2025
APRIL

TRANSPORTATION MASTER PLAN

CITY ON THE MOVE

RVA

CITY OF Welland

Executive Summary

Introduction

The City of Welland has completed a Transportation Master Plan (TMP) to provide proactive planning direction and prioritization on transportation policy and infrastructure investments within the City's transportation system over the next twenty (20) years. The TMP provides the necessary foundation and framework to unite the objectives of overarching City plans and policy, as well as the community vision for transportation within Welland.

The decision to undertake a TMP was made in response to the considerable growth in residential and employment population that is anticipated through to the 2051 planning horizon year. A TMP can ensure that the dynamic nature of Welland's future population is soundly contained and accommodated for within the mobility landscape, allowing for safer streets, thriving businesses and vibrant residential communities.

The TMP was developed by R.V. Anderson Associates Limited (RVA) under the direction of City staff, and was enabled by the input that was received from the Stakeholder Groups and the general public throughout the study lifecycle. The study was conducted in accordance with the Municipal Class Environmental Assessment (MCEA) process for master plan studies.

Engagement and Consultation

Public consultation is a key component of master planning studies. Input received from the public and stakeholder groups, potentially affected Indigenous Communities, provincial ministries, technical agencies, and authorities help facilitate community-driven strategies and objectives.

Engagement and consultation was completed through two (2) in-person public information centres (PICs), two (2) Stakeholder Group meetings, as well as online avenues for respondents that were unable to attend the in-person events. Project materials were continuously posted on the City project website, EngageWelland, throughout the course of the study lifecycle.

Welland's Vision for Transportation

The Vision Statement represents the desired outcome of the TMP with respect to its impact on the community. In other words, the vision statement represents what should be plainly perceived after all of the objectives of the TMP have been fulfilled.

The following Vision Statement was prepared to unite the objectives of the TMP, related City documents, and public interest:

> *An inclusive and barrier-free transportation system that promotes the development of vibrant and livable communities through multi-modal mobility, safe roads, intraregional connectivity, and conservation of Welland's rich heritage and water features.*

Mobility Needs

A shift in Welland's character creates a collection of unique needs in the context of urban mobility. The following needs were derived from common themes among PIC and Stakeholder Working Group respondents, existing conditions analysis and assessment of anticipated changes:

Roadway Safety – A consistent theme from the public and stakeholder consultation was that there is ample room for improvement regarding roadway safety within the City, particularly for pedestrians and cyclists.

Active Transportation – A key theme from the existing conditions review was that the existing cycling network is discontinuous, and many respondents noted safety and comfortability concerns associated with switching between shared and dedicated spaces as drivers are perceivably not respectful of cyclists on the roadway. Another key item for active transportation is to improve wayfinding within the City, specifically in the downtown and along the canal.

Intraregional Travel – In a central location to the Niagara Region, travel patterns and public feedback indicate a strong need for connectivity between Welland and other municipalities within the Region. A multi-modal network that is interconnected with its neighbouring municipalities has the potential to boost industry and recreation.

Adoption of Alternative Transportation Modes – As similar to almost all largely suburban Ontario municipalities, Welland exhibits a relatively high dependence on single-occupancy automobiles with approximately 74% of commuters arriving by car, truck or van.

Accessibility – An accessible network is one that provides equal opportunity to programs, services, devices or environments without any challenge or barriers, regardless of ability. Members of the stakeholder working group highlighted certain areas where the City could improve accessibility. These areas included sound queues at traffic signals, pavement and sidewalk quality, and decreased operating speeds.

Recommendations

The TMP recommendations are categorized by their suggested timeline of implementation to balance the fiscal and resource demands that are imposed on the City by the improvements. The timelines of implementation are partitioned into three (3) groups, including: short-term (prior to 2031), medium-term (2031 to 2036), and long-term (beyond 2036).

One-Way Traffic in the Downtown

While the couplet encompasses the downtown realm, it is also one of the few roadways which cross the canal in Welland and is therefore an integral transportation link for all modes. If the couplet's capacity is reduced, it will influence some traffic to divert to adjacent crossings such as Woodlawn Road and Lincoln Street, increasing out of way travel and directness of route and creating new north-south travel to these roadways. However, some vehicles do not have the option of diverting to other routes such as transit, emergency services, and active transportation.

To try to maintain a desirable level of service for all modes of travel, the conversion would require the addition of left-turn lanes and bicycle lanes in each direction which will be provided through the removal of on-street parking or landscaped areas.

Based on a review of operational and design considerations, it is concluded that the previous findings of the 2001 Welland TMP and 2017 Niagara Region TMP are still applicable today. Therefore, it is not recommended that two-way traffic operation along East Main Street and Division Street be pursued at this time.

Policy Documents

Road Classification

As part of the road network review process, an in-depth evaluation of City roads was conducted to evaluate the suitability of the existing roadway hierarchy. The evaluation considered a number of roadway characteristics including intended service function, typical traffic volumes, posted speeds, active transportation accommodation, parking accommodation, traffic calming feasibility, and more. The new road classification criteria also aggregated the collector roadway type into two (2) sub-types—minor and major—so that unique roadway attributes can be prescribed without contravening the intended function of the roadway. It is recommended that the City adopt the proposed roadway hierarchy as shown in Map ES-1.

Complete Streets

In conjunction with the evaluation of the roadway hierarchy, the City developed new standard roadway cross sections for local, collector, and arterial roadways. These standard cross sections enable multi-modal mobility and a complete streets approach.

Road Safety

Vision Zero is a philosophy and belief that all serious injuries and fatalities related to collisions that occur within the transportation network can be eliminated. There are various initiatives that can be implemented to support the Vision Zero strategy, including:

- Completing educational outreach programs and campaigns to educate residents on the strategy.
- Providing an avenue on the Welland website for residents to share their thoughts and concerns on road safety in their community.

- Collecting and maintaining a robust database of traffic data and collisions.

It is understood that reducing the speed limit in isolation typically results in a negligible reduction in operating speeds. However, when a reduced speed limit is supported by physical measures such as traffic calming, a notable speed reduction is realized. Therefore, it is recommended that the City adopt the revised Traffic Calming Policy to supplement the accompanying road safety initiatives.

Active Transportation

The most consistent feedback received from the public engagement process was that the existing cycling network is discontinuous, and that there is a desire for more dedicated cycling facilities, better wayfinding in the downtown, and connectivity over the water crossings. A number of recommendations for cycling infrastructure were previously recommended and approved by council in the Community Trails Strategy (2021); however, cycling infill links have been recommended to address network gaps and community concerns. The proposed cycling network is shown in Map ES-2.

As for facility selection, it was found that many Welland residents could be reasonably described as "Interested but Concerned" when it comes to cycling as a recreational activity or mode of transport. To facilitate a transition in cyclist comfortability within Welland and optimize safety, it is recommended that the City provide varying degrees of separation for cycling facilities, with specific efforts to provide fully separated facilities where the right-of-way permits.

Capital Improvements

A number of capital improvements were identified through network-level and localized traffic analysis. These improvements are intended to mitigate existing traffic congestion and prepare the network for impending growth.

Default 40km/hr Posted Speeds

Research shows that pedestrians have a 90% chance of survival for collisions at 30km/hr or below but have less than a 60% chance of survival for collisions at 45km/hr or above. Therefore, in alignment with the Vision Zero strategy and community desire for decreased operating speeds, it is recommended that a default 40km/hr posted speed is implemented City-wide on local and minor collector roadways.

Localized Improvements

The key recommended actions for localized area mobility improvements are as follows:

- Provide intersection mode of control improvements to Quaker Road and Rice Road (i.e., traffic signal or roundabout).
- Provide intersection mode of control improvements to Quaker Road and First Avenue (i.e., traffic signal or roundabout).
- Add a centre two-way left-turn lane along Quaker Road from Clare Avenue to Niagara Street.
- Intersection pavement marking improvements at Ontario Road & Canal Bank Street.

- Intersection pavement marking improvements at King Street & Lincoln Street.
- Undertake Lincoln Corridor Improvement Study between King Street and Southworth Street.
- Intersection geometric improvements at East Main Street & Wellington Street.
- Removal of roadway misalignment at Oxford Road & Brown Road/Atlas Avenue.

Goods Movement

The network analysis included a holistic review of the goods movement network, with new additions being made as needed to prepare for future growth in industry while minimizing impacts to sensitive communities. The resulting proposed goods movement network is shown in Map ES-3.

Ultimate Roadway Network

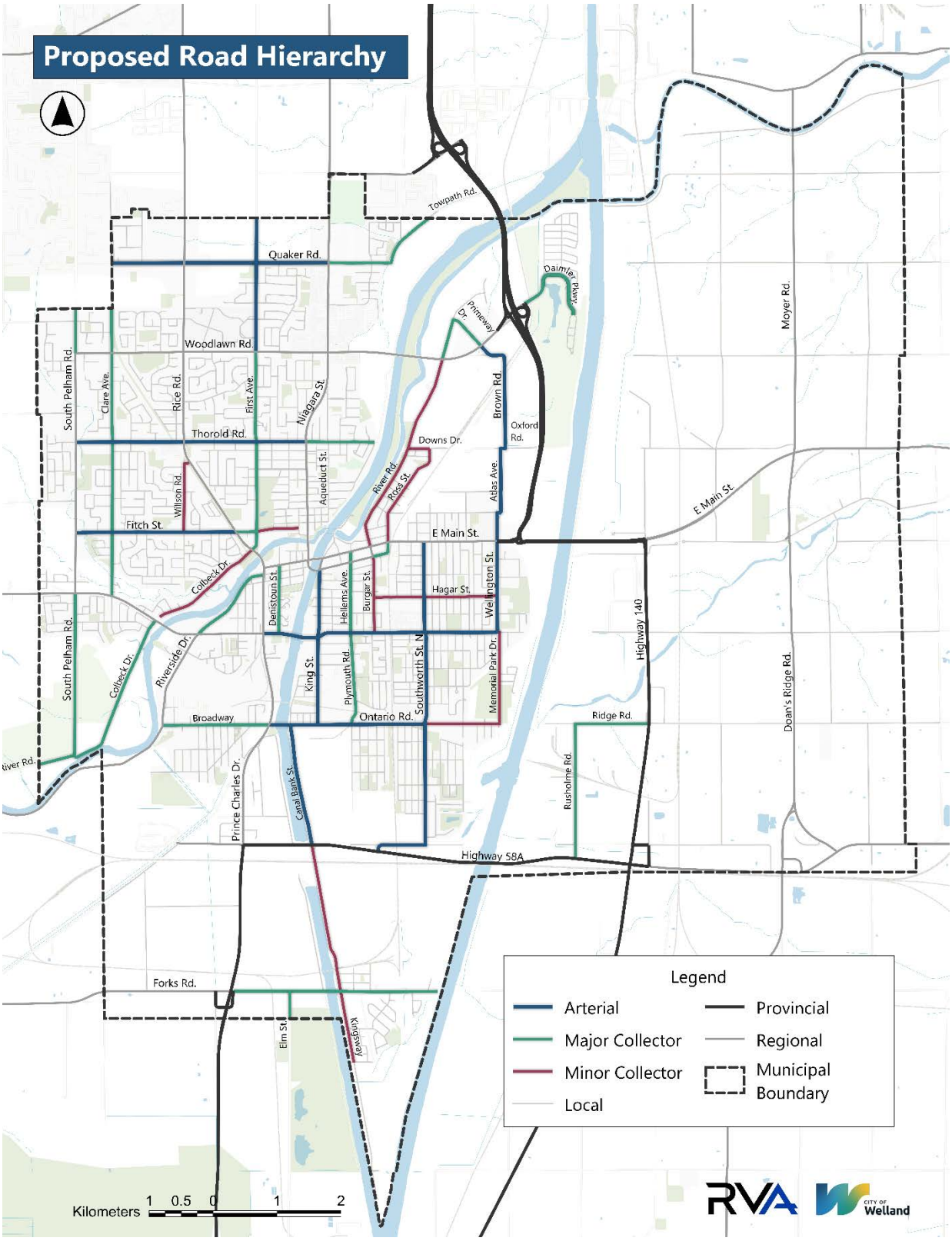
The ultimate roadway network includes three (3) new collector roadways to fill network gaps and alleviate future constraints on the existing roadway network. The new collector roadways are as follows:

