

COMMUNITY TRAILS STRATEGY

CITY OF WELLAND





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1 PLAN FOUNDATIONS

1.1 ABOUT THE PLAN & PROCESS

The Community Trails Strategy: Cycling, Walking and City Recreational Trail 20-year Master Plan (hereafter referred to as a Community Trails Strategy or CTS) outlines an approach to expanding its cycling, walking, and recreational trails network over the next 20 years.

This Plan will act as a guiding document for the City to improve and enhance active transportation and trail infrastructure while also providing recommendations for programming and design approaches to encourage more people to use active transportation and trails in Welland. The Plan will aim to provide direction for an active transportation and trails network that is safe and accessible, providing connections between the downtown core, cannal/river features, and community neighborhoods. The Plan will highlight best practices and emerging trends in active transportation and trail design and implementation, all with the goal of creating a community where trails are Connected, Continuous, Safe, Accessible, Well-Maintained, and Convenient for users of all ages and abilities.

The CTS is not a prescriptive document - it does not bind the City to specific investments, confer authority nor commit the City to construct projects. The Plan acts as a roadmap towards a future where every trip made in Welland, regardless of whether it is by car, on foot, by bike or using a mobility device, feels safe, comfortable and convenient. It communicates the concrete actions that could be taken to achieve that vision and provides the necessary policies and guidelines to ensure that actions taken align with best practices. The CTS provides recommendations to build accountability moving forward, allowing the progress made towards implementing the Plan to be periodically checked against the goals contained within it.

The Community Trails Strategy project will establish a plan for infrastructure implementation and funding as well as outreach programming that will encourage transportation by walking, cycling, and other active modes in the City of Welland. Cycling, walking, and active modes play an important part in how residents and visitors explore Welland's history, communities, and natural areas. The purpose of developing the Community Trails Strategy tailored to the City of Welland is to:

- Outline an approach to implement a network of on- and off-road facilities that connect the communities of Welland. The network will consider equitable access between communities, safety and comfort on different routes, and guidance/standards established at the regional, provincial, and national levels.
- Develop recommendations for trail design and the implementation of supportive infrastructure like lighting, signage and amenities.
- Establish tools to facilitate the implementation of the CTS through policies, guidelines and external funding sources.
- Develop maintenance and monitoring tools for existing and future community trails.
- Provide recommendations for supportive programs that will encourage and grow community trail use in Welland.

To develop the strategy, the following tasks were undertaken:

- **Vision and goals:** Establishing a direction for the project and community trails in Welland that can be used to guide future phases of the project and the final deliverable.

- **Community needs and profile:** Assessing the current socio-economic and commuting characteristics of Welland to identify areas that could benefit from improved access to community trails.

- **Existing and proposed on-street road and off-road community trails:** Mapping and identifying current routes and gaps in the network, including field investigations.

- **SWOT (Strength, Weaknesses, Opportunities, and Threats) analysis:** Assessing the City's existing community trails approach to identify actions moving forward.

- **Background information and policy review:** Reviewing and analyzing policy at the local, regional, and provincial levels related to community trails that could be used to guide recommendations in future phases of the project.

- **Identify Improvements, Missing Links and Opportunities:** Identifying improvements to existing off-road trails and on-road cycling infrastructure through field investigations and assessments using provincial guidance. Improvements reflect opportunities to upgrade existing infrastructure.

- **Develop & Assess Conceptual Trail Network:** Developing new conceptual on- and off-road candidate routes to expand the existing network. A key component of this step is to assess the feasibility of these candidate routes based on constructability.

- **Mapping proposed on and off-road phasing:** Identifying and mapping proposed on-road AT and off-road phasing, including high priority and low priority network linkages. In the future Active Transportation Plan (schedule to commence in 2022), the proposed phasing will be refined and coordinated with road reconstruction projects identified within the City's capital plan, as well as the timing of proposed developments, to take advantage of planned capital projects.

- **Developing cost estimates and funding strategies:** developing unit cost estimates and a Funding Strategy for the proposed AT & Trails network.

- **Identifying monitoring and maintenance protocols:** identifying monitoring and maintenance protocols for the recommended on-road and off-road networks.

- **Developing an implementation strategy:** developing an implementation strategy that informs the future implementation of the 20 Year Master Plan, highlights directives pertaining to private land acquisition, and provides guidance on how best to navigate implementing the network.

1.2 ESTABLISHING A COMMUNITY TRAIL VISION & GOALS

The Community Trails Strategy is designed to provide topic specific direction building upon recommendations, policies and strategies identified in high-order policies such as the City's Official Plan. A strong vision statement not only looks to the future but identifies opportunities for alignment with and articulation of wider community goals and objectives. With both consultation and engagement input as well as alignment with existing policies and plans in mind, the following vision statement has been prepared for Community Trails within the City of Welland:

“The City of Welland aims to create a community where trails are Connected, Continuous, Safe, Accessible, Well-Maintained, and Convenient for users of all ages and abilities. On and off-road trails will provide enhanced recreation and transportation choices for visitors and residents of Welland alike, enhancing access to public space and quality of life across the City.”

To further articulate this vision statement and the desired outcomes of the process, the following goals have been identified:

- **Guide Decision-making:** The CTS is meant to inform the planning, design, implementation, funding, coordination and management of trail infrastructure (both on and off-road) in the City of Welland for the next 20 years. An approach that builds upon existing assets while prioritizing new connections for completion according to community need and fiscal capacity.
- **Build Connectivity:** The development of a continuous and connected system of on and off-road trails connects major and minor destinations within the City, creating economic development and tourism opportunities that support the City's plans to grow. It also provides opportunities to access day to day services and employment needs for those who live, work and play within the City.
- **Facilitate Implementation:** The CTS provides staff, decision makers and partners with the necessary tools and resources to inform short and long-term decision making related to planning, design, implementation, maintenance and programming. This includes accurate costing estimates of potential improvements, the prioritization of investments, policies and design guidelines, monitoring and management strategies and roles and responsibilities to encourage City-led coordination and long-term implementation.
- **Develop supportive partnerships and programs:** The CTS focuses on the development of social infrastructure to support trails use in addition to the physical infrastructure. Opportunities to connect with the community to deliver new programs to encourage trail use maximize the potential for wider outreach and impact through community-led partnerships.
- **Build Equity into decision-making:** The community trails network forms a safe and comfortable network that attracts a range of users for utilitarian and recreational trips. Access to the network is equitably distributed to all communities in Welland. The importance of equity is elevated in all aspects of active transportation (walking and cycling) planning, design and implementation considering the role of trails as part of a healthy and affordable form of transportation that may benefit low-income households and communities.

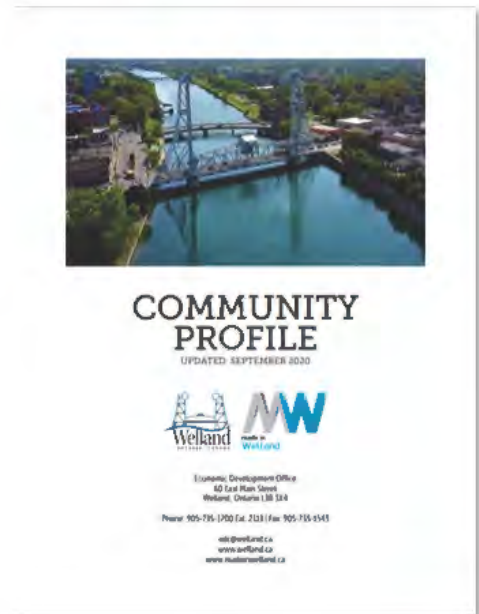
1.3 COMMUNITY PROFILE & CONSIDERATIONS

A key foundation of the CTS is the identification of unique geographic and socio-demographic trends which influence current transportation and travel behaviours as well as the unique needs and opportunity within the community relative to day to day transportation and recreation.

In terms of the geographic context, the City of Welland is a municipality within the Region of Niagara located on the Welland Canal between Lake Ontario and Lake Erie. Due to its location at the crossing of the canal with a few railways, Welland attracted heavy industry in the 20th century that fostered growth within the community. The City has a mix of urban, suburban and rural conditions making it an attractive area for residential and employment growth.

In September 2020, the City updated their Community Profile – prepared by the City's Economic Development department. The profile provides a detailed overview of the City's real estate, labour market, business / investment, manufacturing, retail, infrastructure, education / innovation, health / wellness, sports, recreation and culture and festivals and events. The document provides an excellent snap shot of the community as it relates to different indicators. It positions the City as a growing community with a young population that is looking for recreation, employment and healthy community opportunities. The Canal Trail and Merrit Island are noted as a key part of Welland's emerging and high demand Recreation Corridor with the inclusion of bilingual trail signage as a significant success in the recent years.

For the purposes of the Community Trails Strategy, we have focused on reviewing community trends and needs in three categories – socio-demographics, transportation modes and commuting behaviour as well as equity consideration. The information was developed based on our review of the 2016 National Census. This information was mapped to the dissemination area level to identify spatial trends within the community. Overlaying trails and active transportation facilities overtop of these maps can assist in identifying communities that are underserved by Welland's existing network. This process will be used in future phases of the project to ensure network enhancements are proposed in communities that would receive greater positive impact. Dissemination areas are the smallest standard geographic areas used for census data in Canada. These areas may vary by shape and land area; however, their populations are relatively similar – approximately 200 to 600 people per dissemination area. Dissemination area mapping highlights statistical data relative to each dissemination area, not the City as a whole.



1.3.1 SOCIO-ECONOMIC BREAKDOWN

According to the 2016 National Census, the population of Welland is 52,285. Among its residents, 21% are seniors aged 65 and over and 15% are children under the age of 14. Combined these demographics represent 36% (1/3) of Welland's population, which emphasizes the importance of creating active transportation facilities and networks that are safe and comfortable for all ages and abilities. 0.5% of residents have aboriginal ancestry and 5.2% are visible minorities.

General population density and immigrant populations are both low in Welland's rural communities. Conversely, the median household income is highest in Welland's rural and suburban-most communities where it exceeds \$80,000. The median household income in Welland is below \$40,000 in its city centre and urban communities, particularly those between the new and old Welland Canals.

Table: Summary of Socio-Demographic Dissemination Maps for the City of Welland

MAP OVERVIEW	KEY TAKEAWAYS
Map A. Population Density	High density can encourage active transportation due to shorter distance trips. Welland's population density is highest east of downtown, between the new and old Welland Canals. These areas also have the lowest median household income.
Map B. Population Over 65	Seniors (people 65+) are a key active transportation demographic. This group may use walking and cycling as a form of low impact exercise. Furthermore, they may require assistive mobility devices, more space, and accessibility considerations. Welland's urban areas have higher concentrations of seniors compared to rural areas.
Map C. Immigrant Population	Communities that attract new Canadians should connect and permit mobility throughout their broader municipality. Welland's suburban areas have higher concentrations of immigrants compared to urban and rural areas. Many of these areas are not connected to existing off-road trails.
Map D. Median Household Income	Cycling and walking are low-cost transportation modes. Infrastructure for walking and cycling should be equitably distributed across a municipality particularly near low-income communities. Welland's highest income communities are in the suburbs and rural communities.

Refer to Appendix A for reference maps.

1.3.2 COMMUTING BEHAVIOUR

Prior to stay at home orders due to the COVID-19 pandemic, 42% of residents commuted to work. Among these commuters, 70% spent under 30 minutes commuting to work with 34% spending less than 15 minutes. Despite having short travel times, only 5% of commuters chose to travel by active modes (cycling = 1%; walking = 4%). 86% percent of commuters drove their own vehicles to work and 6% carpooled with drivers. While these statistics do not reflect the distance travelled by commuters in Welland, it is important to note that many residents spend a relatively low amount of time commuting and still choose to drive. The following graph presents commuting methods.behaviour by community residents prior to the pandemic.

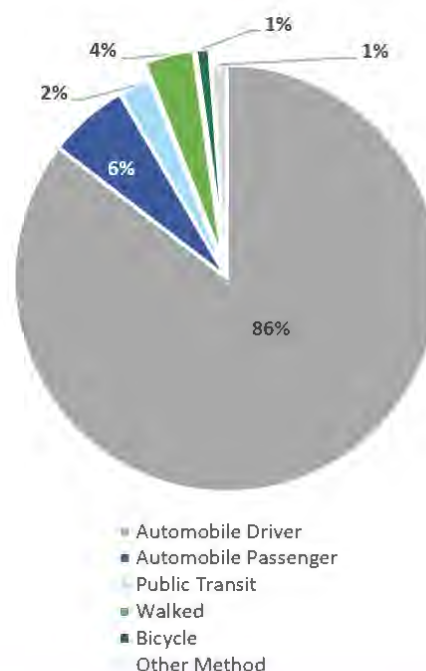


Table: Summary of Commuting Behaviour Dissemination Maps for the City of Welland

MAP OVERVIEW	KEY TAKEAWAYS
Map E Commuters Who Bike	Cycling infrastructure facilitates recreational, utilitarian, and commuter transportation. To manage traffic congestion, many municipalities establish commuter mode share objectives to increase the percentage of commuters traveling by bike during rush hour. This is achieved in part by implementing appropriate infrastructure to invite commuters to bike instead of using their car. A lack of infrastructure in a community may diminish the capacity to choose to bike. In Welland, the downtown and northwest communities have the highest commuter population that bikes. Areas connected to the Steve Bauer Trail, Niagara Street bike lane, and East Main Street bike lane appear to have high cycling commuter populations.
Map F Commuters Who Walk	Similar to cycling infrastructure, the presence of wide pedestrian infrastructure and comfortable roadway crossings can encourage commuters to travel on foot or connect with local transit. A lack of infrastructure in some communities may be a deterrence to walking, similar to cycling. In Welland, the downtown and core communities have the highest commuter population that walks.

Refer to Appendix A for reference maps.

1.4 BACKGROUND REVIEW

The CTS is being developed to align with existing trail and active transportation supportive policies and plans from all levels of government. The intent of the strategy is to review plans, policies and guidelines at the local, regional, and provincial levels were assessed to determine their capacity to support the achievement of the overall vision and goals of community trails in Welland. Where support is lacking, opportunities to improve or enhance these documents – through the required planning approvals processes - are identified. The background review consisted of a policy and plan review, key terms assessment, an exploration on potential policy gaps and enhancements as well as an assessment of existing design standards. The outcomes are documents in the following sections.

1.4.1 POLICY AND PLAN REVIEW

The Welland Community Trails Strategy will be one document in a structure of planning policy tools, guides, and plans that direct trail planning, design and implementation. With an understanding of the policy structure within which the CTS is meant to fall, it is important to establish a better understanding of the applicable policies and the contents of those policies and plans relative to trails. Documents that may support or guide the design and implementation of community trails in Welland have been adopted at the local, regional, and provincial levels. It is important to ensure that these documents are understood before advancing with the development of Welland Community Trails Strategy to ensure that it compliments existing policies, guidelines and plans. The following is a summary of relevant policies and plans at the provincial, regional and local level.

ONTARIO TRAFFIC MANUAL BOOK 18 (2021)

The Ontario Traffic Manual (OTM) Book 18: Cycling Facilities was first adopted in 2013 by the Ontario Traffic Council as the province's first roadway design guideline dedicated to cycling infrastructure. In 2018, the Province began the process of updating the document to reflect industry best practices that have emerged since its first release. The most recent update to the manual was released in 2021. OTM Book 18 provides considerable insight on the recommendations for planning and designing cycling facilities in the boulevard and the roadway in rural, urban, and suburban environments.



MINIMUM MAINTENANCE STANDARDS

Ontario Regulation 239/02, the Minimum Maintenance Standards for Municipal Highways (MMS), recommends maintenance practices for roadways in Ontario. The MMS is not prescriptive and serves as a set of maintenance standards for municipalities that do not have their own local maintenance standards established. While the original MMS pertains to general traffic lanes alone, it was amended in 2018 to include recommended maintenance practices for active transportation facilities in 2018. This includes distinct sections and guidance for cycling facilities in the roadway (bike lanes and cycle tracks) and pedestrian/multi-use facilities in the boulevard (sidewalks and multi-use pathways). Municipalities are encouraged to clear cycling facilities to the best of their abilities, however, they have the discretion to decide if some or all cycling facilities will be maintained in winter months.

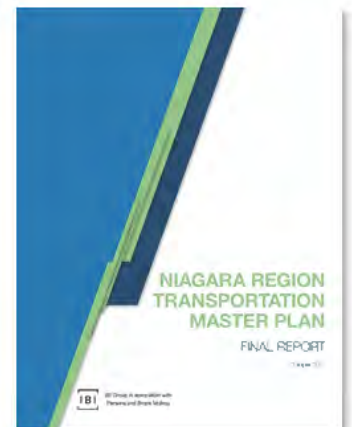
NIAGARA REGION OFFICIAL PLAN (2014)

The Niagara Region's Official Plan (ROP) is a long-term planning documents that guides physical, economic, and social development in the communities of Niagara Region. The ROP identifies growth opportunities, policy objectives, and implementation strategies to achieve its desired long-term goals. Transportation is a key section of the ROP and it outlines a set of general objectives and policies specific to improving mobility for different modes. Regarding general transportation guidance, the ROP notes that the Region must plan and implement a sustainable (multimodal, safe, and efficient) transportation system that manages future needs of its growing population. The ROP expresses the Region's interest in reducing greenhouse gas missions and improving social equity through improved active transportation and public transit.



NIAGARA REGION TRANSPORTATION MASTERPLAN (2017)

The Niagara Region Transportation Master Plan (RTMP) establishes a long-term strategy for transportation planning, development, and renewal in Niagara Region for from 2017 to 2041. Two of the six key goals of the RTMP is to 'enhance multi-modal connectivity' and 'improve options for sustainable modes of transportation,' both of which emphasize the importance of investing in active transportation by the Region and its local area municipalities (Welland). One of the ways that the Region intends on achieving these goals is by adopting a Complete Streets approach in the design and redesign of regional roadways. The Complete Streets approach balances the needs of the different transportation modes (walking, cycling, transit, motor vehicles) and their interaction with adjacent land-uses in the design of roadway infrastructure. The Region is currently developing a Complete Streets Design Manual that will be used to guide regional staff and designers through the planning, design, and implementation process for Complete Streets projects. While the document's guidance specifically addresses regional roads, it may also be applied on roads owned by local area municipalities if they have not adopted their own Complete Streets guidance.



CITY OF WELLAND OFFICIAL PLAN (2010, REVISED 2019)

The Official Plan (OP) is a local statutory document that outlines long-term infrastructure, land-use, and development plans and policies for growth in the City of Welland. The document considers the social, economic, and environmental context of Welland and guides development for a 20-year horizon (i.e. 2010 to 2030).

Section 6.4 of the OP addresses transportation infrastructure within the City of Welland. The first planning objective under this section is 'to provide a transportation system which supports a variety of modes.' Noted within this objective is the City's desire to reduce automobile dependence and to develop greater support for multiple transportation modes, including walking and cycling. In subsequent planning objectives, the OP notes that Welland's transportation network should also be safe and accessible.



WELLAND PARKS RECREATION & CULTURE MASTERPLAN (2019)

The Parks Recreation and Culture Master Plan (PRCMP) identifies 47 recommendations to improve community recreational services, program, and infrastructure for 10 years (2019-2029). Creating a 'Trails or Active Transportation Master Plan to confirm the feasibility of implementing the conceptual trails network illustrated in [the] PRCMP' is identified as one of the highest priorities. It is noted that that a Welland Trails Map should also be created to assist residents and visitors navigate the network and clearly identify routes. The PRCMP recognizes that the City has three primary trail networks – the Welland Canal Parkway Trail, Merritt Island trail, and Stop 19 Pathway (Steve Bauer Trail) – and a series of internal park pathways. The document notes that expansions of the existing trail network should strive toward creating safe, accessible, and convenient linkages to key destinations in Welland. The document includes a conceptual network of new trail routes, which emphasizes the importance of establishing east-west linkages to connect residents with the 'Welland Recreational Corridor' (Welland Canal Parkways Trail and Merritt Island Trail).

1.4.2 POLICY GAPS & ENHANCEMENTS

The City of Welland has a strong planning base to build upon for its Community Trails Strategy. Supporting documents at the local, regional, and provincial levels clearly demonstrate an interest and commitment in establishing a safe and comfortable active transportation network that incorporates principles of universal accessibility. The following is an overview of some of the more specific key themes that emerged through the policy review.

Complete Streets - Niagara Region makes mention of Complete Streets in its OP and RTMP but it is not referenced in Welland's OP or PRCMP. Complete Streets has relevance to trails and active transportation because this roadway design approach typically involves adding or improving walking and cycling infrastructure. Due to its interest Complete Streets, the Region is in the process of developing a Complete Streets Design Manual. The City of Welland may wish to explore the development of its own Complete Streets policy or engaging meaningfully with the Region Complete Streets Design Manual project to understand how this could support its vision for on-road active transportation infrastructure.

Conceptual Trails - The PRCMP identifies approximately fifteen conceptual trail linkages in Welland that would connect its communities to the Welland Canal Recreational Corridor. These linkages focus predominantly on improving east-west connectivity because Welland's existing trails support north-south active transportation. While these east-west linkages would be valuable, the PRCMP does not map the conceptual trails along existing roadways, bridges, hydro corridors, or parks and it does not identify a priority implementation schedule. While these linkages may help with network mapping for the Welland Community Trails Strategy, more detailed mapping on network routes and phasing is necessary.

Equity - The OP notes that one of Welland's key transportation planning objectives is creating a responsible transportation system that supports social inclusion. Supplemental policies and discussion do not clearly connect active transportation infrastructure plans with social inclusion/equity. It would be valuable to improve the City's understanding of communities that are underserved by active transportation infrastructure and identify an approach to improve these areas through policy and planning. It is worth noting that the need for accessible infrastructure for all ages and abilities is mentioned in the OP and PRCMP.

Supporting Infrastructure - Bike racks, bike repair stations, benches, pedestrian-scale lighting, and other walking/cycling amenities are examples of supporting infrastructure that enhance active transportation facilities. While they may not always be the centre focus of infrastructure projects and plans, these features are integral to encouraging residents and visitors to travel using active modes. The OP notes in section 4.1.2.2.B that streetscape and public realm improvements should be incorporated into road design projects but does not require similar features near trail infrastructure. It would be prudent to re-evaluate Welland's existing strategy for supporting infrastructure, particularly bike parking, to provide adequate end-of-trip facilities for people walking and cycling.

Transit Integration - 'First- and last-mile' is a term to describe the beginning and end of transit trips, which are typically completed using active modes (walking and cycling). The term is frequently used when discussing transit integration because there is growing evidence that demonstrates how enhanced active transportation infrastructure near transit stops can increase ridership. Infrastructure in this context would include linear facilities (sidewalk, bike lanes, multi-use trails, cycle tracks), crossings (mid-block and intersection multi-use crossings), and supporting elements (bike parking, benches). While Welland's OP notes that bus stops should be located on sidewalks, trails, or intersections, there is limited discussion on how the City plans to integrate public transit with its active transportation network. It would be valuable to discuss active transportation plans with transit agencies to establish policies and plans that may support both initiatives in Welland.

Regional Cost-Sharing - The capital cost of constructing active infrastructure can be expensive. It's important to ensure that enough proportion of the annual municipal budget covers the cost to implement planned walking and cycling infrastructure. Welland's OP notes in Section 6.4.2.3.G that 'the City may provide funding for implementing a cycling trails system by allocating a portion of the City's budget on an annual basis for this purpose.' It would be prudent to identify external funding opportunities to identify cost-sharing initiatives that levy the cost of implementation projects. The Region of Niagara, for example, offers two cost-sharing initiatives that should be used to support the implementation of Welland's trails and active transportation infrastructure. The Public Realm Investment Program provides funding to local area municipalities who are leading public realm / streetscaping projects on regional roads. The Bicycle Facilities Grants offers funding to local area municipalities who are leading cycling infrastructure projects that support the Region's strategic cycling network.

The intent is for the outcomes of this assessment to be used to inform future policy updates at such as time that the City decides to amend existing or create new policies. This does not include specific policy language but considerations which could help to inform the development of future policies.

1.4.3 REVIEW OF CITY DETAILS

Details for trails, sidewalks, and on-road bike lanes are described in the City of Welland Municipal Standards, which was last updated in 2013. The Standards describe the recommended materials, minimum widths, depths, and heights, and location for of these facilities on public lands and rights-of-way in Section 6.4: Boulevards and Requirements for Lands to be Conveyed to the City.

It should be noted that these written standards are not supported by a detailed drawing (except for sidewalks), which, based on input received as well as best practices would be of significant value to civil engineers, landscape architects, and other designers that are implementing this infrastructure in Welland.

1.5 ENGAGEMENT & OUTREACH

The strategy has been developed in accordance with the International Association of Public Participation (IAP2) process and practices. The IAP2 seeks to create public participation and engagement for all affected stakeholders with a focus on clearly articulating to audiences, their expected level of involvement through a planning process and their roles following the plan's completion. Beyond the audience focused approach of the engagement strategy informed by the IAP2 process, the engagement approach identified for the Welland CTS also follows the principles of Dignity Infused Community Engagement, where the study commits to conducting specific outreach to communities that have been marginalized by traditional engagement processes.

Table: Stakeholder Groups and Consultation Tactics Summary

	DESCRIPTION	LEVEL OF INV.	PRIMARY TACTICS
Core Project Team	Key staff representatives from City Departments Example members: Director of Community Services, Supervisor of Parking, Traffic etc.	Involve, Collaborate, Empower	Project update meetings (x4), Stakeholder Workshops (x2), SWOT Interviews
Technical Agencies	Representatives from local stakeholders and other governmental decision-making bodies. Example members: City Advisory Committees, Niagara Region and Adjacent municipal staff.	Involve, Collaborate, Empower	SWOT Interviews Stakeholders Workshops (x2)
Interest Groups & Orgs	Representatives from groups who have interest in trails within the City Example members: Local service clubs, local cycling clubs, service delivery agencies	Inform, Consult, Involve	SWOT Interviews Stakeholder Workshop Sessions (x2)
Members of the Public	Residents including the people who live, work and play in Welland.	Inform, Consult	Online Engagement Activity (x2) Public Consultation Centres (x 2)
City Council	Elected City and Regional Council members	Inform, Empower	Council Survey Council Presentation

1.5.1 SUMMARY OF ENGAGEMENT OUTCOMES

Throughout the engagement process of the Welland Community Trails Strategy, feedback was largely positive and supportive of the way in which the network was being developed. Key themes that emerged throughout our engagement were:

- The need for safe crossings for people walking and cycling across the Welland Canal, especially at the North end of Merritt Island.
- Improved access to Welland's Downtown for people walking and cycling, as well as better trails connections to the North Welland BIA.
- Improved safety and comfort at existing water and rail crossings, including the bridges heading to downtown.
- Expanded availability of east-west trails and active transportation facilities to complement the City's existing north-south network along the canal.
- Neighbourhood bike routes could be created through the reduction of residential speed limits and the addition of signage in some locations, but traffic calming would need to be included to encourage active use.

PRELIMINARY SWOT ANALYSIS

The rationale for identifying strengths, weaknesses, opportunities and threats is to provide initial understanding of the issues that the CTS will aim to resolve or mitigate and the opportunities that could be leveraged or explored to improve the overall interest in and culture of trails use and active transportation.

STRENGTHS	WEAKNESSES
• Existing trails form a strong foundation for future investments in Active Transportation • Welland Canal Trails and Greater Niagara Circle Route serve recreational trail users very well • Support for Active School Travel Planning efforts • Strong staff support for trails, active transportation and enhanced quality of life • Good community engagement, and an enhanced realization of the importance of trails during COVID • Region of Niagara is a supportive partner, both in Transportation and Public Health • Niagara College has been a good partner for the City to help encourage students to participate and engage with the community	• On-road connectivity is lacking for people on bikes, making it very challenging to access key destinations like Seaway Mall, Niagara College and downtown • Signage can be confusing – there are many sign families that don't relate well to one another • One-way streets downtown create high-speed traffic conditions and an uncomfortable environment for active travel • Lack of a dedicated promotional strategy to encourage trail use and active travel • Not many safe options to cross the Canal by active travel • Lack of a current Active Transportation Committee • Lighting and safety concerns prevent people from using the trails in some instances

OPPORTUNITIES

- Connections between the BIAs and the City could lead to the creation of new supportive programs or infrastructure – both the North Welland BIA and the Downtown BIA are keen to engage in partnerships that draw people from the trail to their business
- Intra-municipal connections could be strengthened to make Welland the heart of the region's trail system. Connections into Thorold, Niagara Falls and Pelham could establish Welland as a key tourism destination in Niagara Region
- Niagara College is a major trip generator in Welland, and there is an opportunity to better connect to the campus to the surrounding trails through a connection to both the Steve Bauer Trail and the Welland Canal Trail to provide more transportation choice
- Existing Trails already have strong recognition in Welland and a recognizable brand. Increased resourcing for programmatic support of Active Transportation could make a significant shift in transportation patterns possible.
- Tourism products like the Welland Canal, the Greater Niagara Circle Route and the adjacent Bridge-It Route position Welland to be a major centre for cycling and trails tourism in Niagara Region, especially for guest who want to find an experience that is outside of busier cities like Niagara Falls.
- Existing partners are ready to participate and support the City in deploying programs and projects like a trailhead project, bike valet, cycling and trails promotions and more. The City merely needs to develop a strategy to rally that support behind.

THREATS

- Stakeholders repeatedly highlighted feeling unsafe on trails or using active transportation in Welland. Whether due to lighting, human factors or environmental factors, real and perceived safety will need to be considered as the City moves forward.
- Staff resource capacity is a challenge to the implementation of any new programs – staff are largely already operating at or above capacity, so additional work will require additional staffing resources to ensure its success.
- Trails may start to get busier as more people use them, which could produce conflict between user groups. There may need to be consideration given to expanding and widening popular trails to maintain separation between users.
- As the trails networks expands, limited operating funds may be available, competing with other demonstrated city needs and priorities, resulting in not being able to meet evolving user expectations.

The key themes that emerged from SWOT interviews were:

- The City has a strong foundation for the CTS. The historical investment in City's existing trails system provides a strong starting point for progress as the CTS is implemented.
- Community desire for change and improvement is there, and the City is supportive of those changes, but coordination and resources for trails and active transportation have been low, resulting in discontinuous efforts towards improvement.
- Key trip generators such as downtown, the North Welland BIA (including the Seaway Mall) and Niagara College are not well-served by trails and active transportation infrastructure.
- Safety is a key concern. Whether it is traffic safety, feelings of personal security along existing trails or the lack of lighting contributing to an unsafe environment, safety was an item that came up multiple times during interviews.
- Intra-municipal connectivity is particularly important in Welland – many residents work in adjacent municipalities and many students coming to Niagara College live in adjacent municipalities. These intra-community links will also benefit the City from a tourism and economic development perspective.



1.6 RATIONALE FOR IMPROVEMENT

Welland is ready for improvements and enhancements...and here's why!

The City's existing assets are already strong

The Trails system, existing sidewalks and cycling infrastructure lay an excellent foundation upon which the CTS can be built. What the SWOT Analysis also illustrates is the myriad ways that Welland's existing trail system and active transportation infrastructure are not being maximized. This may be in part due to the lack of connectivity within the network and a lack of ongoing resource support to grow trails and active transportation use in the community. Welland is well positioned to grow as a trails and active travel destination – by closing key gaps in the network and developing new resources to support community partnerships, the City could begin to see significant shifts in its residents' transportation habits.

Connectivity is one of the strongest determinants of transportation behaviour

If a route features a section that feels unsafe, cautious riders are likely to turn around and not attempt to ride that way again. Interviewees unanimously highlighted the need for enhanced connectivity between Welland's on and off-road active transportation infrastructure. This will require investments, but each gap closed moves the City closer to a truly connected network, which will unlock significant active transportation potential in town. Moving beyond the City limits, connecting with Welland's neighbouring municipalities is also crucial. Building upon the links through the GNCR can help residents and visitors travel seamlessly from Welland into Niagara Falls, Thorold and Port Colborne to enhance Welland's position as a tourism hub along the GNCR.

Creating and promoting a highly visible brand for the City's active travel and trails efforts has the potential to shift the dynamic

Developing a wayfinding and signage strategy and creating a community marketing campaign to accompany that strategy would help to boost awareness of the City's assets and help people to choose safe, comfortable routes when they are walking, cycling or wheeling. A community marketing campaign that highlights active transportation routes, particularly trails, may be an opportunity to attract new businesses, residents, and visitors – supporting community and economic growth.

Investing in public spaces that feel safe, welcoming and joyful

Another way that Welland could enhance its active transportation portfolio is by exploring the opportunity to designing public spaces with amenities that are considered inviting while also generating potential active and passive programming opportunities. Numerous interviewees mentioned places that feel unsafe along the trails or in public spaces in Welland, which could prevent people from walking, cycling or wheeling in those spaces. Public spaces that are visible, clean and cared for can create a feeling of comfort and safety, and can bring dignity to spaces that have previously felt neglected. These types of spaces are vital to a welcoming trails environment.

Partner organizations within Welland are ready and willing to support the City's efforts to develop more support for trails and active transportation

From BIAs wanting to build new trailheads with their beautification and marketing budget to tourism companies wanting to bring more people into the City to dine, shop and stay as they ride the Greater Niagara Circle Route to students who would like to serve as ambassadors to show their classmates safe routes to Niagara College, Welland is full of partners who want to support the City to make positive change.

Staffing resources

Both from an availability and financial perspective proves to be the greatest barrier -the challenges that each of these stakeholders identified in bringing their ideas and their support forward was limited capacity among City Staff to make something happen. This is not to point the finger at staff – it is common for active transportation and trails to slip between the cracks in a municipal organization, especially since it touches so many different departments. But absent a clear direction regarding who they should talk to about helping to bring new events and programs to life, stakeholders often ended up not talking to the right person, or not reaching out to the City at all. For the City to take advantage of all the willingness and energy in the City at large, there is a need for there to be a central resource who can channel those efforts within the community towards a coherent goal – to become a more active Welland.

Residents are ready and willing to walk or bike to their destinations

More than 90% of respondents to the online survey reported walking once a week or more, with 56% of respondents cycling once a week or more. When it comes to community destinations, residents are willing to walk for an average of 8 minute to get to work or school, 10 minutes to get to shops and services or 12 minutes to get to parks or trails. Based on an average walking speed, this means that most residents are willing to walk between 800m and 1.2km to access destinations in their community.

Residents also expressed a desire to cycle to more of their destinations, with residents being willing to ride for between 9 and 12 minutes to access work, school, shops, parks and leisure destinations. Even at a relatively slow cycling pace, this means that most residents would be interested in accessing amenities within 2-2.5km of their homes by bike, putting most of the urban area of Welland in reach for many residents.

2 EXISTING CONDITIONS

The intent of the Welland Community Trails Strategy is to build upon the successes, lessons learned and existing support for cycling, walking, and recreational trails within the City. To do this, there needs to be a clear understanding of the existing conditions within Welland. Existing conditions, within the trails strategy context, refers to existing infrastructure that is currently on the ground, routes / facilities that have been previously identified in past planning and policy documents, as well as the current demand and usage for cycling, walking and recreational trails in the City. The following sections provide a summary of the outcomes of this work.

