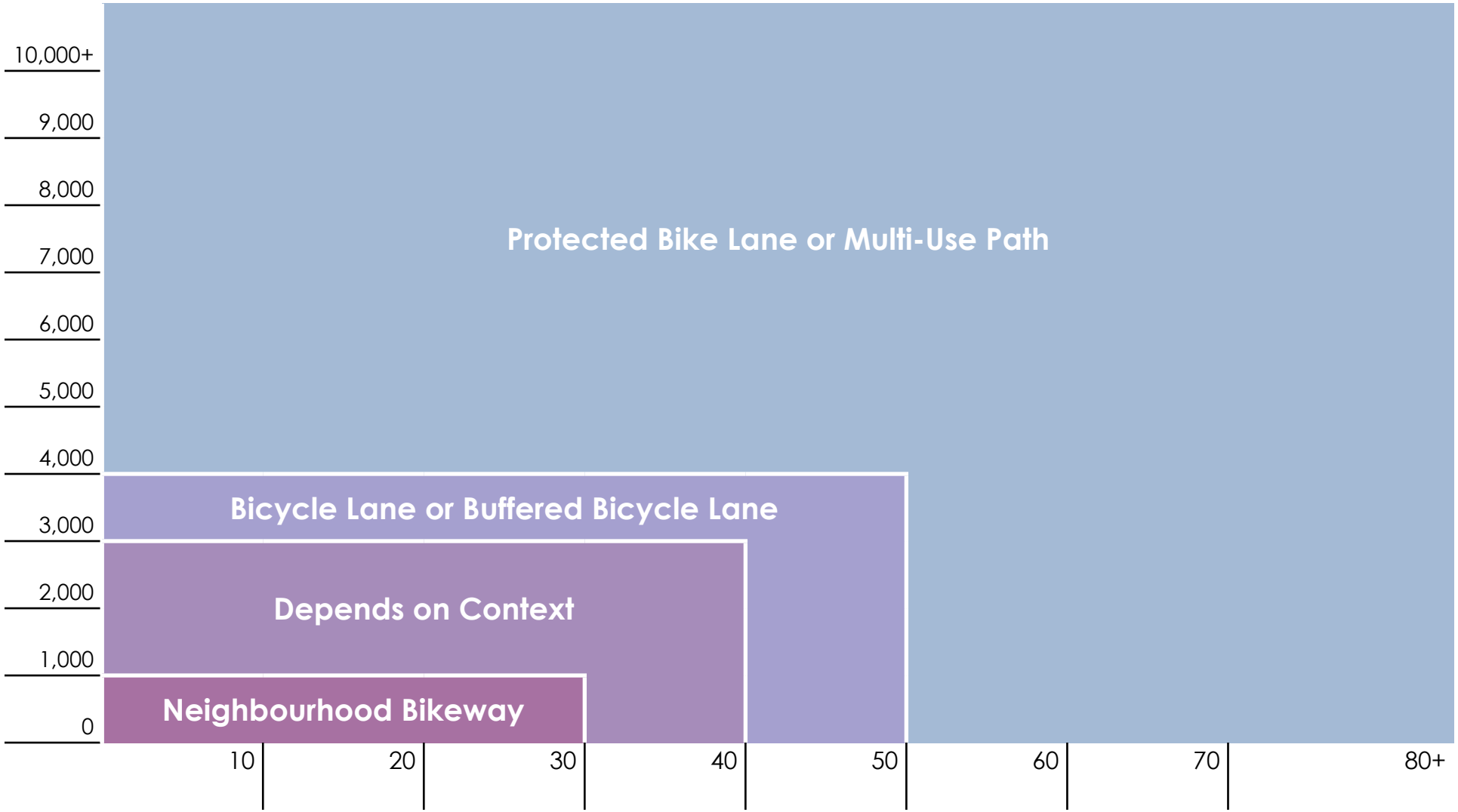
Figure 5 - Facility Types



Design Guidance

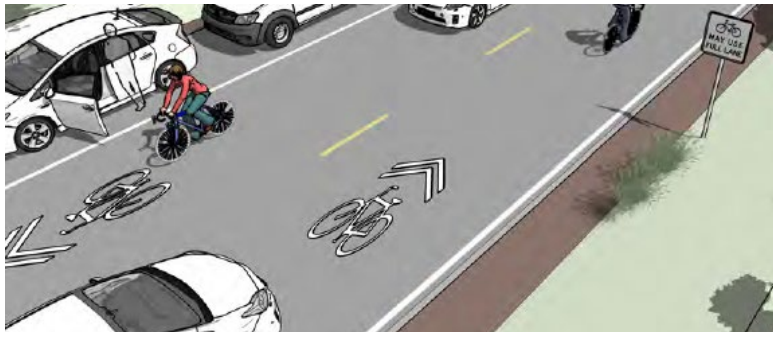
Motor vehicle speeds and volumes are perhaps the most important considerations in selecting the appropriate bicycle facility type. Generally, higher motor vehicle speeds and volumes necessitate a greater degree of separation between motor vehicles and bicycles. Figure 6 illustrates the desired facility based on motor vehicle speed and traffic volume. The grade of the street should also be considered when choosing a facility type. Grade of 8.3% or higher should be considered for a protected bike lane separate from pedestrian traffic.

Figure 6 - Bicycle Facility Decision Matrix



Neighbourhood Bikeway

Neighbourhood bikeways are considered an all ages and abilities bicycle facility as they increase the comfort of users by creating a safe and comfortable environment for people cycling and people driving motor vehicles to share the road. Neighbourhood bikeways are categorized based on the degree to which bicycles are prioritized through design treatments. There are three levels of treatment for a neighbourhood bikeway. Each of these different treatments builds upon the last, adding to the level of prioritization for non-motorized modes. Facilities require sufficient traffic calming and diversion treatments to reduce vehicle speeds and create a pleasant cycling environment.