- Collector Roadway east of Seaway Mall.
- Collector Roadway in Downs Drive and Oxford Road area.
- Highway 406 Overpass from Brown Road to the Hunters Pointe Lands.

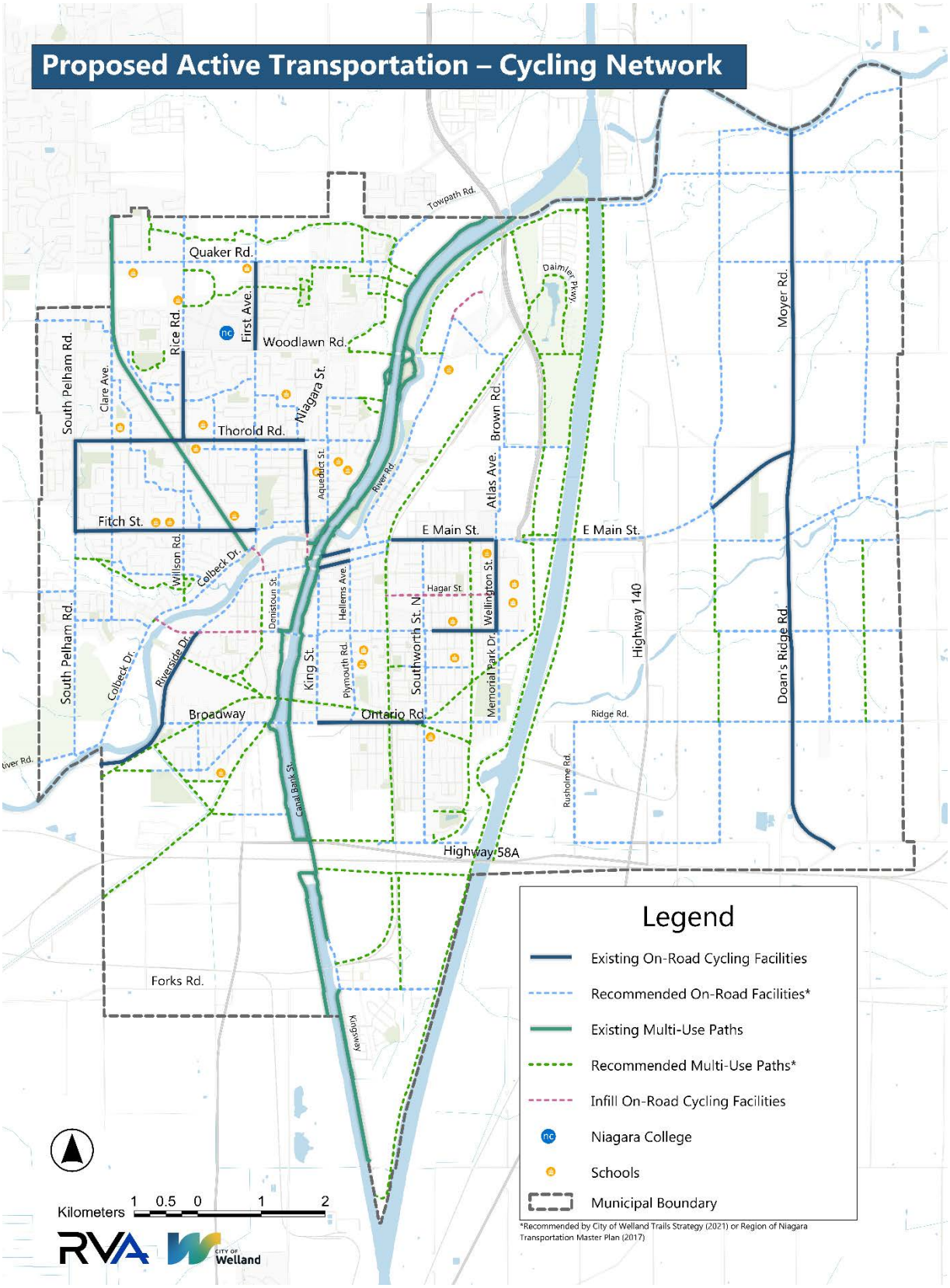
The Proposed Ultimate Roadway Network is illustrated in Map ES-4.

TMP Implementation

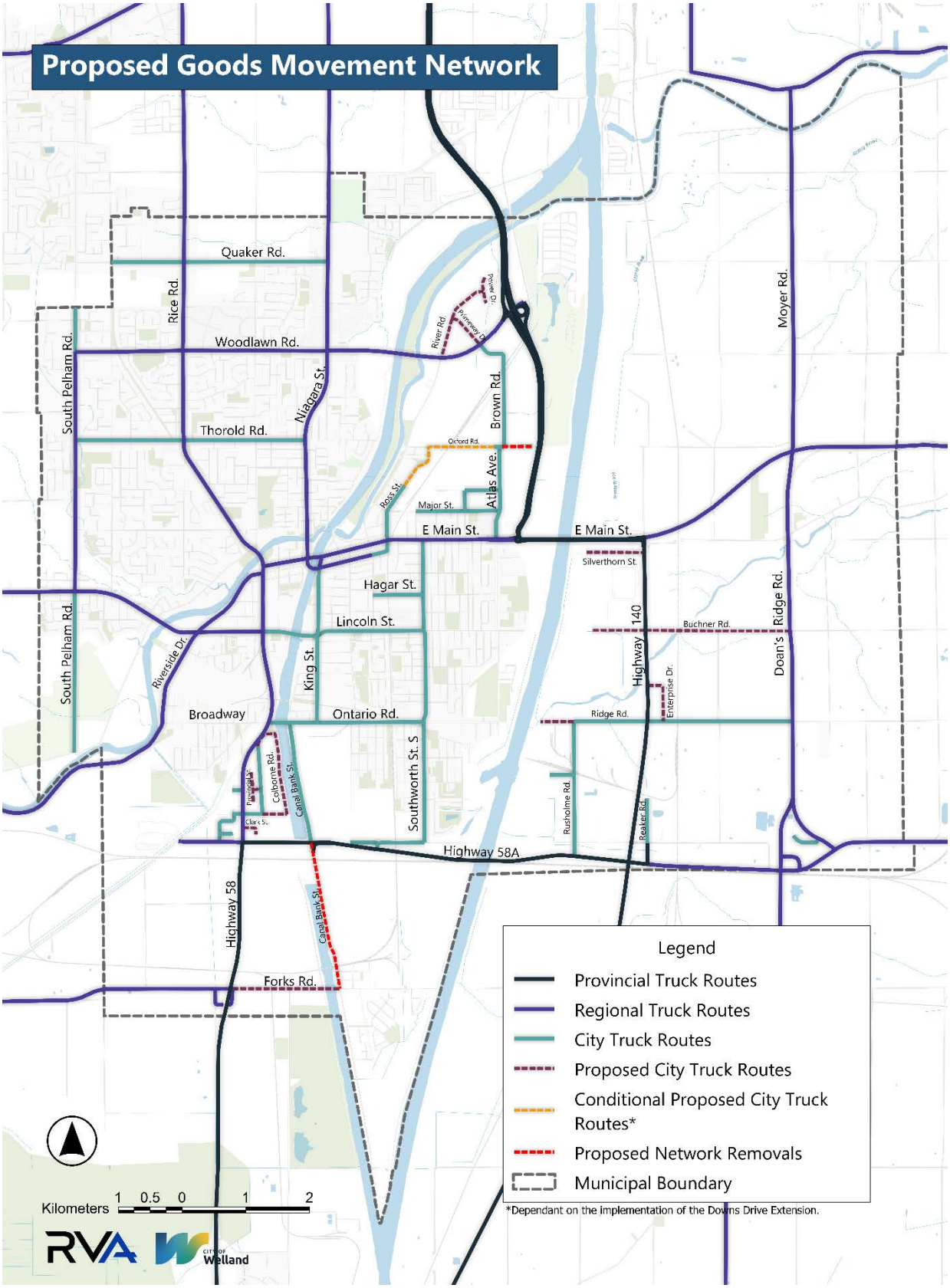
The recommendations, timelines, and associated costs for the TMP recommendations are summarized in Table ES-1