2.1 EXISTING ROUTES & FACILITIES

When referring to “trails” in the context for the City of Welland, consideration was given to the trail type relative to their intended use, experience and design. While there are a considerable number of design options pertaining to trails, for the purposes of the existing investigation, trails were identified within two categories:

On-road trails: which refers to trails and pathways that are found within the road right-of-way (between the curbs) or within the boulevard of the roadway in place of a sidewalk. These on-road facilities typically accommodate more of the utilitarian day to day travel and provide critical linkages between recreational off-road trails and to major community destinations such as employment areas or local services. Their design is dependent on other transportation conditions and context including the speed and volumes of motorized vehicles and the presence of transit or goods movement. The selection and design of appropriate facilities for on-road trails is typically guided by Ontario Traffic Manual Book 18: Cycling Facilities or the Transportation Association of Canada Guidebooks.

Off-road trails: which refers to trails and pathways found within parks, natural areas or utility corridors. These off-road facilities typically accommodate more recreational travel and provide users with environmental and cultural experiences that are meant to explore, enhance and leverage areas of natural and cultural significance within the City. Their design is dependent on the natural area as well as the presence of environmental features as well as the overall experience of the user. The selection of design solutions is very context sensitive and requires the consideration of technical elements such as surface type, slope, latitude, maintenance, etc. Design of these facilities can be based on guidelines and standards such as the Accessibility for Ontarians with Disabilities Act Built Environment Standards but typically are guided by more localized standards based on a consistent hierarchy of trail types.

Considering the City of Welland is a municipality in a regional context, there are unique jurisdictional impacts with the presence of Regional roads and Conservation Authority land as mentioned in the Recreation and Culture Master Plan (2019). **Map G (Appendix A)** illustrates the existing community trails – both existing and planned – found within the City of Welland.

Table: Overview of Routes on **Map G** Existing Community Trails

ROUTE NAME/DESCRIPTION	KM
EXISTING OFF-ROAD ROUTES	
Off-road linkages that have been implemented by the City of Welland	
Canal Parkway Trail	18
Merritt Island Trail	6.7
Steve Bauer Trail	4.3
EXISTING ON-ROAD ROUTES	
On-road linkages that have been implemented by the City of Welland	
Division St from King St to Hellems Ave: Bike lane (south side of the road)	0.4
East Main Str from King St to Hellems Ave: Bike lane (north side of the road)	0.3
East Main Street from railway to Wellington Street: Urban shoulder	1.1
First Avenue from Quaker Road to Woodland Road: Bike lane	1.0
Fitch Street from S Pelham Road to Prince Charles Drive North: Bike lane	1.8
Fitch Street from Prince Charles Drive North to First Avenue: Signed route	0.2
Niagara Street from Price Avenue to Norway Avenue: Buffered bike lane	0.1
Niagara Street from Norway Avenue to Riverbank Street: Bike lane	0.9
Ontario Road from King Road to Southworth Street: Bike lane	1.2
Rice Road from Woodlawn Road to Thorold Road: Paved shoulder	1.0
Riverside Drive from Lincoln Street to City boundary: Paved shoulder	2.0
Thorold Road from Rice Road to Niagara Street: Bike lane	1.4
Wellington Street from East Main Street to Lincoln Street: Bike lane	1.0
ROUTE NAME/DESCRIPTION	KM

CONCEPTUAL TRAIL ROUTES

As part of the City's Parks, Recreation and Culture Master Plan, staff investigated opportunities for new trail routes and linkages to support existing infrastructure with considerations given to connecting destinations and identifying linkages through future residential areas.

Various trails throughout the City

37

SCENIC CYCLING ROUTES

Scenic cycling routes represent "loop rides" that have been identified by the Niagara Freewheelers Bicycle Touring Club (with funding support from Healthy Living Niagara) and further promoted by the Region. Scenic bike rides include primarily include on-road routes, inclusive of Regional and local with no existing cycling infrastructure, as well as off-road trails.

Within the City of Welland there are 39 cycling routes including routes that are fully containing within the City and routes that cross into adjacent municipalities. The following is a list of the 39 cycling routes:

N/A

ROUTE NAME/DESCRIPTION

KM

1. An Easier Alternative Route to Port Colborne
2. Bethel
3. Blue Star
4. Cooks Mills Industrial Zone
5. Dain City
6. Exploring The Cooks Mills Area
7. Ferry to Attercliffe
8. Ferry to Port Colborne
9. Ferry to Port Colborne - 2008
10. Ferry to Ridgeway
11. Ferry to Ridgeway - 2009
12. Ferry To Welland
13. Fonthill to Ridgeway
14. Fonthill to Thorold
15. Fonthill To Thorold 2
16. Gasline
17. Humberstone Marsh
18. Market Street Cafe

ROUTE NAME/DESCRIPTION	KM
19. Marshville Pioneer Festival	
20. Merritt Island	
21. Near Sherkston	
22. Pelham Country & Towns	
23. Port Colborne in the Spring	
24. Port Colborne Marina	
25. Port Colborne - West of the Canal	
26. Port Robinson	
27. Riding Through Bethel	
28. 8Stevensville	
29. Stevensville Castle and Nigh's Chocolates	
30. The Ridgeway Ramble	
31. The Thorold-Welland Loop	
32. Through Chippawa	
33. Through Douglastown	
34. Uppers and Back	
35. Welland	
36. Welland - Crystal Beach - Port Colborne	
37. Welland River Ride	
38. Willoughby Marsh	
39. Willowdell and Back	

NIAGARA REGION STRATEGIC CYCLING NETWORK
Routes that were identified as part of the Region of Niagara Transportation Master Plan which include both regional and local roadways where cycling improvement have been identified for consideration but without specific facility recommendations.

Existing cycling routes	33.8
Infill Link on Municipal Road or on Other Corridor	19.6
Infill Link on Regional Road	3.6
Future Cycling Facility	32
Regional Capital Road Project	3.8

Trails are meant to accommodate all forms of human powered transportation including primarily walking and cycling. Though not typically considered a “trail”, sidewalks are considered part of any municipal active transportation network as they provide the most visible pedestrian “facilities” that provide connectivity for people walking. Sidewalks are typically found in urban or suburban setting where there is an “urban cross section” meaning that there are curbs on the road. They provide a dedicated space for pedestrians and people who use mobility aids which should not be permitted for use by cyclists through municipal by-laws.

The City of Welland has a robust and well-connected system of sidewalks due to its primarily urban nature. Through the municipal capital budgeting process, proposed sidewalks have been identified for implementation for the 2021 construction cycle.

Table: Overview of Routes on **Map H** Existing Sidewalks

ROUTE NAME/DESCRIPTION	KM
EXISTING	
Existing sidewalks and park pathways	353
PROPOSED SIDEWALKS - 2021/22 CONSTRUCTION	
Abbey Road from Niagara Street to Gram Avenue	0.2
Abbey Road from Gram Avenue to Carlton Avenue	0.2
Gram Avenue from Woodlawn Road to Abbey Road	0.3
Forest Road from Gram Avenue to Carlton Avenue	0.2
Carlton Avenue from Thomson Road to Forest Road	0.3
Edgewood Avenue from Forest Road to Abbey Road	0.2
Maplepark Drive from Clare Avenue to Lloyd Avenue	0.2
Memorial Park Drive from 50 Memorial Park Drive to North Park entrance	0.5

2.2 EXISTING DEMAND

CYCLING

The existing conditions demonstrate how people using active transportation are currently being accommodated through trails; however, this doesn't always align with the existing walking and cycling patterns within the City i.e. the existing demand. To better understand the existing walking and cycling demand, a free mobile application and social media service, Strava, was used. Using GPS, individuals are able to track active travel trips and share their speed, time, and highlights from their trips to users with whom they are connected. Strava also plots its data in heatmaps that identify popular routes among its users, which are available on its website. While these heatmaps only identify relative popularity of on- and off-road routes, user counts are not publicly available, they can be used as a way to identify route preferences among its users.

The Strava heat map for cycling activity in Welland as illustrated in the figure (right), identifies a number of key on- and off-road routes that are frequented by its users. The Stop 19 Pathway (Steve Bauer Trail), Welland Canals Parkway Trail, and Merritt Island Trail demonstrate the highest frequency of use, thus the greatest popularity. The frequently used on-street routes are generally regional arterial and local collector roads, including east-west corridors such as Woodlawn Rd, Thorold Rd, Finch St, West Main St, Lincoln St, Broadway, and Ontario Rd and north-south corridors such as Clare Ave, First Ave, Riverside Dr (south of Lincoln St), Prince Charles Dr, Denistoun St, and King St. Cycling activity is also documented at a high rate at all roadway bridges that cross the Welland Canal and Welland River. Some rural and local roads in residential communities also demonstrate cycling activity, however, they are not at the same level of popularity as off-road multi-use trails and regional roads.



Figure: Heat map of cycling activity in Welland (Strava, 2021)

PEDESTRIANS

Compared to cycling, Strava shows considerably more walking activity through documented trips as shown in Figure 4. While off-road trails are also popular among users who walk, there is noteworthy activity on arterial, collector, and local roads throughout Welland.

There is particularly high pedestrian activity in the central-northwest communities in the City. There is also a relatively higher degree of activity within Niagara College for walking than there is for cycling.

Rural roads demonstrate lower pedestrian activity compared to urban and suburban roadways, potentially due to a lack of infrastructure and motor vehicle speeds.

As noted above, the information gathered through Strava is not considered statistically valid and does not represent formal “counts” of existing walking and cycling behaviour within the City. The information combined with some of the socio-demographic and commuting behaviour dissemination areas identifies pockets where there are either fewer trips currently occurring and / or greater need to support a transportation system that uses an equity lens. The information was considered and used when identifying the infrastructure improvements within, as well as the identification of encouragement and educational programming recommendations.



Figure: Heat map of pedestrian activity in Welland (Strava, 2021)

2.3 INVESTIGATION & DOCUMENTATION

The existing conditions mapping, and preliminary information related to walking and cycling demand provides a geo-spatial interpretation of the current trail conditions; however, it doesn't necessarily provide an understanding of the current context and conditions in which the existing and planned trails are occurring. To gain a better understanding of context specific conditions, a detailed field investigation was completed on January 28th, 2021.

The purpose of the investigation was to review and document conditions which may influence future improvements to the existing trails network or warrant the identification of a new trail linkage within the City of Welland. To document the conditions in a consistent manner, a google form was created which included a set of conditions and characteristics that were intended to be investigated. For each corridor, trail or roadway that was reviewed, images of the conditions were documents on camera, with a waypoint and using the google form. The information has been submitted to City Staff as a geotagged KML file and has been designed as a tool to be used by City staff in two possible ways:

- As a communication tool internally and externally to illustrate the current conditions and potential improvements; and
- As an asset management tool to be updated and maintained with additional photos as the conditions are improved or altered.

Table: Select Field Investigations and Preliminary Observations

FIELD INVESTIGATION PHOTO	OBSERVATIONS
	• Segments of off-road multi-use trails feature pedestrian-scale lighting and amenities, such as benches • Wide asphalt surfaces (>3.0m) provide space for passing by all active modes • Snow clearing and ice treatment to accommodate a bare-pavement surface conditions help facilitate active transportation in the winter
	• Multi-use trails along the Welland Canal do not include pedestrian-scale lighting in some sections • Trail entrances are limited to major intersection crossings creating long segments with limited rest spaces • Safety could be enhanced by installing emergency telephones

FIELD INVESTIGATION PHOTO	OBSERVATIONS
	• Desire lines from some sidewalks and trails highlight informal paths created by residents or visitors, reinforced by multiple paths • Consideration may be made to create formal, paved paths to improve access • Consideration should be made toward preserving environmentally sensitive locations to not disturb local ecosystems and ecological functions
	• Jersey barriers and bollards with reflective panels have been placed at the entrances of natural areas to limit access by users, particularly motor vehicles • These features may not support streetscaping and urban design objectives but likely serve a temporary purpose • There is an opportunity to enhance entrances of natural areas and soft surface pathways using coordinate design features
	• Trails head signage is provided for major multi-use trails • Not pictured, additional regulatory signage for trail adequate and safety between people walking and cycling are prominent at entrances • Not pictured, trail maps are provided for some trails to assist with wayfinding – particularly along the Welland Canal Trail • Not all multi-use trails had not received the same level of winter maintenance before field investigations
	• Midblock crossings of multi-use trails do not feature pavement markings to delineate pedestrian or cycling crossing locations • Many are not yield or stop controlled, requiring trail users to wait for gaps in traffic before safely crossing

FIELD INVESTIGATION PHOTO	OBSERVATIONS
	• Sidewalks on some local roads have limited widths and no buffer • Snow storage is placed in the curb or atop sidewalk, reducing pedestrian clearway • Consideration should be made in the future to add a boulevard buffer and or widen the sidewalk to improve comfort for pedestrians walking next to busy, multi-lane roadways
	• Newer sidewalks next to multi-lane roads feature a boulevard buffer for enhanced comfort and snow storage
	• Universal accessibility considerations are demonstrated at many intersection crossings by presence of tactile walking surface indicators (TWSIs) and curb ramps • It should be noted that these are not uniformly applied but appear to be implemented at newer/reconstructed crossings

2.3.1 Other Problem Areas Identified

The following is a list of potential problem areas there were identified through field investigations and consultation. These areas should be reassessed and recommended design guidelines applied.

- Removal of all existing stairs and replacement with ramps or rerouted to mitigate grade change. Two locations where noted along the main canal trail.
- Challenging crossings at roads such as East Main St/406 and Lincoln at main canal trail.
- Ensure parking is improved to meeting accessibility standards, and more parking is included to meet these users needs.
- Connection from Woodlawn Road to main canal trail.
- Pedestrian and cycling infrastructure to continue terminated sidewalk on Woodlawn Road thorough to development area east of HWY #406.

3 NETWORK DEVELOPMENT

The Welland Trail Network is intended to connect the communities of Welland to its recreational canal parkland and historic downtown through a system of on- and off-road active transportation routes. As of 2021, the City of Welland has made considerable investments into developing key spine routes of multi-use trails along off-road corridors and a selection of on-road cycling facilities. While existing off-road routes (ex. Welland Canal Parkway Trails, Steve Bauer Trail) provide a comfortable north-south connection to Downtown Welland, access to these trails is limited and there are several communities in the City with limited or no access to existing active transportation facilities. Through stakeholder consultation in this project and the Welland Parks, Recreation, and Culture Plan, it was revealed that opportunities exist to enhance the equitable access to the Welland Trail Network by creating new east-west connections (on- and off-road) that connect communities that are currently underserved by the network. Additionally, there are sections of existing routes that could benefit from infrastructure improvements to encourage residents and visitors to use the network. Infrastructure improvements may also be necessary to align with emerging provincial guidance and accessibility requirements.

3.1 OPPORTUNITIES & CHALLENGES

The network development process has identified a series of key opportunities and challenges evaluated and consider throughout the selection process, including:

- Gaps are present between segments of the existing trail network, particularly on the southern extent of the Welland Canal Trail (east side).
- Several segments of the existing on-road cycling network do not align with design recommendations in the recent update to Ontario Traffic Manual Book 18: Cycling Facilities. Infrastructure modifications, including the addition of physical separation between cycling facilities and motor vehicle traffic, may be required in the future to align with provincial design guidance.
- The Region of Niagara's Strategic Cycling Network identifies planned cycling routes along select roadways owned and operated by the City of Welland. There is an opportunity along these corridors to implement cycling infrastructure through cost-sharing initiatives with the Region to align with their proposed network.
- Opportunities exist along abandoned or low-volume rail corridors in Welland to construct new off-road multi-use trails. The feasibility of implementing infrastructure in these roadways is subject to negotiations with the existing owners of these rail corridors. Similar opportunities and considerations apply to the existing service roads on either side of the new canal.
- All existing and proposed routes have been assessed through the lenses of connectivity, equity, and feasibility.

- Water crossings present unique challenges to the City of Welland. Many existing roadway water crossings are under the jurisdiction of the Region or the Province and therefore outside of the scope of this project. Several opportunities for new multi-use (pedestrian and cycling) crossings of the old Welland Canal and the Welland River have been identified for consideration. One of these locations includes an abandoned rail corridor crossing where it may be possible to modify and repurpose existing infrastructure to create a new crossing. Specifying the location, design, and costing of these water crossings are not within the scope of this project and the City is encouraged to study the feasibility of implementing water crossings independently.
- A connectivity barrier exists downtown along The Boardwalk / King St between E Main St and Division St. At this location, cyclists traveling on the Welland Canal Trail must travel on-road between traffic, medians, and on-street parking on both sides of the road. This presents a barrier to interested but concerned cyclists that have chosen to travel on the trail because they do not feel comfortable sharing space with motorists. Consideration should be made in the future toward provide space for cyclists in this location or managing motor vehicle movement and parking so that the road may be comfortable for all modes. The north-south crossings of E Main St and Division St should also be revisited to ensure they are accessible and comfortable for both pedestrians and cyclists traveling on the Welland Canal Trail.



3.2 NETWORK DEVELOPMENT APPROACH

A 6-step network development process was applied to identify proposed improvements to the Welland Trail Network. Proposed improvements included modifications to existing routes, new candidate routes, and barriers that may require further study. Each step of the network development process was iterative. It is important to note that future development plans and feedback from local stakeholders during consultation were incorporated into the development of candidate routes. The maps shown in **Appendix B** reflect the outcomes of each step in the process. These maps were produced using spatial data and GIS software.

- **Step 1 – Confirm Existing Conditions:** The review of existing cycling and multi-use routes (on- and off-road) in the City of Welland. Opportunities to improve existing off-road multi-use trails were identified using observations from field investigations. Existing on-road cycling routes were evaluated against the Ontario Traffic Manual (OTM) Book 18: Cycling Facilities' facility selection criteria to identify improvements that may be required in the future to align with provincial guidance.
- **Step 2 – Validate Proposed & Promoted Routes:** The review of planned routes in the Region of Niagara's Strategic Cycling Network (2017) and scenic cycling routes that are currently promoted by the Region of Niagara. Preferred routes on local roads (i.e. roadways or trails owned and managed by the City of Welland) that could compliment the existing Welland Trails Network were identified. Preferred routes were realigned where there are opportunities to connect with public services, parks, and other routes.
- **Step 3 – Identify Candidate Routes:** The identification of candidate routes (on- and off-road) that fill network gaps between the existing routes (Step 1) and preferred routes from Step 2. Candidate off-road multi-use trail routes were prioritized first. Major east-west and north-south cycling connections on roadways were identified to enhance local connectivity between communities and off-road trails.
- **Step 4 – Confirm Routes:** The refinement of proposed routes (Steps 2 and 3) based on feedback received by City Staff and local stakeholders. The proposed routes were also assessed to determine their equitable distribution across Welland, connectivity to key support services, and feasibility of implementation.
- **Step 5 – Designing Barriers:** The identification of topographic barriers (e.g. water, excessive slopes), infrastructure barriers (e.g. intersections and crossings of regional roads, provincial highways, and railways), and other barriers to the implementation or connectivity of the proposed network that may require future study.
- **Step 6 – Costing and Prioritization:** High-level cost estimations for the implementation of the proposed network and a recommended phasing strategy (20-year horizon).

3.2.1 STEP 1 - CONFIRMING EXISTING CONDITIONS

The review of existing on-road cycling routes and off-road multi-use trail routes was an important foundational step in identifying improvements to the Welland Trail Network. It involved assessing the condition of existing infrastructure to identify locations where improvements may be warranted. Conditions that warrant improvements could include disrepair or decaying infrastructure, accessibility barriers (AODA), inconsistent or confusing wayfinding, gaps between segments of the same facility, and inconsistencies with provincial design guidance. Identifying areas of improvements is important for asset management and developing strategies to maintain a state of good repair within the City of Welland. The step also highlights lessons learned from past projects that can be considered when implementing infrastructure in the future.

ON-ROAD IMPROVEMENTS

Existing on-road cycling facilities were assessed by identifying the level of separation of these facilities against what is recommended in the facility selection process of OTM Book 18: Cycling Facilities. The facility selection process determines a preliminary recommendation for on-street cycling facilities based on the posted speed and traffic volume of a roadway. While OTM Book 18 can recommend specific facility types (e.g. bike lane, buffered bike lane, separated bike lane, cycle track), only the level of separation was identified in this preliminary step in the network development process. **Map 1A** identifies existing on-road cycling facilities and the recommended separation improvements from the assessment, which have also been identified in the list below. **Map 1B** highlights how the assessment was performed against all roads in Welland. It should be noted that roadways and segments without separation recommendations in **Map 1B** reflect limitations in posted speed and traffic volume data in the spatial dataset used for the assessment.

- First Ave (south of Woodgate Dr): Upgrade existing bike lane to a separated facility.
- Thorold Rd: Upgrade existing urban shoulder / bike lane to a separated facility.
- Fitch St (east of Wilson Rd): Upgrade existing bike lane to separated facility.
- Ontario Rd: Upgrade existing bike lane to separated facility.
- Wellington St: Upgrade existing bike lane to separated facility (does not apply for the two-block segment between Vanier Dr and Hagar St).

OFF-ROAD IMPROVEMENTS

Existing off-road multi-use trails were assessed using observations documented through field investigations. **Map 2** identifies existing off-road multi-use trails and the recommended improvements from the assessment, which have also been identified in the list below.

- Steve Bauer Trail: Improve crossings at Thorold Road and Woodlawn Road. Improve wayfinding signage.
- Welland Canal. Parkway Trail (West side): Existing signage is worn and requires updating. Signage should be improved for the connection through Main St. The crossing at Lincoln Street should be improved.

- Welland Canal Parkway Trail (East side): Existing gaps should be closed along The Boardwalk and at King St/E Main St, along Canal Bank St at Ontario Rd, and south Townline Tunnel Rd. A paved shoulder or in-boulevard multi-use path should be considered along the Kingsway in Dain City.
- Merritt Island Trail: Improve surfacing on Welland River branch. Improve wayfinding signage.

3.2.2 STEP 2 - VALIDATE PROPOSED & PROMOTED ROUTES

Validating routes that are proposed and promoted by the Region of Niagara is important to ensure that network development at the Regional and Local levels are not contradictory. Understanding where future routes are proposed by the Region may also present coordination and cost-sharing opportunities for the implementation of active transportation infrastructure in Welland. Proposed regional routes include on-road cycling facilities and off-road multi-use trails identified in the Region of Niagara's Strategic Cycling Network, which was planned as part of the Niagara Region Transportation Master Plan, which was adopted in 2017. Promoted routes include on-road and off-road scenic cycling routes that have been identified by the Niagara Freewheelers, which are promoted by Niagara Tourism.

Proposed and promoted routes were validated by mapping them against existing routes (Step 1) and selecting routes that fill network gaps or provide valuable linkages in Welland. Only routes on local roads were considered because they fall under the jurisdiction of the City of Welland – routes on regional roads or provincial highways were not selected. Some routes were realigned along nearby roads or municipal parcels where there were opportunities to improve connectivity with public services and institutions (e.g. schools, hospitals) or where on-road routes could be moved off-road to enhance user comfort. **Map 3** identifies the preferred routes that are proposed or promoted by the Region that were incorporated into the proposed Welland Trail Network.



3.2.3 STEP 3 - IDENTIFY CANDIDATE ROUTES

New candidate routes were identified to improve connectivity and coverage across Welland. Candidate routes included on- and off-road opportunities that were not identified in Steps 1 and 2. Secondary area plans and new developments were incorporated into the identification of candidate routes to ensure the Welland Community Trails Strategy is aligned with existing infrastructure plans. When identifying new route opportunities, priority was made toward identifying off-road candidates before identifying on-road linkages. Key off-road opportunities that were explored include abandoned and low-volume rail corridors, informal dirt roads and trails on public lands, green spaces, and hydro corridors. On-road linkages that were explored include any local road that is owned and maintained by the City of Welland.

OFF-ROAD CANDIDATE ROUTES

There is a significant opportunity for off-road trail expansion in the City of Welland. Railway corridors that have limited commercial rail traffic or that have been abandoned altogether present the greatest opportunity. These corridors are off-road and cross many communities, which could be beneficial for implementation and connectivity respectively. Another opportunity exists along both sides of the new Welland Canal. The feasibility of constructing multi-use trails in these corridors is dependent on the existing owners of the railways and corridors. For this reason, these candidate routes should be considered as conditional. Additional off-road candidate routes that were identified in Step 3 were located on municipal lands. Off-road candidate routes have been highlighted in [Map 4](#).

ON-ROAD CANDIDATE ROUTES

On-road candidate routes were identified along roadways owned and maintained by the City of Welland. Regional roads and provincial highways were not identified as candidates. As previously noted, on-road candidate opportunities were identified after all off-road opportunities were explored. The on-road routes selected provide additional connectivity between existing on-road and off-road routes, as well as the Region's planned strategic cycling routes and promoted cycling routes validated in Step 2. Priority was made toward opportunities that improve access to destinations and public buildings, such as schools. Roadways that could serve as strategic alternatives to major regional corridors were selected where possible – keeping in mind that many of these alternatives could be served by candidate off-road routes. On-road candidate routes have been highlighted in [Map 5](#). Both on- and off-road candidate routes are shown on [Map 6](#) to highlight the entirety of the proposed network.

3.2.4 STEP 4 - CONFIRMING ROUTES

The suitability of preferred routes identified in Steps 2 and 3 was confirmed using three evaluation criteria: equity, connectivity, and feasibility. The evaluation criteria were selected because they demonstrate components of a healthy trails network. Equity reflects the capacity of preferred routes to improve access and routing through communities that are currently underserved by or that may benefit from active transportation infrastructure. Connectivity reflects the capacity of preferred routes to improve access to organizations and services that provide social support to the community. Feasibility reflects the relative ease by which preferred routes can be implemented based on geometric, topographic, and financial constraints. The evaluation criteria, their key considerations used through evaluation, and the methods applied to perform the evaluation are described below.

CRITERIA	CONSIDERATIONS	APPLICATION
EQUITY	• Greater emphasis on providing more robust routes and facilities in high need areas • Access to community needs services • Focus on providing 8-80 trail opportunities • Design relative to accessibility	• Application of socio-economic and demographic heat mapping from Phase 1 • Emphasis on input from high needs groups as provided through engagement
CONNECTIVITY	• Direct access to key major and minor destinations • Recreational off-road routes are linked by on-road connections (e.g. avoid “dead ends”) • No missing links in the on-road and off-road system – viewed separately	• Mapping of major and minor destinations within the community • Assessment based on demand of existing routes • Mapping of route access
FEASIBILITY	• The space that is available either on-road or within the boulevard requires minimal or necessary intervention • The cost to implement the trail is not outweighed by the environmental impacts or cost	• On-road improvement / intervention relative to the space available • Impact on surrounding infrastructure i.e. hydro, trees, etc. • Anticipated EA schedule for project • Identification of acquisition cost relative to improvement needs

EQUITY

Map 7A highlights the equity assessment applied to the proposed network output from Step 3. The map overlays the proposed network overtop dissemination areas that have been symbolized on a relative range of high to low need. Assigning these values to dissemination areas considered median household income, child population (under 10 years old), senior population (over 65 years old), and immigrant population based on Statistics Canada data (Census 2016). As demonstrated in the map, the highest and high needs areas have access to the network through proposed on- and off-road routes. There are no dissemination areas that are not connected by an existing or proposed route.

CONNECTIVITY

Map 7B highlights the connectivity assessment applied to the proposed network output from Step 3. The map identifies services and highlights the number of proposed or existing on-road cycling and off-road multi-use trail within 400m. Services incorporated into the assessment include youth services, places of worship, hospitals and walk-in clinics, grocery stores, employment services, and addiction services. Public schools were not included in this assessment as they were considered in the development of candidate routes in Step 3. As demonstrated in the map, services in downtown benefit from a concentration of routes. It is worth noting that the density of routing in this location is due in part to existing routes along main streets and the canal. Routes with one or no routes within 400m are located in rural or suburban areas where cycling demand is low or along regional roads, which are not under consideration for the proposed network.

FEASIBILITY (OFF-ROAD)

The feasibility assessment was performed independently between on-road and off-road routes. **Map 7C** highlights the feasibility of proposed off-road multi-use trail routes, it does not evaluate existing infrastructure. The evaluation considered topographic constraints (wetlands, steep slopes, uneven terrain), jurisdictional challenges (ownership and operations of existing property), and physical barriers (provincial highways, regional roads, waterways). While routes with low feasibility may have additional challenges associated with planning and implementation, it does not mean that they cannot be implemented. Routes along rail corridors and service roads provide an opportunity for high-quality off-road trails through existing residential community but their feasibility of implementation may be impacted by the use of these corridors by the organizations and authorities that own them.

FEASIBILITY (ON-ROAD SCENARIOS)

Maps 7D and 7E highlight two scenarios for the level of separation of on-road cycling infrastructure on the proposed network (existing and proposed facilities). It applies the same analysis used in Step 1 to recommend level of separation for cycling facilities according to the facility selection process of OTM Book 18: Cycling Facilities. In Scenario 1 (**Map 7D**), the recommended level of separation considers the existing speed of roadways within Welland. In Scenario 2 (**Map 7E**), the recommended level of separation considers a speed limit reduction to 30 km/h on roads classified as 'local' under the City of Welland Official Plan. Scenario 2 reduces the number of designated facilities (e.g. bike lanes, buffered bike lanes) that are recommended along local roads. Instead, shared facilities are appropriate along these roadways when the speed limit is reduced to a level that is more comfortable to people cycling. Traffic calming measures such as speed humps and curb extensions may also be appropriate along these corridors to improve compliance among motorists. The City may wish to explore converting

these corridors into Neighbourhood Greenways, whereby streetscaping improvements, speed limit reductions, and traffic calming strategies are implemented to create a comfortable space for all road users to share. Scenarios 1 and 2 have been explored to communicate how the feasibility of on-road cycling infrastructure may be increased if the City explores speed management practices along local roads in the future.

3.2.5 STEP 5 - DESIGNING BARRIERS

Network barriers include topographical, jurisdictional/ownership, and infrastructure challenges at specific locations that may require context-sensitive solutions to resolve. Each barrier is unique and should be evaluated on a case-by-case basis when implementing routes in the future. Key examples include crossings and intersections of Regional Roads and Provincial Highways where the volume and speed of traffic is high and the ownership of infrastructure could dictate the specific design approach based on standards adopted by the respective jurisdiction(s). **Map 8** highlights these barriers as well as many others that apply to both on- and off-road infrastructure. Water crossings on the old Welland Canal have been identified at recommended locations where an existing bridge could be redesigned to accommodate active transportation or an opportunity exists to create a new crossing. The feasibility and design of these crossings are not within the scope of the project and the City is encouraged to review the opportunity to add crossings over the Welland Canal in greater detail in the future.

3.2.6 STEP 6 - COSTING & PHASING

The implementation of the trails network for Welland is intended to be a long-term undertaking by Municipal staff and their partners. There are routes identified as part of the network which can be easily implemented with minor improvements, while others will require more time to complete the necessary next steps and approvals to move forward with the proposed improvements. As part of the implementation strategy, a proposed timeline for implementation has been identified for each of the proposed routes that make-up the trail network – this is known as a phasing plan. The following sections outline the approach used to develop the phasing plan for the CTS.



4 COSTING & IMPLEMENTATION

4.1 COSTING & PHASING APPROACH

Developing an appropriate costing and phasing strategy is a critical component of the CTS to make progress towards the City's overall vision. The proposed phasing for the City's trails network was prioritized based on a number of factors that reflect the current processes and plans, as well as input from the City Staff, technical and interested stakeholders and residents. As the City moves forward with implementing the proposed trails network, it is recommended that staff review the appropriateness and confirm the proposed facility or crossing at each location. The phasing plan should be updated annually to reflect available budgets, newly planned capital projects or changes in existing conditions, such as volume or pavement conditions.

Refer to **Appendix C. Map 9** highlights a phasing approach for off-road routes, outlining; short, medium and long term implementation targets. **Map 10** highlights a prioritization approach for on-road routes which highlights the level of importance to the overall network, outlining; high, medium, and low priorities.

4.1.1 OFF-ROAD PRIORITIES

Off-road routes identified as part of the CTS were reviewed with the intent of targeting areas of need while balancing feasibility. The routes are categorized as Short-Term, Medium-Term and Long-Term priority. The phasing strategy should be reevaluated through opportunities that may arise with redevelopment and partnerships.

SHORT-TERM (0-5 YEARS)

Trails identified are seen as 'quick wins' or sections that are critical to providing linkages to underserved areas. These trails include simple short section projects that are manageable in a short timeframe. East/west connections were a priority for short-term projects as they will generate a larger positive impact to users.

MEDIUM-TERM (6-10 YEARS)

Trails that are larger projects which will require more design and budget planning. These trail sections are seen as important to the system, but not an immediate focus. Included in this phase is the trail with rail project that could be reassessed for long-term if there was indication that the rail line is slated for decommissioning or an increase in service – factors that will greatly impact the design approach.

LONG-TERM (11-20 YEARS)

Trails located within the Seaway lands have been allocated for long term planning as it is anticipated that agreements will require time to negotiate and the extent of this segment is large. It has also been relegated to long term as it is not seen as a priority to support connectivity due to the location and lack of residential or community service use nearby. Other areas identified for long term are due to their location in areas where future land development is anticipated. These trails should be installed with those developments to complement the need and leverage developer assistance for the trail construction.

4.1.2 ON-ROAD PRIORITIES

On-road routes identified as part of the CTS were reviewed with the intent of supporting the off-road trails. Therefore routes are categorized as either high priority or low priority. It is expected that the routes be reviewed in the Active Transportation Plan to ensure that other factors, such as current road conditions and planned roadway construction projects, be considered in the phasing strategy.

HIGHER PRIORITY

High priority routes were identified at a high level for segments of on-road cycling facilities that should likely be implemented in the next 0 to 10 years to support short-term and medium-term proposed trails.

Approximately 55% of the proposed on-road network is categorized as high priority. This is largely attributed to the fact that the majority of short-term projects are shared facilities (signed bike routes and sharrows). These routes are considered to be low investment and quick wins to establish network connectivity on streets with lower speeds and volumes.

High priority routes are also aligned with the priorities set out by the off-road phasing. On-road routes that link between short-term phased trails or fill in a gap in the trails network were marked as high priority. This builds out the commuter trails network and forms a spine to travel between key points of interest within the City.

LOWER PRIORITY

Lower priority routes are characterized as segments that would require major investment or additional studies to confirm the feasibility or design. Generally these routes would be to support the overall trail connectivity network by forming secondary routes and be implemented in the 11-20 year horizon.

4.2 PROPOSED COSTING

Implementing the trails network will require funds and resources from the City and its partners. Annual funding for construction, maintenance, operation and programming should be identified in the annual budgeting process to strategically implement the network over time.

The City should seek additional funding sources, such as from the Provincial or Federal government, to maximize budget efficiencies and coordination with other major projects.

High-level costing has been prepared for the off-road trails in the network. This costing is based on a set of unit prices (included in Appendix D) that are average rates that reflect best practices from comparable municipalities. The costing for the on-road network should be conducted as part of the upcoming Active Transportation Plan once the preferred treatment is determined. It is recognized that the level of effort will vary on a project-by-project basis and that the price of materials will vary over time. Certain projects could require additional work and further studies as they are considered for implementation.