Existing Motor Vehicle Volumes (VPD)	Existing Motor Vehicle Speeds	Level of Treatments		
		Level : Required Treatments	Level 2: Traffic Calming	Level 3: Traffic Diversion
<1,000	30 km/h or less	X		
<1,000	30 to 50 km/h	X	X	
1,000 - 2,500	30 km/h or less	X		X
1,000 - 2,5000	30 to 50 km/h	X	X	X
>2,500	> 50 km/h	Consider alternate facility type		

Level 1: Required Treatments

Treatments to include:
- Intersection signalization, such as bicycle detection at major intersections.
- Sign and pavement markings

Level 2: Traffic Calming

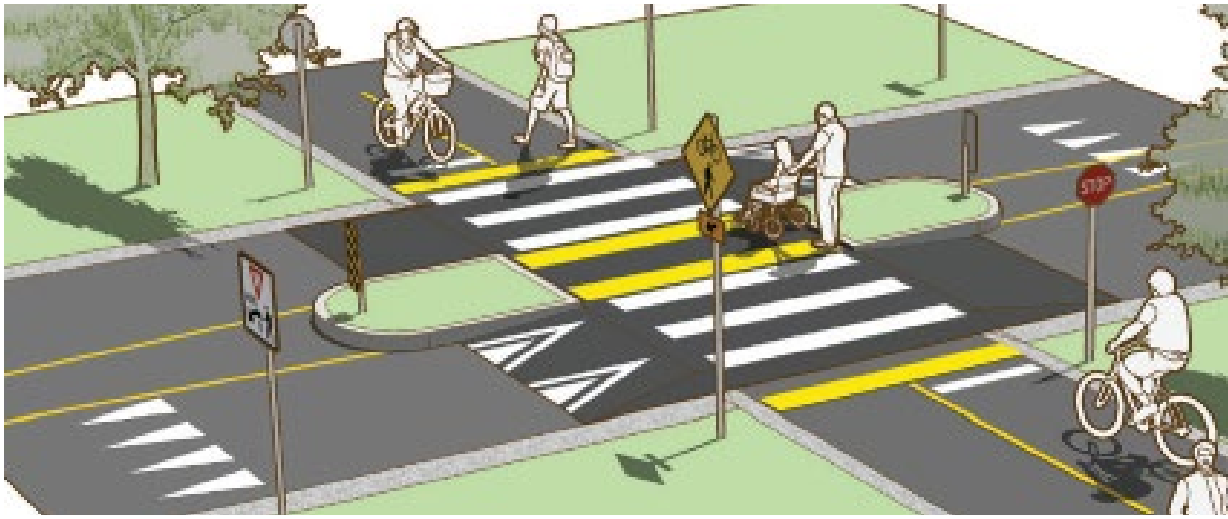
Treatments to include:
- Level 1 treatments
- Speed management measures like speed bumps, curb bump-outs, and raised intersections.

Level 3: Traffic Diversion

Treatments to include:
- Level 1 and Level 2 Treatments
- Volume reduction measures like diagonal diverters and median islands

Multi-Use Path

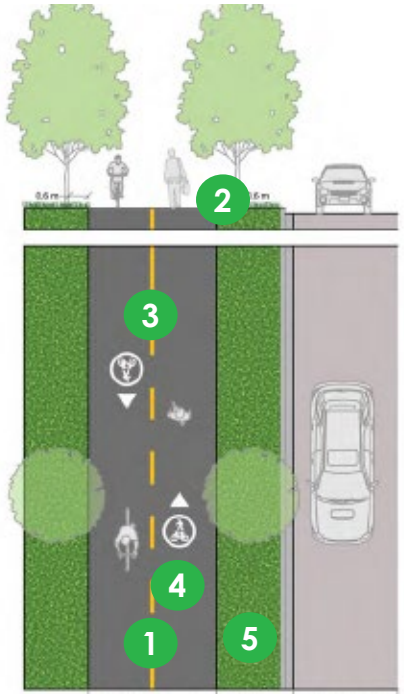
Multi-Use Pathways are off-street pathways that are physically separated from motor vehicle traffic and can be used by any non-motorized user. This includes people walking, cycling, skateboarding, kick scootering, in-line skating, and using other active modes. Multi-use pathways may also be referred to as shared-use pathways, multi-use trails, and boulevard multi-use pathways. Typically, multi-use pathways accommodate bi-directional travel for all users. Multi-use pathways can be located in a variety of contexts, including rail corridors, greenway corridors, utility corridors, parks, along waterfronts, and adjacent to a road or highway.



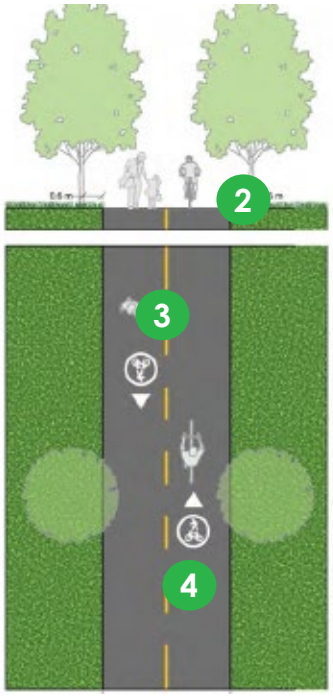
Key Considerations

There are five key considerations for Multi-Use Paths. These are:

1. The desired path width is 4.0 metres. However in constrained situations this can be reduced to 3.0 metres.
2. A horizontal buffer should be provided on both sides of the pathway. 1.5 metres is desirable, however 0.6 metres is acceptable in constrained situations.
3. Dashed directional dividing lines should be used to separate the direction of travel.
4. Pavement markings should be used to provide guidance for types of users and direction of travel.
5. A buffer from motor vehicle lanes should be provided. 2.0 metres is desirable, however 0.6 metres is appropriate in constrained environments.