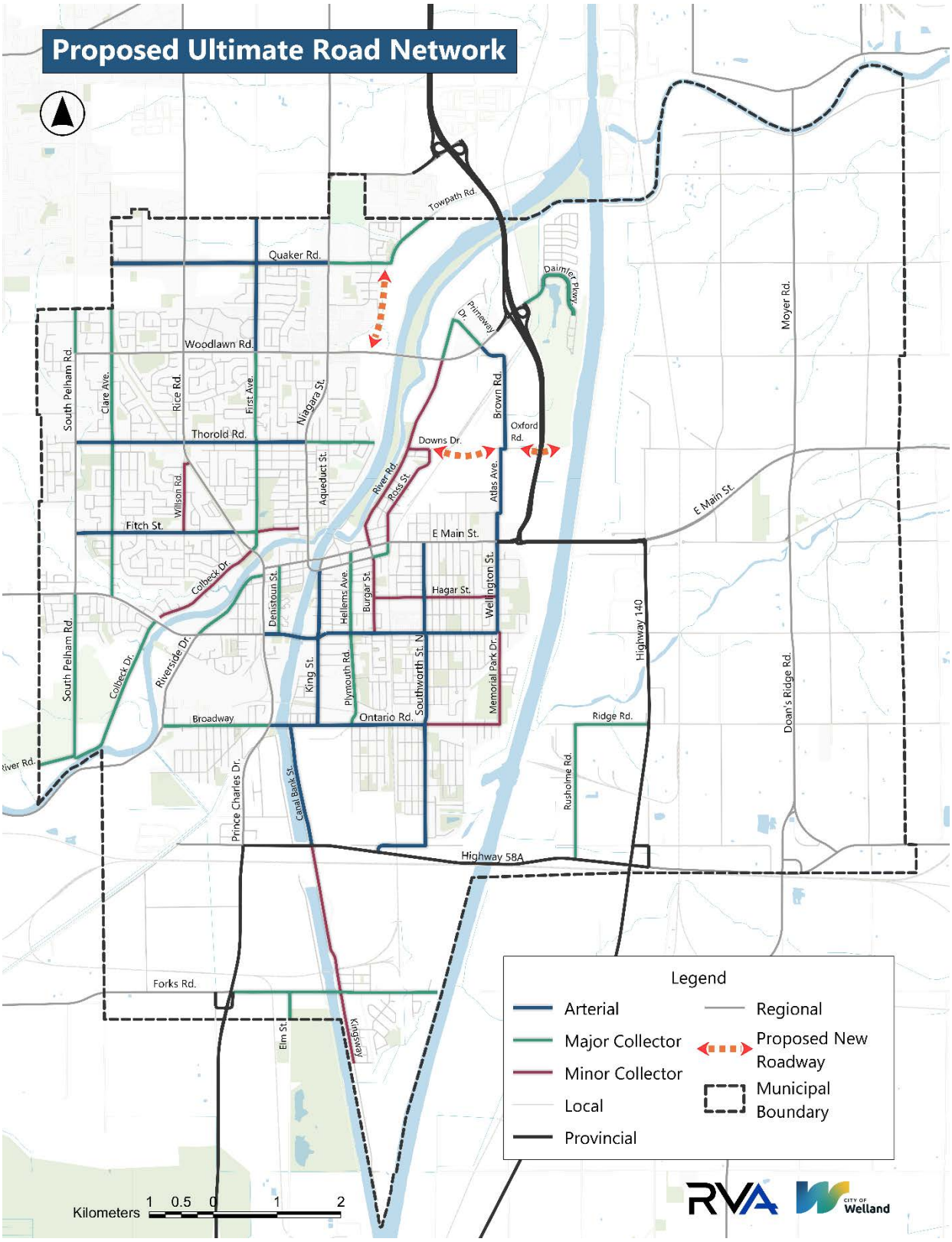
Map ES-1: Proposed Road Hierarchy



Map ES-2: Proposed Active Transportation – Cycling Network



Map ES-3: Proposed Goods Movement Network



Map ES-4: Proposed Ultimate Road Network

Table ES-1: TMP Costing and Implementation

ID	Action Item	Location	Description	Implementation	Total Improvement Cost	Responsibility
P-1	Adopt Proposed Roadway Classifications	City-Wide	Update Schedule E in the Official Plan (OP)	Short-Term (Prior to 2031)	-	City
P-2	Adopt Vision Zero Strategy	City-Wide	Implement Vision Zero Strategy	Short-Term (Prior to 2031)	-	City
P-3	Adopt Revised Traffic Calming Policy	City-Wide	Implement Revised Traffic Calming Policy	Short-Term (Prior to 2031)	-	City
C-1	Adopt 40km/hr Default Speed Limit	City-Wide	Implement 40km/hr default speed limit along local and minor collector roadways	Short-Term (Prior to 2031)	$218k	City
C-2	Adopt Proposed Goods Movement Network	City-Wide	Provide restrictive truck route signage in planned subdivisions.	Short-Term (Prior to 2031)	$34k	Developer
AT-3	Add Conventional Bicycle Lane	Niagara Street	Mill Street to Riverbank Street (pavement markings and signage only)	Short-Term (Prior to 2031)	$5k	Region
C-3	Undertake Intersection Control Study	Quaker Road & Rice Road	Evaluate suitable intersection design solutions.	Short-Term (Prior to 2031)	$20k	Region
C-4	Undertake Intersection Control Study	Quaker Road & First Avenue	Evaluate suitable intersection design solutions.	Short-Term (Prior to 2031)	$20k	City
C-5	Mode of Control Improvements	Quaker Road & Rice Road	Implement traffic signal or roundabout.	Short-Term (Prior to 2031)	$1m - $1.2m	Region
C-6	Mode of Control Improvements	Quaker Road & First Avenue	Implement traffic signal or roundabout.	Short-Term (Prior to 2031)	$1m – $1.2m	City
C-7	Intersection Improvements	Ontario Road & Canal Bank Street	Reconfigure intersection to improve lane alignment and operations (pavement markings only)	Short-Term (Prior to 2031)	$5k	City
C-8	Improve Left-Turn Lane Storage Length	King Street & Lincoln Street	Extend westbound auxiliary left-turn lane storage length (pavement markings only)	Short-Term (Prior to 2031)	$5k	City
C-9	Undertake Lincoln Corridor Improvement Study	Between King Street and Southworth Street	Evaluate corridor design solutions to alleviate future capacity constraints	Short-Term (Prior to 2031)	$60k	City
C-10	Lincoln Street Corridor Improvement	Between King Street and Southworth Street	Implement geometric and traffic control recommendations from study	Medium-Term (2031 to 2036)	TBD	City
AT-1	Provide Shared Cycling Facility (Signed Bike Route and Sharrows)	Hagar Street	Approximately 90 metres west of Empire Street to Wellington Street (pavement markings and signage)	Medium-Term (2031 to 2036)	$5k	City
AT-2	Provide Shared Cycling Facility (Signed Bike Route and Sharrows)	River Road	Primeway Drive to northern limit (pavement markings and signage)	Medium-Term (2031 to 2036)	$5k	City
C-11	Add Left-Turn Lane	Wellington Street & East Main Street	Implement northbound auxiliary left-turn lane (geometric improvements)	Medium-Term (2031 to 2036)	$450k	City/Region
C-12	Add centre two-way left-turn lane	Quaker Road from Clare Avenue to Niagara Street	Three-lane major collector with cycling facility	Medium-Term (2031 to 2036)	$12.5m	Developer
C-13	Construction of new Collector Road east of Seaway Mall	New Roadway from Woodlawn Road to Towpath Road	Two-lane major collector with cycling facility	Long-Term (Beyond 2036)	$16.5m	Developer
C-14	Construction of Downs Drive Extension	New Roadway from Ross Street to Atlas Avenue	Two-lane major collector with cycling facility. This will require a Schedule 'C' EA study.	Long-Term (Beyond 2036)	$3.3m	City
C-15	Construction of Highway 406 Overpass	New Roadway from Brown Road to New Road Connection	Two-lane major collector with cycling facility. This will require a Schedule 'C' EA study.	Subject to Development*	TBD	Developer
C-16	Provide Intersection Improvements	Oxford Road & Brown Road/Atlas Avenue	Remove roadway misalignment and plan for Downs Drive Extension	Subject to Development*	$1.3m	City
AT-4	Add Conventional Bicycle Lane	Webber Road	Colbeck Drive to Lincoln Street (pavement markings and signage only)	Subject to Bridge Reconstruction	$5k	Region
AT-5	Add Conventional Bicycle Lane	Lincoln Street	Webber Road to Prince Charles Drive (pavement markings and signage only)	Subject to Bridge Reconstruction	$11k	Region
AT-6	Add Conventional Bicycle Lane	Prince Charles Drive	Colbeck Drive to West Main Street (pavement markings and signage only)	Subject to Bridge Reconstruction	$5k	Region

P: Policy Documents | AT: Active Transportation | C: Capital Improvements | *Subject to the development of the Hunters Pointe Lands | TBD: To Be Determined

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1 Introduction

1 Introduction

1.1 What is a Transportation Master Plan (TMP)?

A Transportation Master Plan (TMP) is a long-range planning document that provides direction and prioritization on transportation policy and infrastructure investments within the City's transportation system. In the context of Welland, the City is anticipating substantial growth in employment and housing, and has initiated the TMP to establish a strategic transportation network that supports this growth, fostering vibrant, livable communities and thriving businesses.

The TMP will endeavour to fulfill a variety of strategies and objectives through to the ultimate horizon year of 2051, with the understanding that the TMP is a "living document" and may require further adaptation in response to various uncertainties including growth realizations, economic landscape, shifts in technology, emerging trends, external funding, political context, environmental assessments, feasibility study findings, and others.

At the inception of the TMP, numerous high-level objectives were established to guide the study process. These objectives were to connect residential, commercial, and industrial areas; enhance active transportation including cycling and walking; promote safe, environmentally responsible, and accessible mobility; promote links to areas of growth, neighbouring municipalities, and key transport corridors; and, update/create transportation policy documents to support the community vision. The TMP includes an implementation plan that aggregates the recommendations into short-term, medium-term, and long-term solutions to address the mobility needs of the community while balancing the fiscal and resource demands that are imposed by the improvements.

1.2 How was the TMP Developed?

The TMP was developed by R.V. Anderson Associates Limited (RVA) under the direction of City staff and was enabled through significant input from the Stakeholder Groups and the public. The study process can be generally broken down into four (4) main stages. These stages are illustrated in Figure 1.1 and are briefly described as follows:

1. Existing Conditions Assessment

Serving as the foundation of the study, the Existing Conditions Assessment consisted of a fulsome review of existing policies, plans, infrastructure, and intersection operations to establish a benchmark of Welland's current mobility landscape. This stage also involved of a holistic analysis of existing travel patterns and trends.

2. Identifying Future Needs and Opportunities

In alignment with ongoing Official Plan (OP) Update, the future transportation demands within Welland were estimated through an iterative forecasting process, with constraints within the existing transportation network being evaluated through a multi-modal lens.

3. Assessment of Alternatives and Preferred Solutions

Using the findings from the second stage, a detailed analysis of potential alternatives and preferred solutions was completed. In a collaborative process with stakeholders and the public, preference was given to strategies that resonated with the community vision of having a safe, accessible, and inclusive transportation environment that promotes walkability and recreational cycling along the canal.

4. Formulating and Implementing the Plan

As a culmination of all of the preceding stages, the fourth stage brings everything together into the draft TMP document. This draft document is subject to a 30-day public review and comment period, with the final TMP being presented to the City council for adoption thereafter.