Table: Summary of Off-Road Trail Costing by Phase

	Length (KM)	Cost (\$)	Percentage of Overall Network (%)
Short	28.0	\$5,591,224	30.2%
Medium	21.8	\$4,351,850	23.5%
Long	26.3	\$5,265,522	28.4%
Bridge - Medium	-	\$2,300,000	12.4%
Bridge - Long	-	\$1,000,000	5.4%
Total	76.0	\$18,508,596	100%

Refer to **Appendix D** for detailed costing.

4.3 FUNDING OPTIONS

A review of internal and external funding options was conducted to identify different options available. The City is encouraged to monitor available funding opportunities including those outside of the City. Information contained within this strategy to support these funding applications.

The following is a list of potential external funding sources that could be explored; however, they are subject to change and should be reviewed again prior to applications. It is important for the City to seek a diverse range of funding sources for the various initiatives and programs highlighted in this plan and external sources are an effective way to reduce the City's costs while being an opportunity to develop new partnerships.

Table: Potential Funding Opportunities

FUNDING OPPORTUNITIES	ADDITIONAL DETAILS
Federal Active Transportation Fund	For additional details regarding the Active Transportation Fund refer to: https://www.infrastructure.gc.ca/trans/active-actif-eng.html
Canada Community-Building Fund / Provincial Gas Tax	For the federal Canada Community-Building Fund program please refer to: https://www.infrastructure.gc.ca/plan/gtf-fte-eng.html
Federation of Canadian Municipalities Green Municipal Fund	For additional details regarding the Green Municipal Fund and potential funding alternatives refer to: https://fcm.ca/home/programs/green-municipal-fund.htm
Federal and Provincial Infrastructure / Stimulus Programs	For Federal Government infrastructure stimulus fund details refer to: https://www.canada.ca/en/office-infrastructure.html For Provincial Government infrastructure stimulus fund details refer to: https://www.ontario.ca/page/ministry-infrastructure
Ontario Trillium Foundation	For details regarding potential funding alternatives refer to: https://otf.ca/
Ontario Rural Economic Development Program	For details refer to: http://www.grants.gov.on.ca/GrantsPortal/en/OntarioGrants/GrantOpportunities/PRDR006918
Ontario Sport and Recreation Communities Fund	As part of the Ontario Sport and Recreation Communities Fund: https://www.ontario.ca/page/rural-economic-development-program
Tourism Economic Development and Recovery Fund	For additional details regarding the Tourism Development fund refer to: https://www.ontario.ca/page/available-funding-opportunities-ontario-government#section-26
Service Club Support	Lions, Rotary and Optimist clubs who often assist with highly visible projects at the community level.
Corporate Environmental Funds (e.g. Shell, TD, MEC, etc.)	For example refer to: https://www.shell.ca/en_ca/sustainability/communities/funding-guidelines-process.html for Shell Canada's Social Investment Program or https://www.td.com/corporate-responsibility/fef-grant.jsp for TD's Friends of the Environment Foundation Grant
Private Citizen Donation / Bequeaths	Can also include tax receipts for donors where appropriate.

4.4 PARTNERSHIPS

The implementation of a long-range master plan requires considerable coordination and collaboration. Successful implementation requires strong partnerships which build on existing community support and efforts. The City of Welland should continue to work with their partners as they proceed with the next steps when implementing the Community Trails Strategy and should expand their network of partners to support future programs and initiatives. The following is a list of the partners that are either currently engaged or should be engaged as part of the implementation process:

POLITICAL AGENCIES

- Regional Municipality of Niagara
- Bordering Municipalities
- Conservation Authorities
- School Boards
- Ministry of Transportation Ontario
- Ministry of Natural Resources
- Ministry of the Environment & Climate Change
- Provincial Parks
- Ontario Provincial Police

LOCAL INTEREST GROUPS

- Committees to Council
- Local Businesses
- Lions Club & Service Clubs

TRAIL ORGANIZATIONS

- Trans Canada Trail Association
- Waterfront Regeneration Trust
- Ontario Trails Council
- Bike Niagara
- Ontario by Bike

Each partner that works with the City will likely have a unique role and will be involved in various aspects of master plan implementation. Depending on the type of initiative, the intended outcomes or its timing there may be various groups involved. Typically, there are two types of involvement that partners could contribute to including: infrastructure and programs / initiatives. Within these two categories there are subcomponents specifically address the key elements that would need to be considered. An overview of the involvement of each of the agencies related to these categories is presented in the table below.

Table: Partner Involvement

PARTNER INVOLVEMENT		INFRASTRUCTURE				PROGRAMS		
		PLANNING	DESIGN	CONSTRUCTION	MAINTENANCE	DEVELOPMENT	PROMOTION	HOSTING
PARTNER	REGIONAL MUNICIPALITY OF NIAGARA	●	●	●	●		●	
	BORDERING MUNICIPALITIES	●	●	●	●			
	CONSERVATION AUTHORITY	●	●	●	●	●	●	●
	SCHOOL BOARDS	●				●	●	●
	MINISTRY OF TRANSPORTATION ONTARIO	●	●					
	MINISTRY OF NATURAL RESOURCES	●	●					
	MINISTRY OF ENVIRONMENT & CLIMATE CHANGE	●	●					
	PROVINCIAL PARKS	●	●	●	●			
	ONTARIO PROVINCIAL POLICE					●	●	●
	COMMITTEES TO COUNCIL	●				●	●	●
	LOCAL BUSINESSES					●	●	●
	LIONS CLUB & SERVICE CLUBS		●		●	●	●	●
	BIKE NIAGARA				●	●	●	●
	TRANS CANADA TRAIL ASSOCIATION	●	●	●			●	
	WATERFRONT REGENERATION TRUST	●	●	●			●	
	ONTARIO TRAILS COUNCIL	●	●				●	
	ONTARIO BY BIKE					●	●	●

5 MONITORING & MAINTENANCE

A monitoring plan is an important component post-implementation to evaluate the success of a route, and to inform smarter investments through data-driven measures. Research indicates that meaningful performance measures can help to prioritize future projects and appropriately allocate resources. The following approaches are recommended to be explored by City Staff in further detail, for inclusion into the on-going workplans of monitoring for maintenance and operations staff.

5.1 MONITORING & MAINTENANCE

Guiding next steps in the management and maintenance of trails, the City of Welland should consider adopting a trail maintenance log to document maintenance activities. The log should be updated when features are repaired, modified, replaced, removed, or when new features are added.

Accurate trail logs also become a useful resource for determining maintenance budgets for individual items and tasks, and in determining total maintenance costs for the entire trail. In Accurate addition, they are a useful source of information during the preparation of tender documents for trail contracts, and to show the location of structures and other features that require maintenance.

Leveraging technology to collect managing data is can be a powerful tool to finding efficiencies and more accurately budgeting for need. Digital dashboard style programs can be an effective interface for staff to organize inputs and action items. This type of technology can be linked to digital trail logging, user reporting systems, and on-site sensors (such as waste bin sensors) to create the ability for on-demand service and strategic deployment of resources.

Using the maintenance strategies outline within the trail plan as well as existing City maintenance practices specific to trail infrastructure should be a starting point from which a trail specific maintenance plan and budget can be developed.

In addition, annual maintenance budgets should be refined to accommodate the maintenance of trail facilities. As the proposed trail network is implemented the trail budget should increase to address the increasing number / length of trail facilities that have been implemented.

Table: Maintenance Strategy Framework

FREQUENCY	MAINTENANCE TASK
IMMEDIATE (within 24 hours of becoming aware of the situation through a “hotline”, email or other notification or observation)	• As a minimum, mark, barricade and sign the subject area to warn trail users or close the trail completely until the problem can be corrected. • Remove vegetation and/or windfalls, downed branches etc., where traffic flow on the trail is being impaired or the obstruction is resulting in a sight line issue. Remove hazard trees that have been identified. • Repair or replace items that have been vandalized or stolen/removed. This is especially important for regulatory signs that provide important information about trail hazards such as road crossings, steep grades, and sharp curves. • Removal of trash in overflowing containers or material that has been illegally dumped. • Repair of obstructed drainage systems causing flooding that poses a hazard to trail users or that is resulting in deterioration that poses an immediate safety hazard. • Monitor trail areas and structures that are prone to erosion after severe summer storms and repair as required. • Repairs to structural elements on bridges such as beams, railings, access barriers and signs.
REGULARLY (weekly / biweekly / monthly)	• Trail patrols/inspections should review the trail conditions (as often as weekly in high-use areas), to assess conditions and prioritize maintenance tasks and monitor known problem areas. • Mow grass along edges of trails (in parks and open meadow settings only). Depending on trail location this may be done weekly, biweekly or monthly and the width can vary according to the location (typically 0.5 to 1.0m). This helps to keep the clear zone open and can slow the invasion of weeds into granular trail surfaces. Not all trails will have mown edges. In woodland and wetland areas, pruning and brushing is typically the only vegetation maintenance needed. • Regular garbage pickup (10-day cycle or more frequent for heavily used areas). • Repair within 30 days or less, partially obstructed drainage systems causing intermittent water backups that do not pose an immediate safety hazard, but that if left unchecked over time will adversely affect the integrity of the trail and/or any other trail infrastructure or the surrounding area.

FREQUENCY	MAINTENANCE TASK
ANNUALLY	• Conduct an annual safety audit. This task can be efficiently included with general annual safety audits for parks and other recreation facilities. • Evaluate support facilities/trailside amenities to determine repair and/or replacement needs. • Examine trail surface to determine the need for patching and grading. • Grading/grooming the surface of granular trails, and topping up of wood chip trails. • Pruning/vegetation management for straight sections of trail and areas where branches may be encroaching into the clear zone. This task is more of a preventative maintenance procedure. Cuttings may be chipped on site and placed appropriately or used as mulch for new plantings. Remove branches from the site unless they can be used for habitat (i.e. brush piles in a woodlot setting) or used as part of the rehabilitation of closed trails. Where invasive species are being pruned and/or removed, branches and cuttings should be disposed of in an appropriate manner. • Inspect and secure all loose side rails, bridge supports, decking (ensure any structural repairs meet the original structural design criteria).
EVERY 3 TO 5 YEARS	• Cleaning and refurbishment of signs, benches and other trailside amenities.
EVERY 10 TO 20 YEARS	• Resurface asphalt trails (assume approximately every 15 years). • Major renovation or replacement of large items such as bridges, kiosks, gates, parking lots, benches etc.

FREQUENCY	MAINTENANCE TASK
SEASONALLY	SPRING: • Check the structural integrity of trail features such as bridges, steps, and railings. Repair damage • Clear windfalls and dangerous trees from the trail bed for safety and to prevent detouring • Remove loose rocks and debris from the tread surface • Repair trail washouts • Remove new plant growth • Level the trail tread as necessary and restore the trail grade to the original slopes. Fill ruts, holes, low spots, or muddy areas • Clear and maintain drainage features to minimize trail erosion and environmental damage • Check and repair water bars, drainage ditches, culverts and drainage dips. Construct additional drainage works if needed • Check, repair or replace signs and trail markers prior to the high-use season WINTER: • Remove snowpack at Trail entrances and key intersections • Erect winter weather hazard signs to warn of icy conditions
COST EFFECTIVE	• Patching/minor regrading of trail surfaces and removal of loose rocks from the trailbed. • Culvert cleanout where required. • Top up granular trail surfaces at approaches to bridges. • Planting, landscape rehabilitation, pruning/beautification. • Installation/removal of seasonal signage.

6 PROMOTION & EDUCATION

The success of a trail plan goes beyond the implementation of infrastructure. Initiatives that encourage people to use trails and educate people on safe and responsible trail use are critical to establishing long-term community and behavior change.

The City of Welland has a strong connection to high quality and active living with its access to natural areas, waterfronts and forested areas. The City's tourism draws are increasing in popularity and it is becoming an increasingly more desirable community for young families and working professionals. As the City and its partners continue to grow the network of comfortable, accessible trails within Welland, there is an opportunity for the City to spur behaviour change through the use of targeted, thoughtful programs designed to get people thinking about active travel and trail use more often. Utilizing promotion and marketing opportunities to leverage interest is another avenue which could be explored by staff and partners. Creation of trail mapping can be assisted by connecting with organizations and app developers as a next step.

The recommendations for the Encouragement and Outreach Programs for the City of Welland are separated into two categories – Foundations and Future Projects. The Foundations Category includes programing recommendations that:

- Address key concerns identified by stakeholders during SWOT Interviews and other consultations
- Have a track record of success in similar municipalities
- Build upon existing capacity and partnerships within the City of Welland
- Are most likely to generate additional momentum and interest in Trails use and active transportation in the City

Programs in the Future Projects category, on the other hand, represent initiatives that may require additional resources or support. These initiatives should still be considered, but it is recommended that the City wait until all aspects of the Foundations section are fully implemented before considering programs in this section.

6.1 FOUNDATIONS

The foundations Section is focused on creating the conditions within Welland for a culture of active trail use to flourish. The recommendations in this section are based on best practices and examples from around Ontario and beyond, and represent some of the “quick wins” that could be achieved through existing partnerships, a scaling up of existing programs of the implementation of low-cost, low-effort projects. The recommendations in this section are outlined as options to simply explore the possible outcomes and future considerations for trail design, and are not a direct outcome of the approval of the Welland Trails Strategy.

First and foremost, it is important to recognize that the delivery of these new programs, including the coordination efforts that must take place between internal and external stakeholders within the City, will require additional staff resources and support from the City of Welland. **For that reason, it is strongly recommended that the City establish a Community Trails and Active Transportation Coordinator role to support the new programs being proposed here.** This role can be filled by seasonal staff, reallocation of existing staff resources and/or consideration for a future dedicated staff member. It is recommended that the City start with a seasonal staff member and/or assign responsibility to an existing staff member, and reassess the needs for future staffing after 2-5 years.

The importance of this staff resource is paramount to the delivery of many of the programs outlined in this section, and to the growth of the City’s culture of active transportation and trails use. The success of a trail plan goes beyond the implementation of infrastructure. Initiatives that encourage people to use trails and educate people on safe and responsible trail use are critical to establishing long-term community and behavior change.

The importance of this staff resource is paramount to the delivery of many of the programs outlined in this section, and to the growth of the City’s culture of active transportation and trails use. The City should consider starting out with a relatively small investment – potentially through the use of a Summer Student position (potentially funded by the Canada Summer Jobs Grant) to provide support for programming from May to September. As the benefit of the position becomes more clear and the level of programming increases, the City should consider expanding the position with the eventual goal of having a full-time Trails and Active Transportation Coordinator position to:

- Liaise between different City departments to ensure that active transportation and trails issues are being considered in new roadway projects, developments and programs
- Strengthen connections between external stakeholders, including Heart Niagara, Niagara Region, Niagara Public Health, Niagara College and more as new programs are developed and implemented
- Seek funding opportunities through the growing number of streams being developed and delivered by higher levels of government to support active transportation
- Serve as the City Staff resource for the City’s Active Transportation Advisory Committee
- The remainder of the “Foundations” Section will operate on the assumption that a summer student is hired to serve in this role for the first year of the implementation, and that staff support will grow each subsequent year as new programs come into effect.

6.1.1 RECOMMENDED PROGRAMS

PROGRAM 1: (RE)CREATE THE WELLAND AT ADVISORY COMMITTEE

An effective Active Transportation Advisory Committee serves as an additional support for implementation and accountability with regards to the implementation of this Strategy. While these committees typically have the role of reviewing infrastructure decisions and providing advice on those projects, there is also significant value in empowering your committee to organize and deliver events and even to direct small investments in infrastructure projects such as adding new amenities to the trails. A Committee is at its most beneficial when it:

- Has staff support, and feels that its advice is being heeded when they are asked for input
- Has a discretionary budget each year to spend on actions, items or infrastructure that supports trail use and active transportation (for example, to fund the design and printing of trails maps, to purchase promotional bike lights or to pay for advertising space in a local media outlet)
- Is empowered to run events and perform outreach in the community to boost trail and active transportation use

Consider inviting key stakeholders, including Niagara Public Health, to sit on the committee as ex-officio members to provide updates and support as the committee develops and implements new programs.

Table: Welland Active Transportation Advisory Committee Chart

RECOMMENDED PARTNERS	KEY OUTCOMES	ESTIMATED COSTS
• City Staff and Council as necessary to strike the committee • Niagara Region Public Health • Community members • Niagara College and BIA representatives	• Welland Active Transportation Advisory Committee Struck • Monthly meeting Schedule established • WATAC delivers new programs as identified in this Strategy	\$5,000 for discretionary program funding support

PROGRAM 2: FAMILY TRAIL DAYS

Family Trail Days have been successfully deployed in several communities across Ontario, most notably in Ingersoll, where their annual Family Bike Day brings out hundreds of families each year to learn basic cycling skills, trade in bikes that have been outgrown and enjoy the cycling amenities and trails that the Town has to offer in a safe, controlled environment. Welland should consider developing a plan for a Family Trail Day that involves elements of cycling education (Bike Rodeos, bike maintenance clinics etc.), demonstrations and riding clinics, a Bike Swap (similar to a ski swap, where parents can trade in bikes that their children have outgrown) and other elements that will make the day enjoyable for families of all ages. Focusing the event on a trail can help to ensure that families with young riders feel safe and comfortable letting their kids practice riding, and also creates a unique draw to the event. These events could serve as a high-profile kick-off to Bike Month, and also could help to raise the profile of trails as students head back to class in September, so consider hosting 2 each year – one in the late spring and one in the late summer.

Table: Family Trial Days Chart

RECOMMENDED PARTNERS	KEY OUTCOMES	ESTIMATED COSTS
- City Staff - NRPS - Schools - Community groups	Host one Family Trails Day each year, scaling up to two events annually	\$2,000 per event for promotional materials, educator honorariums etc.

PROGRAM 3: ROUTINE COMMUNITY WALKS AND RIDES

One of the most common, and easiest to deliver, methods of connecting to individuals and encouraging behaviour change is to host regular community walk and ride events. While community bike rides are much more common than community walks, that is not to say that a walking program is not without a significant level of merit, and for Welland. Community walks and bike rides provide residents with the opportunity to engage in an enjoyable, social activity while also exposing them to the possibilities that exist for getting around Welland actively. Key “ingredients” for a successful community walk or ride program include:

- REGULARITY:** walks or rides should be held on a regular basis, whether that be monthly, biweekly or even weekly. Having the events occur at predictable intervals ensures that residents can engage with the events - even if they miss one, there is another event coming up.
- VISIBILITY:** do your best to “brand” the walks or rides as much as possible. Have walk leaders carry a sign encouraging passers-by to join the walk or learn more about it, create a mobile billboard that can be towed on a trailer behind the leader of a community bike ride etc. The best advertising for these events is having people see them “in the wild”, or having

information spread by word of mouth.

- **ACCESSIBILITY:** these are not training events; they are social events. Rides and walks should be done at a pace that is family friendly, and allows for socialization. Ride and walk distances should also be a length that is manageable for first-time riders, inexperienced walkers or young children. Ensure that routes have a shortcut built-in if they are longer so that people can still join up with the larger group if they are not comfortable with completing the entire route.
- **SOCIALIZATION:** the idea of community walks and rides is to provide people with an opportunity to meet their neighbours and explore their community – and that means introducing people to businesses and gathering places in their neighbourhoods as well! Ensure that each event ends in a place where attendees can gather and socialize – a local café, a park or even a local brewery!

The City should consider serving as co-funder for community rides and walks, providing insurance for ride and walk leaders as necessary, promoting events through Municipal communications feeds and helping to print / distribute promotional materials.

Table: Community Walks/Rides Chart

RECOMMENDED PARTNERS	KEY OUTCOMES	ESTIMATED COSTS
• Active Transportation Committee • Recreation and Tourism staff • Downtown and North Welland BIAs • Service clubs • Local businesses	• City hosts a training session for potential ride leaders and organizers – potentially led by the new Active Transportation Coordinator. • City offers liability insurance to all ride leaders who attend training and agree to abide by rules as set out by the Township. • Advisory Committees, Service Clubs, cycling groups, local businesses and other stakeholders are engaged as ride leaders. • Welland works to develop a consistent brand and identity for the ride series. • Ride leader T-Shirts or other swag are made available as a small token of appreciation. • Incentives for attendees, including discounts or giveaways as local restaurants/cafes or cycling accessories like lights, bells etc. are made available. • Storytelling is embedded in the rides – City communications staff attends rides to talk with residents who attend the ride to share their stories and create positive press about the events.	\$2,500 per year for insurance and promotional costs.

PROGRAM #4 – BIKE VALET PROGRAM

Bike Valet (here) is a highly visible, effective way of showing a Community's commitment to making cycling easier, safer and more convenient. Welland should host Bike Valet at the local Farmers' Market while it is in season, offer the service at regular festivals and events downtown and along the Canal – ideally providing staffing support from the Active Transportation Coordinator. This would provide a benefit to the community – providing people on bikes with a safe place to lock their bike while at community events and providing an opportunity for Municipal representatives to talk with riders about cycling in Welland. The City could also consider integrating bike valet into the special events permitting process to ensure that all special events in Welland include provisions for Bike Valet. This could be accompanied by a small fee for event organizers to pay for staffing at the bike valet, and could help the community make bike valet a more reliable element of special events in Welland. There may also be an opportunity for the City to partner with surrounding municipalities like Thorold, Niagara Falls or Port Colborne to share the costs of investing in Bike Valet materials so that the service can be more widely available to all the communities in the area on a more frequent basis. The City may also wish to consider contracting out the development and delivery of Bike Valet services to a Regional partner like Heart Niagara, who would be able to deliver the program within the City, but could also support neighbouring municipalities when they need a Bike Valet system as well.

Table: Bike Valet Program Chart

RECOMMENDED PARTNERS	KEY OUTCOMES	ESTIMATED COSTS
• City Staff • Event organizers • Heart Niagara or other community group	Deliver Bike Valet at 10 events per year, in addition to weekly bike valet at Farmer's Market	\$5,000 to purchase Bike Valet materials (tents, fencing, bike racks, tags, tables and promotional materials)

PROGRAM #5: ORGANIZE AND HOST WELLAND BIKE AND TRAILS MONTH

As this strategy moves forward, hosting a Bike and Trails Month in Welland is a great way to bring trails use to a much larger audience. Expanding the number of events and programs offered during one single month can help to create a conversation about trails, walking and cycling in the community and can provide the push for people to get back on the trails in a way that events interspersed throughout the warmer seasons cannot. Maximizing the number of events during Bike and Trails Month can help to target the “interested but concerned” population of potential trail users in Welland and can build a strong sense of community around walking and cycling. Consider partnering with partners at the BIAs, Niagara Region, local service clubs and local bike shops to offer weekly guided bike tours and walks around Welland during Bike and Trails Month and expand the offerings of events to ensure that June is a month-long celebration of trails use in Welland. Consider hosting one larger event to either kick off or wrap up Bike and Trails Month – potentially a family trail day (See Program #2) or a “Tour De Welland” showcasing the routes that can be accessed within the community.

Bike and Trail Month Planning Guide

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

Step 1: A Bike and Trail Month Task Force

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

- Local cycling or hiking Clubs
- Downtown Welland and North Welland BIAs
- Local Bike Shops
- Heart Niagara and other non-profit partners
- Niagara Regional Police Service
- Niagara Public Health
- Municipal Events / Active Transportation Staff
- Large Employers
- Service Clubs (Rotary, Lions, etc.)

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

Step 2: Build your Calendar

A great Bike and Trails Month can be achieved with as few as 4 events over the span of the month – one event each week can help to keep cycling on the agenda and give residents multiple opportunities to engage in cycling in a positive way. Consider “bookending” your Bike Month with more significant events – for example, a complimentary Bike to Work Day Breakfast at City Hall and at Niagara College to start the month and a Family Trails Day or a Glow Ride (a night ride lit up with lights and glowsticks) to end it. Intervening events can be smaller and easier to organize – for example, host a community coffee shop tour, a trail ride, a bike repair workshop or a “dust off your bike” event where bike mechanics volunteer their time to be on-site for basic repair (inflating tires, greasing chains) for bikes that have been in the garage for a little bit too long. Empower interested residents to plan and lead the events to reduce the planning burden on municipal staff.

Step 3: Promote your Events

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

Step 4: Evaluate

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

Table: Bike and Trails Month Chart

RECOMMENDED PARTNERS	KEY OUTCOMES	ESTIMATED COSTS
Active Transportation Advisory Committee, Service Clubs, Niagara Public Health, Local Bike Shops, BIAs	- Begin planning in early Spring by convening a Bike and Trail Month Task Force - Bike and Trail Month takes place annually in June with at least 4 events throughout the month	\$3,000 for promotional materials, event expenses, prizes and more

PROGRAM #6: DOWNTOWN BIKE CORRALS

Bike parking in the Downtown area of Welland was identified as a challenge by stakeholders and members of the public. As a means of adding bike parking capacity, consider installing bike parking corrals in the downtown area in spaces that are currently occupied by a vehicular parking space, or which are currently hashed off due to space constraints. One bike corral can fit up to 20 bikes in the space that is normally reserved for one car, so it can significantly expand the number of parking spaces for visitors to the downtown area. Consider installing bike corrals for seasonal use when cycling rates are higher.

Table: Downtown Bike Corrals Chart

RECOMMENDED PARTNERS	KEY OUTCOMES	ESTIMATED COSTS
Downtown Welland BIA	2 bike corrals installed on a seasonal basis.	\$1,200 per bike corral.

PROGRAM #7: ACTIVE SCHOOL TRAVEL PROGRAMS

Establishing Active School Travel programs for all elementary schools in Welland is an effective way to promote active transportation to the younger generation. It helps to create lifelong habits of walking and cycling and should be a focus of the City as it aims to create a stronger culture of active travel in Welland. Increasing the number of children walking and cycling to school often relies on parents – their understanding of the safety and suitability of routes around the schools, for example – so effective programs must also be targeted at parents as well as students.

Experience from the Ontario Active School Travel Program shows that the most significant factor in determining the success of a School Travel Planning process is the inclusion of a dedicated staffing resource to liaise with schools, deliver programming and provide support to administration to deliver events and promotions. It is suggested that the City work with Niagara Public Health to hire a School Travel Planning Facilitator to perform School Travel Planning work with schools all throughout the City. The Ontario Active School Travel group has prepared an extremely comprehensive guide to launching your own School Travel Planning project, which can be found [here](#).

Many organizations in Welland, including the NRPS and Niagara Public Health, have existing relationships within schools, and are in frequent contact with staff and administration at most schools in Welland for a variety of programs and events. Those connections could be expanded to include more emphasis on cycling education in schools to help to ensure that all students know the rules of the road, and how to operate a bicycle safely.

As School Travel Planning Efforts get underway, be sure to include data collection in your efforts. BikeWalkRoll ([here](#)) is a simple tool that uses hands-up surveys to track progress and show how walking or cycling increases in a school over time.

Table: School Travel Programs Chart

RECOMMENDED PARTNERS	KEY OUTCOMES	ESTIMATED COSTS
- Niagara Region Public Health - Schools	All schools in Welland have School Travel Planning programs in place	\$10,000 annually to support implementation of Active School Travel recommendations put forward by AST Partners.

6.1.2 FUTURE PROJECTS

As the City's culture of Cycling and Trail Use becomes more established, there are opportunities to expand the number of residents that are reached by promotional activities, helping to grow ridership and interest in trail use and active transportation in the City. These programs require a higher level of ongoing staff support or the development of new partnerships, but their potential to drive increased use of trails and active transportation infrastructure in Welland make them a worthwhile suite of programs to pursue, especially as the City continues to expand its investments in new infrastructure in the City.

PROGRAM #1: DATA COLLECTION AND REPORTING

As communities expand their investments in new trails and active transportation infrastructure, it becomes increasingly important to demonstrate the value that those investments are bringing to the community. Building the capacity to collect quantitative data – for example, changes in ridership or trail use, safety improvements and changes in the number of students walking or cycling to school, requires investing in tools such as trail counting devices to track changes over time. The automated collection of data can also be supplemented by human resources, for example, by organizing an annual cycling and trails count in Welland to validate and expand on the data collected through automated tools.

While quantitative data is important for understanding how investments are impacting the community, they only ever tell part of the story. For the City to gain a stronger understanding of the rational behind its residents travel patterns, the City should also work to collect qualitative data that explores the human stories behind the transportation choices being made by residents. By combining these two data sets, the City can begin to tell a more defined story of how its support for new trails and active transportation projects are impacting the lives of residents in Welland, and can better understand the barriers faced by some residents when it comes to choosing active transportation to get around their community. To better collect and communicate this data, it is recommended that the City:

- Invest in permanent bicycle and pedestrian counters.** There are many technologies available to help communities gain a stronger understanding of how many people are using their active transportation facilities. From simple pneumatic tube counters to high-tech

video detection devices, there are options to fit virtually any budget. The City should have a network of these devices around the community to be able to monitor how trail use and active transportation rates are changing over time as new facilities are constructed and connected to the existing network.

- **Undertake Parent Travel Surveys and Interviews:** Since parents are the primary decision-makers when it comes to school travel patterns, it is important for the community to have a strong understanding of how parents view transportation to school, and how they could be supported in making more active choices for their kids. These surveys should be used to monitor the efficacy of the various interventions through the AST programs in Welland, and to guide future efforts to improve attitudes and behaviours in the community.
- **Consider Transportation Diaries and Focus Groups:** Statistics Canada data provides a community with only one metric in terms of transportation behaviours – Journey to Work data. While this data is helpful to see how cycling to work changes every 5 years, it does not capture the majority of trips that residents make. Trips to the grocery store, to places of worship, to local restaurants or businesses – all of those trips go uncounted in the routine census. Sending travel diaries to a select group of residents each year (see an example from the City of Vancouver [here](#)) and asking them to capture every trip that they make over the course of a week provides a much better snapshot of how people are moving around the community using different modes of transportation. Once diaries are completed and submitted, consider also hosting focus groups with residents to discover how they feel about their transportation choices in Welland, to identify barriers to making different choices and to uncover stories that can be utilized to humanize the successes that are being realized because of the community's investment in active transportation and trails.
- **Develop Trail User Surveys and Economic Impact Studies:** Especially as Welland begins to see more cycle tourism, it can be valuable to collect information about the economic impact of cycling in the area. Use intercept surveys, trail user surveys and surveys administered through local accommodations and restaurants to gain a better understanding of the impact of cycle tourism on Welland's economy. That type of data can help to identify projects or programs that can boost tourism, and can also be helpful as a rationale for additional investments in cycling projects.

As the City's data collection efforts grow, be sure to also ensure that the City is expanding its ability to hold itself accountable to its Trails Strategy by releasing Biannual Report Cards about the progress being made as trails investments continue. Report on projects that are being built, the impact those projects are having on trail use, stories that can be shared to inspire others and any information uncovered through the dissemination of surveys or other data collection efforts. These types of reports can both keep the City on track as it expands its support for trails and can serve as a motivator for behaviour change among residents – consider the report an additional opportunity to market the community's support for trails.

RECOMMENDED PARTNERS	KEY OUTCOMES	ESTIMATED COSTS
- Schools - Active Transportation Advisory Committee - Niagara Region - Ontario By Bike (for support in developing economic impact studies)	4-6 Permanent Trail Counters installed - Annual in-person trail counts performed - Qualitative data collection - Travel Surveys, Focus Groups, Parent Surveys – included in data collection efforts - Biannual Report Card produced outlining Welland's trails progress - Strong quantitative data about economic impacts, ridership and safety made available	\$5,000 per year for data collection efforts through polling and research firms, most other data collection performed by Municipal Staff \$5,000 per year for purchase of data collection devices

PROGRAM #2: COMMUNITY CYCLING AND TRAIL PROMOTIONS

As the broader community promotions begin to take hold in Welland, supplementing the wider community messaging with more targeted interventions will help to get more residents walking and thinking about riding their bikes more often. Consider introducing more focused interventions such as:

- **WORKPLACE LUNCH AND LEARNS:** Take active transportation education programs to where residents and employers already are in Welland. Consider offering different modules, including Bicycle-Friendly Driver training, Basic Bike Maintenance and Cycle Commuting 101 to help employees build up their active commuter skills. These programs should aim to take approximately one hour, and should offer a mix of practical, hands-on lessons and classroom-based lessons. Consider offering incentives or additional benefits to employees who take the courses, including gift certificates for local businesses participating in the Walk and Wheel Wednesdays (see below).
- **WALK AND WHEEL WEDNESDAYS:** Consider partnering with restaurants and other businesses in the City's BIAs to offer discounts for customers who walk or bike to their businesses during lunch hour every Wednesday. Be sure to promote the program widely.
- **SENIOR CYCLING AND TRAILS EVENTS:** Consider partnering with a local bike shop to offer test rides of E-Bikes for groups of Seniors through senior social groups. Cycling is a great way for older adults to remain active, and an E-Bike makes cycling even easier and more enjoyable. Particularly among seniors, the popularity of E-Bikes is increasing, but seniors are much less likely to consider an E-Bike if they don't know someone who has one or they've never ridden one themselves. By introducing seniors to e-bikes in an enjoyable, social setting, you can help to build a stronger culture of cycling and E-biking among Welland's growing seniors' population.

Table: Community Cycling and Trail Promotion Chart

RECOMMENDED PARTNERS	KEY OUTCOMES	ESTIMATED COSTS
• City staff • Workplaces • BIAs • Local businesses • Active Transportation Advisory Committee • Seniors groups • Local bike shops	Targeted programs aimed at several demographics in operation each summer	None. Costs of delivering Lunch and Learns should be covered by employers, Walk and Wheel Wednesdays would be based on in-kind support from local businesses and Seniors Cycling Events would need promotional efforts from local bike shops and Seniors Groups.

PROGRAM #3: BIKE SHARE AND MICROMOBILITY FEASIBILITY STUDY

For a community like Welland, a small-scale bike share / micromobility program has the potential to significantly expand the availability of active transportation to a higher share of the population. Bike Share systems have evolved very rapidly in the past 5 years and are now flexible enough to accommodate cities of any shape or size. For a great primer, be sure to see the latest version of the Bikeshare Planning Guide, updated in 2018 to reflect the changing nature of bike share systems. While these systems can require a relatively high level of initial investment, there is an opportunity to leverage the community's support for Bike Share or Micromobility into a significant tool to attract new talent, attention and tourists. Additionally, with new vendors entering the market, it is also possible for a community to invite a bike share system to operate within their community at no cost to the municipality, although this leaves the community vulnerable to the loss of that system unexpectedly if the vendor decides to leave. For Welland to undertake a Bike Share or Micromobility system, the following steps are recommended:

DEVELOP A PARTNERSHIP AGREEMENT WITH NEIGHBOURING MUNICIPALITIES (OPTIONAL)

One of the themes that emerged through the development of this Strategy is Welland's connections to its neighbouring municipalities, especially the City of Niagara Falls and the Town of Thorold. Consider working with those communities to create a Bike Share / Micromobility system that can be operated across municipal borders, especially near areas where transit routes provide additional connectivity into neighbouring communities.

ISSUE AN RFP FOR A BIKE SHARE PILOT PROJECT

For the pilot to be successful, it is suggested that you concentrate the service in areas where potential ridership is high – areas near downtown, Niagara College and the Welland Canal Trail would be a good place to start. Be sure to evaluate the proposals based on their offerings of E-Bikes, especially as those products become more accessible in the market.