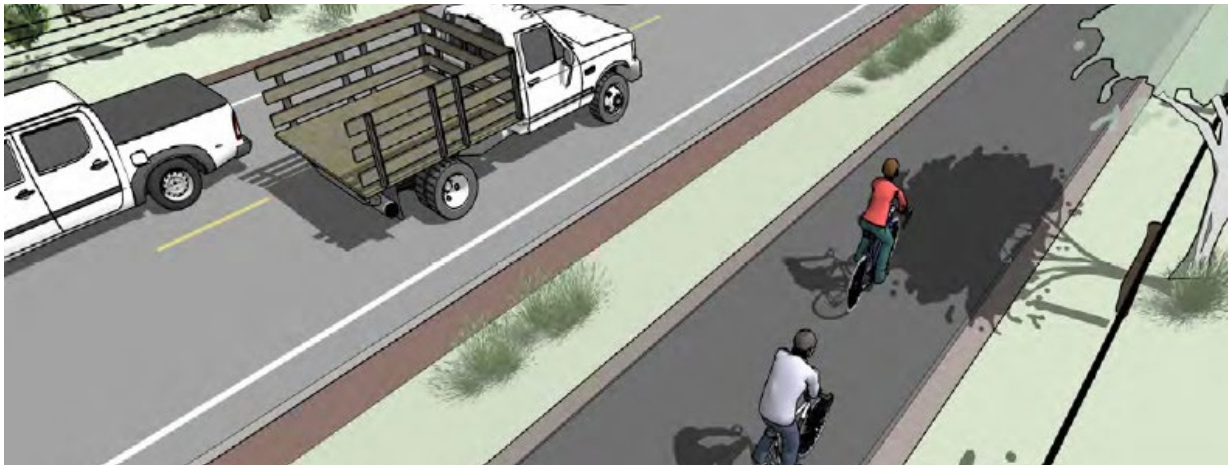
Roadway Context



Non-Roadway Context

Protected Bicycle Lanes

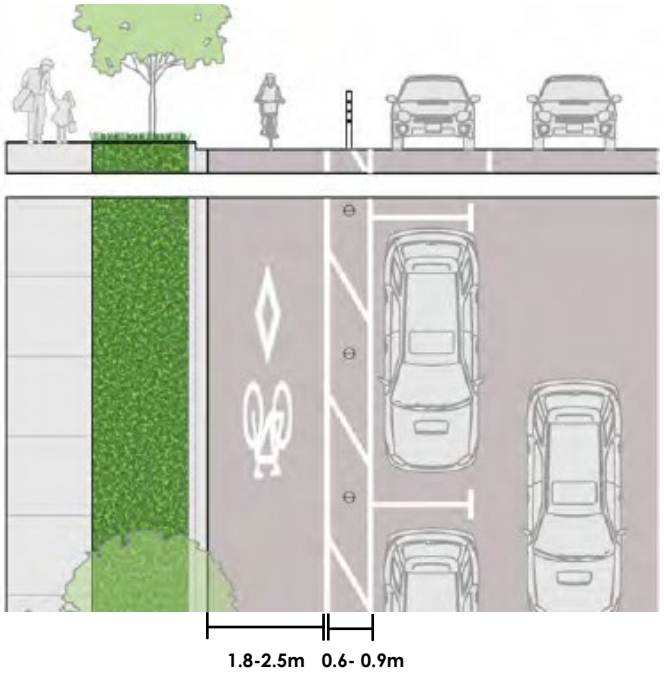
Protected bicycle lanes are dedicated facilities for the exclusive use of people cycling and using other active modes (such as in-line skating, using kick scooters, and skateboarding, where permitted through local and regional government bylaws). Protected bicycle lanes are physically separated from motor vehicles and pedestrians by vertical and/or horizontal elements. Protected bicycle lanes are distinct from painted or buffered bicycle lanes as they provide physical separation between bicycle users and motor vehicles.



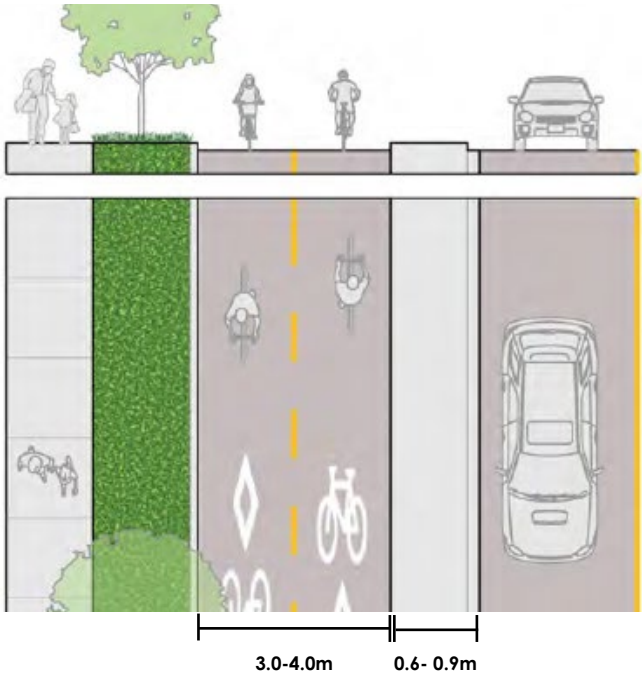
Typical Application

Uni-Directional Protected Bicycle Lane Cross-Section
No On-Street Parking

Uni-Directional Protected Bicycle Lane Cross-Section
With On-Street Parking



Bi-Directional Protected Bicycle Lane Cross-Section
No On-Street Parking



Types of Separation

The types of separation that may be used as part of a protected bicycle lane are shown in Figure 7. A combination of these treatments may be used along a corridor to achieve the full benefits of each separation type. The benefits of each are compared in Table 1.

A raised or landscaped median provides vertical physical separation. If a raised or landscaped median is not used, then some type of vertical object within a painted buffer area is needed to provide separation. The placement of the vertical objects within the buffer should consider the need for shy distance to the protected bicycle lane and the motor vehicle lane. When placing vertical objects, preference should be given to maximizing the width of the protected bicycle lane. Additionally, sightlines should be considered when placing and choosing types of separation, especially near intersections and conflict zones.