1.3 MCEA Process for Master Plans

The TMP was conducted in accordance with the requirements of the Municipal Class Environmental Assessment (MCEA) Master Plan Approach #1, which is an approved process under the Environmental Assessment Act. The MCEA process is broken down into five (5) phases, as follows:

Phase 1 – Identify problem or opportunity;

Phase 2 – Identify alternative solutions, evaluate, and select the preferred solution;

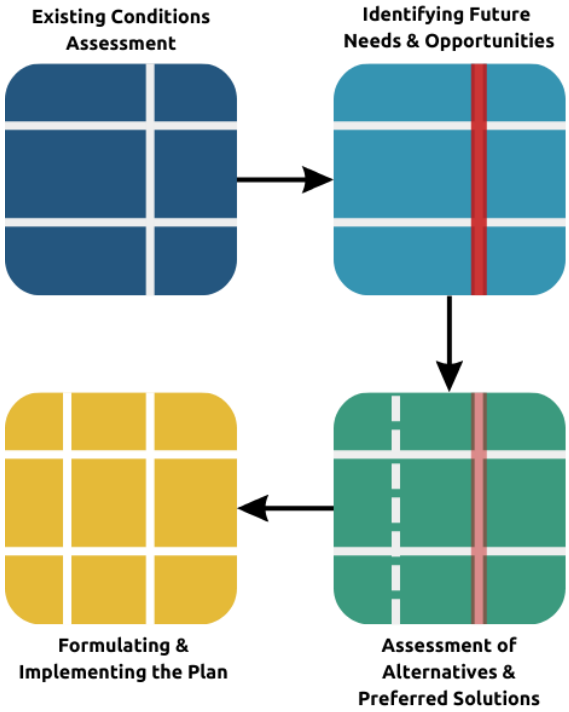


Figure 1.1 – TMP Development

Phase 3 – Identify alternative design concepts, evaluate, and select the preferred design concepts;

Phase 4 – Complete the Environmental Study Report (ESR) and place it on the public record; and

Phase 5 – Project implementation, which is to undertake the contract drawings and tender documents for the project and proceed to construction and operation of the project.

Master Plans are long range plans which integrate infrastructure requirements for existing and future land uses with EA planning principles. At a minimum, Master Plans must follow the same steps as Phases 1 and 2 of the MCEA process but can also cover other phases. Master Plans following Approach #1 must also allow for

integration with the City's Official and Secondary Plans. Figure 1.2 illustrates the steps for the MCEA Master Plan Approach #1 process to develop a TMP document.

Approach #1 involves the Master Plan being undertaken with a broad scope and level of assessment. This involves analysis on a systems scale, which enables the City to identify needs and establish broader transportation alternatives and solutions. The inventory of the natural, social and economic environments which are to be considered when assessing the alternative solutions are also broader.

The Master Plan becomes the basis for future investigations for the specific Schedule "B" and "C" projects identified within it. The final deliverable comprises of documentation of the planning process, including public consultation, as provided in the TMP.

1.3.1 Engagement and Consultation

Public consultation is a key feature of master planning studies. Input received from the public and stakeholder groups, potentially affected Indigenous Communities, provincial ministries, technical agencies, and authorities help generate meaningful dialogue between project planners and the public.

A Notice of Study Commencement was sent to a complete list of technical agencies, special interest groups and Indigenous Communities on September 14th, 2022. The list of agencies that were contacted as part of the study is provided in Appendix 1.

Figure 1.2 – Environmental Assessment Process for Master Plans

Public Information Centres and Online Engagement

Public Information Centres (PICs) were held at the conclusion of Phase 1 and 2 of the TMP study. The PICs invited stakeholders including residents to learn about the study and share their opinion on the study materials. After each PIC, a Summary Report highlighting the purpose of the PIC, the format in which they took place, and the comments received was

prepared. These Summary Reports are available in Appendix 2.

PIC #1 was held on February 1, 2023, at Welland City Hall. The purpose of this PIC was to introduce the study and garner public feedback on key issues and constraints that should be considered in the development of the TMP.

PIC #2 was held on November 29, 2023, at Welland City Hall. The purpose of this PIC was to present and harbour responses on the preliminary improvement alternatives, evaluation of alternatives, and the preferred set of solutions.

Online Engagement was completed throughout the study process using the City's project website, EngageWelland. After each PIC was held, the presentation materials were continuously posted online, and comment forms were published online and made available for two (2) weeks following each PIC to provide an engagement avenue for those who were not able to attend the in-person PICs.

Stakeholder Working Groups

Various government agencies, authorities, and stakeholder / interest groups were engaged to ensure that voices from all facets helped to shape the TMP. These sessions were undertaken through two (2) Stakeholder Working Group Meetings (SWG). Summary Reports for SWG #1 and SWG #2 are available in Appendix 3.

1.4 Guiding Documents

The TMP decision-making process was heavily influenced by a variety of local, regional, and provincial plans that are concerned with transportation, land-use planning, and environmental protection. The objectives of the TMP seek to enhance or support the overarching strategies or visions of these plans as they relate to mobility within Welland.

1.4.1 Provincial Plans and Policies

Provincial Policy Statement (2020)

The Provincial Policy Statement (PPS) came into effect on May 1st, 2020, under Section 3 of the Planning Act. The PPS provides guidance on a number of community planning interests, including land use planning, management of natural resources, health and safety, transportation, and more. The guidance related to transportation is largely encompassed in Policy 1.6.7.3, Policy 1.6.7.4, and Policy 1.2.1 (d), with the overarching vision being to minimize reliance on automobile trips and promote current and future widespread adoption of active transportation and transit.

A Place to Grow (2020)

The A Place to Grow Plan builds on the PPS to provide a growth structure for the Greater Golden Horseshoe area of southern Ontario and support intensification through strategic planning and infrastructure investments.

With respect to transportation, the Plan is primarily focused on encouraging active transportation and transit through the implementation of complete streets and transportation demand management (TDM) initiatives.

1.4.2 Regional Plans and Policies

Niagara Official Plan (2022)

The Niagara Region Official Plan addresses planning matters at the regional and provincial level; and provides direction on growth, development, land use planning, transportation, sustainability, economic strategies, and quality of life. The Plan also prescribes growth and intensification targets for local municipalities within Niagara Region.

Niagara Region Transportation Master Plan (2017)

The Niagara Region Transportation Master Plan (2017), entitled "How We Go", builds on the principles established in the Regional Official Plan and embraces a multi-modal strategy for regional transportation facilities. This Plan is concerned with regional corridors, many of which serve as key transportation passages within the City of Welland.

1.4.3 Municipal Plans and Policies

Welland Official Plan (2010)

The City of Welland Official Plan (OP) provides a comprehensive framework of development strategies, policies, requirements and permissions for various land uses. At the time of this study, the City was undertaking an OP Update which included an extensive review of growth projections, intensification targets, land use schedules and policies. The Welland TMP was completed with ongoing collaboration with City Planning staff to ensure that the recommendations were aligned with the OP's vision and updated growth targets.

Community Trails Strategy (2021)

The Community Trails Strategy (CTS) is a guiding document for active transportation and trail infrastructure within the City. Similar to the TMP, the CTS provides an implementation and phasing plan for investments, albeit exclusive to active transportation and trail facilities rather than all modes of transportation. The contents of the CTS served as the starting point and foundation for the review of active transportation facilities within Welland.

Development Charges Background Study and By-Laws (2022)

The Draft Development Charges Background Study (DC Study) was completed in conformance with the Development Charges Act (1997) and O.Reg.82/98, and recommends new rates to help the City of Welland meet the increased monetary demands associated with growth and development. The DC Study includes population and dwelling distribution forecasts which informed sections of the travel demand forecasting for the TMP.

1.4.4 Traffic Impact Studies

To provide a greater degree of refinement on planned developments within the City, numerous Traffic Impact Study (TIS) reports provided by the City were reviewed as part of the TMP. TIS reports contain development plans and their associated traffic impacts on the

surrounding road network. The TIS reports reviewed as part of the TMP include but are not limited to:

- Hunters Pointe Golf Course Redevelopment Transportation Study Update (February 2019)
- Northwest Welland Secondary Plan Transportation Assessment Update Preferred Plan (December 2023)
- Dain West Draft Plan of Subdivision Traffic Impact Study (July 2020)
- 201 Ontario Road Transportation Impact Study (September 2021)
- Sports Court Complex Development at 11 Shaw Street Traffic Brief (January 2022)
- Northern Reach Concept Plans (2022)

Welland International Flatwater Centre

2 Welland Today

2 Welland Today

2.1 The Community

Located in the heart of the Niagara Peninsula, the City of Welland is a lower-tier municipality within the Region of Niagara serving as the home to a total of 55,750 residents in 2021. The City is abutted by numerous local municipalities that are also within the Niagara Region, including the Town of Pelham to the northwest, City of Thorold to the northeast, City of Niagara Falls to the east, City of Port Colborne to the south, and the Township of Wainfleet to the west. Geographically, the City can be easily identified by its distinctive waterways that cut through and within the municipal boundary.

2.1.1 The People

As of 2021, the age distribution within Welland could be reasonably described as an "aging population", with a greater distribution of residents aged 65 and over compared to the provincial average, and a lesser distribution of all age groups younger than 54 years of age compared to the provincial averages. Although this pattern is expected to continue with the latter portion of the "Baby Boomer" generation moving into the 65 and over age category, there was also a notable increase (approximately 2% of overall population distribution) in those aged 25 to 34, indicating a surge of young families within the City (2021 Census). The 2021 age distribution within the City of Welland is illustrated in Figure 2.1.

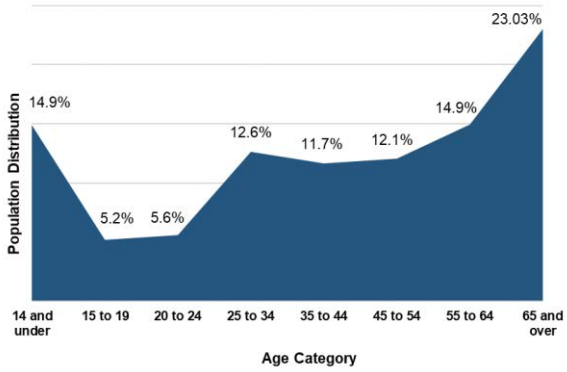


Figure 2.1 – Welland Age Distribution

2.1.2 The Economy

The identity and context of Welland's employment is dynamic and subject to considerable change over the next twenty years; however, barring an approximate 15-year period between 2001 and 2016 where manufacturing employment dwindled as a result of recessions, free trade agreements, and increased prevalence of automation, the City has historically been defined as one (1) of Niagara's primary industrial and manufacturing cores. Since this recession in the manufacturing sector, the economic focus on manufacturing within Welland has experienced a resurgence with the arrival of numerous businesses in recent years, which has resulted in the manufacturing job share within Welland increasing from 7.8% in 2016 to 9.5% in 2021. Furthermore, as per the Region's Land Needs Assessment (August 2021), the City of Welland is forecast to accommodate the principal share of the Region's growth in urban industrial-type employment areas through to 2051.

2.1.3 The Housing

The City of Welland recorded a total of 23,660 residential dwellings in 2021 with an average household size of 2.3 persons per dwelling unit. The housing mix consists of predominantly single family detached and semi-detached dwellings (71.6%), followed by apartments (18.8%), row homes and townhomes (9.1%), and other dwellings (0.5%) which could include dwellings such as recreational vehicles (RVs). The dwelling distribution is presented in Figure 2.2.