UNDERTAKE A PILOT PROJECT TO EVALUATE THE SUCCESS OF THE BIKE SHARE PROJECT

Ensure that the pilot provides sufficient operational time to adequately capture trends over multiple cycling seasons, potentially by having the program run for 18-24 months

EXPAND THE BIKE SHARE PILOT TO A FULL, PERMANENT SYSTEM BASED ON THE RESULTS OF THE PILOT

Once the Pilot period is over and the results are analyzed, roll out a full Bike Share system across areas of Welland based on the demand and the potential for cycling in those areas. If Bike Share is paired with a network of high-quality cycling infrastructure, experience has shown that it can have transformational impacts on the cycling culture of a community.

Remember that Bike Share works best when station density is high – so focus on providing a quality service over a smaller area rather than trying to overextend the reach of the system and risking spreading it too thin. Better to have a successful program over a smaller area that can grow than a failing system over a large area.

Table: Bike Share and Micro-mobility feasibility Chart

RECOMMENDED PARTNERS	KEY OUTCOMES	ESTIMATED COSTS
- Niagara Region - City of Niagara Falls - Town of Thorold - Niagara College	- Bike Share Pilot delivered - Bike Share system analyzed and permanently rolled out according to results	Unknown – best to be determined through Bike share Feasibility Study

The education and encouragement action plan recommended above represents a significant shift for the City of Welland in how it communicates with its residents about trails and active transportation. As noted in the section, to accomplish the desired outcomes and to achieve wider community culture shift objectives, the City should secure additional staffing to support and / or oversee the coordination of the action plan. With this additional staffing support, the City is well positioned to be a leader in active transportation and trails in Ontario, and to reap significant benefits from tourism, quality of life and health improvements among its residents. The costs of each programming phase of the action plan is presented in a summary table below including the suggested level of effort for the FTE staff. It should be noted that the programs listed in the “Future Projects” category rely much more heavily on new staff resources, so the monetary costs in that section are lower, but staffing support required to make those projects successful are higher than the Foundations Section.

6.2 OTHER ACTIVITIES & PROGRAMMING

Recreational and web-based programming for trail systems provides ample opportunity to draw in users, promote overall trail use, and remove user barriers which may have existed within the trail system. Incorporating programming activities into the trail experience can help draw in a multitude of users to the trail system in a dynamic and interactive way. These programs can be pivoted to target and attract specific user groups to the community's trail system and promote opportunities for people in the community to share experiences and connect with one another. This is especially useful in reducing barriers for different age demographics, like teenagers, to get outside and benefit from collective social experiences, fitness opportunities, and educational resources. Targeting trail use from different demographics can be as simple as creating walking groups for specific age groups, genders, and interests. Walking groups can include storytelling walks for children, self-esteem walks for teenaged girls, moms, and stroller walks, or walks for people new to the community.

Programming can be leveraged to shift users from busy sections of a trail and encourage use in underutilized areas where increased traffic is desired. Interaction can be further encouraged through the implementation of physical permanent or temporary signage along a trail that links users to activities on a municipal website, social media group, or other app platform. A 'spot and share' program, for example, can encourage the documentation of seasonal nature photos and social media sharing along the trails. Photo sharing can target themed educational opportunities, like the documentation of migratory birds, and can vary seasonally to attract users throughout the year. Fitness programming can also be used to encourage off season use of trails. Trail users can be encouraged to log and share location specific fitness achievements and photos as they travel throughout the trails.

Activities and programming can be used to remove barriers to participation and help to form social connections with other members of the community. Activities can be themed to respond to different seasons, or to other events and activities that are occurring within the community. Trail tourism can be a multi-disciplinary approach that combines the expertise of the City's different departments to determine the best means to attract users through specific trail programming. For example, a partnership between the Recreation & Culture and Parks and Facilities departments may find combined programming opportunities to attract atypical trail users and provide them with a reason to experience local trails. Activities could include the temporary installation of game or challenge stations throughout the trail system. Stations can be based on nostalgic games and include oversized lawn components, spray lining on turf, or provide signed or digital signage to describe the intention of the challenge.



6.3 PROGRAMMING COST MATRIX

Table: Costs Associated with programs in the “Foundations” Section

PROGRAM	ESTIMATED COST	ANNUAL OR ONE TIME COST
Establish Welland Active Transportation Advisory Committee and provide annual discretionary funding	\$500 - \$1500	Annual
Family Bike Days	\$2,000	Annual
Routine Community Walk and Bike Events	\$2,500	Annual
Bike Valet	\$5,000	One-time
Bike and Trails Month	\$3,000	Annual
Downtown Bike Corrals	\$2,400	One-time
Active School Travel Support	\$10,000	Annual
Total	\$22,500 plus \$7,400	Annual costs plus one-time expenses

Table: Costs Associated with programs in the “Future Projects” Section

PROGRAM	ESTIMATED COST	ANNUAL OR ONE TIME COST
Data Collection and Reporting	\$10,000	Annual
Cycling, Walking and Trails Promotions	None	Annual
Bike Share and Micromobility Feasibility Study	None	Annual
Total	\$10,000	Annual costs

7 DESIGN GUIDELINES

The Welland Community Trails Strategy (CTS) is a reference for the development of off-road trail connections and on-road linkages in Welland. While the CTS is intended to provide general guidance on the design of these off-road trails and on-road cycling routes, it is not intended to address the design of every condition possible. The City may follow the general best practices described in the CTS when implementing recommended routes, however, every corridor is unique and sound engineering judgment should always guide design. This section summarizes some general best practices in the design of on and off-road active transportation infrastructure from national and provincial levels. It includes a mixture of short-term interim design solutions and long-term construction/reconstruction design strategies.

7.1 OVERVIEW & APPLICATION

The design guidelines in this section provide high-level information on a range of infrastructure (facilities) that are appropriate for a range of active modes, which include walking, cycling, skateboarding, rollerblading, and scooting. It should be noted that these are guidelines, not standards, and may be applied flexibly. The information included in this section should be applied in conjunction with existing City policies and standards that dictate the design of on- and off-road infrastructure within Welland. The guidelines may be referenced and applied in a range of project contexts, such as new construction, major reconstruction, minor rehabilitation, and interim roadway reconfiguration where the curb is not moved. On projects that have segments that cross regional roads, the Region of Niagara should be consulted to identify respective standards and design practices for infrastructure under their jurisdiction.

7.2 UNDERSTANDING THE USER AND EXPANDING USER POTENTIAL

7.2.1 WHO WILL BE USING THE TRAIL NETWORK?

Pedestrians and cyclists are the primary user groups that were considered when identifying and selecting preferred trail connections and design concepts for Welland. Within these two user groups there are sub-groups which have their own unique interests and preferences.

When designing trails, consideration should be made for the appropriate user in order to determine how the facility should be designed, the amenities to complement and enhance the route and other key features. Though there are a number of unique users, typically trails accommodate a range of user groups. It is important to consider and balance the various users and their interests and preferences when determining the appropriate design.

WALKERS



Walkers can be defined by their trip type including recreational or utilitarian (to work, school or most frequent activity). Utilitarian Walkers typically walk within urban areas and tend to use sidewalks, parking lots and plazas as well as trails where they are convenient, well designed and properly maintained. Trails can sometimes provide a convenient “short cut” to traveling the sidewalk network to get to their destination. The average walking distance for elderly persons and preschoolers is 190m between rest opportunities. As such, a common trend in current trail master planning is to space at maximum 200m intervals and at every trail entrance point.

USERS WITH MOBILITY IMPAIRMENTS



Walkers and users with mobility aids (e.g. wheelchairs and power chairs) have a wide range of interests and motives (i.e. leisure, relaxation, socializing, exploring, making contact with nature, meditation, fitness, or dog walking). Persons with hidden mobility disabilities (able to walk independently but only for a short distance and to stand unsupported but only for a brief time) experience difficulties and are dissuaded from participating in walking when the distances between rest exceed 15-20m (Riddle 2019).

HIKERS



Hikers are often considered the elite of the recreational walking group and may challenge themselves to cover long distances and be willing to walk on sections of a rural roadway shoulder considered less safe or less interesting by occasional leisure walkers. They take trips that may range between 5 and 30 km in length, may be more keenly interested in natural features, are often more adept at map reading, are more self-sufficient than leisure walkers, may expect fewer amenities and are often attracted to challenging terrain and rural areas.

RUNNERS & JOGGERS



Although the primary motivation for joggers and runner may be fitness, they may share more in terms of profile characteristics with distance hikers than they do with leisure walkers. This group typically is accomplishment oriented, enjoy travelling on trails at higher speeds for distances between 3 and 15 km or more, often avoiding hard surfaces such as asphalt and concrete and many prefer to run on granular, natural (earth) and turf surfaces which can provide a more cushioning effect.

CYCLISTS



The average travel speed for a cyclist on a trail is in the range of 15-20 km/h, although they may reach speeds in excess of 30 km/h traveling downhill on some trails. Where higher speeds are a potential issue on trails, speed limits and warnings should be posted to discourage fast riding and aggressive behaviour. Some bicycles are designed to travel easily over stone dust and gravel surfaces (e.g. all-terrain, hybrid or mountain bikes), whereas, narrow-tired touring and racing bicycles require very compacted granular surfaces or hard surface pavements such as asphalt. The mechanical efficiency of the bicycle allows users of all ages to travel greater distances at a higher rate of speed than pedestrians, and distances covered vary widely from a few kilometers to over a hundred depending on the fitness level and motivation on the individual cyclist.

E-BIKES & ELECTRONIC ASSISTED USERS



Electronically assisted bikes can open the trail experience to users who may otherwise 'hang up their helmets'. The ability of these devices to travel at higher speeds can cause concern over user conflicts, however, can be mitigated with regulator and enforcement measures, including restriction of use on certain types of trail infrastructure or specific locations. The benefits for facilitating inclusion far outweigh the potential negatives in supporting e-bike use within the Welland trail system. Infrastructure to support e-bike are important to facilitate users, including charging amenities and rental opportunities. E-bikes are a 'game changer' in removing barriers cycling and keeping persons with mobility limitations active in the community.

OTHER WHEELED USERS



This group includes in-line skaters, skateboarders and other trail users with small-wheeled devices. They have characteristics of both the pedestrian group as they are sometimes traveling at a walking pace, yet sometimes traveling at higher speeds. They use trails for recreation, exercise and transportation purposes. A key requirement of this group is that they must have a hard surfaced trail, and cannot operate on natural surfaces or granular/stonedust surfaces.

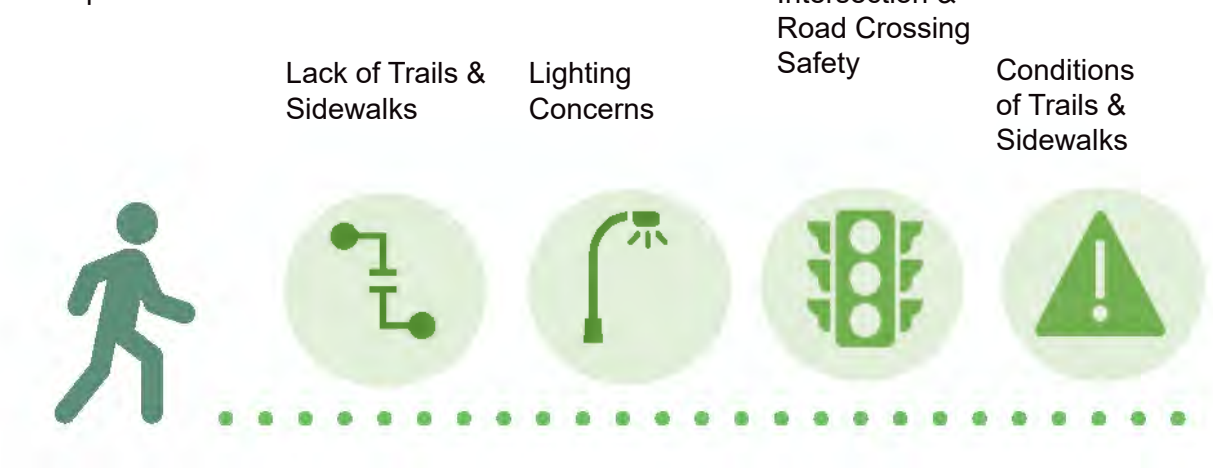
7.2.2 OVERCOMING BARRIERS

Just as people with disabilities experience social and environmental barriers to full participation in society, they can also experience barriers to full participation and enjoyment of parks and trails. Creating parks and trail networks that support people of all abilities is based on the fundamental right to quality of life, individual empowerment, respect and dignity for all people, and the guarantee of equal access to and participation in society.

One of the goals of the Welland Community Trails Strategy is to provide greater access to trails and their associated cultural, historic and natural resources to all visitors, including persons with disabilities, by incorporating the following accessibility guidelines for trails and trail facilities.

Barriers are not only physical, and future trail design and programming needs to consider mechanisms for mitigating barriers to use. Barriers can be derived from differing cognitive abilities and mental processes experienced by potential trail users. Barriers can be socially based and stem from issues related to income, language, race, religion, sexual orientation, health, and gender.

Examples of common barriers to use related to trails include:



7.2.3 THE DUTY TO CONSULT

The legislation requires local municipalities to consult with the accessibility community as part of the design and development process for the construction of new trails and significant redevelopment of existing trails. The local accessibility community and Accessibility Advisory committees provide vision and direction to staff and Council regarding accessibility and engaging the committee early in the design process is an effective method of sharing information and receiving feedback to inform the design.

Consultations typically focus on elements of the design feasibility to meet accessibility requirements in the design of a new trail or trail improvement, and where requirements can be practicably met, consulting on design criteria such as:

- Trail slope, the need for and location of ramps on the trail.
- The location and design of rest areas, passing areas, viewing areas, amenities along the trail and other pertinent trail features.

- Information related to accessibility that will be included on signage.
- Surface materials, including trail surfacing, tile wayfinding bars /decision trees, tactile warning plates and other crossing amenities.

7.2.4 ADDRESSING BARRIERS BASED ON GENDER AND THE LGBTQ+ COMMUNITY

Trails may be underutilized by certain groups including women and the LGBTQ community. These groups may not feel physically safe or welcome on recreational trails, especially those that are unlit, unmarked, or are located farther from urban areas. Consultation with these groups should be undertaken to understand how trails may be designed to promote safety and inclusion. Design elements like clear and consistent signage, communication about trail surfacing and lighting, mapping that shows community connections and exit points, emergency call boxes, and open sightlines make trail infrastructure more accessible to women and gender minorities. Technology may also remove access barriers for underrepresented user groups and designing for crime prevention are discussed below.

7.3 ACCEPTED DESIGN GUIDELINES

The Welland trails network was developed using the most relevant design guidelines, standards and best practices. As the City is moving forward with the proposed trails network, reference should continue to be made to the most updated versions of these documents, as well as review for new international, national and provincial guidelines and standards.

While developing consistent trail standards are important, there is a significant flexibility with off-road trail design. Accessibility, access and safety remain the key components guiding trail facility design with a goal of removing barriers to participation in trail facilities. The level to apply each of these guidelines is subject to a range of factors including; user demographics, target users, desired level of challenge, function, availability of alternates, and impacts to natural heritage systems. Additional guidelines for trails that interface with roadways, such as multi-use pathways and road crossings have been identified in the subsequent section.

Eight applicable guideline documents are accounted the most relevant and applicable being the provincial guidelines and standards:

International	National	Provincial
		
National Association of City Transportation Officials (NACTO) Urban Bikeways Design Guide and Urban Street Design Guide American Association of State Highway and Transportation Officials (AASHTO)	Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads Transportation Association of Canada (TAC) Bikeway Traffic Control Guideline for Canada	OTM Book 18: Cycling Facilities OTM Book 15: Pedestrian Crossing Treatments MTO Bikeways Design Guidelines Accessibility for Ontarians with Disabilities Act – Built Environment Standards

When using these design guidelines, it may also be appropriate to consult the following resources for region-specific guidelines as it relates to each project:

- Niagara Region Transportation Master Plan (2017)
- Niagara Region Complete Streets Design Manual (in development, 2022)

7.3.1 ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT

As a vital form of public infrastructure, it is essential that all trail facilities be planned and designed to accommodate the needs and abilities of all potential users. This not only maximizes the utility of such public investments but affirms broader municipal imperatives related to supporting diversity and inclusion. Within Ontario, these requirements are not only encouraged but codified under provincial law through the Accessibility for Ontario with Disabilities Act (AODA). Through the legislation, a specific target has been set of making the entire province accessible to people with disabilities by 2025.

“The people of Ontario support the right of persons of all ages with disabilities to enjoy equal opportunity and to participate fully in the life of the province.” The stated goal of the AODA is “to make Ontario accessible for people with disabilities by 2025.” (Accessibility for Ontarians with Disabilities Act, 2004).

To action AODA in practice, the Government of Ontario has also adopted The Accessibility Standards for the Built Environment. This accompanying document serves as a key technical reference which prescribes specific guidelines and standards needed to ensure universal barrier-free access. Forms of public infrastructure to which these standards apply include both on-road and off-road active transportation infrastructure such as multi-use trails. Importantly, however, these standards only apply to projects involving either new construction or extensive renovation.

For multi-use trail facilities specifically, AODA provides guidance on a wide range of design considerations. As a legislative requirement, the municipality should apply guidelines outlined in the Built Environment Standards as a minimum unless the trail’s location, surrounding environment or desired user experience warrants their exceedance.

In addition to adhering to AODA, all trail signage and wayfinding should be easily understood and detectable by users of all abilities. This includes using simplified text, visual icons and clear and contrasting colours which ensure that signage and mapping / messaging is informative, legible and visible. Wayfinding and signage systems should also clearly communicate which trails are accessible so that users can make an informed personal decision about which pathways they will use.

Another important consideration to inform a more equitable inclusive approach to designing the trails network is through applying principles to Universal Trail Design. Like AODA, Universal Trail Design is a concept that takes into consideration the abilities, needs, and interests of the widest range of possible users. Regarding trail and multi-use pathway design, this includes planning and developing a range of facilities that can be experienced by a variety of users of all abilities.

AODA criteria which are to be considered for multi-use trail design include: operational experience, width, longitudinal / running slope, cross slope, total slope, surface, changes in level and signage. The City should refer to the guidelines outlined in the Built Environment Standards to ensure that the needs of all user groups are accommodated and to satisfy the requirements of the AODA to the greatest extent possible, given the context of each trail's location, the surrounding environment and type of trail experience that is desired. Sections 80.8 and 80.10 of the Accessibility Standards for the Built Environment provide the technical requirements for off-road multi-use trails. These include:

- Minimum clear width 1.0m
- Minimum head room clearance of 2.1m above trail
- Surfaces are to be firm, stable with minimal glare
- Preferred maximum running / longitudinal slope of 5%; with up to 10% acceptable over short distances;
- Maximum cross slope of 2%
- High tonal or textural changes to distinguish the edge
- Standards also address changes in level, openings in the surface, edge protection (e.g. near water)
- Signage shall be easily understood and detectable by users of all abilities. It is important to ensure that signage and mapping / messaging clearly communicate the level of accessibility/ challenge for each section of trail so that users can make an informed personal decision about which pathways they will use.
- Consider audio components and/or braille to enhance signage communication.
- Trail parking should be designed to current accessibility standards and be provided at key locations along the trail system.
- Include temporary or permanent washrooms. Direct users to near-by public washrooms.

User-Friendly Trails Initiative Assessment Elements

Geography	Trail Surface	Infrastructure
• High esthetic values with good view points • Variety of ecosystem types represented • Interesting natural features present • Cultural heritage values present • Accessible recreational opportunities beyond hiking are present • Close proximity to urban center	• Trail width >1 m • Minimal elevation changes or gradual elevation changes, slope <6% • Minimal cross slope • Compact and obstacle free trail surface (compact gravel, pavement, or boardwalk)	• Parking lot at trail head • Accessible parking stalls • Public transportation in close proximity • Toilet facilities • Accessible toilets • Benches or rest areas • Picnic tables • Good clear signage

7.3.2 UNIVERSAL DESIGN APPROACHES

Universal design refers to the design of facilities, services, programs and products that can be used by all people, to the greatest extent possible, without the need for adaptation or specialised design.

The intent of universal design is to accommodate the broadest spectrum of people through a single, all encompassing design, rather than through the provision of multiple elements specially designed for use by distinct groups.

Universal design is governed by seven principles:

- **Equitable Use:** the design is useful and marketable to people with diverse abilities
- **Flexibility in Use:** the design accommodates a wide range of individual preferences and abilities
- **Simple and Intuitive Use:** the use of the design is easy to understand, regardless of the user's experience, knowledge, language skill or current concentration level
- **Perceptible Information:** the design communicates information effectively to the user, regardless of ambient conditions or the user's sensory abilities
- **Tolerance for Error:** the design minimises hazards and the adverse consequences of accidental or unintended actions
- **Low Physical Effort:** the design can be used efficiently and comfortably and with a minimum of fatigue
- **Size and Space for Approach and Use:** appropriate size and space is provided for approach, reach and manipulation, regardless of user's body size, posture or mobility.

KEY CONSIDERATIONS TO INFORM A UNIVERSAL TRAIL DESIGN APPROACH

				
BARRIER FREE	SAFETY	COGNITIVE	SOCIO-ECONOMIC	CULTURAL
Lack of uneven surfaces and grade, wide entrance and exit points. Greater trail widths to accommodate mobility devices.	Application of CPTED principles to minimize safety risks through greater passive surveillance. Improved lighting. Lack of or illumination of all non-visible areas.	Ensure trail alignments are direct and more intuitive to navigate. Appropriate use of trail signage and markings to assist navigation.	Ensure trails provide adequate coverage within underserved areas.	Ensure trail signage is translated in a wider range of languages and makes use of universally understood symbols and icons

7.3.3 SECURITY & CPTED

To the extent possible, trails should be designed to allow users to feel comfortable, safe, and secure. Principles of Crime Prevention Through Environmental Design (CPTED) provide guidance on how to consider and appropriately design with comfort and safety in mind. CPTED should be considered and appropriately applied to help address security issues concerning the use of these facilities, particularly in locations where trails are infrequently used, isolated or in areas where security problems have occurred in the past.

Understanding how these principles translate to trail planning and design is important to help inform future next steps. Some specific design considerations that have been employed by municipalities include:

- Providing good visibility by having routes pass through well-used public spaces;
- Provide the ability to find and obtain help: Signage that tells users where they are along the trail system;
- Provide “escape” routes from isolated areas at regular intervals;
- Maintain sight lines and sight distances that are appropriately open to allow good visibility by users;
- Provide trailhead parking in highly visible areas;
- Minimize routing close to features that create hiding places such as breaks in building facades, stairwells, dense shrubs and fences;
- Design underpasses and bridges so that users can see the end of the feature as well as the area beyond
- Signs near entrances to isolated areas can be used to inform users that the area is isolated and suggest alternative routes;
- Adequate lighting or lit ‘refuge locations’ where users can reach a safe place.

4 ARTICULATED CPTED PRINCIPLES

Understanding how these principles translate to Municipal planning and design is important to help inform future next steps. Some specific design considerations that have been employed by municipalities include:

- Providing good visibility by others by having routes pass through well-used public spaces;
- Provide the ability to find and obtain help: Signage that tells users where they are along the trail system;
- Provide “escape” routes from isolated areas at regular intervals;
- Maintain sight lines and sight distances that are appropriately open to allow good visibility by users;
- Provide trailhead parking in highly visible areas;
- Minimize routing close to features that create hiding places such as breaks in building facades, stairwells, dense shrubs and fences;

- Design underpasses and bridges so that users can see the end of the feature as well as the area beyond
- Signs near entrances to isolated areas can be used to inform users that the area is isolated and suggest alternative routes;
- Adequate lighting or lighting 'refuge locations' where users can reach a safe place.

Four core CTPED principles

1

NATURAL ACCESS CONTROL:
Deters access to a target and creates a perception of risk to the offenders

2

NATURAL SURVEILLANCE:
The placement of physical features that provides for natural visibility

3

TERRITORIAL REINFORCEMENT: Defines clear borders of controlled space from public to semi-private to private to understand ownership

4

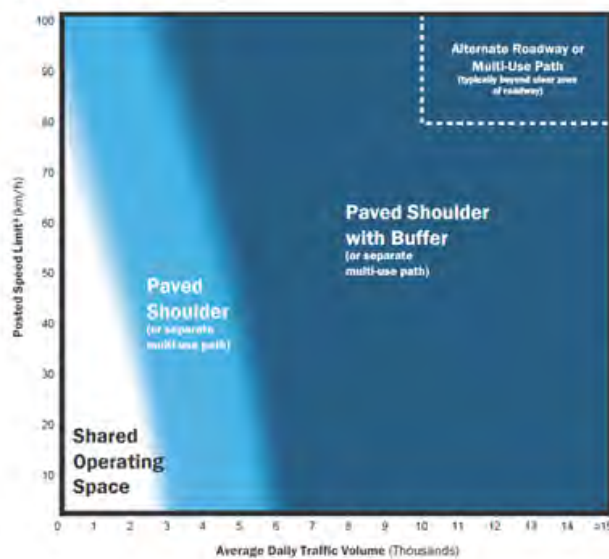
MAINTENANCE:
Allows for the continued use of space for its intended purpose

7.4 ON-ROAD FACILITY DESIGN

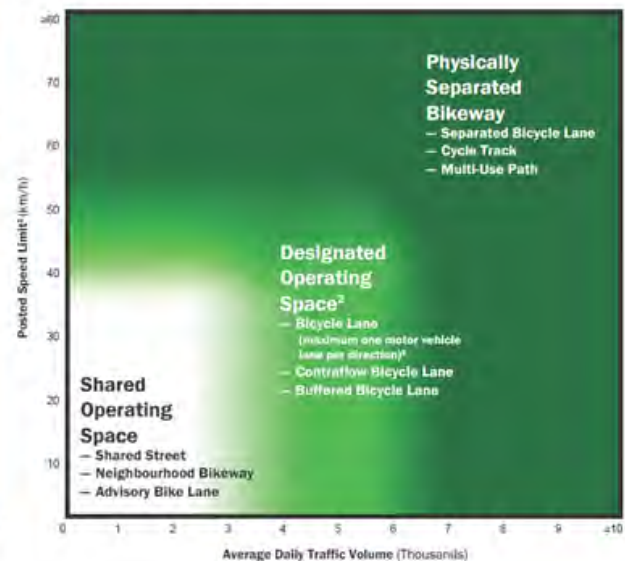
The Welland Community Trails Strategy is unique as the City understands that forming a trails network requires the support of on-road facilities. With the anticipation for an upcoming comprehensive Active Transportation Plan, the proposed cycling network intentionally does not recommend proposed facility type. The City's preference that the preferred treatment should be determined through this separate plan to understand feasibility of each route. This plan recommends facilities based on the recommended level of separation from the updated Book 18: Cycling Facilities.

The following is an overview of the applicable design treatments for the routes that are recommended as part of the on-road piece of the network:

**Desirable Cycling Facility Pre-Selection Nomograph
Rural Context¹**



**Desirable Cycling Facility Pre-Selection Nomograph
Urban/Suburban Context**



7.4.1 On-Road Facility Design Considerations

The following is an overview of the applicable design treatments for the routes that are recommended as part of the on-road piece of the network.

URBAN TREATMENTS

Elm Street, City of Temiskaming Shores

SHARED

- Signed Route
- Signed Route with Sharrows



TYPICAL DESIGN FROM BOOK 18

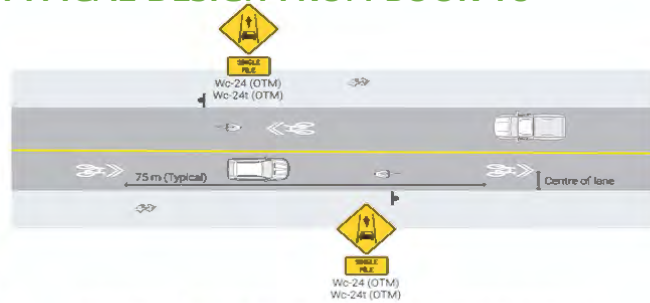


Figure 4.67 – Mixed Traffic Operation with Cyclists Positioned in Centre of Lane

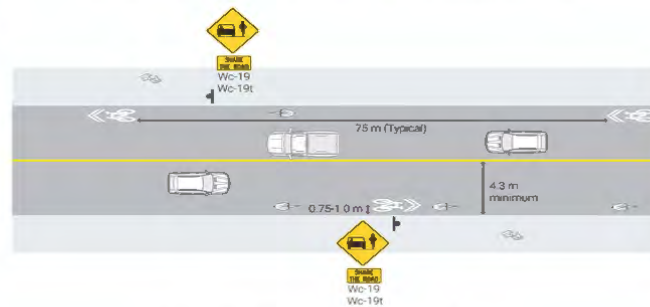


Figure 4.68 – Mixed Traffic Operation with Wide Lanes

Springbank Avenue, City of Woodstock

DESIGNATED

- Bike Lane
- Buffered Bike Lanes (painted or with flex bollards)



TYPICAL DESIGN FROM BOOK 18

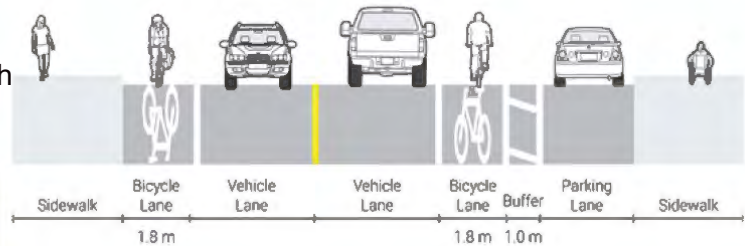


Figure 4.47 – Cross-section of Conventional Bicycle Lanes

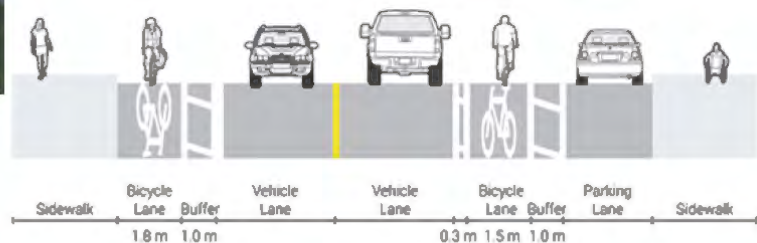


Figure 4.50 – Cross-Section of Buffered Bicycle Lanes

URBAN TREATMENTS

Woolwich Street, City of Kitchener

SEPARATED

- Physically Separated Bike Lanes
- In-boulevard Multi-Use Pathway
- Cycle Track
- Physically Separated Bike Lanes
- In-boulevard Multi-Use Pathway



TYPICAL DESIGN FROM BOOK 18

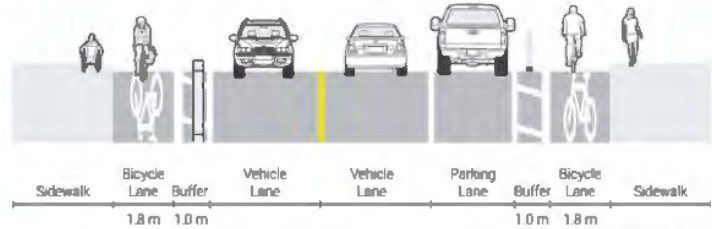


Figure 4.34 – Cross-Section of One-Way Physically Separated Bicycle Lanes

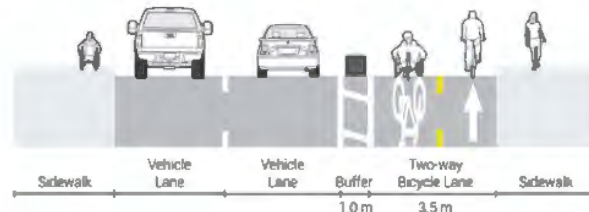


Figure 4.35 – Cross-Section of Two-Way Physically Separated Bicycle Lane

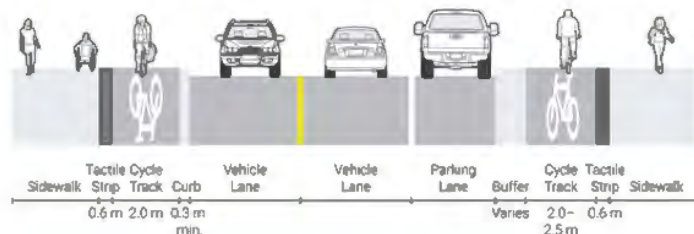


Figure 4.39 – Cross-Section of One-Way Cycle Tracks

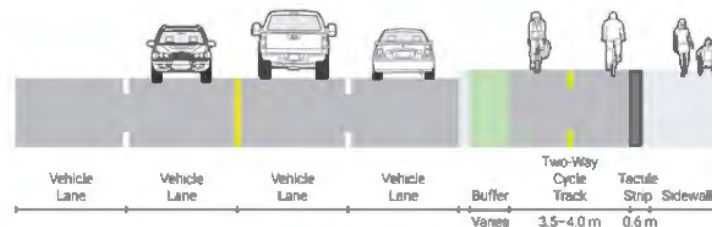
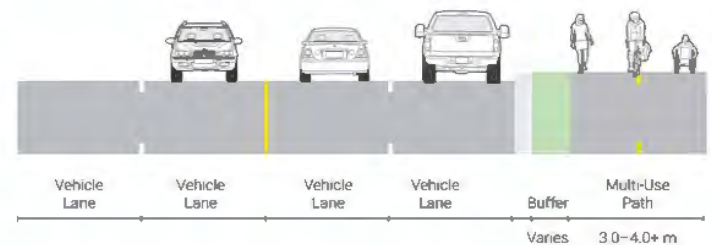


Figure 4.40 – Cross-Section of Two-Way Cycle Track



RURAL TREATMENTS

Champlain Road, Town of Penetanguishene

PAVED SHOULDER



TYPICAL DESIGN FROM BOOK 18

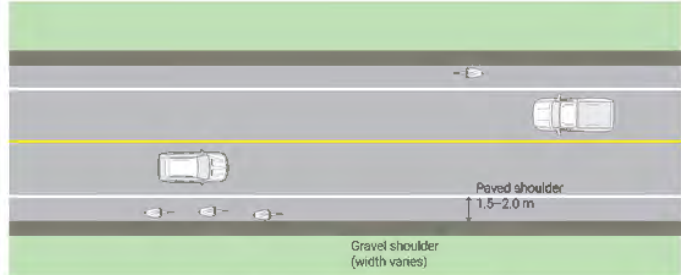


Figure 4.73 – Roadway with Paved Shoulders

County Road 50, Essex County

BUFFERED PAVED SHOULDER



TYPICAL DESIGN FROM BOOK 18

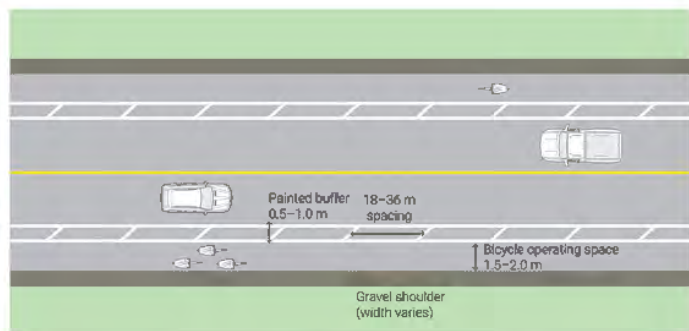


Figure 4.74 – Roadway with Buffered Paved Shoulders

7.5 OFF-ROAD FACILITY DESIGN

A key component of the Community Trails Strategy development was the creation of a new trail classification system to help enhance, connect, and provide accessibility to the various types of trails within the City of Welland.