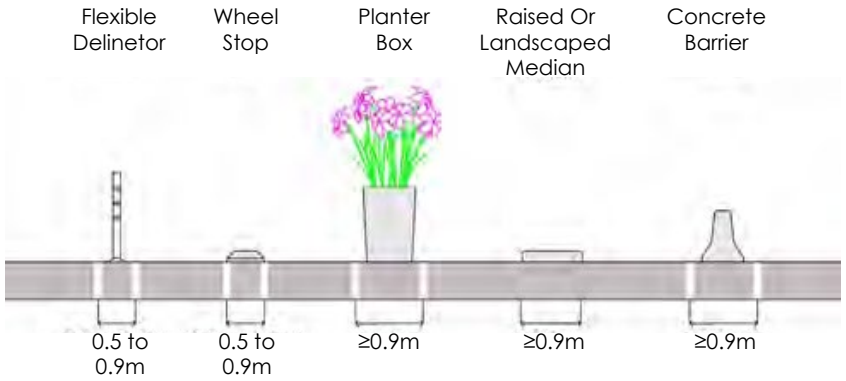


Figure 7 - Types of Separation Used as Buffers

Example of Protected Bike Lane, Montreal QC

Separation Decision Support Tool

	Flexible Delineator Post	Wheel Stop	Planter Box	Concrete Barrier	Raised Landscape Median	Parking Lane
Appropriate Context	• Lower-speed environments; may not be appropriate for roads with posted speeds that exceed 50 km/h. • Recommended treatment adjacent to motor vehicle parking to allow access.	• Lower-speed environments; may not be appropriate for roads with posted speeds that exceed 50 km/h.	• Lower-speed environments; planter boxes with periodic or intermittent spacing are not appropriate on roads with posted speeds of 50 km/h or greater. • If planter boxes are used on roads with posted speeds of 50 km/h or greater, they should be constructed of a durable material and should not be periodic or intermittently spaced unless they are placed on top of a concrete median or adjacent to a median or curb to provide continuous physical protection. • If they are used on roads where operating speeds are different from posted speeds, the design should be adjusted accordingly.	• Recommended for locations where more physical protection from motor vehicles is needed, such as on bridges with high-speed traffic. • Should not be used with on-street parking.	• Recommended for locations where more physical protection from motor vehicles is needed; for example, on bridges with high-speed traffic.	• Where on-street parking exists, the protected bicycle lane can be placed between the parking and the sidewalk.
Cost	• Lowest initial capital cost but may need routine replacement, resulting in higher long-term costs.	• Low cost.	• High cost, including ongoing maintenance for re-positioning and possible seasonal removal	• Relatively low initial capital cost compared to other types of separation.	• Higher initial capital cost, but requires less long-term maintenance than other types of separation.	• Low cost, plus the cost of any additional separation elements.
Design Flexibility	• Easily removed and relocated.	• Easily removed and relocated.	• Easily removed and relocated. • Can be used on a seasonal basis (removed in the winter). • If they are used on roads with posted speeds of 50 km/h or less, there is more flexibility in their design.	• Relatively low flexibility	• Relatively low flexibility	• Relatively low flexibility.

Table 1: Comparison of Separation Types For Protected Bicycle Lanes (Adapted from British Columbia Active Transportation Design Guide)

Refer to the TAC Geometric Design Guide for Canadian Roads, Section 5.7.5 for detailed guidance on the recommended type of separation, dimensions, and spacing for based on the posted speed limit of the adjacent motor vehicle lane.

	Flexible Delineator Post	Wheel Stop	Planter Box	Concrete Barrier	Raised Landscape Median	Parking Lane
Design Notes	• Small footprint compatible with a range of buffer designs. • Should be combined with buffered bicycle lane pavement markings. • Allows drainage and snow storage. • Appearance is less 'permanent' than other forms, and may be less aesthetically pleasing."	• Can be used in narrower buffers than other types of separation. • Must be pinned down. • Consider use of end treatments such as mini-barrier noses. • Must have vertical element at least at the start when adjacent to traffic; may need additional vertical elements to enhance visibility, particularly during winter months."	• Can add to the aesthetics and enjoyment of the facility. • Planters with intermittent spacing that are not separated from adjacent motor vehicle lanes should consider clear zone. • Should have reflective markings or be signed.	• Intended to provide continuous vertical separation. • On higher speed roads, crash cushions should be included at barrier ends. • Less aesthetically pleasing than other types of separation.	• Intended to provide continuous vertical separation. • On higher speed roads, crash cushions should be included at barrier ends. • Less aesthetically pleasing than other types of separation.	• Intended to provide continuous vertical separation
Durability	• Low durability.	• High durability.	• Relatively high durability; depends on material used	• High durability.	• High durability.	• Depends on type of additional separation used.
Protection	• May increase user comfort, but does not offer physical protection.	• Can be used to provide continuous protection, but low height provides less protection than other types of separation.	• Moderate to high degree of protection, depending on spacing and material used. The face of the planter exposed to traffic may be rounded to better absorb the energy of an impact. The planter should not be anchored to the pavement and should have sufficient mass to absorb the energy of an impact without significant deflection.	• Provide a high degree of separation and physical protection from motor vehicles.	• Can provide a continuous curb separation from motor vehicles, though may include gaps or inlets for channelizing stormwater towards existing catch basins in retrofit facilities.	• Parked motor vehicles provide a vertical separation that adds protection only when present. Risk of dooring if insufficient buffer is not included. When parking spots are not in use, a horizontal separation is present. Additional vertical separation elements should be used to provide protection when parking spots are not in use and allow visibility of curbs for winter maintenance.

	Flexible Delineator Post	Wheel Stop	Planter Box	Concrete Barrier	Raised Landscape Median	Parking Lane
Maintenance	• Can be impacted if buffer space is used for snow storage. • Susceptible to damage and may need to be frequently replaced.	• Low maintenance requirements.	• High maintenance requirements; likely to require ongoing care and landscaping.	• Low maintenance requirements.	• Low maintenance requirements.	• Low maintenance requirements; and is the same as normal on-street parking conditions.
Sightlines	• Minimal impacts.	• Minimal impacts.	• Need to ensure they do not restrict clear zone requirements and sightlines, particularly on roads with higher motor vehicle speeds.	• Minimal impacts	• Need to ensure they do not restrict clear zone requirements and sightlines, particularly on roads with higher motor vehicle speeds.	• Parking should be discontinued before intersection and driveways to provide adequate sightlines.
Spacing	• Spaced 3.0 to 6.0 metres apart. • Spacing may be dependent on factors such as parking and loading encroachment. • Generally placed in the middle of the buffer area but may be positioned to one side or the other as site conditions dictate.	• May be spaced closer to create a continuous barrier. • If spaced apart, spacing should be even along the corridor. Spaced 2.5 metres to 3.5 metres apart.	• May be spaced closer to create a continuous barrier. • If spaced apart, spacing should be even along the corridor	• Continuous, with breaks for emergency access as needed.	• Continuous, with breaks for emergency access as needed.	• N/A

One-Way vs Two Way Roads

Protected bicycle lanes can be installed on one- and two-way roads. Table 2 and3 will provide an overview of the typical configurations of uni-directional and bi-directional protected bicycle lanes on one- and two-way roads, along with a summary of associated considerations.