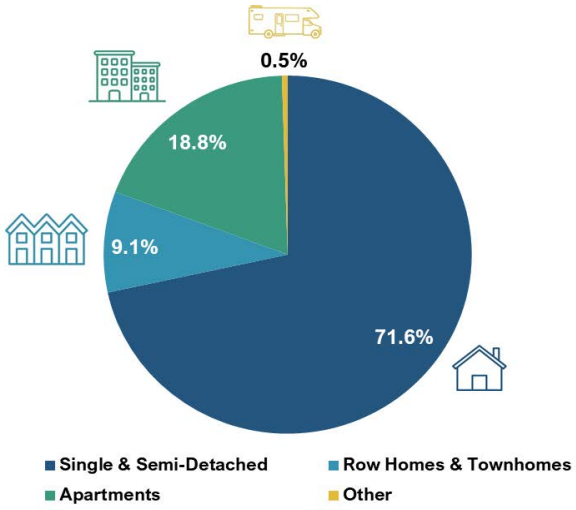


Figure 2.2 – Existing Housing Type Distribution

2.2 Mobility Planning Context

Understanding the current context of mobility within Welland is crucial for shaping the future dynamics and functionality of the urban landscape. This section seeks to provide key insights on how, why, and where people are moving within the City; and will provide a foundational planning component to all future transportation initiatives within Welland.

2.2.1 Travel Mode Share

The travel mode share provides insight on "how" within the existing mobility context by providing a breakdown on the selected methods of transportation for Welland residents. The TMP utilized results from the 2011 and 2016 Transportation Tomorrow Survey (TTS) to establish a baseline of existing travel characteristics and trends. These distributions are illustrated in Figure 2.3. The mode share within Welland, as similar to the other Niagara Region municipalities and almost all suburban context municipalities within Ontario, leans heavily towards the use of single-occupancy automobile. In a comparison between 2011 and 2016 modal splits, the use of carpooling (auto passenger) lost popularity over the 5-year period, but there was a notable increase in transit usage (approximately 1% of overall trip distribution). The use of active transportation and other modes (i.e., micromobility) remained consistent over the 5-year period.

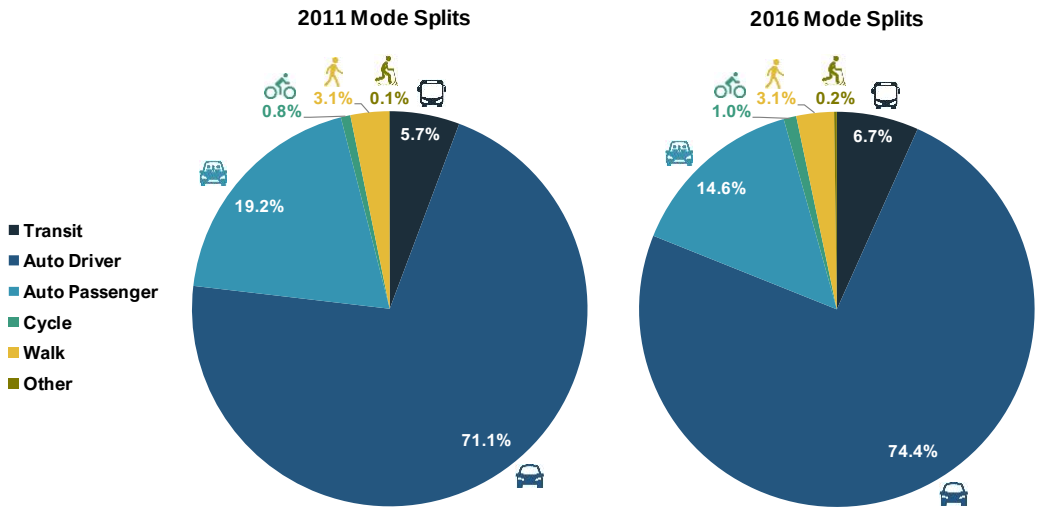


Figure 2.3 – Comparison between 2011 and 2016 Modal Splits

Trip Characteristics

Majority of commuters within Welland have an average commute time of less than 30 minutes, with less than approximately 10% of commuters travelling outside of the Niagara Region for employment. The commuter distribution is summarized in Table 2.1 and illustrated in Figure 2.4.

Table 2.1 – Commuter Destination Distribution

Destination	Distribution
Welland	40.75%
St. Catharines	17.15%
Niagara Falls	11.55%
Pelham	5.13%
Thorold	4.92%
Hamilton	4.30%
Port Colborne	4.26%
Niagara-on-the-Lake	2.67%
Greater Toronto Area	2.49%
Lincoln	2.22%
Fort Erie	1.90%
Wainfleet	0.95%
Grimsby	0.55%
West Lincoln	0.53%
Other	0.63%
Total	100%

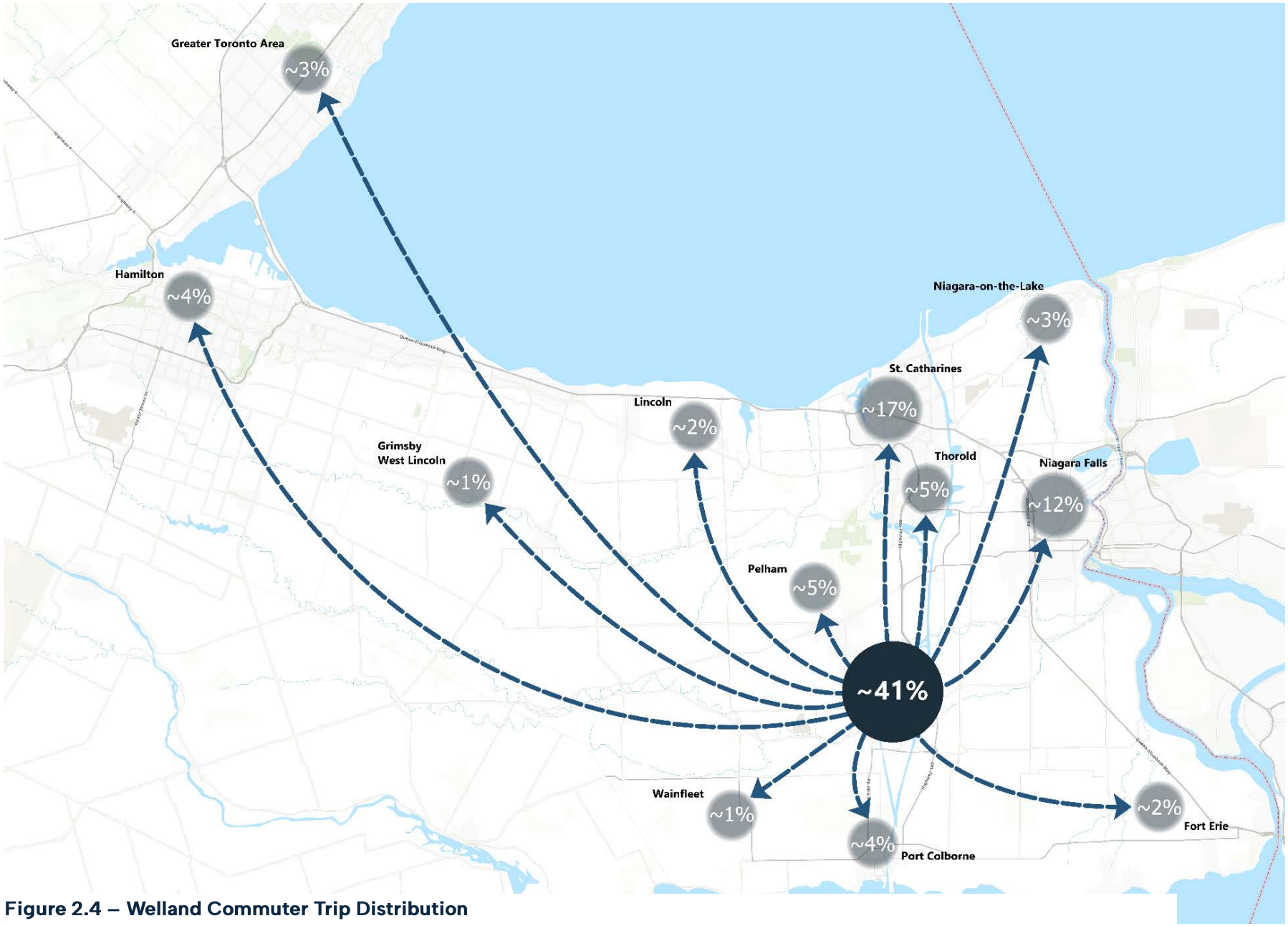


Figure 2.4 – Welland Commuter Trip Distribution

As seen in Table 2.1, many Welland residents work within the City, with other noteworthy employment areas being the City of St. Catharines and the City of Niagara Falls. The majority of the remaining commuters are dispersed throughout neighbouring municipalities within the Niagara Region as well as the Greater Toronto-Hamilton Area. The responses also indicated that a small number of residents commute to the Region of Waterloo, the City of Cambridge, Haldimand County, and the City of Brantford; however, all of these trips comprise less than one (1) percent of the commuter population within Welland.

When compared to the commuter statistics from 2011, there is a significant reduction in the percentage of the City population that works within Welland. As seen in Figure 2.5, an approximate 9% of the population that worked within Welland in 2011 was dispersed across the City of Hamilton and Niagara Region municipalities—barring Port Colborne which exhibited a decrease as well. There was also a slight decrease in the number of commuters to the greater Toronto area municipalities. The municipalities that showed the greatest increase in commuters from Welland were the City of Thorold, the City of Niagara Falls, the City of St. Catharines, and the City of Hamilton.

2.3 Baseline Travel Demand Forecasting Model

The Niagara Region Travel Forecasting Model is an analysis tool that is utilized to reasonably predict travel behaviours in the Niagara Region and Greater Toronto and

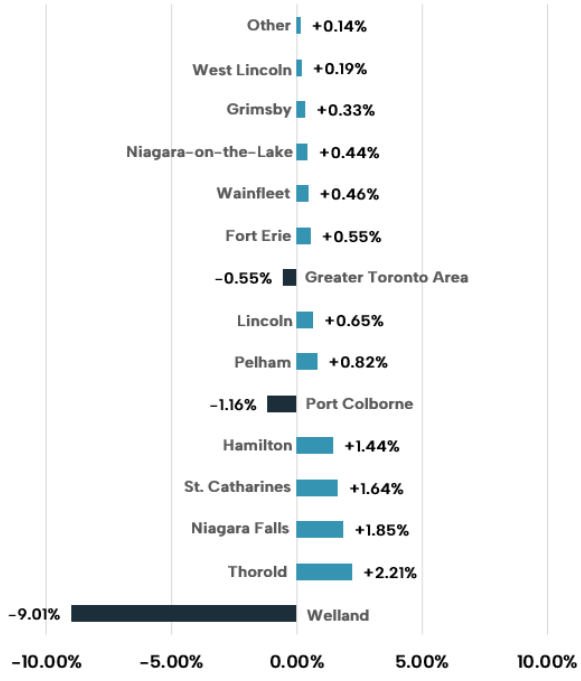


Figure 2.5 – Change in Welland Commuter Destination Distribution from 2011 to 2016

Hamilton Area (GTHA). The tool is used to measure the magnitude of which development, changes in infrastructure, varying travel behaviours, transit ridership, and more, will impact the number of trips to the Region, thereby allowing for pro-active infrastructure and policy investments.