To ensure consistency in design, implementation and maintenance, a revised trail classification has been identified and applied to both the existing and proposed linkages. The Recreational Trail Classification System for the Welland trail system is adapted from the Welland Parks, Recreation and Culture Master Plan (2019). It includes 6 trail types generally defined by the location and function of the trail in the context of the overall network. The Parks, Recreation and Culture Masterplan was able to identify trail connectivity as a key area of needed improvements for the City, and the apt opportunity given the current structure. The updated trail classification considers the trail user and incorporates elements of user experience such as ease of use/level of difficulty, accessibility and trail amenities in addition to the technical criteria.

Trail types include:

- Type 1 - Principal Multi-Use Trail
- Type 2 - Road Corridor Multi-Use Trail
- Type 3 - 4-Season Multi-Use Trail
- Type 4 - 3-Season Multi-Use Trail
- Type 5 - Natural Trail
- Type 6 - Neighborhood Greenway

The Recreational Trail Classification is presented in **Appendix D**. The classification does not include “Tertiary”, cultural (i.e. unsanctioned and unmaintained trails), or former trails which have been closed; and applies to construction of new trails and existing trails at the time of their reconstruction.

Within each of the 6 classes there are options for some of the technical criteria, for instance base depth depending on whether the trail segment will need to accommodate maintenance vehicles. The trail classification and associated mapping included covers existing and planned trail routes, Open Space/Environmental Protection Area (EPA) and Stormwater Management Areas. Multi-use trails and enhancement of existing road-networks is also part of the trail classification.

It is recommended that the City adopt these as the new trail standards / guidelines, building upon the existing recommendation and plans as set out by the City’s official plan and consultation documents/studies. The City should adopt the proposed trail network in principle and should reinforce the proposed network within other municipal planning documents such as the Official Plan in the form of a schedule or appendix. The network classification should be used as the primary reference related to the design and construction of proposed linkages. Should an additional route emerge or a new trail opportunity arise, the City should refer to the trail classification matrix to determine the most appropriate trail type prior to design and construction. Refer to the charted trail types for trail descriptions (Figure 9. Welland Trail Classification).

7.5.1 THE 6 TRAIL CLASSIFICATION TYPES

WELLAND TRAIL CLASSIFICATION	
TYPE 1: PRINCIPAL MULTI-USE TRAIL	The Principal Multi-Use Trail will be located along the main spine of the trail network existing in Welland currently. This trail type will exist for the function of providing a point of origin to all other types, housing celebrations and large functions; a focal point to the network. The Principal Multi-Use Trail will also work to close gaps in trail network and accessibility, anticipating a high-level of use for connection between pedestrian and destination; creating linkages for residents between home, work, school, shopping.
TYPE 2: ROAD CORRIDOR MULTI-USE TRAIL	This trail type provides connection to the elements of the community such as parks, schools, and commercial areas. Trail users will be able to commute to these elements with ease whether hiking or cycling. Road corridors provide active transportation use and reduce barriers for those with longer commutes, or seeking a longer trail experience. Connecting some of these existing road routes will expand available preferred routes and walkability.
TYPE 3: 4 SEASON MULTI-USE TRAIL	All season trails offer the community a consistent route for commuting and activity with maintenance. Even grading with mild inclines make these trails accessible and easy to use for infrequent trail-users, and offering preferred routes for daily users, appealing to all community members and mixed-use functions. These routes occur in corridors and open space systems.
TYPE 4: 3 SEASON MULTI-USE TRAIL	3 season trails offer a more moderate level of difficulty and are not a feasible active transportation option, however still accommodate most recreational uses. Lighting is not provided and amenities are more infrequent. Granular surfacing is used for 3 season trails, with limited servicing accessibility and a lower maintenance structure. These trails stay connected to the other primary links and neighbourhoods.
TYPE 5 – NATURAL TRAIL	Natural trails exist in sanctioned ‘naturalized’ or defined sensitive areas most commonly woodlots or near ravines. Natural trails provide an escape from urban landscapes, offering a serene environment and connection with nature. These areas are naturally surfaced and therefore user ability is defined by the landscape, often displaying a more difficult level of use. Some brush may be cleared for safety or walkability, but there is little to no maintenance in these areas. Stairs may be implemented in areas where slope exceeds 20%. Little signage and amenities are present on trail. These trails offer the community an opportunity to explore their connection with nature deeper and the surrounding landscape deeper.
TYPE 6 – Neighbourhood Greenway’s	Neighbourhood Greenway’s exist in road corridors through the enhancement of road networks and walkability/accessibility. This can occur in multiple ways; providing signage to trail links and heads, sidewalk widening, path connections meeting grade of the sidewalk, cycling lanes. Availability for mixed-use programming and can be at a moderate level of difficulty depending on road grade/ existing route. Maintenance is based on city mandates pertaining to clearing snow etc. The purpose of this trail type is to improve city infrastructure and connection between residential areas and active transportation networks.

7.5.2 UNIQUE AND COMPLEX PROJECTS

RAIL WITH TRAIL

A rail with trail project has been recommended for the railway corrector extending from the Highway 406 crossing of the canal/Welland River to Humberstone Road, with a possible extension to Forks Road E. This project has been identified for the medium term and would provide excellent connectivity within the community. The corridor appears to have adequate space on the west side of the rail line, with the possibility of needing to switch sides to improve feasibility in a few locations as needed. The City will need to complete a feasibility assessment as part of the development of this trail section with a focus on determining key safety design parameters related to the speed and frequency of rail use.

The following are typical requirements for trail projects within active rail corridors:

- Offset distance from the centerline of track to the edge of trail (typically 3m for low speed/frequency lines)
- Barrier between trail and rail. This can be achieved by grade separation; however, a barrier railing is often required. The design of the rail needs to facilitate access to avoid a person becoming 'trapped' near the rail, such as a tube rail fence over a chain link fence. The type of barrier may need to be more secure in areas where rail speed is higher.
- Crossings of the rail line that meet the rail at 90 degrees with clear sightlines and which forces users to stop (single p-gate, double p-gate, signage, possible light/arm electrification).
- Active transportation appropriate surfacing at crossings.



SEAWAY SERVICE/CANAL ROAD TRAIL

The Seaway Service Road and Canal Road, located on private lands, are actively used as an unsanctioned trail and private trail use. As this alignment is an active gravel service road, minimal trail infrastructure would be required and the alignment would continue to function for service level vehicular traffic. This project has been identified as a long term assignment due to the potential complexity of establishing a shared use agreement and the lower priority to the overall system. Similar to the existing canal trails, this trail would offer a community spanning north/south route. Paired with proposed east/west connections, this alignment would provide a looping network of trails functioning with the Welland Canal Trail. At the north most extent of Welland both the Seaway Service Road and the Canal Road have existing vehicular bridges that can provide a more feasible connection to Port Robinson and Merritt Island. This existing bridge could be considered an alternative to a new pedestrian bridge spanning the Welland River to forge the Merritt Island loop connection.



7.6 CROSSING DESIGN

Inevitably the active transportation network will need to cross roads, natural features such as waterways and other physical barriers. In these cases, a design feature would be needed to guide users from one part of a trail to another. By implementing crossings and structures that reflect the design of the facility and the conditions that are being crossed a greater sense of connectivity can be achieved. The following are design guidelines and considerations related to types and conditions of trail and on-road active transportation facility crossings.

Consideration should be given to enhancing trail crossings at these locations to alert motorists of potential cyclists (and pedestrians) crossing, increase the visibility of users at this location, and to provide clear guidance for cyclists and pedestrian when crossing the roadway. Trail crossings could include:

- Creation and maintenance of an open sight triangle at each crossing point;
- Trail access barriers;
- Signage along the road in advance of the trail crossing to alert motorists to the crossing;
- Signage along the trail to alert trail users of the upcoming roadway crossing;
- Alignment of the trail crossing point to achieve as close to possible a perpendicular crossing of the roadway, to minimize the time that trail users are in the traveled portion of the roadway; and
- Curb ramps on both sides of the road to ensure accessibility.

7.6.1 ROAD CROSSINGS

In locations where a trail intersects with a roadway, the flow of pedestrian, cyclist and vehicular traffic will need to be managed. The crossing treatment selected generally depends on the type of road being crossed (e.g., low volume local street vs. urban arterial); number of lanes being crossed; traffic volume and vehicle operating speeds; sight lines; and the anticipated volume of trail users. More significant improvements are recommended for crossings of with multiple lanes, higher traffic volumes and higher operating speeds. The following text outlines a range of at grade crossing types that correspond with roadway classification and character and includes typical considerations for their application.

The following are some considerations for the design of roadway trail crossings:

- Creating and maintaining open sightline triangles for trail users to see approaching vehicles and for trail users to be seen by oncoming vehicular traffic;
- Access barriers such as swing gates or bollards at trail access points to prevent unauthorized vehicles from entering the trail; and act as a visual cue to trail users that they are approaching an intersection with a roadway;
- Caution signs along the roadway in advance of the crossing point to alert motorists to the upcoming crossing;
- Caution signs along the trail to alert users of the upcoming roadway crossing;
- Aligning the crossing point to achieve as close to possible a perpendicular crossing of the roadway to minimize the time that users are in the traveled portion of the roadway;

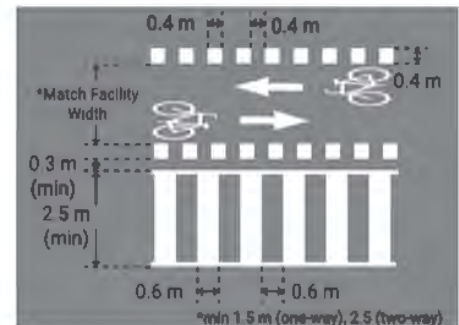
- A concrete ramp in the boulevard and curb ramps on both sides of the road to allow users to enter and cross the roadway efficiently and quickly;
- Tactile warning surface indicators which are,
 - Mandatory for signalized crossings;
 - Recommended for unsignalized crossings; and
 - Pavement markings where appropriate.
- Pavement markings to delineate a crossing should only be considered at crossings where there is some form of vehicle control in place (e.g. stop sign, or traffic signal). Pavement markings should not be used at uncontrolled trail intersections with roads (i.e. free flowing vehicular traffic that is not controlled by a stop sign or traffic signal). Trail users are required to stop and wait for a gap in traffic at uncontrolled intersections. Pavement markings at uncontrolled crossings may give trail users the false sense that they have the right-of-way over motor vehicles, which is contrary to the Highway Traffic Act.
- In some locations signing on the trail may not be enough to get trail users to stop before crossing the road. Under these circumstances or in situations where the sight lines for motorists are reduced and/or where there is a tendency for motorists to travel faster than desirable, the addition of other elements into the trail crossing may be necessary. Changing the trail alignment may help to get trail users to slow and stop prior to crossing. Changes to the streetscape may also provide a visual cue and traffic calming effect for vehicles.

PAVEMENT MARKINGS AT SIGNALIZED INTERSECTION CROSSINGS

Three types of pavement marking treatment can be implemented to improve crossings for both cyclists and pedestrians at complex and high-risk areas of the trail network.

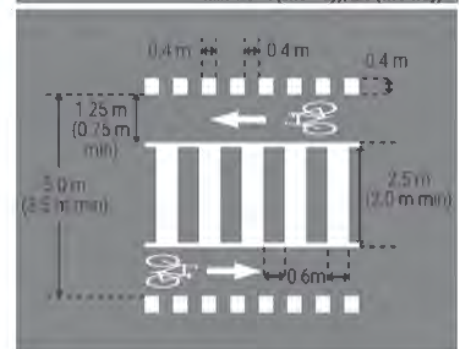
Separate Crossride and Crosswalk

- Separate space provided for cyclists and pedestrians, typically used when modes approach crossing in separated facilities
- Can be designed as either one-way or two-way.



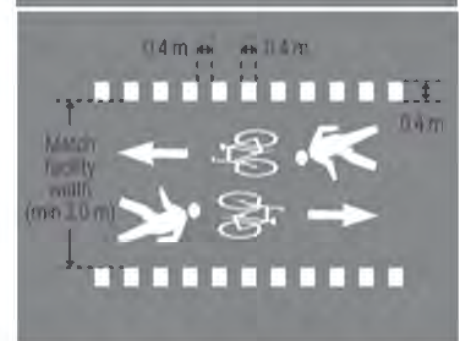
Combined Crossride and Crosswalk

- Cyclist crossings provided on either side of crosswalk and are typically used in conditions where pedestrians and cyclists approach the crossing on a shared facility.
- Tactile Surface Indicators (TWSI) should be implemented along full-length of initial mixing area.
-



Mixed Crossride and Crosswalk

- Intended for use at low-volume crossings (or where cyclist volumes are high and pedestrian volumes are low, where pedestrians and cyclists are approaching the crossing on a shared facility such as a multi-use path.
- Not permitted at signalized intersections.



SIGNALIZED INTERSECTION CROSSING

SIGNALIZED INTERSECTION CROSSINGS

INTERSECTION PEDESTRIAN SIGNAL



- Multi-lane cross-section
- Applied in conditions with good sight lines or compromised sight lines (other factors have greater influence on decision than sight lines)
- Moderate to high motor vehicle traffic volume
- Moderate to high pedestrian volume (consider existing conditions and future demand)
- Urban setting (e.g., arterial road)
- Trail crossing cannot be routed to a nearby stop-controlled intersection (e.g. within 200 m of trail crossing point)
- Note that signal control can also assist motor vehicles entering the arterial from the side street
- Moderate to high cost to install

MID-BLOCK CROSSINGS

MID-BLOCK PEDESTRIAN SIGNAL



- Multi-lane cross-section
- Applied in conditions with good sight lines or compromised sight lines (other factors have greater influence on decision than sight lines)
- Moderate to high motor vehicle traffic volume
- Moderate to high pedestrian volume (consider existing conditions and future demand)
- Urban or urban fringe setting (e.g., arterial road in urban setting)
- No signal-controlled nearby (e.g. within 200 m of trail crossing point)
- Moderate to high cost to install

7.6.2 PEDESTRIAN BRIDGE STRUCTURES

Prefabricated pedestrian bridge structures, in particular those that utilized weathering steel and wood decking, are the most cost effective structures provided by the market. A 'pony truss' or 'H-section' bridge style can span up to 55m and are the most economical design choice. For larger spans, a full 'box truss' is required and can span up to 80m. Alternately, custom bridges can offer more flexibility for architectural design features and are less limiting in maximum free span, however tend to cost 10X more in design and installation costs.

When spanning greater distances, assess both the material costs and design/approval costs for structures. This can help determine whether it is best to add an in-water pier or design a more extensive structure for a single span. Typically, the use of piers and prefabricated structure is a more cost-effective solution over a costume large spanning structure, however there are several variables such as environmental sensitives and aesthetic/tourism considerations that can influence a decision.

Pedestrian bridge projects will require a significant design and approval process and the potential for in-water works will greatly increase the requirement for environmental studies. Most water crossings will require a Crown Easement and consultation with Transport Canada.

PROPOSED WATER CROSSING: VEHICULAR ROAD BRIDGES

Utilizing existing road bridges can offer a low cost and impact water crossing solution, providing they have been designed with adequate width. Streets such as Lincoln, Woodlawn and Division are multi-lane with existing concrete sidewalks and have the potential for reconfiguration. The Region is in process of finalizing Complete Street Design Guidelines (projected for completion in early 2022) which include new cross section parameters and classifications. This study can be leveraged to support a conversation with the Region regarding future accommodation of improved pedestrian and cyclist facilities that will better support these beneficial crossings. Road bridges under City derestriction should be assessed for improved active transportation facilities during the 2022 Transportation Study with a priority to align implementation recommendations with the proposed on and off-road facilities recommended in this study.

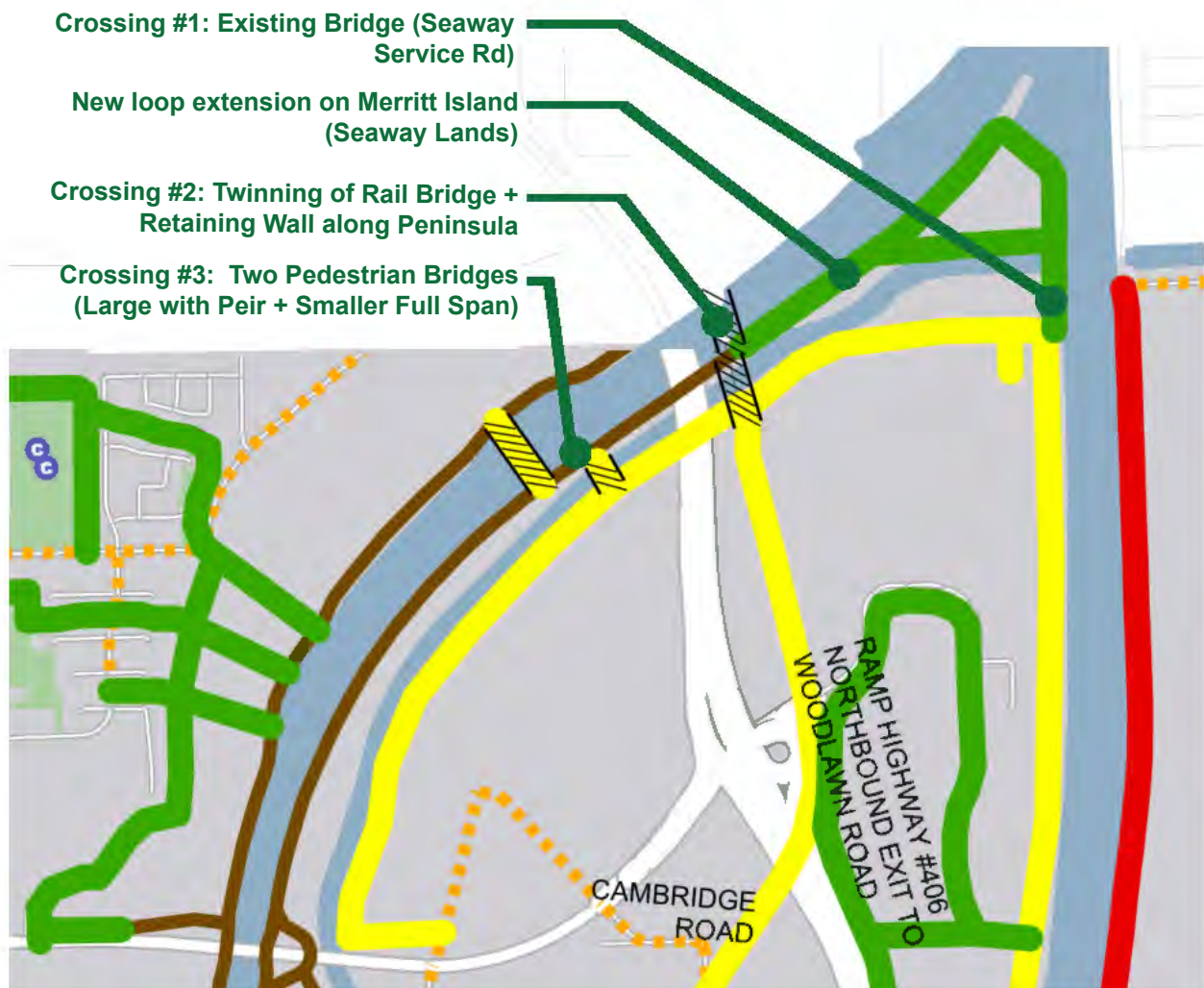
The flowing vehicular bridge crossings should be monitoring for improvement opportunities:

- Main Street and/or Division Street (Regional Road)
- Woodlawn Road (Regional Road)
- Lincoln Street
- Ontario Road
- Prince Charles Drive (Regional Road)
- Seaway Service Road - at Merritt Island (Private Road)
- Canal Road - at corner of River St. and Biggar Rd (Private Road)

PROPOSED WATER CROSSING: MERRITT ISLAND

There are several options to develop a bridge crossing connection to interface with the portion of the Welland Canal Trail that is located on Merritt Island. Utilizing the existing vehicular bridge crossing on the Seaway Service Road would provide a low-cost connection and connect residents within the adjacent new residential development to the Merritt Island portion of the existing trail system. The second most feasible means of crossing the Welland River and Old Canal is the leverage the existing rail bridge crossing with a twinning of the trail bridge over the River and constructing retaining walls to support a grade separated trail with rail over the canal. Both of these options have infrastructure that extends beyond Welland borders and would require a joint partnership to complete. Further west of HWY #406, two pedestrian bridge spans would complete a full crossing and could be installed in a phased approach and should consider both aligned and off set alignments. The Welland river can be spanned with a relatively simple full span bridge. The Canal will require the construction of a pier to support two prefabricated bridge sections or the design of a custom single span structure. If the bridges are constructed in a phased approach, consider installing all Merritt Island abutments in the first phase to take advantage of coordinated access to the Island.

A pedestrian bridge connection in this area would facilitate important east/west connection where there are few other options. Paired with improved road crossings, the connectivity would activate the potential of redeveloping area.



PROPOSED WATER CROSSING: EXISTING RAILWAY BRIDGE

The existing railway bridge north of Ontario Road offers a cost and impact reduction opportunity.



SAMPLE PEDESTRIAN BRIDGE CONSTRUCTION



Photos of Pedestrian Bridges (Left: Etobicoke Creek Trail, 35+/-m)+ (Right: Craig's Crossing in Galt, two sections 55m+/- long)

7.6.3 BOARDWALKS

Where trails pass through sensitive environments such as marshes, swamps, or woodlands with many exposed roots, an elevated trailbed or boardwalk is usually required to minimize impacts on the natural feature. If these areas are left untreated, trail users tend to walk around obstacles such as wet spots, gradually creating wider or multiple meandering footpaths through the surrounding vegetation, resulting in vegetation trampling and damage.

On trail classifications applied to sensitive natural areas (Type 5 – Woodland Trail), a low-profile boardwalk may be appropriate and requires modest engineering to develop an appropriate design. For trails with more frequent usage, cyclist traffic, and maintenance vehicle access (Type 1,2,3, 4) a more sophisticated design and installation is necessary. This is likely to include engineered footings, abutments, structural elements and railings.

Helical piles are an alternative foundation methodology that is cost effective and a low impact installation compared to concrete footings. Piles are drilled into the ground with a small skidsteer or mini-excavator then left in place to serve as the foundation. Helical piles allow for a narrower disturbance area and reduced numbers of trips to haul in concrete and haul out fill generated by pier excavations. Where finished boardwalk surfaces are less than 60cm above the surrounding grade a curb along the edge of the boardwalk will prevent users from rolling off the edge. Where the difference in grade exceeds 60cm, a railing should be provided.



Photo of Board Walk Trail (with helical piles) at the University of Guelph Arboretum. RAIL CROSSINGS

7.6.4 RAIL CROSSINGS

Where the trail network crosses active railway lines crossing designs / design upgrades must follow Transport Canada Grade Crossing Standards (2019).

<https://tc.canada.ca/en/rail-transportation/standards/grade-crossings-standards>

The requirements for trail crossings at railway lines will vary depending on the speed and frequency of rail service on the line in question. Crossings can range from simple signage to signalized lights to barrier arms. Depending on how the trail interfaces with the crossing, users may need to be controlled with forced mechanisms to slow speed and create awareness such as single and double barrier gates, signage, line paint, etc. beyond the standard rail crossing infrastructure.

Surfacing controls are important to improve accessibility and overall user experience. Surface treatment between/abutting a track is highly regulated, however there are several options to choose from that vary in cost and performance, including concrete, rubberized matting, metal grading, etc.



Photo: Unsignalized Pedestrian Rail Crossing (Left: fenced coral, Rohnert Park – photo: Press Democrat) + (Middle: use of bollards and line paint, Bike WalkKC) + (Right: Double 'P' Gate, Guelph Trans Canada Rail with Trail)



Photo: Track Crossing Material Alternatives to Asphalt (Left: Concrete) (Right: Rubberized Matting)

8 SUPPORTIVE INFRASTRUCTURE & AMENITIES

8.1 LIGHTING FEATURES

Lighting is often debated when assessing trail infrastructure. Women and people with young families are more likely to use a trail if lighting is provided, especially when daylight hours are reduced. Lighting a trail, in part or full, can remove barriers to recreational and commuter trail use. Consider lighting all urban trails, in particular those that facilitate connections to transit, amenities and community services. If full lighting is not feasible, consider 'refuge' lighting key areas at regular intervals to provide safe landing points. Solar lighting options are increasing in function and decreasing in cost, with options to delay light activation to concentrate seasonally limited battery function when needed most. Solar is an excellent solution for remote trailheads and short sections of trail that present safety/vandalism concerns.

Lighting within trail systems must be carefully considered to ensure environmental and financial factors are well managed. Lighting costs and environmental concerns can be mitigated with the use of diffused lighting, energy efficient bulbs and motion sensors.

Lighting plays a key role in preventing crime in and around trail networks and park spaces. Adequate lighting allows people to see and be seen and gives people time to respond to what is around them. Light features also illuminate potential hazards on trails such as rocks and branches so that they can be avoided. Personal safety is increased through the illumination of sightlines, pathways, and possible entrapment areas and hiding places.

While illuminating entire trails is not standard practice in trail development, trail lighting is often recommended in key locations such as:

- Main connections to important attractions such major parks
- Celebratory spaces and waterfront promenades that have regular activity after dusk
- Trails that serve important commuter and school routes, where lighting may be needed to provide guidance during periods of low light (e.g. fall and winter when days are shorter)
- Trails that provide a commuter/access function, connecting people to transit, groceries, etc.
- As refuge nodes/urban trailheads where intermittent lighting is more feasible.

8.2 CYCLING RELATED AMENITIES

An adequate supply of properly designed and properly located bicycle parking encourages increased cycling use as well as trail use. Bicycle parking can include individual racks, groups of racks where demand is high, or bicycle lockers. Potential locations for bicycle parking should be assessed to determine the number and type of parking units needed.

BICYCLE RACKS

These are available in an array of styles, ranging from the single post and ring style rack, to larger units that accommodate multiple bicycles. They are the least expensive style of unit which can be surface mounted on concrete pad or set in a concrete footing (e.g. Sono tube). Some manufacturers offer custom designs.



BICYCLE PARKING AREA

A “bicycle parking lot” or area where multiple racks are separated by aisles, much like a typical motor vehicle parking lot. Designs may include a roof and / or secure enclosure.



BICYCLE LOCKER

Bicycle lockers are individual storage units. They protect bicycles from weather, are secured with a key, swipe card (key fob) or an electronic key pad located on the locker door. Lockers are the most expensive style of unit, therefore are typically only used in locations where longer term parking is needed (e.g. commuter parking nodes).



8.3 SEATING & REFUGE

It is important to incorporate places for people to rest and take refuge. It is recommended that trails strive for some form of informal or formal seating every 200m, in particular located at points of entry and vistas. This metric is based on accommodating the average user. In areas where there is a higher potential for users with mobility impairments, such as near seniors' homes or amenities, along transit routes, or trails within tourism destination locations, rest seating is recommended every 50m. Formal bench seating with arm rests and back rests are recommended for areas where accessibility is of greater need, however provision of seating outweighs the priority for quality. Substitution or augmentation with natural materials such as flat-topped stones is always welcomed

Consider the provision of shelter in similar areas where accessibility is important, as well as areas where gathering is desired such as vistas, interpretive/commemorative nodes and where distances from point of entry/vehicular parking area significant.

8.4 END OF TRIP FACILITIES

Access barriers are intended to allow free flowing passage by permitted user groups, and restrict access by users groups that are prohibited. Barriers typically require some mechanism to allow access by service and emergency vehicles. Depending on site conditions, it may also be necessary to provide additional treatments between the ends of the access barrier and edge of the multi-use trail right-of-way to prevent bypassing of the barrier altogether. Additional treatments may consist of plantings, boulders, fencing or extension of the barrier treatment depending on the location.

There are many design alternatives for trail access barriers and some have proven to be more successful than others. They can generally be grouped into three categories:

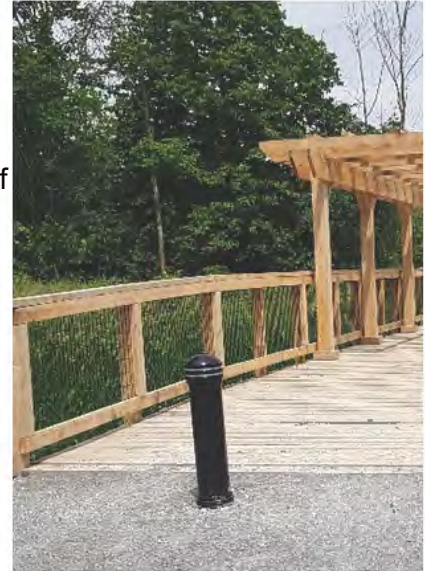
- Bollards;
- Offset Swing Gates; and
- Single Swing Gates.

Each access point throughout the Centre Wellington trails network should be evaluated to determine which type of barrier is the most appropriate and what additional treatment(s) may be required to discourage unauthorized users from bypassing the barrier.

BOLLARD

The bollard is the simplest and least costly barrier. The structure can range from permanent, direct buried wood or metal posts, to more intricately designed cast metal units that are removable by maintenance staff. An odd number of bollards (usually one or three) can be placed in the multi-use trail bed to create an even number of “lanes” for users to follow as they pass through the barrier.

Although the removable bollard system provides flexibility to allow service vehicle access, they can be difficult to maintain as the metal sleeves placed below grade can be damaged by equipment and can become jammed with gravel and debris from the trail bed.



SWING GATE

A single swing gate combines the ease of opening for service vehicle access, with the ease of passage of the bollard. Gates also provide a surface / support for mounting signage. The swing gate should provide a permanent opening to allow permitted users to flow freely through the barrier. The width of the permanent opening must be carefully considered so that it will allow free passage by wheelchairs, wide jogging, double strollers and bicycle trailers and electric scooters, yet prohibit access by unauthorized vehicles such as snowmobiles and all-terrain vehicles. Note that snowmobiling is permitted on some sections of the Elora Cataract Trailway, and during winter months the swing gate portion of the barrier is locked in the open position to allow free passage for trail groomers and snowmobilers with a valid permit from the Ontario Federation of Snowmobile Clubs (OFSC).

The offset gate is similar to the single swing gate, except that barriers are paired and offset from one another. Although they can be effective in limiting access by unauthorized users and can be easily opened by operations staff, some groups including cyclists, especially cyclists pulling trailers and wheelchair users, can have difficulty negotiating the offset swing gate if the spacing between the gates is not adequate. In urban areas, the single swing gate or bollard is quite effective for most applications. For large parks, park service access/pathway routes, more rural settings and locations where unauthorized access is an ongoing problem, a more robust single swing gate should be employed.



8.5 LEVERAGING TECHNOLOGY

There are several emerging technologies and innovations that can be incorporated into the design of new trails and improvements to existing trails that can enhance the user experience, promote use and widen inclusivity of the trails network. Technology is a tool to be leveraged to address a problem and implementation needs to result in specific outcome. Recognizing that technology-based applications can have high capital, staffing, and training investments costs, the benefits need to be tangible and in magnitude with the problem they are addressing. There is no denying technology is fun and the enthusiasm for technology-based solutions will garnish a high impact amongst current and future generations of young trail users. Consider how technology can expand the traditional parameters of a trail function and programming – reaching more people in meaningful ways, while reducing demands of maintenance and operational practices.

Below are examples of how technology can be incorporated into a trail system.

- **Waste and parking management** through sensors and dashboard systems to enable ‘as needed’ maintenance service with strategic deployment and better track frequency of use. Companies such as eleven-x in Waterloo-Ontario offer wireless real-time data solutions that are adaptable to existing amenities/systems.
- **Charging stations** that offer USB ports (for phones, tablets), E-bike rapid charge ports. Stations can be solar or hardwire powered. Charge stations come in standalone towers or can be found integrated with multi-function site furnishing.
- **Wi-fi** can draw users to a trail system and enable accessibility aid devices. Small cellular broadcast devices require little power and can be standalone units or integrated with furnishings such as those made by Seedia which collect data from and output directed messaging to users.
- **Digital mapping** such as Google Street view for trails and 360-degree imagery will allow users to preview the challenges ahead and participate virtually in the beauty of Welland trails when they are unable or for education purposes.
- **User count displays**, such those offered by Eco-Counter provide data that will inform operational management while promoting the success of the trail system.

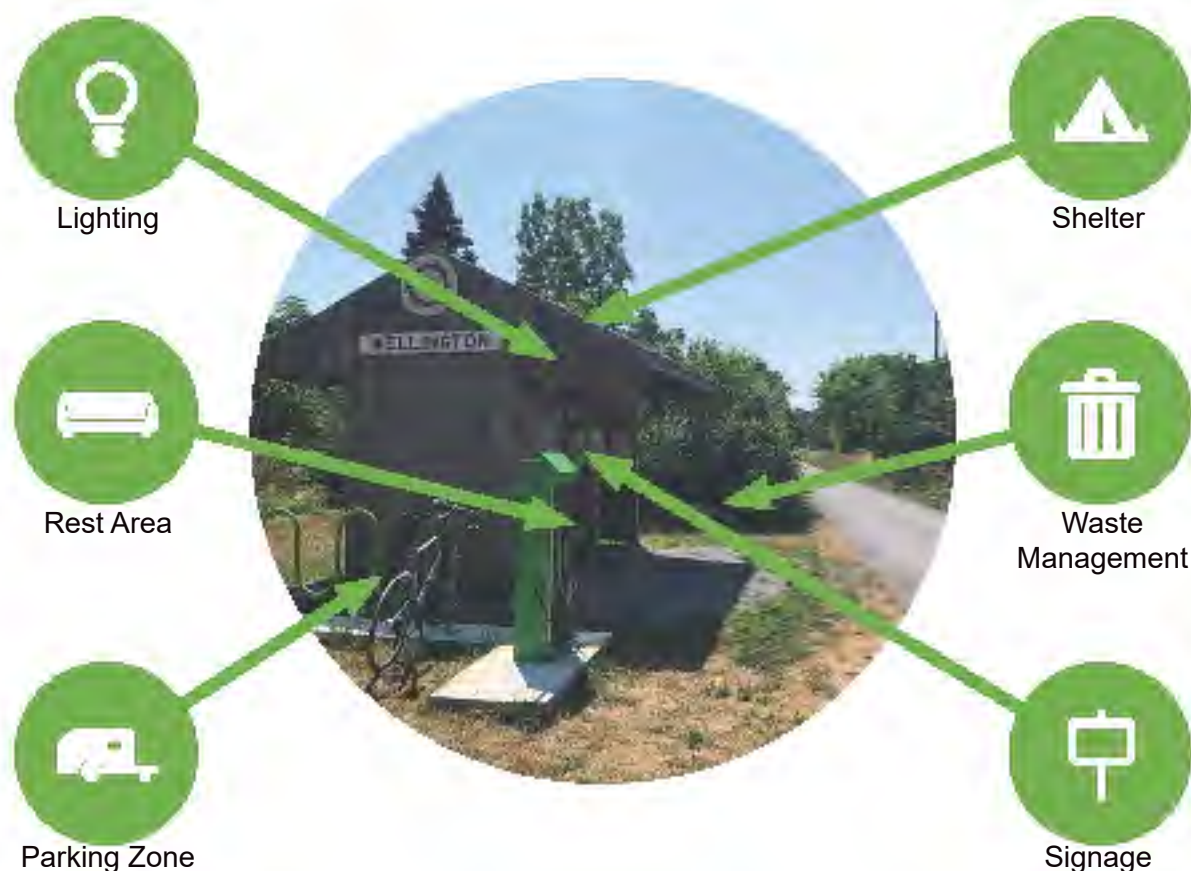


8.6 END OF TRIP FACILITIES

Network continuity, connectivity and feasibility are further enhanced through the implementation of network amenities. In some cases, amenities can be a determining factor for trail users and cyclists. Network amenities can reinforce Welland's commitment to promoting active transportation and recreation and may include lighting, seating / rest areas, parking areas, signage, bicycle parking, loading or unloading areas, garbage receptacles, washroom and amenity buildings and gates / access barriers.