Table 2- Protected Bicycle Lane Configurations on One-Way Roads
(Adapted from British Columbia Active Transportation Design Guide)

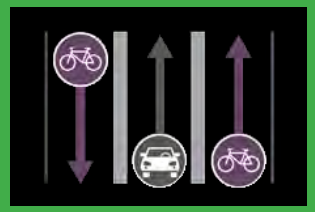
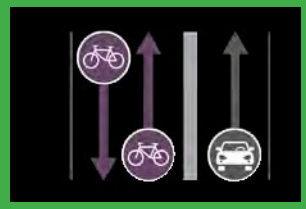
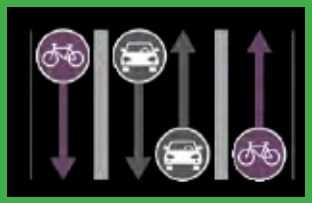
	ONE-WAY PROTECTED BICYCLE LANE	ONE-WAY PROTECTED BICYCLE LANE + CONTRAFLOW PROTECTED BICYCLE LANE	TWO-WAY PROTECTED BICYCLE LANE
			
ACCESS TO DESTINATIONS	Provides bicycle access to only one side of the road.	Provides full access for people cycling to both sides of the road.	Provides bicycle access to only one side of the road.
NETWORK CONNECTIVITY	Does not address contraflow travel and may result in wrong way cycling.	Accommodates two-way bicycle travel, though contraflow travel through signals may be impacted by signal timing.	Accommodates two-way bicycle travel. Contraflow travel may be impacted by signal timing.
CONFLICT POINTS	Has fewer conflict points when compared to other configurations.	Other road users may not anticipate people cycling in the contraflow direction.	Other road users may not anticipate people cycling in the contraflow direction.
INTERSECTION OPERATIONS	Can often make use of existing signals and phasing, although separate bicycle signals may be required.	Will require additional signal equipment for the contraflow bicycle lane.	Will require additional signal equipment for the contraflow bicycle lane.
IMPACT	Requires less width when compared to the other configurations.	Requires more width and impacts both sides of the road.	Requires more width when compared to the uni-directional configuration on one side.

Table 3- Protected Bicycle Lane Configurations on Two-Way Roads
(Adapted from British Columbia Active Transportation Design Guide)

	ONE-WAY PROTECTED BICYCLE LANE ON ONE SIDE OF THE ROAD	ONE-WAY PROTECTED BICYCLE LANE ON EACH SIDE OF THE ROAD	TWO-WAY PROTECTED BICYCLE LANE
			
ACCESS TO DESTINATIONS	Provides bicycle access to only one side of the road.	Provides full access for people cycling to both sides of the road.	Provides bicycle access to only one side of the road.
NETWORK CONNECTIVITY	Does not address contraflow travel and may result in wrong way cycling.	Accommodates two-way bicycle travel.	Accommodates two-way bicycle travel. Contraflow travel may be impacted by signal timing.
CONFLICT POINTS	Turning movements yielding to bicycles is the primary conflict; as a result, parking should be restricted close to intersections to ensure sightlines are unobstructed.	Turning movements yielding to bicycles is the primary conflict; as a result, parking should be restricted close to intersections to ensure sightlines are unobstructed.	There is significant potential for conflict between turning motor vehicles and bicycles. Traffic signalization is recommended to mitigate this risk. Conflicting movements should be prohibited by providing separate signal phases for bicycle users and turning motor vehicles.
INTERSECTION OPERATIONS	Can likely make use of existing signals and phasing.	Can likely make use of existing signals and phasing.	Typically requires additional signal equipment for the contraflow bicycle lane.
IMPACT	Requires less width when compared to the other configurations.	Requires more width and impacts both sides of the road	Requires more width when compared to the uni-directional configuration on one side.

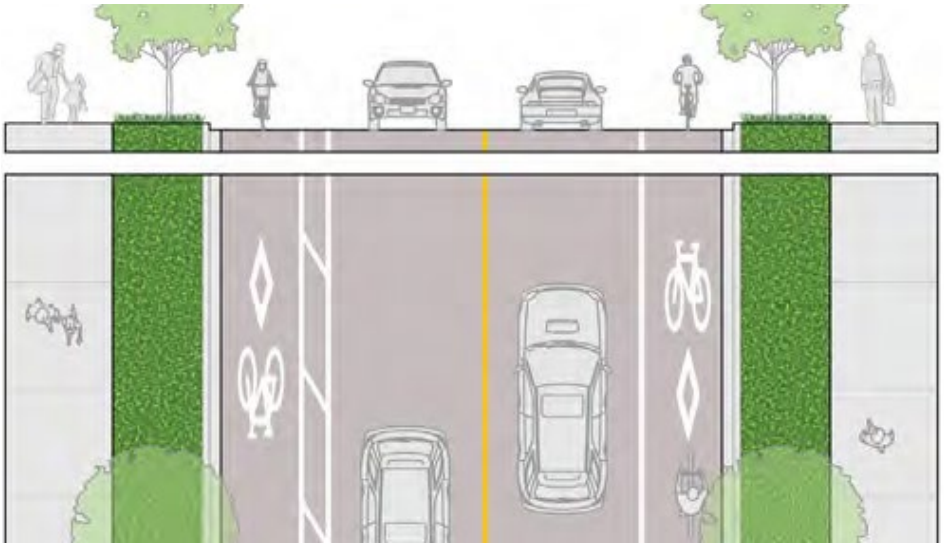
Painted and Buffered Bike Lanes

Painted and buffered bicycle lanes are separate travel lanes designated for the exclusive use of people cycling. Other active users such as skateboarders and in-line skaters may also be permitted to use bicycle lanes depending on local bylaws. Bicycle lanes are different from protected bicycle lanes as they do not provide physical separation between bicycle users and motor vehicles, therefore these are not considered an All-Ages and Abilities facility type.