The modal split and trip distribution within the baseline model is calibrated to the Transportation Tomorrow Survey (TTS) 2016 dataset, which is a travel survey that is conducted every five (5) years to garner data on travel characteristics in southern Ontario.

The model was used for baseline (2016) and future 2031, 2041, and 2051 horizon years for the Welland TMP, with numerous refinements and localized calibrations

being implemented into the model architecture as part of this study. Additional information on the Travel Forecasting Model can be found in Appendix 4.

2.4 The Network

2.4.1 Road Classification Definitions

A transportation system will achieve its optimal function from a traffic operations, road safety, and urban design perspective if the roads comprising it are serving their intended purpose. For example, the intended use of Highway 406 is to move people and goods, whereas the intended use of residential streets are to provide land access. These competing interests oftentimes impede one another, which is the reason why road hierarchies are established.

The road classifications that currently exist within Welland, along with their intended purpose, are described as follows:

Freeways and **Expressways** are roadways of the highest order, usually consisting of multi-lane (more than four total through lanes including two through lanes in each direction), high-speed highways that generally accommodate long-distance travels between different cities and regions. Although the terms "freeways" and "expressways" are often used interchangeably, freeways are defined as highways limited to through traffic with access to the corridor only being provided by interchanges, whereas expressways consist of a divided roadway for through traffic with access provided through interchanges or controlled access points. Freeways and expressways within Welland are under provincial jurisdiction; an example of a freeway in Welland is Highway 406.

Secondary/King's Highways generally consist of 2-lane or 4-lane (one lane or two lanes in each direction) corridors that transfer traffic between freeways and arterials. They may be divided or undivided, with at-grade intersections and the potential for short sections of Freeways within the overall corridor. Secondary/King's Highways within Welland are under provincial jurisdiction; an example of a King's Highway in Welland is Highway 58A.

Arterial Roads are higher-order corridors that are intended to accommodate relatively high volumes of traffic and provide efficient, uninterrupted movement for through volumes (barring interruptions from traffic signals along the corridor). Resultantly, majority of resident and emergency vehicle trips will utilize an arterial roadway at some point in their route. The vast majority of arterial roads within Welland are under regional jurisdiction; however, there are a number of arterial corridors that are maintained by the City. An example of a City-owned arterial is Ontario Road.

Collector Roads are intended to carry moderate traffic volumes, with traffic movement and land access having a similar level of importance. In the ideal road system, collector roads will garner traffic from local streets, eventually

connecting to the foregoing higher-order roadways to accommodate the larger portion of travel. All collector roads are under the City jurisdiction; an example of a collector road within Welland is Memorial Park Drive.

Local Roads are intended to provide access to their adjacent land uses. These roadways generally carry much lower volumes than the other roadways, as they are only intended to service trip ends (either origin or destination of a trip). All local roads are under the City jurisdiction; an example of a local road is Empress Avenue.

2.4.2 Existing Road Network

The existing road network was extracted from Schedule E of the Official Plan (revised July 15, 2020) and is aggregated by jurisdiction and road classification. This road network is shown in Figure 2.6.

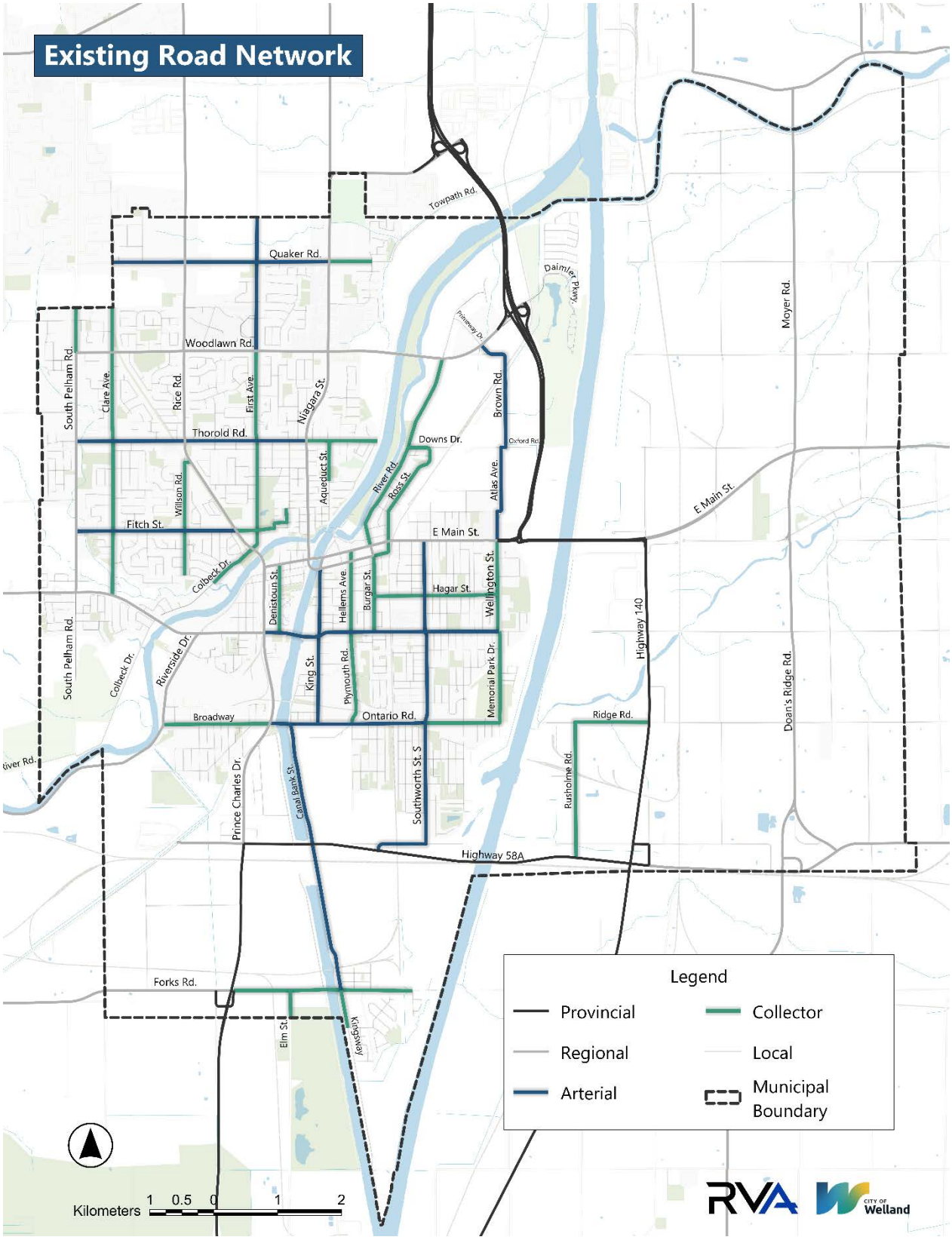


Figure 2.6 – Existing Road Network

2.4.3 Goods Movement

A "truck route" is a corridor that is formally designated for use by certain types of trucks. The network of these corridors is coined the "truck route network" or "goods movement network"—oftentimes used interchangeably. The purpose of designating certain routes for use by trucks is to maximize the needs of the trucking industry while minimizing the adverse impacts to sensitive areas such as residential land uses or corridors with significant pedestrian and cyclist volumes. The intent of the designated network is for truck drivers to utilize designated corridors whenever possible, with the understanding that there are circumstances where it is not possible to do so. An example of this would be an at-home delivery—where in this case, the truck driver can be reasonably expected to utilize the designated truck network for majority of the trip; however, they will likely have to deviate from the designated network to complete the delivery.

Historically, the City of Welland has served as a hub for commerce due to the first Welland Canal opening in 1829, with further support from the Welland Railway opening in 1856 and the Canada Air Line Railway opening in 1869, which later became part of the Great Western Railway in 1871 (Source: Gayler. H., & Jackson, J., The Canadian Encyclopedia). In Welland today, the movement of goods is still largely facilitated by the canal and rail corridors, although the increased traction of the trucking industry has added an additional facet to the goods movement network. With respect to the Welland TMP study, the goods movement review focuses on optimizing truck routes within the City of Welland. The existing goods movement network is shown in Figure 2.7.