Network amenities can be implemented individually or as a grouping of amenities commonly referred to as a staging area. They meet a critical need trail users and are also significant opportunities for the Municipality and those responsible for the network's implementation to engage in partnerships with local organizations, services and businesses.

In the urban areas of Welland, staging areas could be integrated into many of the existing park spaces and tourist destinations. In the rural areas, staging areas play a key role in the marketing package for trail use and cycling tourism. Once the master plan has been adopted the Municipality should undertake and identify a set of strategic priorities for future staging areas.



STAGING AREAS

Staging areas are nodes throughout the trail network where users can travel to, or where groups can meet to begin their journey on the trail. An even distribution of staging areas in the rural parts of the community will provide multiple meeting and access points to the trail system. In urban areas existing community centres are excellent candidates for trail staging areas as they often have many of the necessary amenities.

- Parking for automobiles – parking capacity will vary depending on the location of the staging area. A minor staging area may accommodate 5-8 cars, whereas a major staging area may accommodate over 30 cars. Spaces for trailers may be included at rural staging areas where equestrian and / or snowmobile use is permitted on the trail;
- Waste receptacles – located where they can be easily accessed by service crews and at regular intervals, typically grouped with other amenities such as benches, etc.
- Information / trailhead signing complete with mapping;
- Bicycle parking facilities;
- Seating – may also include picnic tables;
- Washrooms – should be considered for all staging areas. Seasonal, portable toilets are sufficient at small rural staging areas; and
- Potable water – optional, typically only at major urban staging areas (e.g. community centres).



8.7 TRAILS ON SLOPES

Pedestrian and some self-propelled users are capable of ascending grades of 30% or more whereas some users are limited to grades of less than 10%. Once trail slopes exceed this threshold and slopes are long (i.e. more than 30m) it is important to consider alternative methods of ascending slopes, such as switchbacks and stairs, or alternative locations for the trail.

Where construction is feasible, switchbacks are generally preferred because they allow wheeled users such as cyclists to maintain their momentum, and there is less temptation to create shortcuts, as might be the case where stairways are used. Switchbacks are constructed with turns of about 180 degrees and are used to decrease the trail's longitudinal slope. A switchback with a trailbed that is properly "benched" also provides outlets for water runoff at regular intervals, thus reducing the potential for erosion. Switchbacks typically require extensive grading and are more suited to open locations where construction activity will not cause major disruption to the surrounding environment. Switchbacks can be difficult to implement in wooded areas without significant impacts to surrounding trees.

When designing switchback and stair structures on trails the following should be considered:

- Use slip resistant surfacing materials, especially in shady locations.
- Incorporate "corral" barriers on either side of the upper and lower landing to prevent trail users from bypassing the stairs; and
- Provide signs well in advance of the structure to inform users that may not be able to climb stairs.

The design and construction of the network should incorporate a hierarchy of signs each with a different purpose and message. This hierarchy is organized into a "family" of signs with unifying design and graphic elements, materials and construction techniques. The unified system is immediately recognizable by the user and can become a branding element. The details for specific types of signage are provided in the following pages.

8.8 WAYFINDING & SIGNAGE

8.8.1 WAYFINDING

Wayfinding design must be universally understood to truly be affective and inclusive for all visitors. Trails should be open and welcoming to people with varying levels of mobility, hearing, vision and language. In short, all levels of ability and understanding should be taken into consideration when designing wayfinding features such as signage and maps.

Some examples of wayfinding features that can be utilized to increase accessibility include:

- Non-visual cues such as audio signals or material change at intersections can improve safety for visually impaired people
- Clearly delineating between accessible routes and non-accessible routes can improve usability and safety for people with mobility restrictions
- Using universally understood symbols or icons on wayfinding features can make it easier for people who speak a different language to find their way around.

TRAILHEAD SIGNS

- Typically located at key destination points and major network junctions.
- Provide orientation to the network through mapping, other appropriate network information as well as any rules and regulations.
- Where network nodes are visible from a distance, these can be a useful landmark and should include municipal “911” addressing for positive location identity.
- Can also be used as an opportunity to sell advertising space. This not only provides information about local services that may be of interest to trail users, but it may also help to offset the cost of signs and/or trail.
- At minimum, entrances should have clear signage that uses good colour contrast and a readable font, and details:
 - Trail length / Trail width
 - Location of amenities
 - Slope steepness
 - Surface types
 - Hazards / Trail difficulty
 - Accessibility rating (i.e. accessible by wheelchair, walker, scooter, etc.)



DIRECTIONAL AND DISTANCE MARKER SIGNS

Directional signs should be used throughout the trail at regular intervals of uninterrupted segments and at pathway intersections. Directional signs provide users with reassurance that they are following the designated trail network. Coupled with directional signs, distance markers placed incrementally along a trail can enhance the user's experience if they are using the trail for exercise. Frequent and accurate markers can also help in the case of an emergency, especially if they are recorded with a GPS device and incorporated into a digital mapping format.



INTERPRETIVE SIGNS

Interpretive or informational signs can be used in combination with directional signs or on their own to educate users of points of interest along the trail, such as natural and cultural heritage features. These signs provide specific educational information about points of ecological, historical and general interest, as well as current land uses along the corridor depending on the interpretive program and complexity of information to be communicated.



8.8.2 REGULATORY SIGNS

Regulatory signs are intended to restrict aspects of travel and use along the trail. Signage restricting or requiring specific behavior is not legally enforceable unless it is associated with a provincial law or municipal by-law, etc. Where applicable, it is recommended that authorities discreetly include the municipal by-law number on signs to reinforce their regulatory function. Standard regulatory signs are aluminum plate blanks of varying dimensional size with a painted or reflective sheeting surface. Regulatory signs call attention to a traffic regulation concerning a time or place on a route and are installed in an optimal location most visible to trail users. Generally, these signs are rectangular shape except for stop and yield signs. For most trail applications the size can be reduced from the specified size for signs used along roads (i.e. 50% smaller). Typically, they are individually mounted on a metal post or custom wood post; grouped on a metal post or custom wood post; or grouped on a custom sign board, so long as the sign message is clearly visible.

WARNING SIGNS

Warning or cautionary signage should be used throughout the trail system on an as-needed basis. Where traffic control signs are needed (stop, yield, curve ahead etc.), it is recommended that scaled-down versions of recognizable road traffic control signs be used.

These caution signs may be location or purpose specific and will need to be customized. For example, the trail system will provide access to destination features in parks including

playgrounds. Children will be playing and not always paying attention to their surroundings while actively using playgrounds, and portions of trails surrounding playgrounds may also be promoted as tricycle / bicycle loops for very young riders. Caution signage should be placed at the approaches to these areas to alert faster moving trail users such as cyclists they are approaching a playground area and remind them to slow to 10km/hr. and be aware of children playing and possibly crossing the trail.

Another example is the temporary closure sign. Some locations along the trail network will also be used by festivals and events that attract large numbers of users, some of whom use the trails to travel to the event which may result in congestion on the trails themselves. Additionally, within the event space some activities may overflow onto trails, and depending on the event and number of participants it may be appropriate to temporarily close the trail to through cycling traffic, and require cyclists to dismount and walk their bicycles through the event area.

PEDESTRIAN AND BICYCLE CROSSING AHEAD SIGN

- Warning sign to inform motorists of a crossing ahead: provides a summary of the minimum advance distance for installation of Pedestrian and Bicycle Crossing Ahead signs (Wc-15) and accompanying tab Crossing sign (Wc-32t) on roadways with posted speed limits at 50, 60 and 80 km/h.
- Although not a requirement, in addition to installing the Pedestrian and Bicycle Crossing Ahead Sign in advance of a trail crossing, it is recommended that a duplicate of this sign be installed within 15m of the actual trail crossing on both approaches to inform motorists of the actual trail crossing location.



WAIT FOR GAP SIGN

- Wait for Gap sign intended to warn pedestrians and cyclists, intending to cross the trail at a roadway, that they do not have the road right-of-way and must wait for a gap in traffic sufficiently large to ensure a safe crossing.
- Typically implemented along the trail at the crossing of a roadway and installed below the stop sign on the same pole.



STOP SIGN

- Stop sign is intended to warn pedestrians and cyclists that they stop before crossing the trail at the roadway.
- Typically implemented along the trail at the crossing of a roadway.



must

STOP AHEAD SIGN

- Stop Ahead sign is intended to warn pedestrians and cyclists of an approaching Stop sign (Ra-1).
- Typically implemented along the trail 100m to 120m before a Stop sign.
- Additional details regarding different types of signage that are typically implemented as part of a cycling network are described in section 3.4.



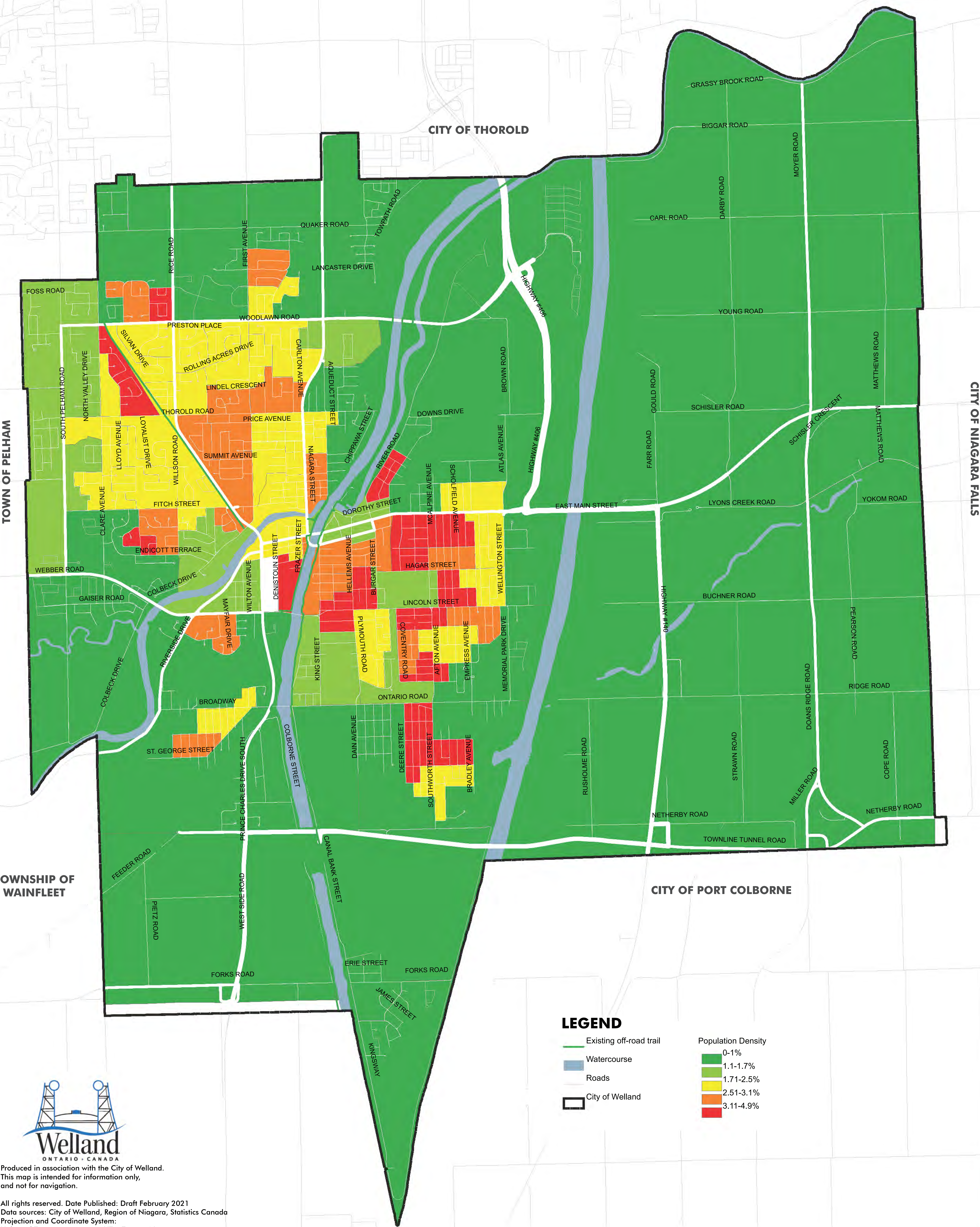


APPENDIX A

Community Context Mapping

Map A Community Profile: Population Density

CITY OF WELLAND COMMUNITY TRAILS STRATEGY



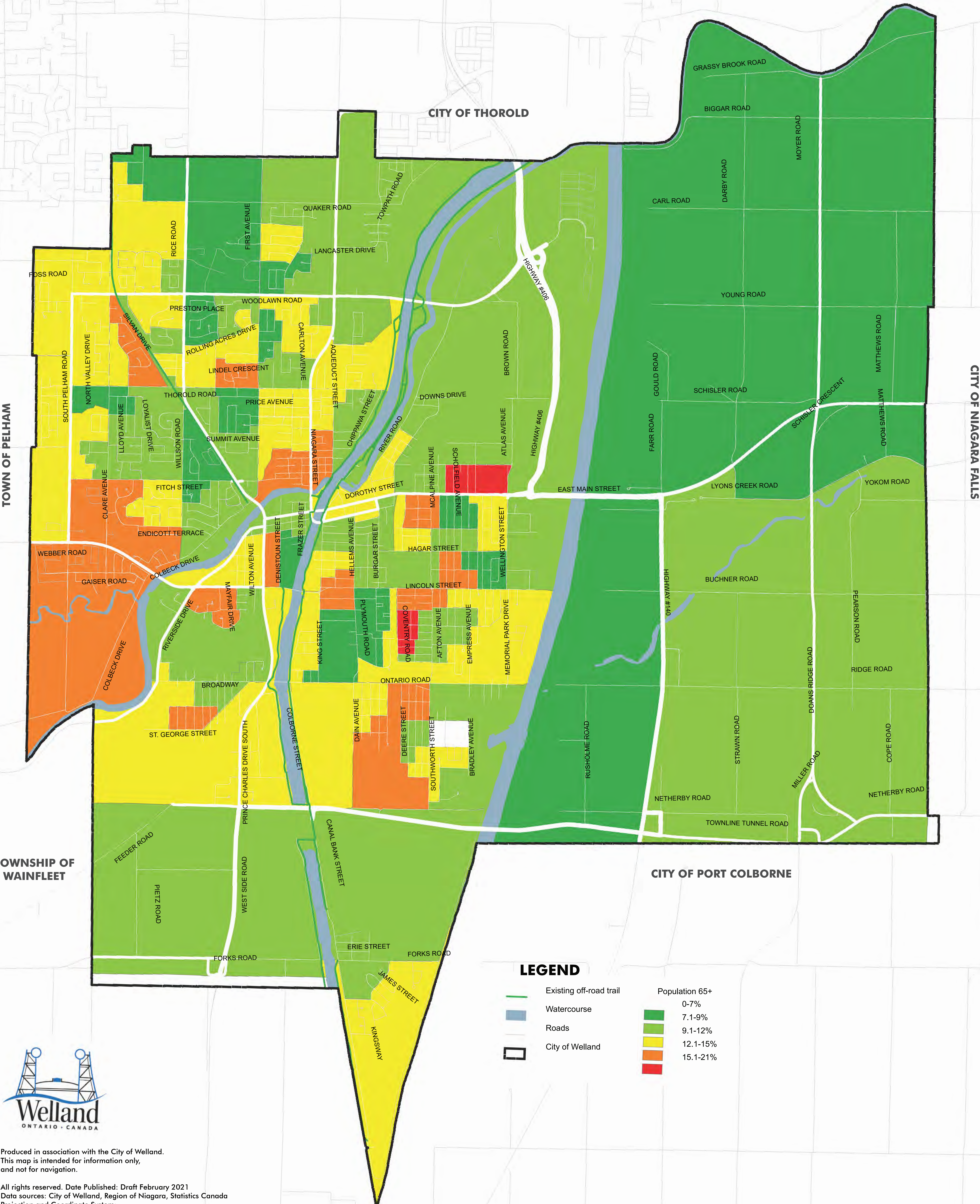
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Universal Transverse Mercator UTM Zone 17N



Map B Community Profile: Population Over 65

CITY OF WELLAND COMMUNITY TRAILS STRATEGY



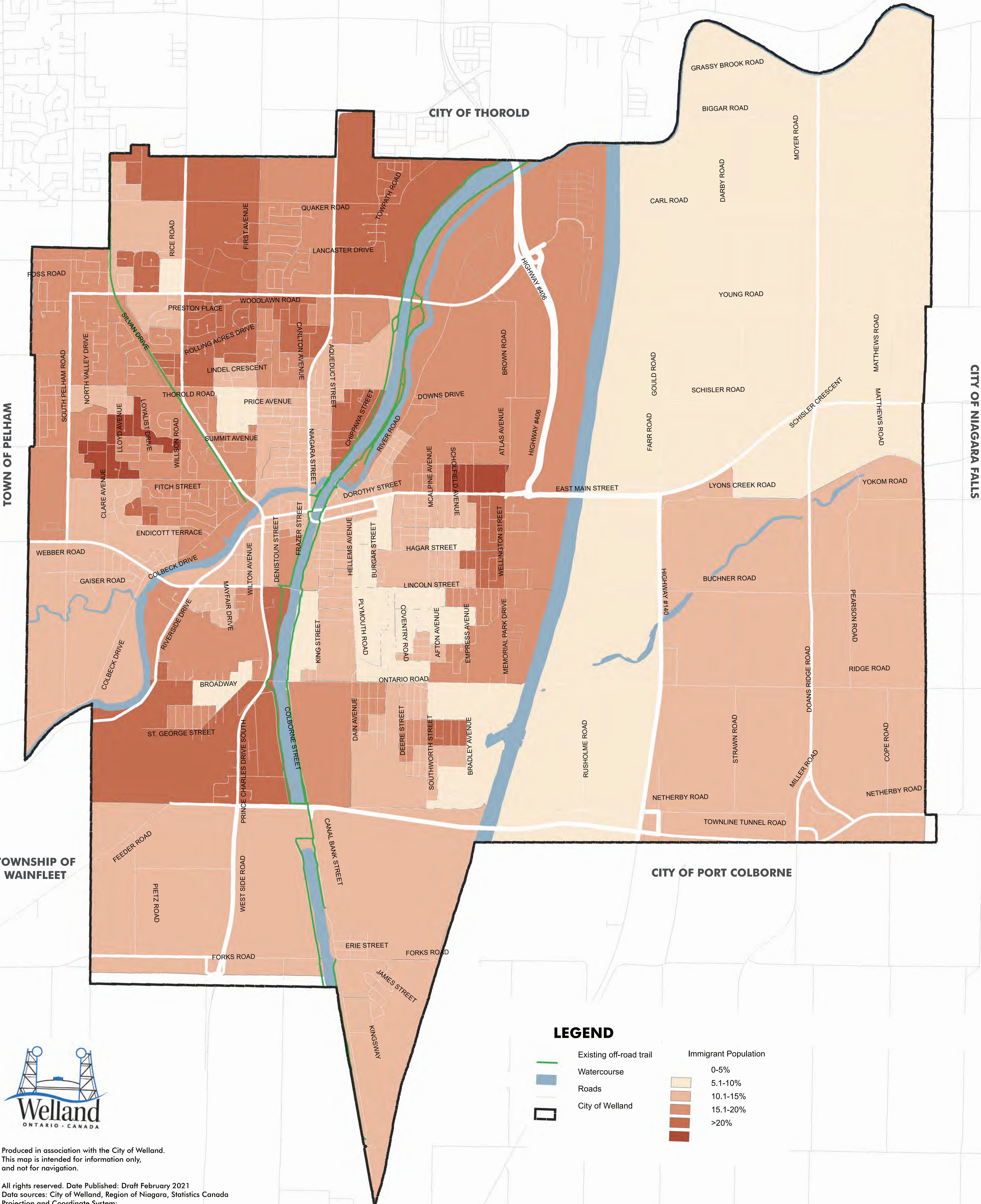
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Map C Community Profile: Immigrant Population

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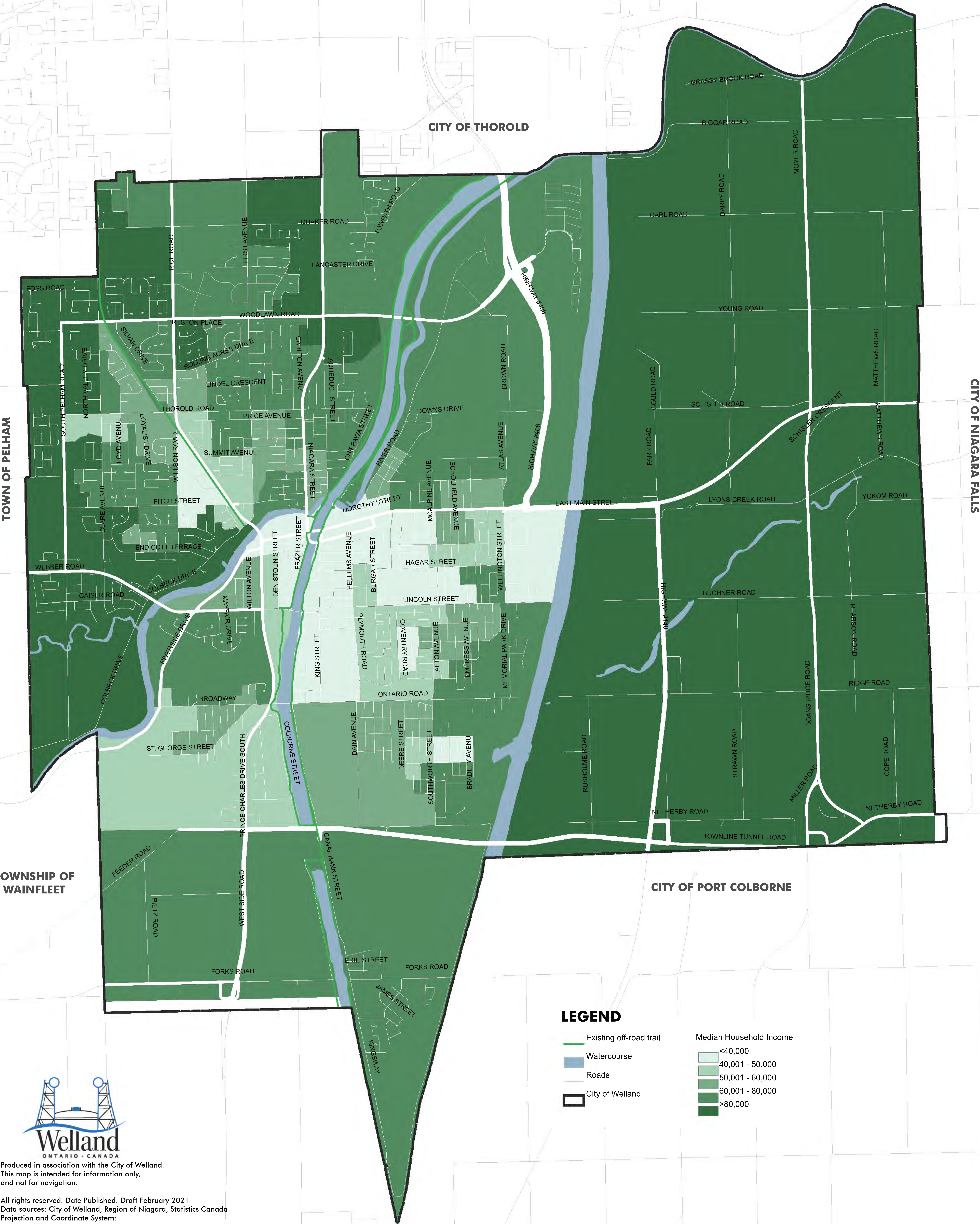
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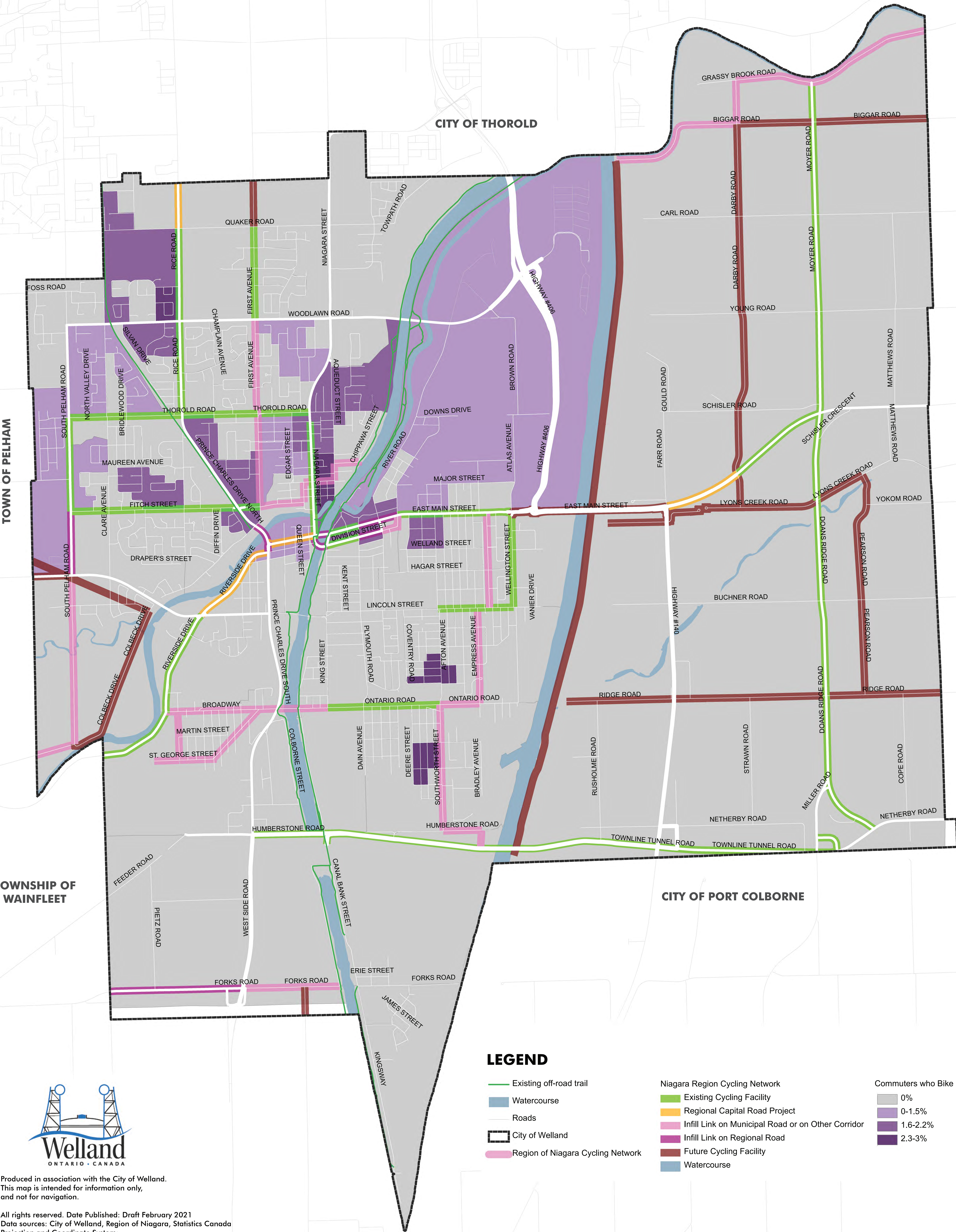
Map D Community Profile: Median Household Income

CITY OF WELLAND COMMUNITY TRAILS STRATEGY



Map E Community Profile: Commuters Who Bike

CITY OF WELLAND COMMUNITY TRAILS STRATEGY



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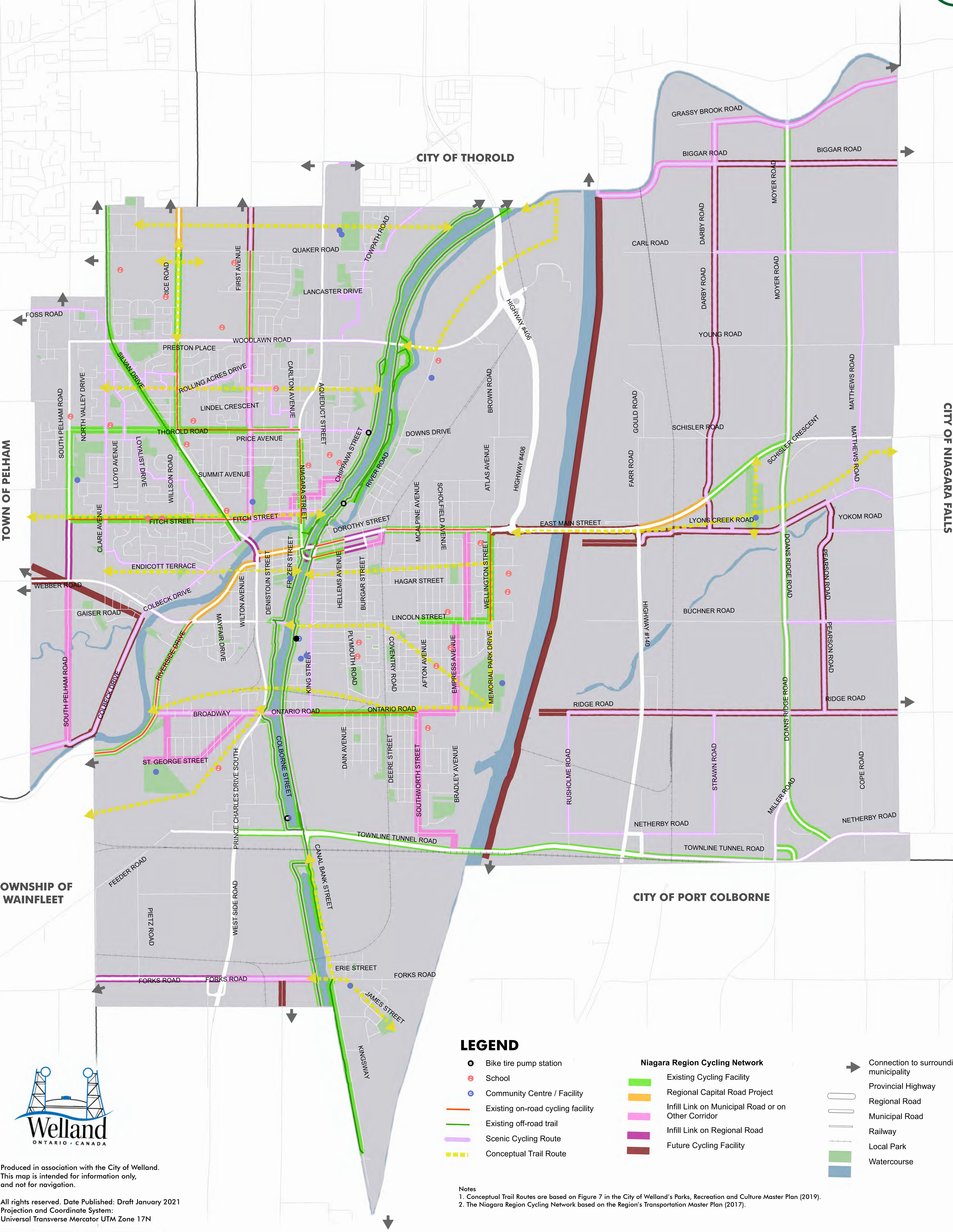
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MAP G EXISTING COMMUNITY TRAILS

CITY OF WELLAND COMMUNITY TRAILS STRATEGY



LEGEND

- Bike tire pump station
- School
- Community Centre / Facility
- Existing on-road cycling facility
- Existing off-road trail
- Scenic Cycling Route
- - - Conceptual Trail Route

Niagara Region Cycling Network

- Existing Cycling Facility
- Regional Capital Road Project
- Infill Link on Municipal Road or on Other Corridor
- Infill Link on Regional Road
- Future Cycling Facility

- ➔ Connection to surrounding municipality
- Provincial Highway
- Regional Road
- Municipal Road
- Railway
- Local Park
- Watercourse

Notes
1. Conceptual Trail Routes are based on Figure 7 in the City of Welland's Parks, Recreation and Culture Master Plan (2019).
2. The Niagara Region Cycling Network based on the Region's Transportation Master Plan (2017).