Typical Application

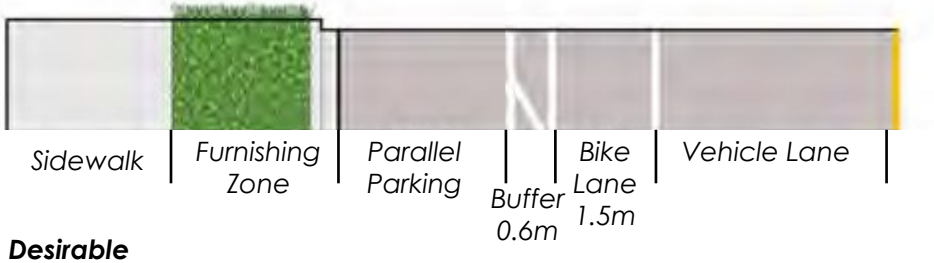
An Unbuffered Bicycle Lane includes only a white longitudinal line running parallel to the alignment of the road to visually separate the bicycle lane from the motor vehicle and/or parking lanes.

A Buffered Bicycle Lane provides additional separation between the bicycle lane and the motor vehicle travel lane and/ or parking lane by way of an additional white longitudinal line that runs parallel to the bicycle lane. A buffer may be used to visually narrow the bicycle lane width to reduce the perception that a wider bicycle lane may be used as a motor vehicle parking or travel lane.

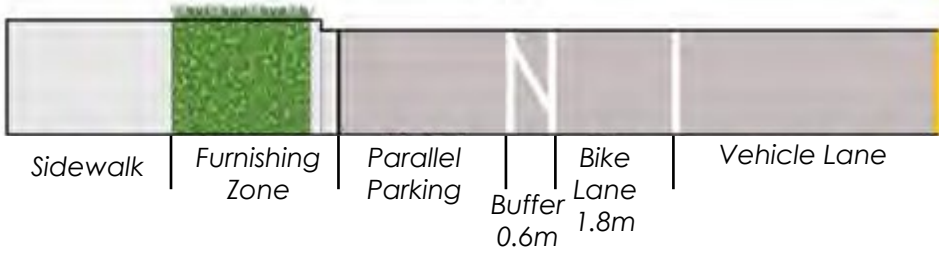


Buffered Bike Lane **Painted Bike Lane**

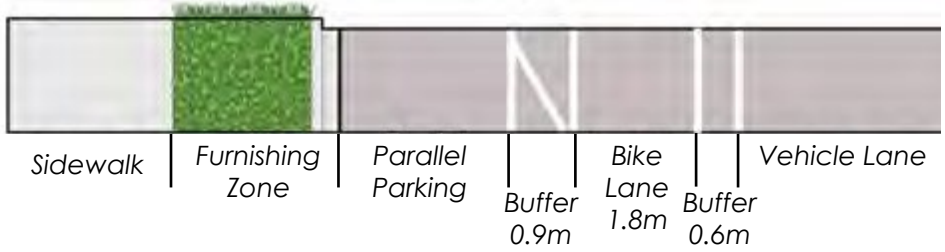
Constrained Limit



Desirable



If Additional Space Available



Crossing Treatments

Where bicycle routes intersect with other roads, treatments are required to distinguish space for people cycling and other road users to reduce conflicts. Treatment should increase the level of visibility, denote clear right-of-way and facilitate eye contact and awareness with other modes. While the type of treatment required depends on the facility type, street function, and land uses, generally crossing treatments should include elements such as colour, signage, signal detection,and pavement markings. More infrastructure intensive can include, medians and protected intersections.

Coloured Conflict Zone Markings

Dashed Bicycle Lane Markings

Enhanced Bicycle Signal Crossing

Cross Rides

Two Stage Median Crossing

Bicycle Push Button

Bicycle Box

Protected Intersection

3. INTERSECTIONS

Intersections

The critical locations for any active transportation facility are at intersections and crossing points. Crossing points are often the most difficult real, or perceived barrier to people walking, rolling or cycling. A pedestrian, multi -use or cycling path may still feel uncomfortable or unsafe if an intersection is difficult to navigate. This section provides general design guidance for intersections, and additional resources are provided for detailed design considerations. Good intersection design is based on the six design principles below:

Design Principles

Design for all ages and abilities

People of all ages and abilities should be able to safely and comfortably navigate an intersection, crossing, or transition area.

Minimize conflicts between users

Providing opportunities for different users to move through an intersection at different times can minimize conflicts. Consider phasing crossing times for different user groups and providing dedicated crossing space to minimize exposure between active transportation users and motor vehicle traffic.

Ensure clarity of right-of-way

Right-of-way at intersections should be intuitive for all users. Right-of-ways should align with municipal by-laws and the Nova Scotia Motor Vehicle Act. Provide clear visual and audible cues that indicate which user is expected to yield to minimize conflicts between user groups.

Reduce speed at conflict points

When approaching, and within intersections, the speed differential between user groups should be minimized. This reduces the potential for collisions. Ways to reduce the speed differential include using signage, pavement markings, and design elements like raised crossings, curb bump-outs, and narrower lane widths.

Ensure clear sightlines

Provide clear sightlines to ensure that all users have enough decision and reaction time to stop or yield to conflicting traffic. Sightlines are especially important at uncontrolled intersections to ensure that all users can see each other upon approaching and entering the intersection.