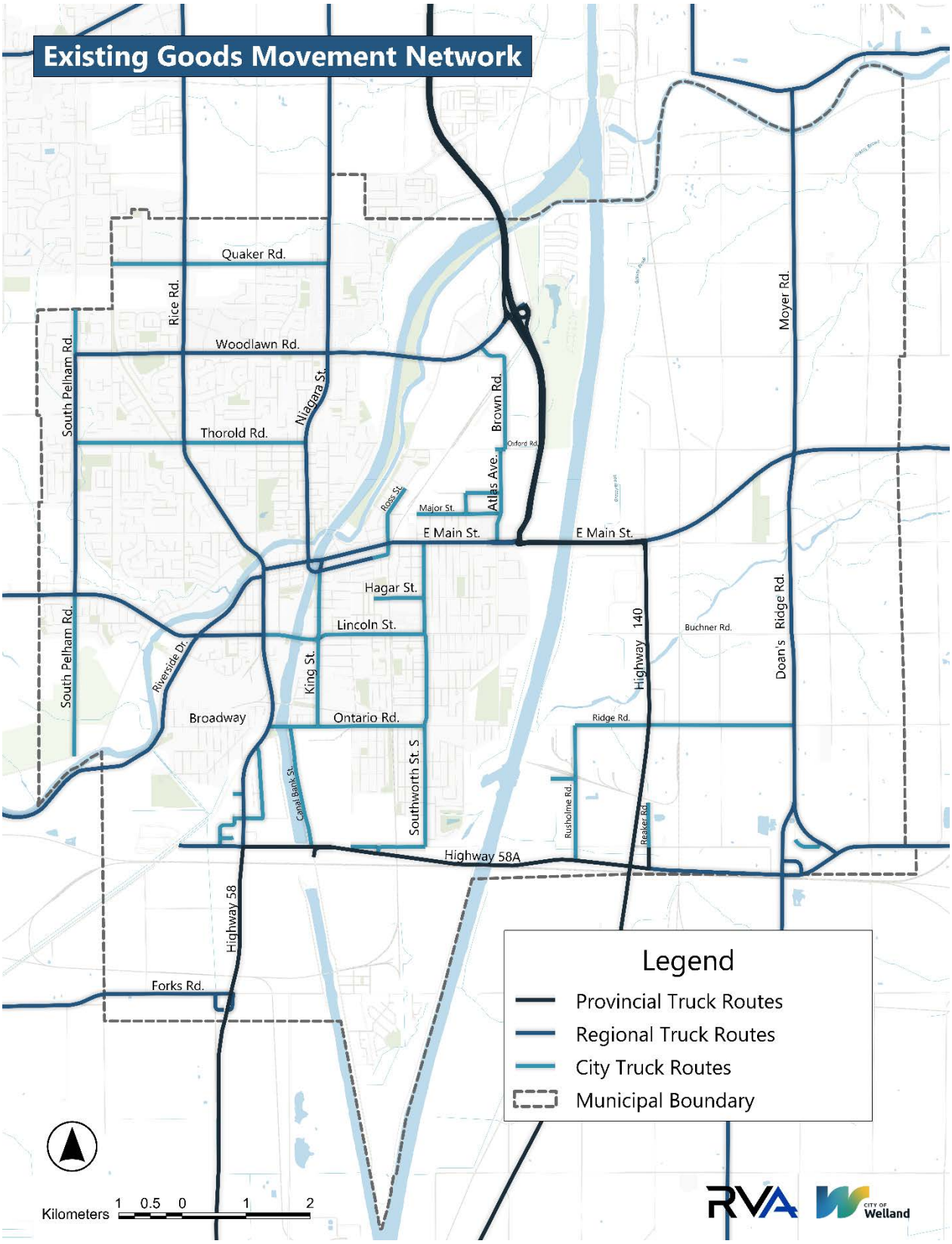


Figure 2.7 – Existing Goods Movement Network

2.4.4 Transit Network

Public transit within Welland was formerly provided by the Welland Transit Service but has since been assumed by the Niagara Region Transit Service (NRT) as of January 2023. The transit system within Welland is accommodated by NRT fixed and OnDemand services. The fixed route services are as follows:

75/70 St. Catharines – Welland (Regional)

65/60 Niagara Falls – Welland (Regional)

25 Port Colborne – Welland (Regional)

501 Broadway (Local)

502 Rice Road (Local)

503 First Avenue (Local)

504 Fitch Street (Local)

505 Lincoln Street – Wellington Street (Local)

506 Ontario Road (Local)

508 Woodlawn Road (Local)

509 Niagara Street (Local)

These routes are illustrated in Figure 2.8.

Welland Canal Bridge 13

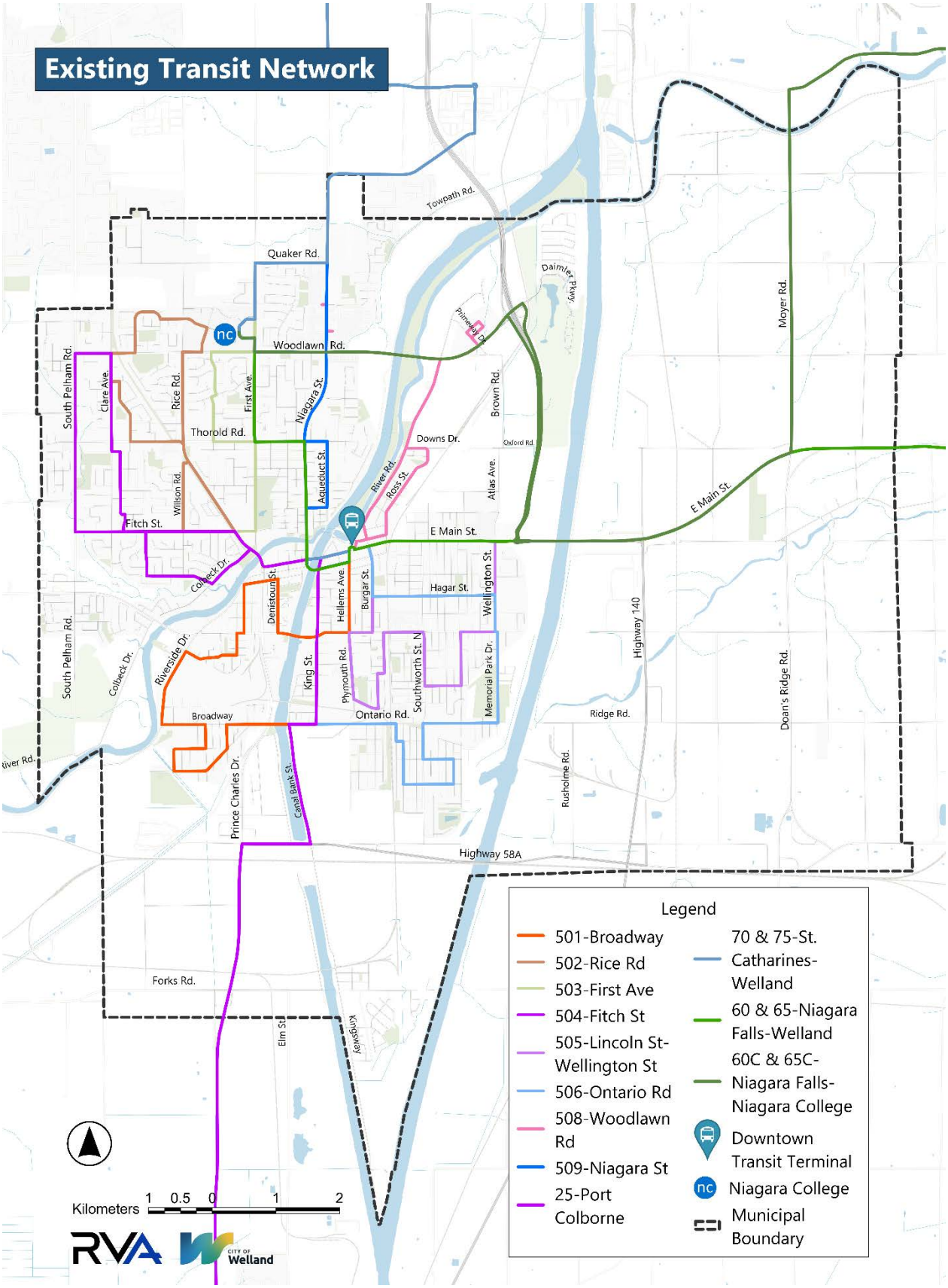


Figure 2.8 – Existing Transit Network

2.4.5 Sidewalk Network

The City maintains sidewalk network data and identifies corridors that are missing sidewalks. Missing sidewalks are predominantly addressed as part of road reconstruction projects, and the network is expanded in alignment with future development. However, through a missing sidewalk links program, the City will complete individual sidewalk projects in priority areas such as school zones when feasible.

2.4.6 Cycling Network

Multi-use paths along the canal serve as the heart of the urban cycling network, with bike lanes being provided along certain segments of local and regional corridors throughout the City. For majority of trips in the urban area however—barring those that are completed solely along the canal trails—cyclists must share the right-of-way with vehicles until they can return to a dedicated bike facility. The existing cycling network is shown in Figure 2.9.

Canal Terrace, Downtown Welland

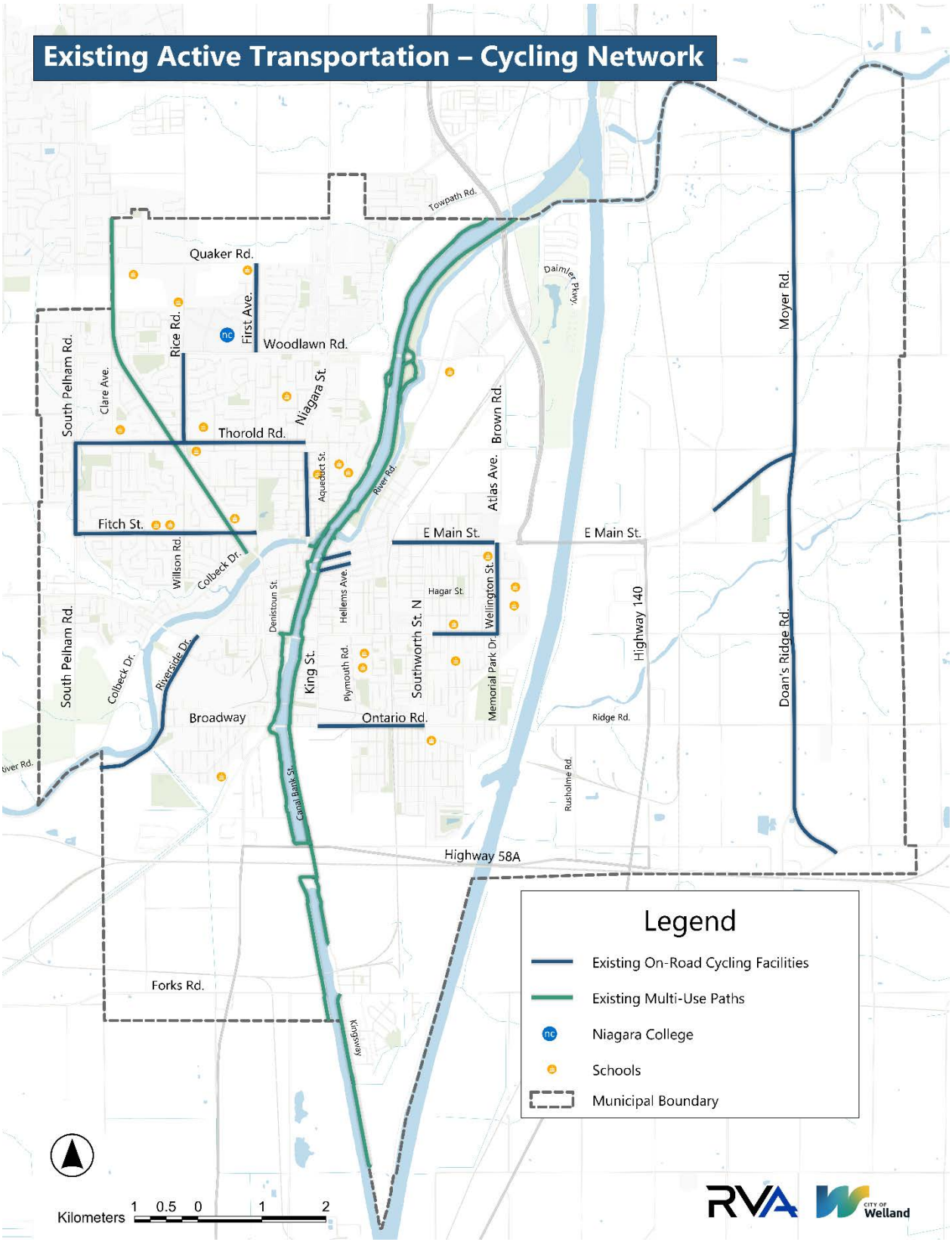


Figure 2.9 – Existing Active Transportation – Cycling Network

2.4.7 Water Crossings

While the waterways that traverse Welland have provided it with an iconic brand and trademark topography, they also impose unique confines on the transportation network. Roadway crossings across the waterways in Welland are provided by a number of provincial, regional, and local bridges that vary in size, function, and history. In two (2) cases, bypassing a waterway is provided through an underground tunnel. The roadway crossings used to bypass the significant waterways along with their associated lane configurations and jurisdiction are shown in Table 2.2.