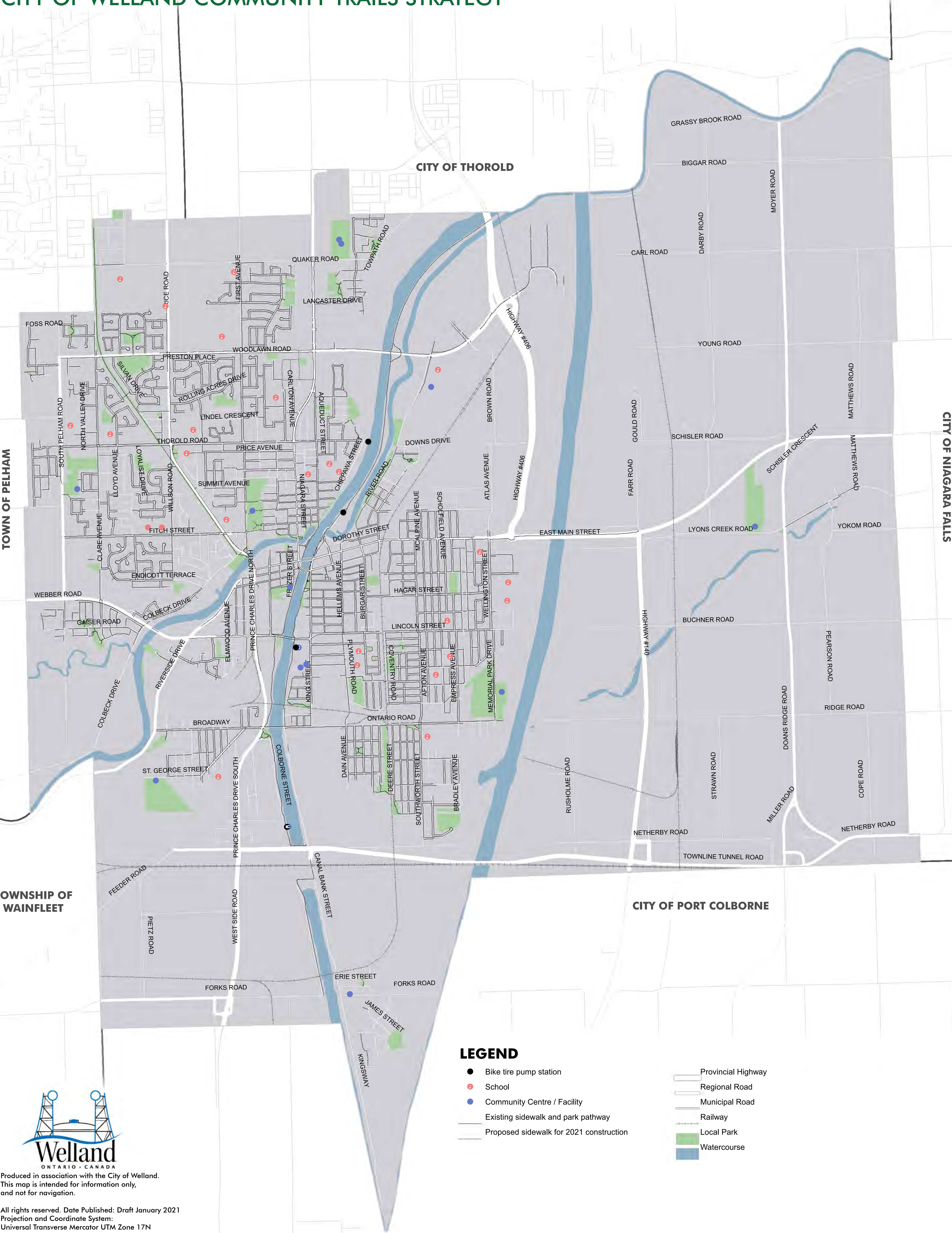
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MAP H EXISTING SIDEWALKS

CITY OF WELLAND COMMUNITY TRAILS STRATEGY



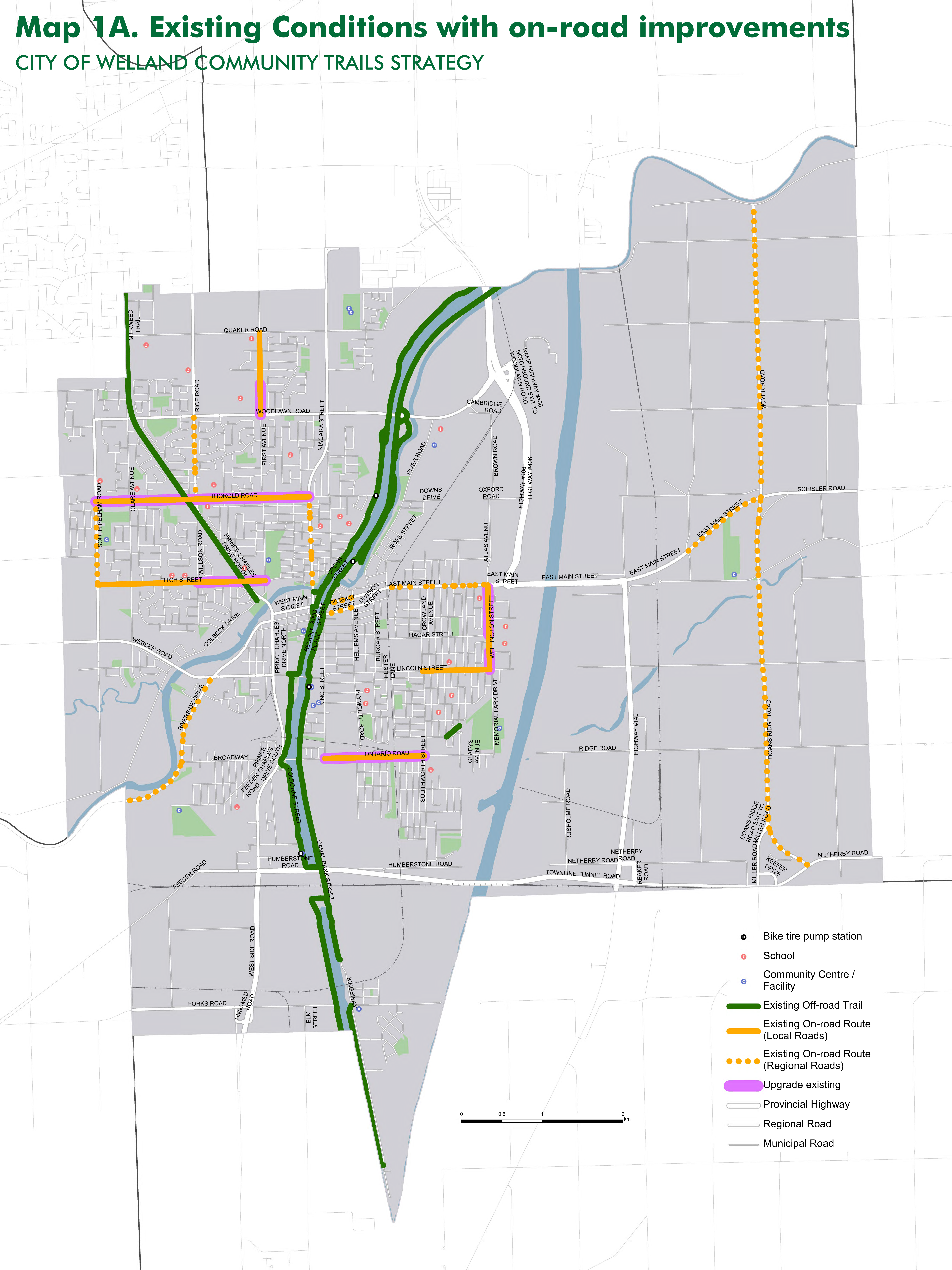


APPENDIX B

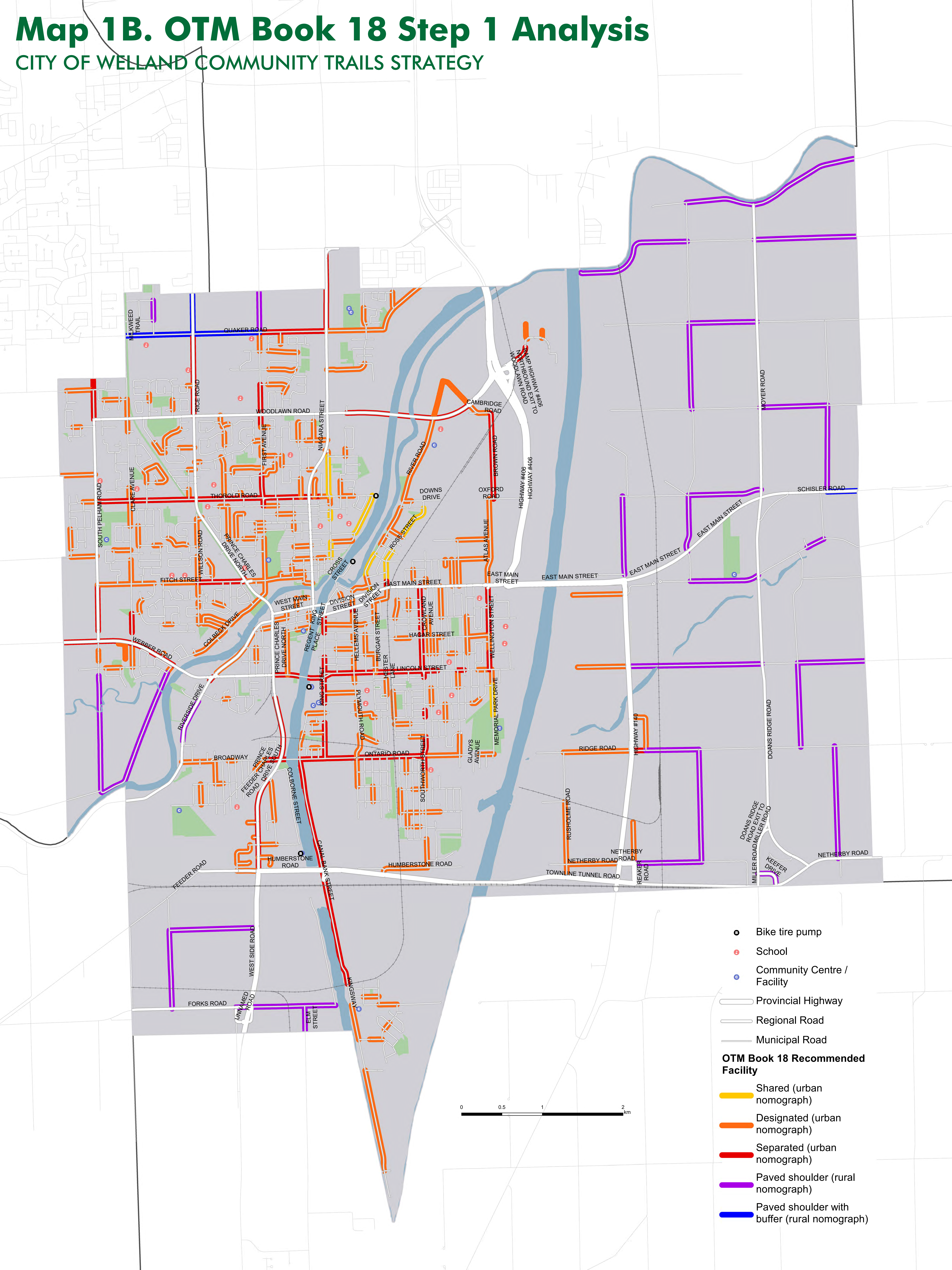
Network Development Mapping

Map 1A. Existing Conditions with on-road improvements

CITY OF WELLAND COMMUNITY TRAILS STRATEGY

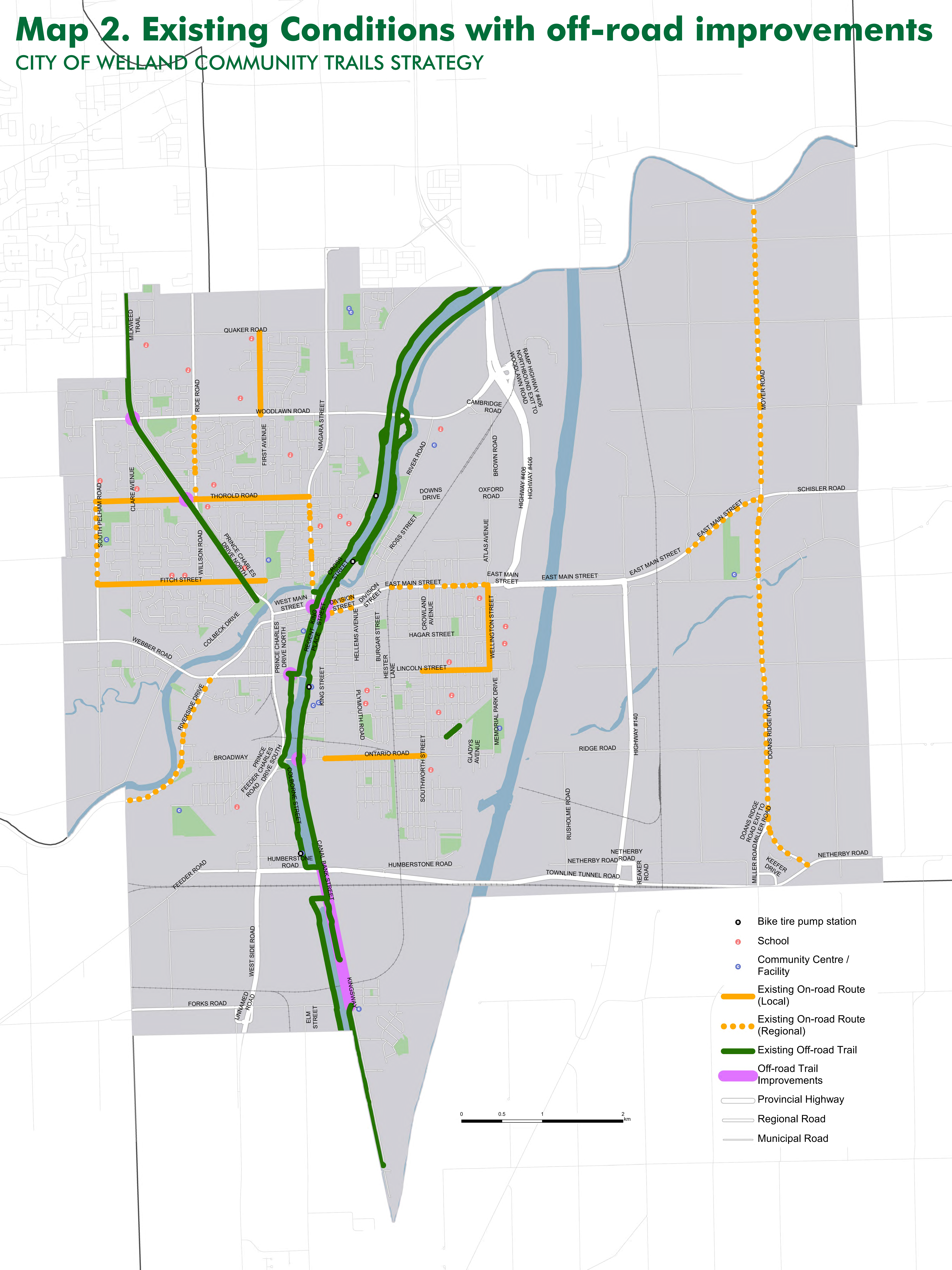


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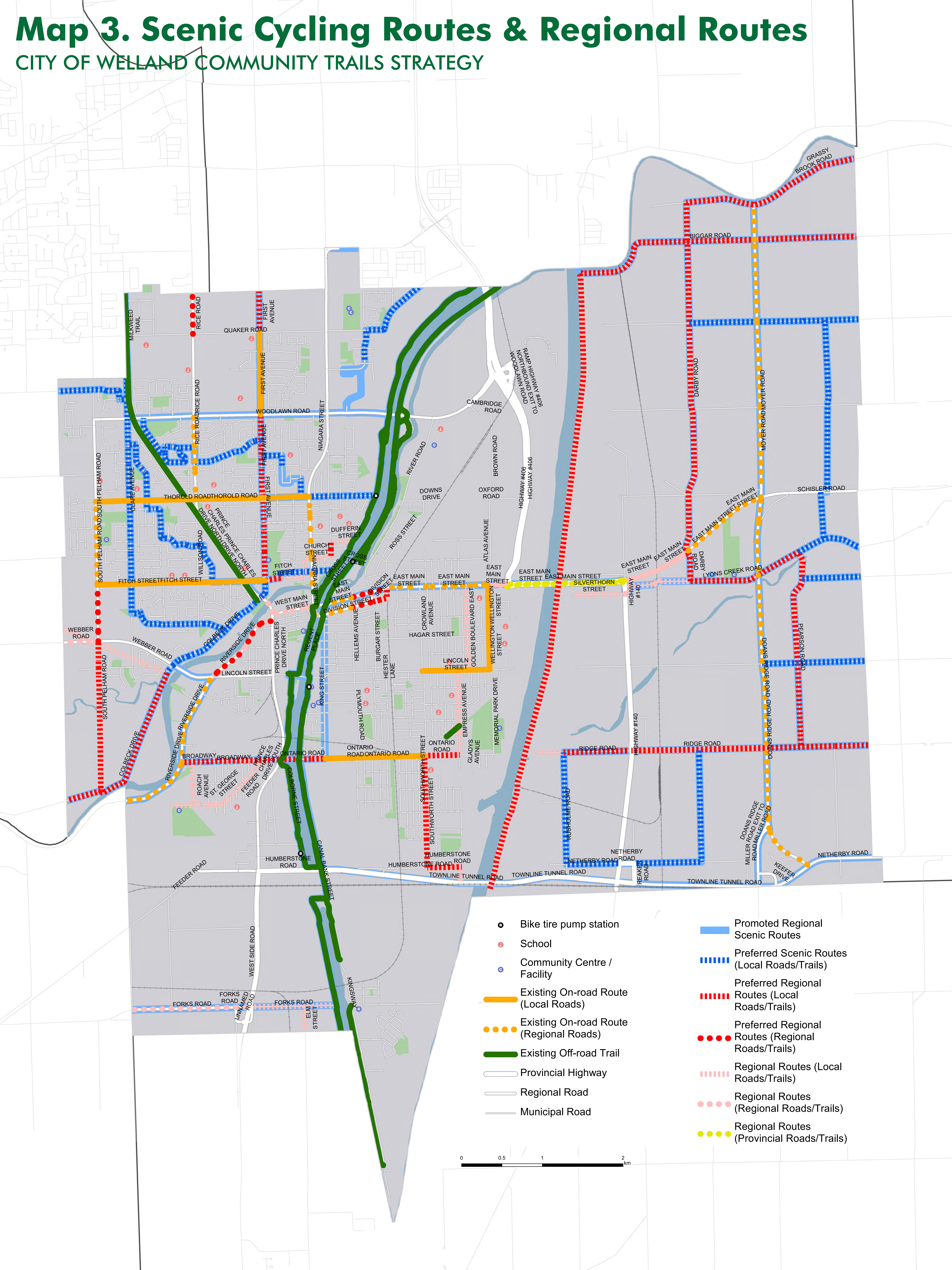
Map 2. Existing Conditions with off-road improvements

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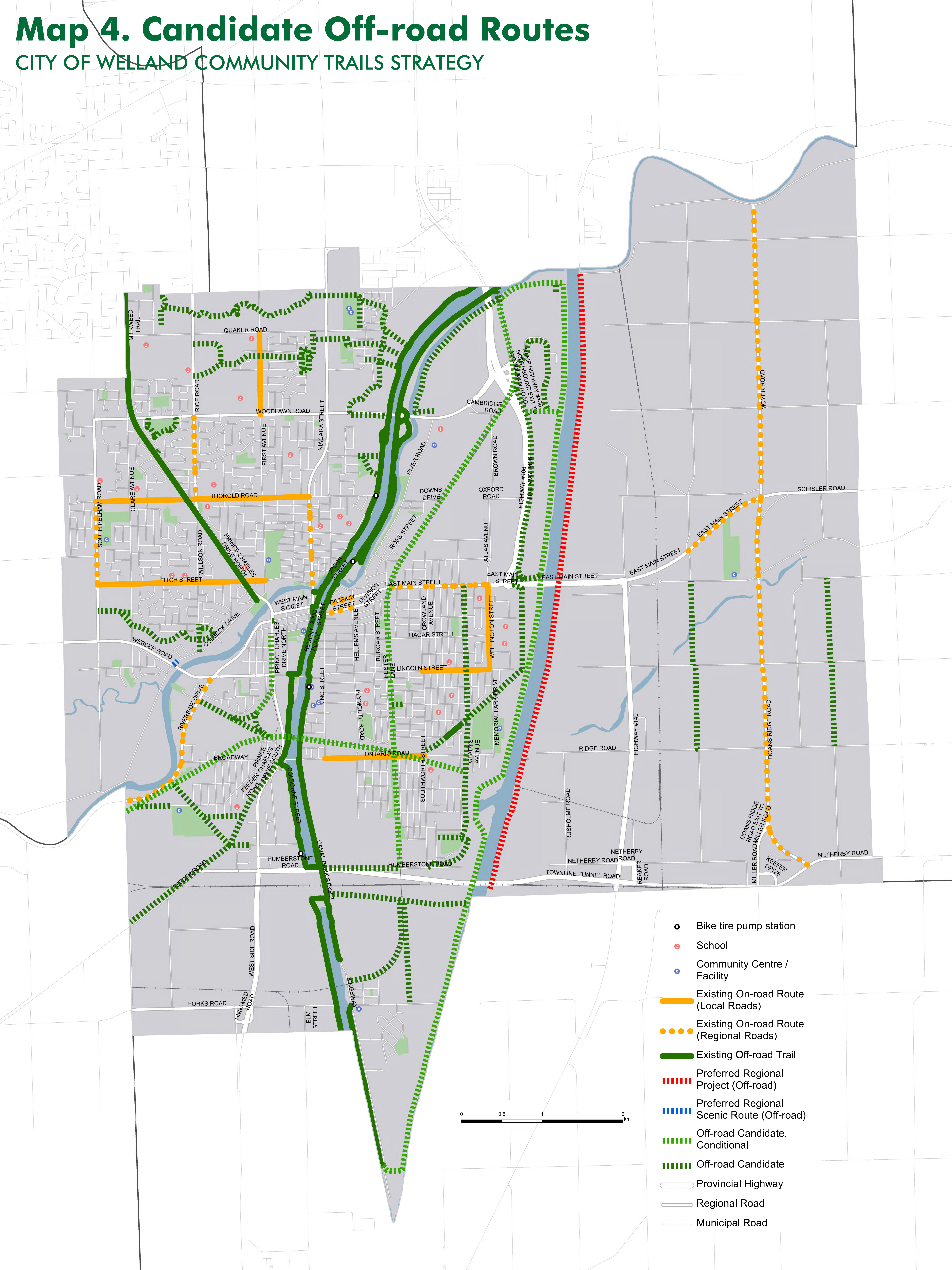


Map 3. Scenic Cycling Routes & Regional Routes

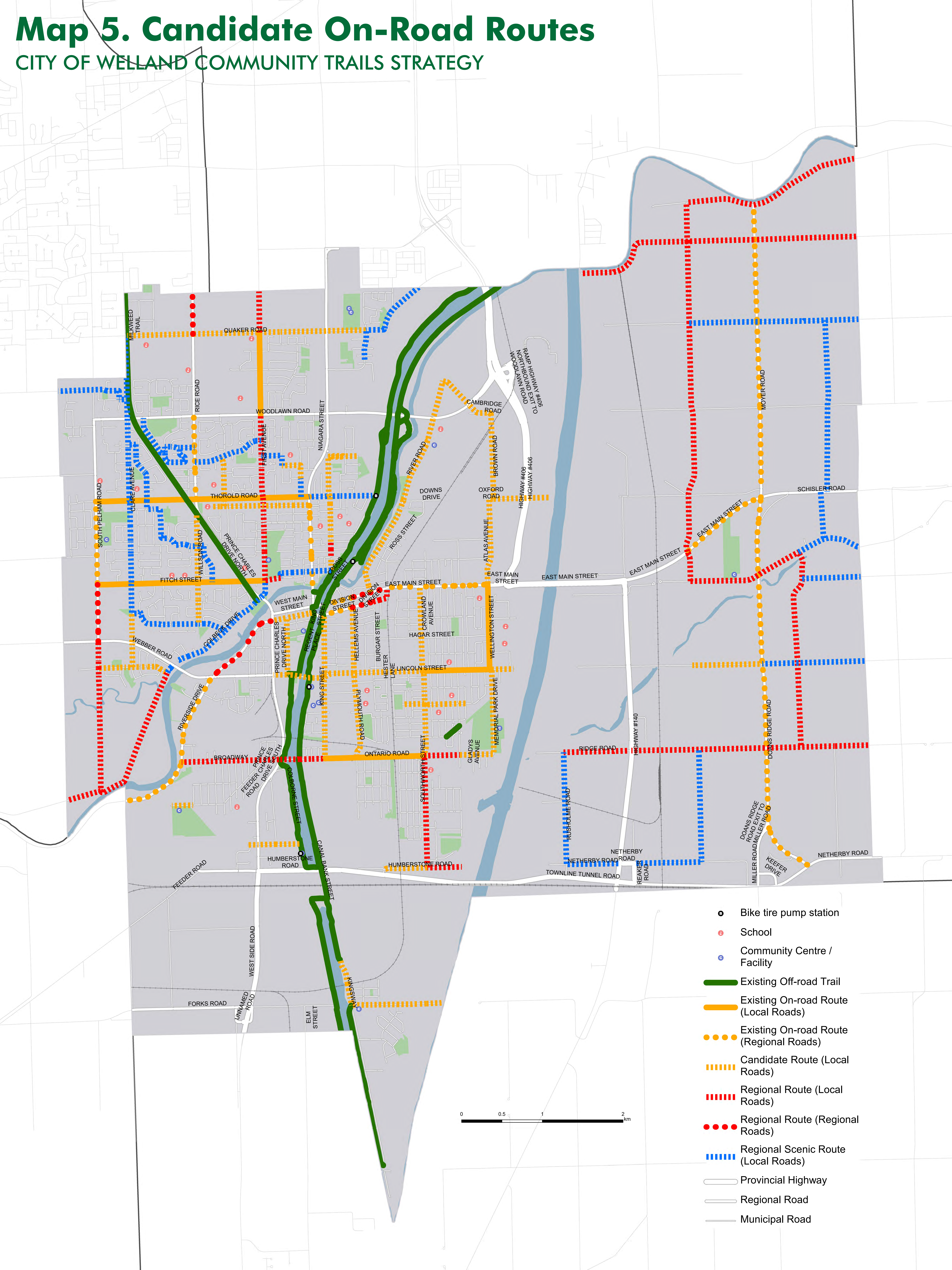
CITY OF WELLAND COMMUNITY TRAILS STRATEGY



CITY OF WELLAND COMMUNITY TRAILS STRATEGY

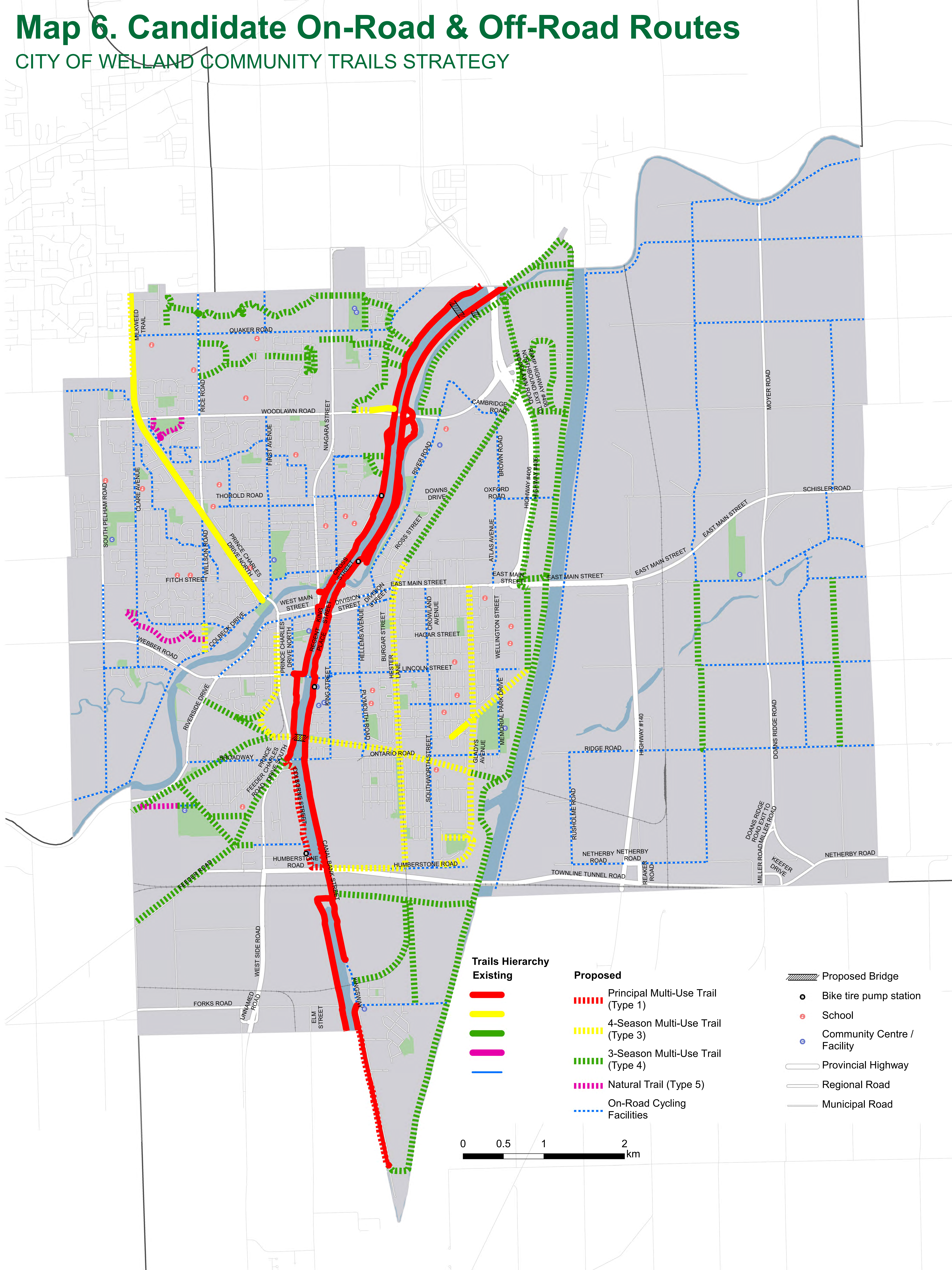


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Map 6. Candidate On-Road & Off-Road Routes

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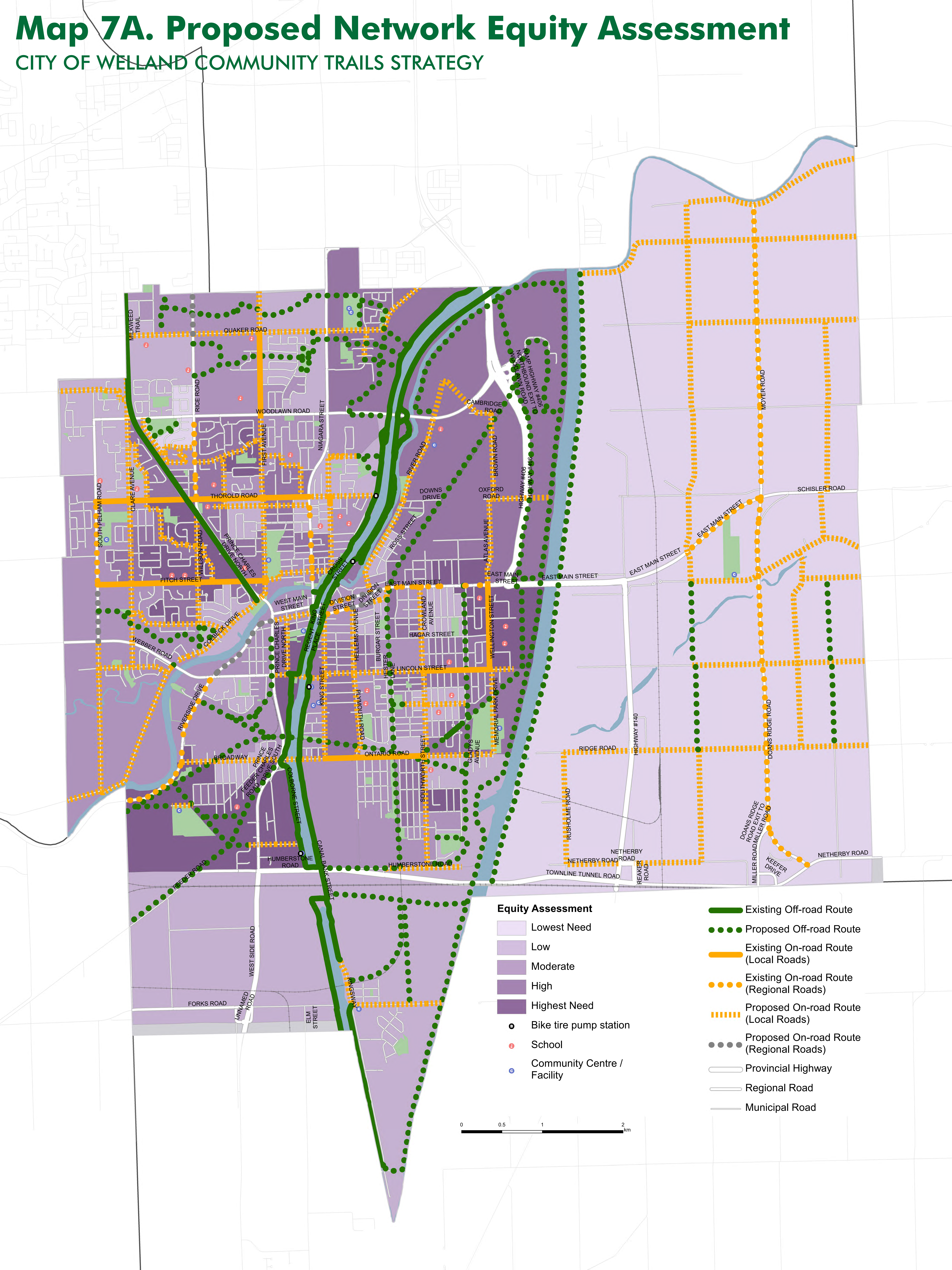
A photograph of a park area. In the foreground, there is a gravel path and a stone retaining wall. Behind the wall is a lush green garden with various plants and flowers. In the background, there is a wooden pergola structure. A large green semi-circle graphic is overlaid on the right side of the image, containing the text.