Make intersection as compact as possible

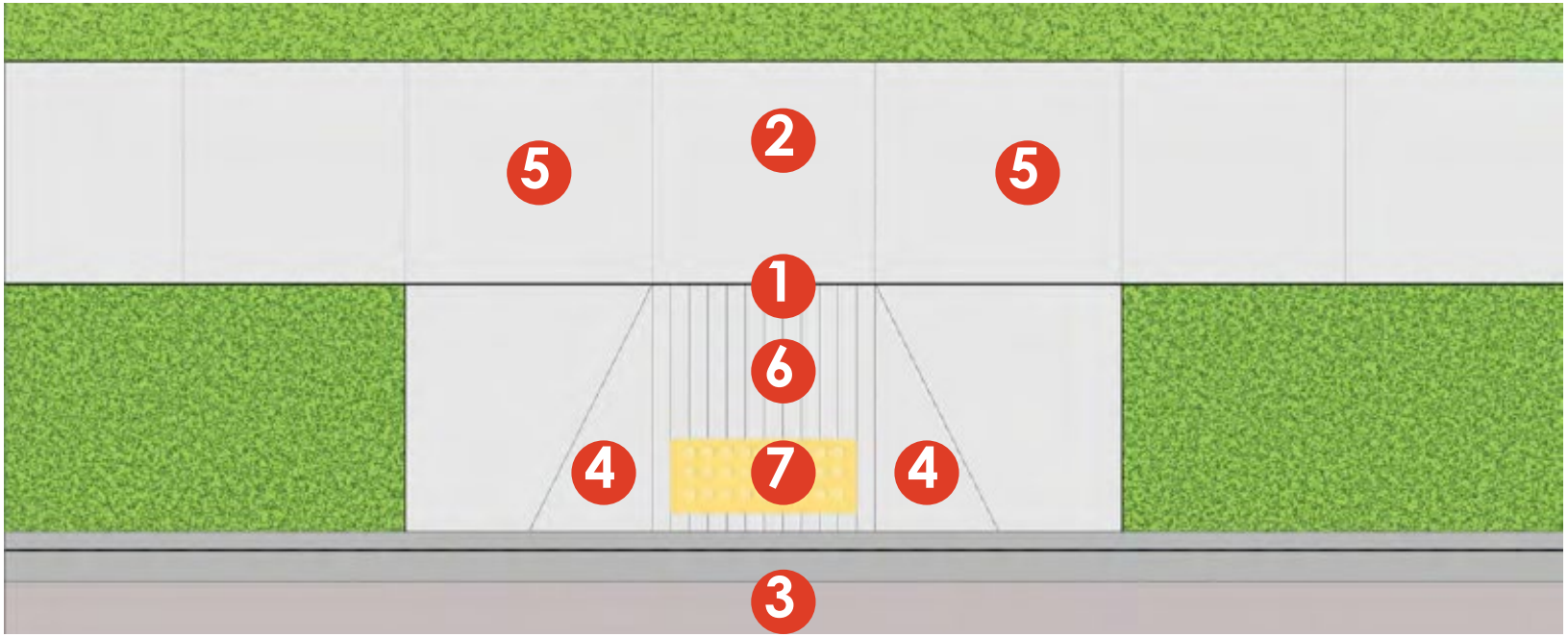
Compact intersections can enhance safety for active transportation users by increasing visibility for all modes, reducing the exposure of people walking and cycling to motor vehicles, and slowing motor vehicle speeds at conflict points. Intersections may be made more compact by reducing corner radii, limiting the use of dedicated turn lanes, and removing channelized right turn lanes where feasible. Careful consideration should be given to the intersection design vehicle as well as motor vehicle volumes and turning movements prior to implementing any of the above treatments.

Curb Ramps

A curb ramp is a smooth, graded transition from the sidewalk to the road. Curb ramps are an essential universal design element – they are required for people using wheelchairs, power scooters, and other mobility devices, people with strollers, baggage, and delivery carts, and they are used as a navigational tool by people with visual impairments. Curb ramp characteristics and design guidance are provided below.

Curb ramps consist of several components that combine to create a universally accessible crossing. These include:
1. a ramp;
2. top landing area;
3. bottom landing area;
4. flares; and
5. approach.

The shape and positioning of each element can vary according to geometric constraints and curb ramp type. Directional score lines (6) may be included on the ramp and oriented to direct pedestrians in the correct crossing. Tactile attention indicators (7) can also be provided for universal accessibility.



Curb Ramps

The ramp is the transitional surface between the sidewalk and road. The surface of the curb ramp should be firm, stable, and slip resistant. The desired curb ramp width (exclusive of flared sides) is as follows:

Desirable	Constrained	Absolute Minimum
1.8 Metres	1.5 Metres	1.2 Metres

The maximum running slope of a curb ramp is as follows:

Desirable	Maximum	Exception in existing locations
5%	8.3%	10%

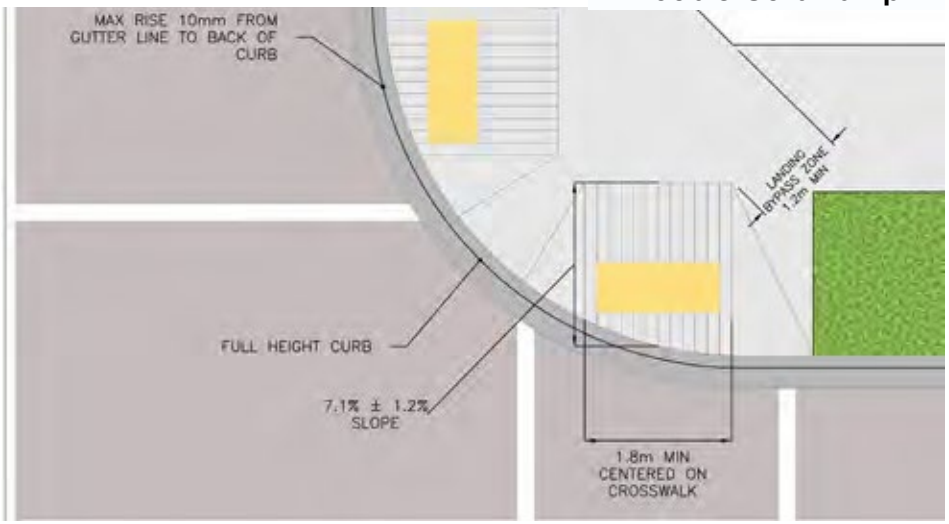
At mid-block locations, the cross slope may match the road gradient.

Tactile attention indicators should be installed at the base of curb ramps to alert pedestrians that they are entering a conflict zone and to assist with wayfinding. When used, tactile attention indicators should extend the full width of the curb ramp and should start between 300 and 350 millimetres from the road face of the curb.

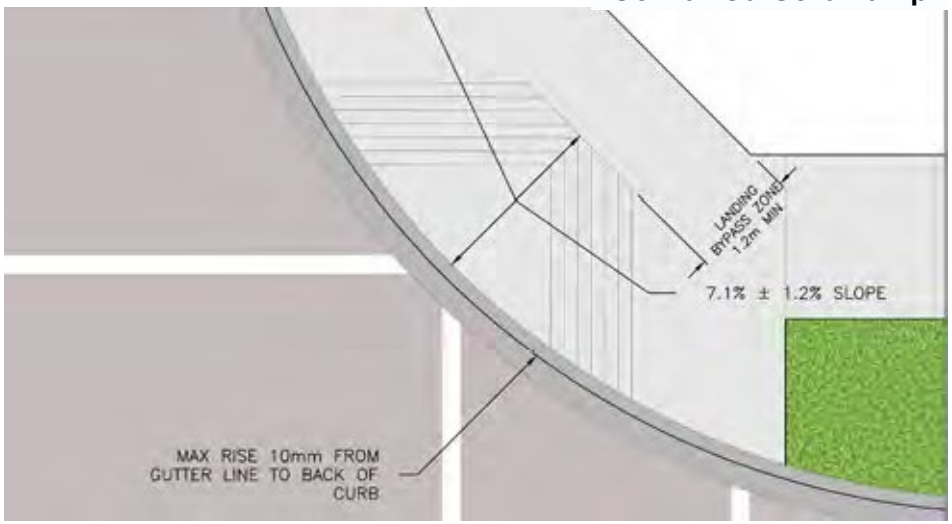
Ramp Placement

Where feasible, the recommended approach is to provide double curb ramps. Where there is insufficient space for a double curb ramp due to obstructions such as utility poles, a combined curb ramp is acceptable. Combined curb ramps do not provide the benefit of separating directions of pedestrian travel. Separating directions contributes to universal access by landing pedestrians directly in the desired area of travel rather than at an angle.

Double Curb Ramp



Combined Curb Ramp



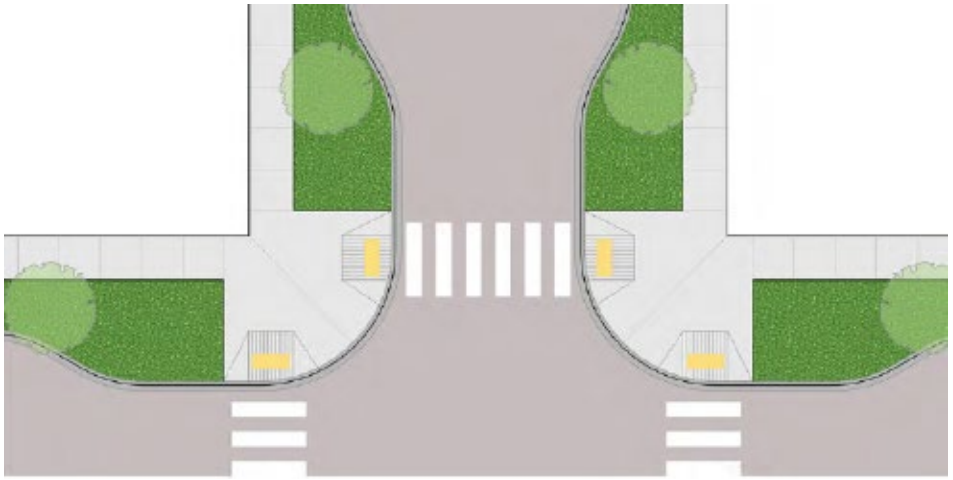
While there are many design features that can be used to minimize conflicts between road users, two can be implemented quickly and cheaply. Implementation can range from a can of paint and some flower pots, to curb re-alignment and additional concrete pavement. These features are curb extensions and pedestrian refuge islands. More details about the design considerations for these features can be found in the NACTO "Urban Street Design" and "Don't Give Up at the Intersection" guides.

Curb Extensions

Curb extensions shorten the crossing distance, reducing the time that people are in mixed traffic conditions. They also increase visibility by bringing people waiting to cross further into the intersection, ensuring that they can be seen by people who are driving. Curb extensions can change the corner radii as well, and a typical radius for a curb extension is between 3 and 5 metres. Finally, curb extensions create extra space at the corner that can be used for pedestrian queuing, street furniture, and landscaping.

Curb extensions should extend 1.5-2.2 metres from the curb line, and visiually marked with landscaping and signs.

Curb Extensions at corner



Pedestrian Refuge Islands

Pedestrian refuge islands allow pedestrians to cross only one direction of traffic at a time and provide physical protection for waiting pedestrians. The pedestrian crossing may either be cut through a median island or raised with curb ramps on either side of the refuge island. A refuge island may be cut out as part of an existing median or it may be added specifically for use by crossing pedestrians.

Pedestrian Refuge Island

Additional Resources

Pedestrian Facilities

Canadian Standards Association (CSA Group). CSA B651-18: Accessible design for the built environment. 2018. https://store.csagroup.org/ccrz__ProductDetails?sku=2702123

City of Vancouver. 'Accessible Street Design.' City of Vancouver. Accessed May 21, 2019. https://vancouver.ca/files/cov/AccessibleStreet-Design.pdf

City of Coquitlam. ' Trail Development Guidelines and Standards'. City of Coquitlam. 2015

Montufar, Jeannette, Keenan Patmore, and Geni Bahar. 'Pedestrian Crossing Control Guide – Third Edition.' Transportation Association of Canada. 2018.

National Association of City Transportation Officials. 'Don't Give Up at the Intersection – Designing All Ages and Abilities Bicycle Crossings.' National Association of City Transportation Officials. 2019.

National Association of City Transportation Officials. 2017. Designing for All Ages & Abilities: Contextual Guidance for High-Comfort Bicycle Facilities. New York: National Association of City Transportation Officials.

Bicycle Facilities

Alta Planning + Design. 'Small Town and Rural Multimodal Networks.' 2016. Washington DC: Federal Highway Administration (FWA).

Chiu, M., Clayton, C., Millen, G. et al. 2017. Geometric Design Guide for Canadian Roads. Ottawa, ON: Transportation Association of Canada.

City of Copenhagen. 2013. Focus on Cycling: Copenhagen Guidelines for the Design of Road Projects. Copenhagen: City of Copenhagen.

City of Vancouver. 'Transportation Design Guidelines: All Ages and Abilities Cycling Routes.' 2017. City of Vancouver. Accessed May 30, 2019. https://vancouver.ca/files/cov/design-guidelines-for-all-ages-and-abilities-cycling-routes.pdf

CROW. 2016. Design Manual for Bicycle Traffic. Utrecht: CROW.

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Federal Highway Administration (FHWA). Incorporating On-Road Bicycle Networks into Resurfacing Projects. 2016. Washington, DC: Federal Highway Administration.

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Richardson, D., McLaughlin, D., Kowpak, D. et al. 2014. Traffic Signal Guidelines for Bicycles. Edited by G Noxon. Ottawa, ON: Transportation Association of Canada.

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