APPENDIX C

Final Network Mapping

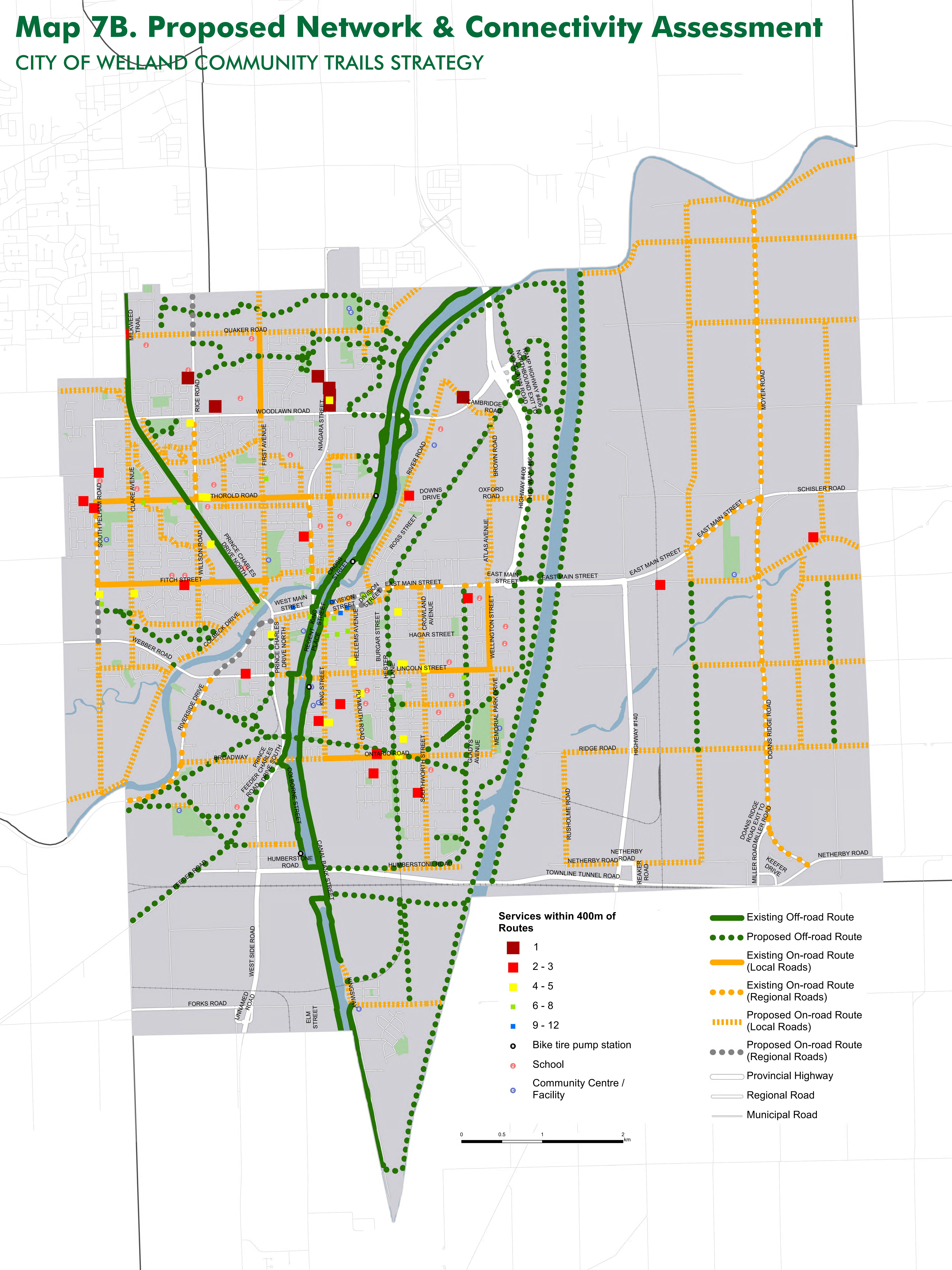
Map 7A. Proposed Network Equity Assessment

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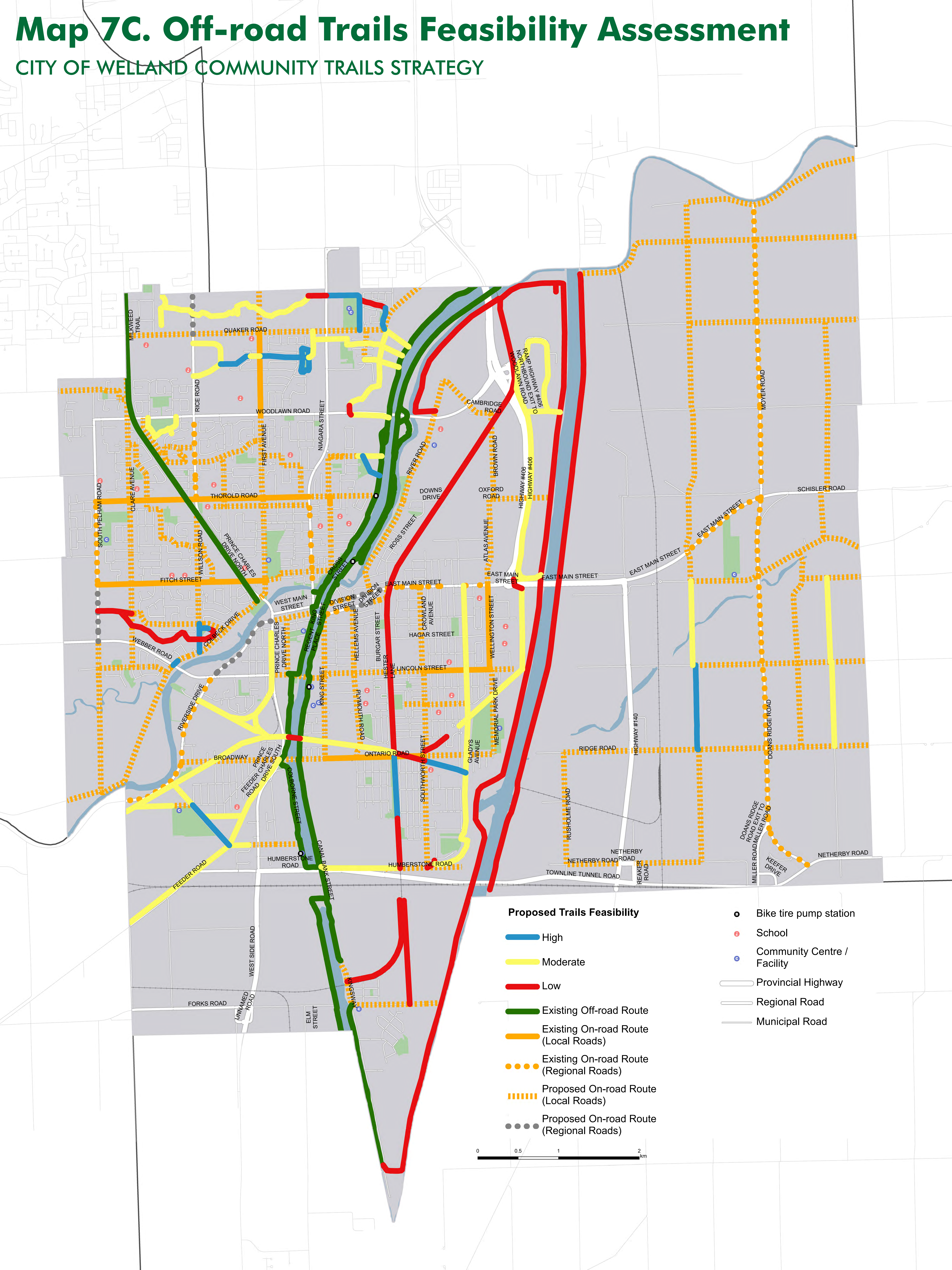
Map 7B. Proposed Network & Connectivity Assessment

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Map 7C. Off-road Trails Feasibility Assessment

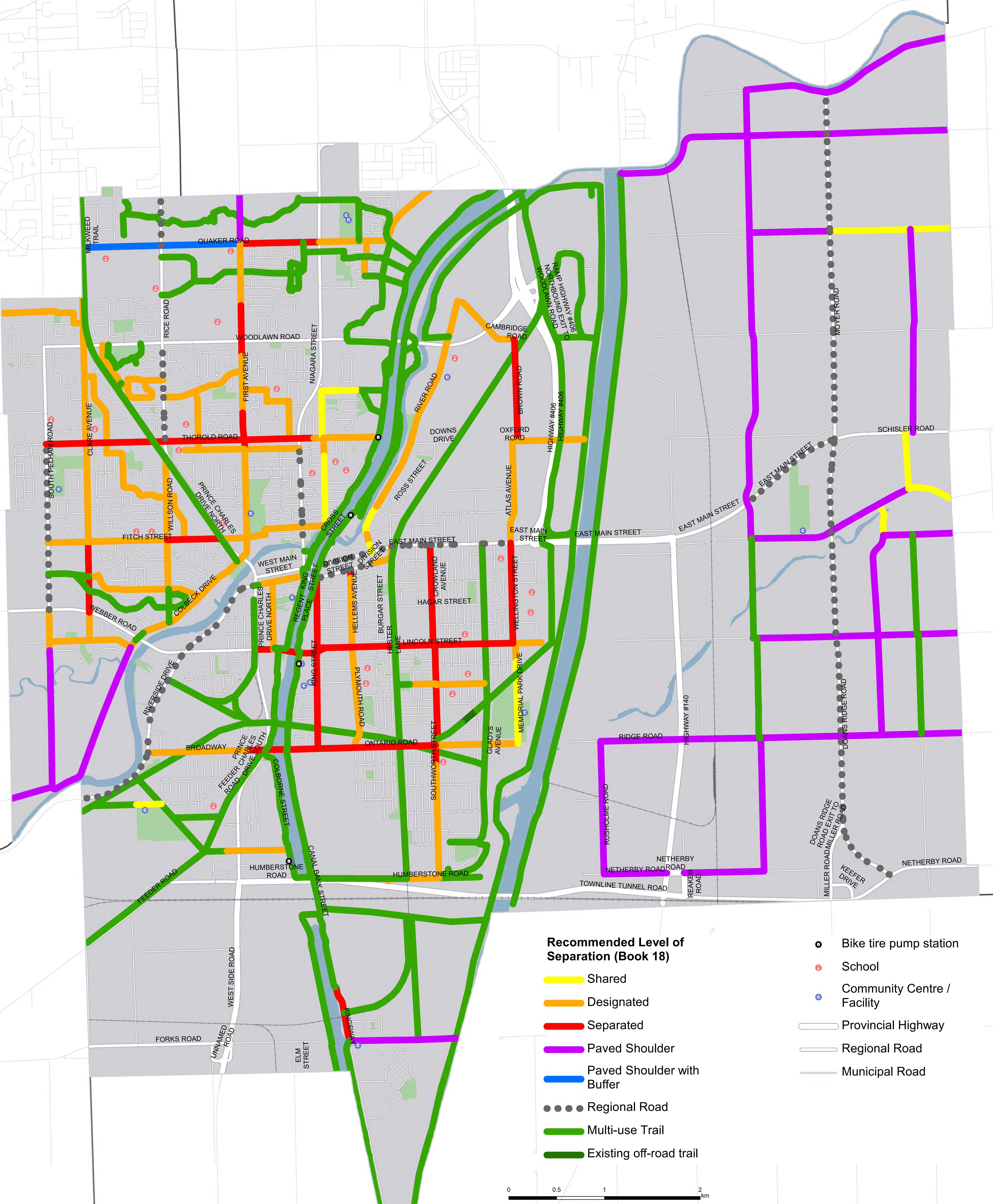
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Map 7D. Recommended Separation on Proposed Network

Scenario 1 - No Speed Limit Reductions

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Recommended Level of Separation (Book 18)

- Shared
- Designated
- Separated
- Paved Shoulder
- Paved Shoulder with Buffer
- Regional Road
- Multi-use Trail
- Existing off-road trail

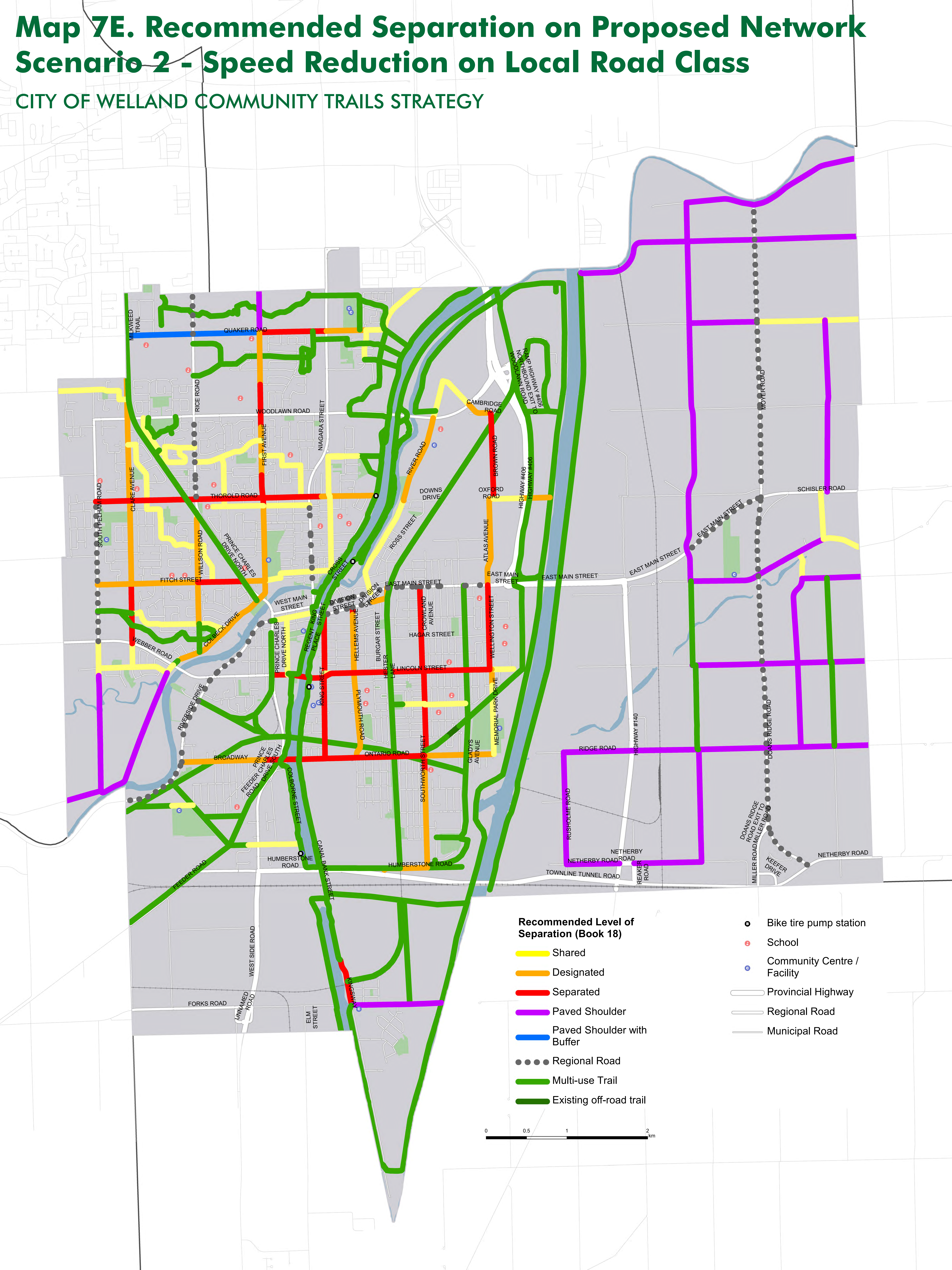
- Bike tire pump station
- School
- Community Centre / Facility
- Provincial Highway
- Regional Road
- Municipal Road

0 0.5 1 2 km

Map 7E. Recommended Separation on Proposed Network

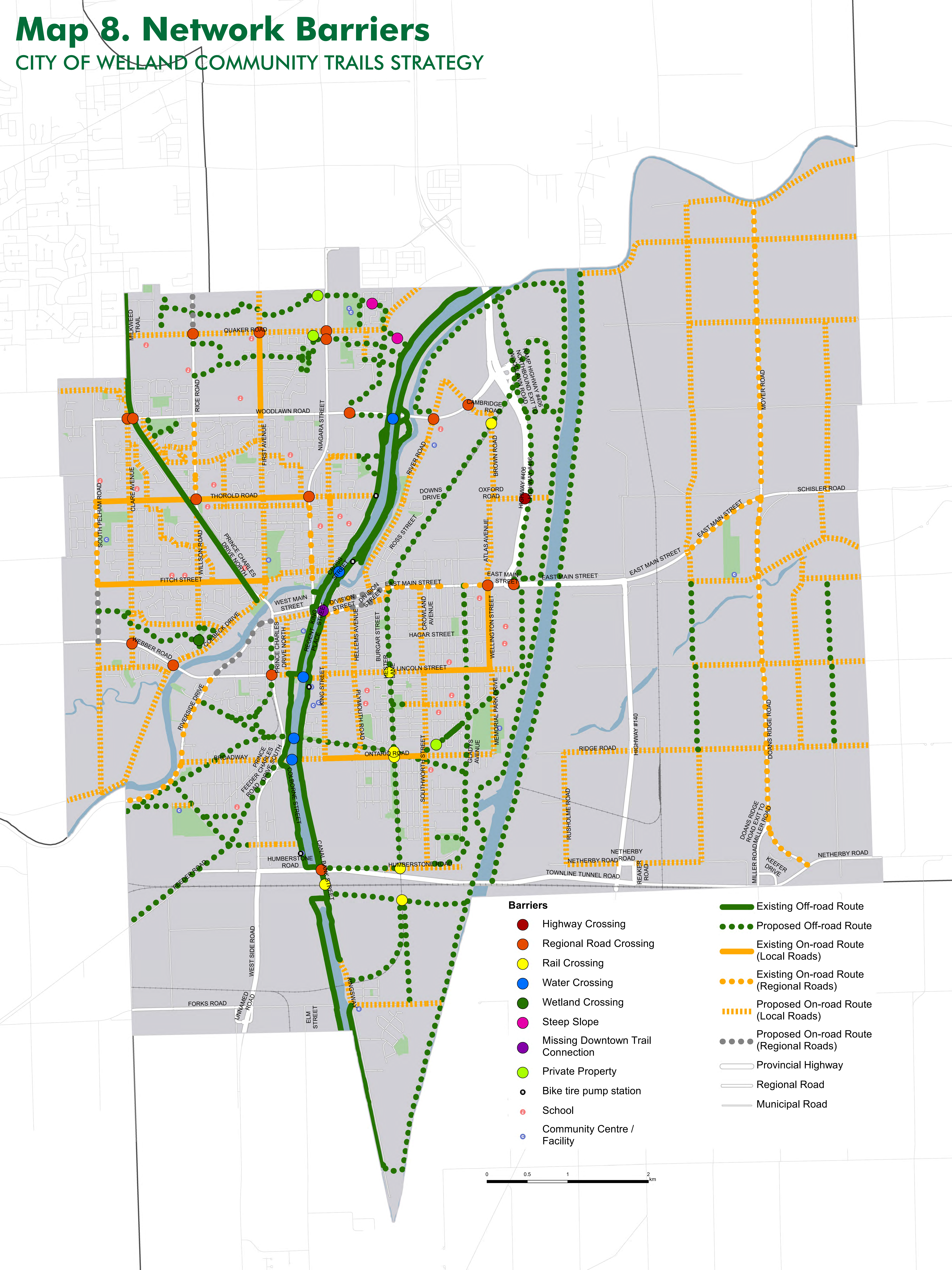
Scenario 2 - Speed Reduction on Local Road Class

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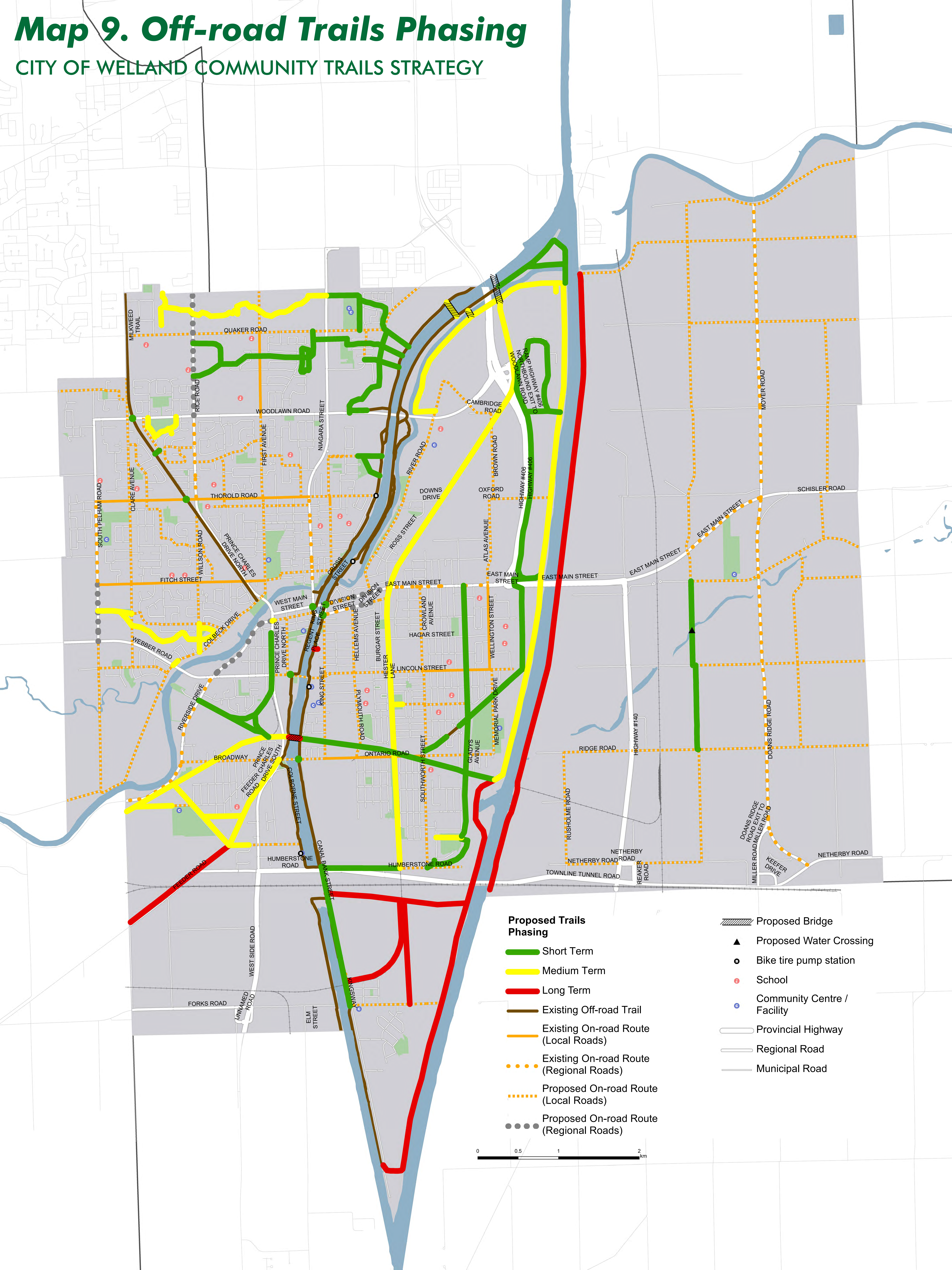
Map 8. Network Barriers

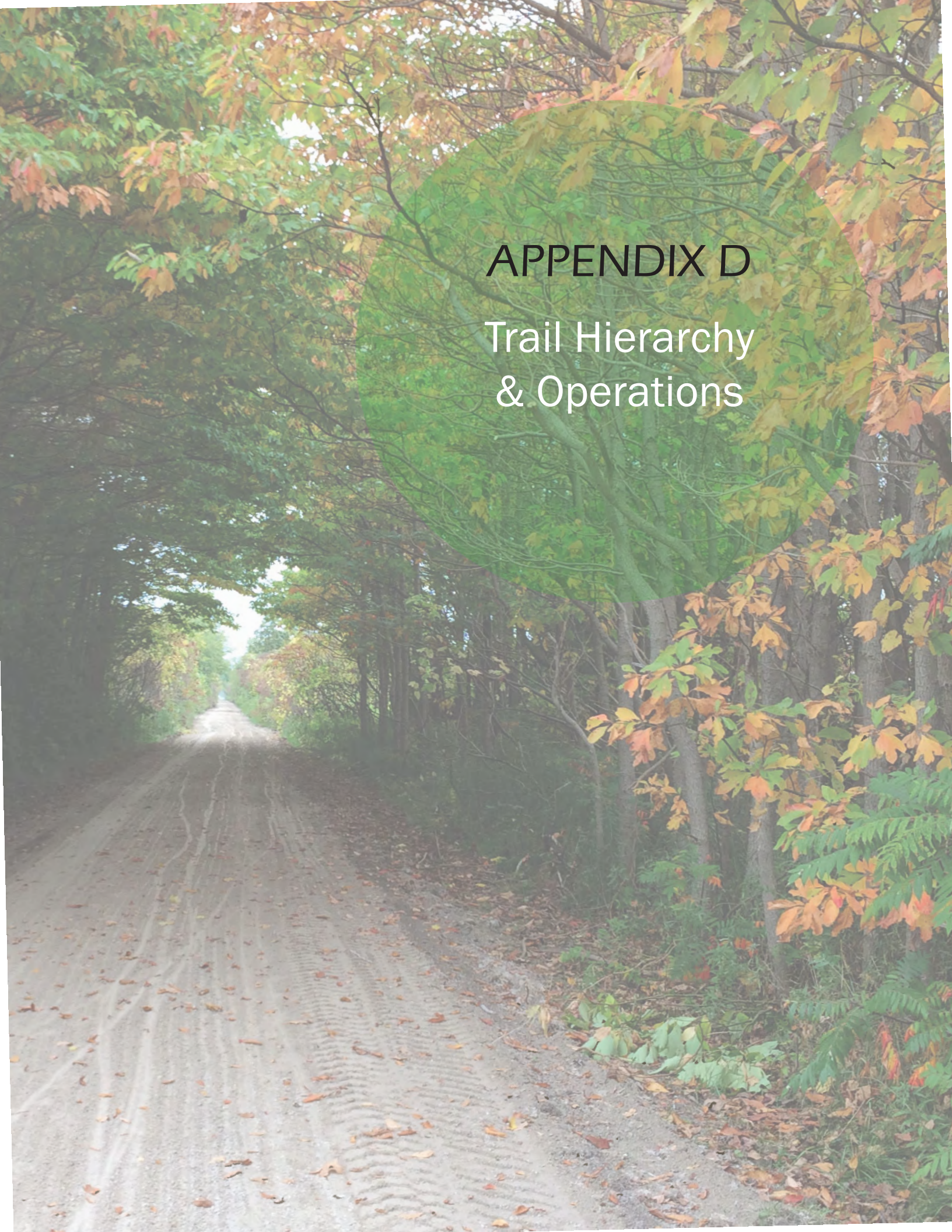
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Map 9. Off-road Trails Phasing

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A photograph of a dirt trail winding through a forest. The trail is covered in fallen leaves and has visible tire tracks. The trees on either side have green and yellowing leaves, suggesting an autumn setting. The trail leads into the distance, disappearing into the woods.

APPENDIX D

Trail Hierarchy & Operations

Trail Hierarchy Chart

Principal Multi Use Trail (Type 1)		Road Corridor Multi Use Trail (Type 2)	4 Season Multi Use Trail (Type 3)	3 Season Multi Use Trail (Type 4)	Natural Trail (Type 5)	Neighborhood Greenway (Type 6)
DEFINITION / DESCRIPTION						
General Function	Recreation, leisure and active transportation commuting functions along main canal spine. City showcase location providing access to, and along the main canal trail spine. Key tourism attraction, celebration and event / festival location.	Recreation and active transportation commuting functions along road corridors, providing access to key destinations such as community centres, parks key commercial areas, schools etc. Includes maintenance access to SWM facilities etc.	Recreation, leisure and active transportation commuting functions within open spaces and dedicated corridors, providing access to key destinations such as community centres, parks key commercial areas, schools etc.	Recreation and leisure providing opportunities within open spaces and dedicated corridors, providing access to key destinations such as community centres, parks key commercial areas, schools etc.	Recreation and leisure providing opportunities to ‘escape’ the urban environment and experience natural settings within City limits. Note: this does not include “Tertiary Trails, Cultural or unsanctioned trails, or former trails which have been closed	Enhancement of existing road network, sidewalks and road infrastructure, to improve user experience and safety. Key connector between dedicated active transportation networks.
Location	High Density Land Use / Main Canal Corridor	Road Corridor / Maintenance Access	Open Space / Dedicated Corridors	Open Space / Dedicated Corridors	Woodlot / Sensitive Naturalized Area	Road Corridor
USER / USER EXPERIENCE						
Ease of Use/ Rating (general)	Easy 	Easy 	Easy 	Easy to Moderate 	Moderate to Difficult 	Easy to Moderate 
Anticipated Level of Use	Very high, especially on weekends, during peak tourist season, during celebrations and events	High	High	Moderate	Low	Moderate
Users/ User Groups	Accommodates all user groups, all ages and abilities, families, tourists Pedestrian, mixed uses, vehicular for servicing. Suitable for users with no trail experience	Accommodates all user groups, all users and ability, families, with more appeal to commuting or destination driven function Pedestrian, mixed uses, vehicular for servicing. Suitable for users with little to no trail experience	Accommodates all user groups, all users and ability, families Pedestrian, mixed uses, vehicular for servicing. Suitable for users with little to no trail experience	Accommodates most user groups, families Pedestrian, mixed use, vehicular for servicing in some locations.	Experience/stamina required, experienced hikers Pedestrian, but may include special use trails (e.g. catering to walking, hiking, fitness etc.) Some use may be restricted / prohibited	Accommodates all user groups, may include mixed uses where the route is a connecting link to other trail network or on road facility Pedestrian, mix uses. Note: cyclists in this condition are on the roadway and thus triggering a moderate trail rating for those users.
Accessibility	Meets or exceeds path of travel accessibility requirements (less than 5% slope)	Meets or exceeds path of travel accessibility requirements (less than 5% slope)	Meets or exceeds path of travel accessibility requirements (less than 5% slope)	Meets or exceeds minimum accessibility requirements for recreational trail facilities (can exceed 5% with amenity accommodations)	Meets accessibility requirements for recreational trail, however low in accommodating where feasible. Maintaining natural heritage values takes precedence.	

Trail Hierarchy Chart

	Trail Hierarchy					
	Local	Neighborhood	Regional	State	National	International
Wayfinding/ Signage	Highest frequency, at trail entry points, trail intersections, key decision points and at regular intervals between intersections. Designed to meet or exceed AODA requirements at trailheads and entrances May include supplemental destination signage to key attractions.	High frequency, at trail entry points, trail intersections, key decision points. At regular intervals where there are long distances between intersections. Designed to meet AODA requirements at trail entrances	Moderate frequency, at all trail entry points, trail intersections and key decision points. Occasional markers where there are long distances between trail intersections. Designed to meet AODA requirements at trail and entrances	Moderate frequency, at all trail entry points, trail intersections and key decision points. Occasional markers where there are long distances between trail intersections. Designed to meet AODA requirements at trail and entrances	Low frequency, at trail entry points and key decision points. May include occasional markers along long stretches between trail intersections (may include simple trail blazes). Designed to meet AODA requirements at trail and entrances	Low frequency, at entry points and connection point to Type 1, 2, 3, 4 trails. Designed to meet AODA requirements at trail and entrances
Lighting	Lighting will be provided	Lighting provided by existing street lighting.	Lighting may be considered where use/demand is high (i.e.: heavily used commuter routes)	Lighting not provided	Lighting not provided	Lighting provided by existing street lighting.
Amenities	Benches: Every 200m, Every 50m in select areas Refuge (shelter locations): Shelter or public facility, identified on digital mapping, and/or key locations not exceeding every 1000m, and major trail heads and destinations Washrooms: Locations of public washrooms identified on digital mapping, portable outhouse units at key locations Charging stations (mobility aid devices, electric assist bicycles, handheld devices): Major furnishing nodes, major bike parking locations	Benches: Destination and rest nodes Refuge (shelter locations): At transit hubs Washrooms: Locations of public washrooms identified on digital mapping Charging stations (mobility aid devices, electric assist bicycles, handheld devices): None	Benches: Every 200m, Every 50m in select areas Refuge (shelter locations): Shelter or public facility, identified on digital mapping, and/or key locations not exceeding every 1000m Washrooms: Locations of public washrooms identified on digital mapping Charging stations (mobility aid devices, electric assist bicycles, handheld devices): Key locations	Benches: Every 200m, or at a minimum points of entry, and top and bottom of slopes that exceed 5% Refuge (shelter locations): Key targeted locations Washrooms: Locations of public washrooms identified on digital mapping Charging stations (mobility aid devices, electric assist bicycles, handheld devices): Key locations	Benches: Points of entry, top and bottom of severe slopes Refuge (shelter locations): Large trail heads Washrooms: Locations of public washrooms identified on digital mapping Charging stations (mobility aid devices, electric assist bicycles, handheld devices): None	Benches: Little to no frequency Refuge (shelter locations): None Washrooms: None Charging stations (mobility aid devices, electric assist bicycles, handheld devices): None
TECHNICAL						
Width	3.5-4m wide Asphalt	3-4m wide asphalt	2.5-3m wide asphalt	2.5-3m wide limestone screening trail	1.2-2m wide woodchip	Varies
Profile/ Longitudinal Slope	5% maximum	5% maximum (where feasible) Provide rest area (e.g. level area) every 30m where running slope exceeds 5%	5% maximum (where feasible) Provide rest area (e.g. level area) every 30m where running slope exceeds 5%	Exceeds 5% depending on location/context. Maximum slope 10% over short distances Note: over 12% may be subject to ongoing erosion if runoff is not diverted off trail at regular intervals	Responds to surrounding topography – slopes may exceed 20% for short distances (i.e. 20m) Consider an alternate trail route where longitudinal slope exceeds 20%, or a structure (e.g. stairs) where an alternate route is not available	Match existing road profile

Trail Hierarchy Chart

Surface	Hard surface: 90mm asphalt (typical), May include concrete, coloured and patterned concrete to suit urban design	Typically, hard surface (i.e. 90mm asphalt, concrete) May include granular surface in context specific locations	Typically, hard surface (i.e. 90mm asphalt, concrete) May include granular surface in context specific locations	Granular surface (i.e. limestone screenings, granite screenings) Granular A, clear stone, wood boardwalk in context specific locations Limestone screenings should not be used in floodplain areas or where drainage flows directly to watercourses. In these locations trail hardening with asphalt over short distances where erosion is an ongoing issue and cannot be mitigated by re-routing, and for trails within floodplain areas	Natural surface (earthen, grass), woodchips May include granular (limestone screenings, granite screenings, granular A, clear stone), or wood boardwalk in context specific locations	Existing or widened concrete sidewalks. Existing road surfacing. Additional paint markings and signage.
Base Depth	300mm Increase to 350mm for trails intended to include vehicular service / full service access May include Recycled Concrete Material (RCM) to OPSS 1010 Specification	300mm Increase to 350mm for trails intended to include vehicular service access May include Recycled Concrete Material (RCM) to OPSS 1010 Specification	300mm Increase to 350mm for trails intended to include vehicular service access May include Recycled Concrete Material (RCM) to OPSS 1010 Specification	0-150mm	None- existing compacted soil. Vegetation clearing may be required to establish base.	
Vertical Clear Zone	3.5m minimum	3.0m minimum	3.0m minimum	2.4m minimum	2.4m minimum	
Horizontal Clear Zone	1.2m	1.2m Standard, 0.6mn Minimum	1.2m Standard, 0.6mn Minimum	1.2m Standard, 0.6mn Minimum	0.6m Standard, 0.2m Minimum	N/A
Setbacks for Landscaping	1.5m	1.5m	1.5m	1.5m	0.6	N/A

Trail Hierarchy Chart

Maintenance	Highest level of service in all 4-seasons / highest frequency of maintenance (e.g. weekly) Ploughing in winter, sweeping as required in other seasons, regular grass mowing and trimming along trail edges, regular trimming, weeding of plant beds	High level of service in 3-seasons, and moderate frequency of maintenance (e.g. twice per month during spring, summer, fall; and/or as required for emergencies during 4 seasons). Trail segments identified as key commuter routes are candidates for winter maintenance. Mowing and trimming as per surrounding park maintenance practices and schedule.	High level of service in 3-seasons, and moderate frequency of maintenance (e.g. twice per month during spring, summer, fall; and/or as required for emergencies during 4 seasons). Trail segments identified as key commuter routes are candidates for winter maintenance. Mowing and trimming as per surrounding park maintenance practices and schedule.	Moderate level of service in 3 seasons and moderate-low frequency of maintenance (e.g. seasonally or as required for emergencies) Includes topping up of granular surface as necessary, keeping trail envelope free from obstacles (e.g. pruning to maintain clear zone). May include seasonal/annual mowing along trail edges in open areas to stop vegetation encroachment.	Lowest level of service (e.g. to remediate significant erosion, remove obstacles on trail bed) Lowest frequency of maintenance (e.g. annually or as required for emergencies) No winter maintenance	Winter maintenance based on sidewalk and road clearing mandates. Sidewalk clearing should be prioritized in these areas.
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