Table 2.2 – Existing Water Crossings

Corridor	Number of Lanes	Jurisdiction
Highway 406	Four (4)	Provincial
Highway 140	Four (4)	Provincial
Woodlawn Road	Two (2)	Regional
Main Street	Two (2)*	Regional
Division Street	Two (2)**	Regional
Lincoln Street	Four (4)	Regional
Ontario Road	Two (2)	Regional
Townline Tunnel Road	Four (4)	Provincial
Forks Road East	Two (2)	Local
Webber Road	Two (2)	Regional
Prince Charles Drive North	Four (4)	Regional
Niagara Street	Two (2)	Regional

*Two lanes westbound **Two lanes eastbound

2.4.8 Rail Crossings

The City of Welland has a rich past of trade and industry, largely in thanks to its historic system of rail lines that date back to the 1800's. In Welland today, the rail lines are owned and operated by Canadian National Railway Company (CNR), Canadian Pacific and Kansas City Southern Railway Company (CPKC), and Trillium (Port Colborne Harbour) Railway (TRRY). The rail system intersects with a variety of two-lane (one lane in each direction) City roadways, as shown in Table 2.3.

Table 2.3 – Existing Rail Lines

Intersecting Road	Number of Tracks	Train Movements per Day
Brown Road	Three (3)	Two (2) to Four (4)
Colborne Street	One (1)	Two (2) to Four (4)
Daimler Parkway	One (1)	One (1) to Two (2)
Forks Road	One (1)	Two (2) to Four (4)
Hagar Street	One (1)	Two (2) to Four (4)
Humberstone Road	One (1)	Two (2) to Four (4)
Kingsway	One (1)	Two (2) to Four (4)
Lincoln Street	One (1)	One (1) to Two (2)
Ontario Road	Three (3)	Two (2) to Four (4)
Pietz Road	One (1)	Two (2) to Four (4)

2.4.9 One-Way Operation in the Downtown

The transportation network includes several one-way streets, chief among them being the Regional couplet of East Main Street and Division Street within the downtown area.

The prospect of converting one-way operation to two-way operation along East Main Street and Division Street was a focus area of the 2001 Welland Transportation Master Plan and 2017 Niagara Region Transportation Master Plan. The principal essence of this conversion was that the existing one-way

configuration is detrimental to downtown business owners, as it effectively cuts storefront vehicular traffic in half, and consequently reduces spontaneous walk-in customers and business exposure to motorists travelling along the adjacent roadway.

The Welland TMP (2001) and Niagara Region TMP (2017) resonated similar findings regarding the conversion, with both studies noting that two-way operation results in increased congestion. Furthermore, with limited space available, converting to two-way traffic will require trade-offs within the corridor.

While the couplet encompasses the downtown realm, it is also one of the few roadways which cross the canal in Welland and is therefore an integral transportation link for all modes. If the couplet's capacity is reduced, it will influence some traffic to divert to adjacent crossings such as Woodlawn Road and Lincoln Street, increasing out of way travel and directness of route and creating new north-south travel to these roadways. However, some vehicles do not have the option of diverting to other routes such as transit and emergency services, and they also must be considered in this discussion.

Other considerations for the two-way conversion are as follows:

- Auxiliary Turn Lanes: Given the restricted right-of-way within the downtown area, the conversion to two-way operation would require re-purposing of existing roadway space. Specific needs may include addition of left-turn lanes at key intersections to minimize delays and queueing. This space would require the removal of a significant amount of on-street parking along one side of the roadway.
- Active Transportation: Existing on-street bike lanes are provided in one direction only in the one-way system (westbound direction on East Main Street and eastbound direction on Division Street). To maintain active transportation connectivity in a two-way system, bike lanes in each direction on each roadway will be required. The space for this additional bike lane would require removal of on-street parking along each corridor.
- Emergency Services: Welland Fire & Emergency Services is located on the northwest corner of East Main Street and Patterson Avenue. Increased congestion from the conversion could have adverse impacts on emergency services response times. Although emergency vehicles can use their sirens to gain priority, there must be roadway space available to provide this priority.
- Transit: The Welland Bus Terminal is located in the heart of the downtown. The delays caused by the two-way conversion would have corresponding impacts to transit schedule adherence and would increase the difficulty that transit vehicles are already having when accessing East Main Street.
- Geometric Constraints: There are numerous geometric constraints within the downtown, including the Historic Lift Bridge and existing

buildings. These constraints can create difficulty with sightlines, lane widths, vehicle turn paths, and lane alignments—all of which are required to maintain safe operation for all modes.
- Traffic Signals: With closely spaced intersections in a grid network, the conflicting needs for green time allocation would likely result in greater congestion and queuing as compared to the one-way operation.
- Infrastructure: Reconstruction of all existing traffic signals and assumption of either Division Street or East Main Street as a City asset along with its associated bridge would be required.

Based on a review of operational and design considerations, it is concluded that the previous findings of the 2001 Welland TMP and 2017 Niagara Region TMP are still applicable today. Therefore, it is not recommended that two-way traffic operation along East Main Street and Division Street be pursued at this time.

2.5 What We Have Heard

Based on the feedback solicited throughout the engagement process, a number of consistent themes were noted by respondents. In general, the action items arising from the two (2) consultation avenues were to:

Stakeholder Working Groups:

- Improve active transportation connectivity between local and regional roads, and to key corridors such as Niagara Street and Thorold Road.
- Add new multi-use path connections through parks such as Lancaster Park.
- Urbanize roads with rural cross sections to improve pedestrian accommodation, safety, and accessibility.
- Reduce vehicle operating speeds through the implementation of various traffic calming measures.
- Improve wayfinding and advisory signage on downtown streets to improve one-way operations and reduce confusion.
- Increase safety in school zones as it relates to pedestrian sidewalks and vehicle speeds.
- Enhance safety for pedestrians at rail crossings.

Public Information Centres:

- Implement cycling improvements throughout the City, specifically with respect to dedicated facilities, connectivity, and wayfinding signage in the downtown and along the Canal.
- Mitigate congestion and operational concerns at intersections in the downtown.
- Provide more secure bicycle storage areas.
- Investigate additional safety measures around parks and schools, primarily with respect to excessive driver speeds.

3 Welland Tomorrow

3 Welland Tomorrow

3.1 Planning Groundwork

This section provides the framework and foundations for which all recommendations in the TMP have been made.

3.1.1 Complete Streets

The Complete Streets approach is a design philosophy that seeks to accommodate all road users regardless of age, ability or selected mode of transportation. The primary goal of a Complete Street is to create a balanced, multi-modal transportation network that simultaneously serves to improve road safety and enhance the urban landscape. In today's mobility context, Complete Streets bely the traditional auto-centric approach to road design and provide all road users with access to transportation equity.

In general, designing streets that provide a plethora of diverse and welcoming transportation options will:

- Alleviate congestion on the transportation network by supporting other modes such as walking, cycling, transit, and more.
- Reduce greenhouse gas emissions by shifting road users out of their cars.
- Help foster safe and livable communities.
- Create an accessible and navigable roadside environment for those with mobility impairments and needs.
- Promote thriving businesses through enhanced roadside walkability and activity.

The principle of Complete Streets resonates with the feedback received through the consultation process, which indicated a desire for increased road safety and cycling options rather than additional automobile capacity.

To ensure that the transportation network achieves equity for all road users, the TMP explores ways to prioritize all modes of transportation, not just motorists.

3.1.2 Vision Zero

Vision Zero is a philosophy and belief that all serious injuries and fatalities related to collisions that occur within the transportation network can be eliminated. Originating out of Sweden in the 1990's, the strategy has picked up momentum throughout the rest of Europe and North America. Today, many cities within the province of Ontario are committing to the Vision Zero strategy as a devotion to improve safety within the transportation network and provide equitable mobility to all road users.

Vision Zero is not a single principle or rule for municipalities to abide by, but rather a fundamental change in how entire communities view and approach road safety. Traditionally, severe injuries and fatalities have been viewed as an unavoidable product of mobility; however, Vision Zero recognizes that all severe injuries and fatalities that occur within the transportation network are preventable. Vision Zero identifies two (2) vital components of the strategy, these are as follows:

- Vision Zero recognizes that human error within the transportation network is inevitable, but it does not need to result in a severe injury or fatality. The system should be designed to accommodate mistakes and minimize the severity through design, policy, and other related criteria.
- A Safe System approach is one that is multidisciplinary, and should be a collaborative result of transportation professionals, policymakers, public health officials, police, and community members. The system should not be solely accountable to one entity. An illustration of the Safe System approach is shown in Figure 3.1.

Figure 3.1 – Safe Systems Approach (Source: The Vision Zero Network)

Vision Zero serves as a cornerstone for many of the action items contained within the TMP, with its themes being integrated into design, policy, and planning considerations.

3.1.3 Emerging Trends

Emerging trends and technology advancements are a vital lurking factor to consider when planning a strategic transportation network. In many cases, emerging trends in transportation have the potential to significantly alter the way people and goods are transported, and can therefore have substantial impacts on the transportation network as a whole. The most relevant emerging trends are briefly described below:

Connected and Autonomous Vehicles (CAVs)

Connected and Autonomous Vehicles (CAVs) are vehicles that, to a certain level, can autonomously perform driving tasks on behalf of the actual driver. The level of autonomy for vehicles is classified from Level 0 to Level 5, with Level 0 referring to a vehicle where the driver is fully responsible for all driving tasks, and Level 5 referring to vehicles that are able to functionally perform all driving tasks on behalf of the driver. The vast majority of vehicles on the roadway in Welland today would be classified under Level 1 or Level 2 automation, which includes vehicles that provide some degree of driving assistance such as cruise control, lane assist, and/or safety features (i.e., automatic braking).

There is currently extensive research being undertaken by transportation professionals, the automotive industry, public health agencies, and more, regarding the feasibility and timelines of

more widespread CAV adoption. Regardless of timelines however, a certainty is that CAVs will play an integral role in the future of mobility and will impact the way road systems are designed, planned, and used.

Smart Cities and Open Data

A Smart City is an urban area that utilizes communication technology and sensors to collect specific data that can be used to enhance quality of life, operational efficiency, sustainability, and municipal planning practices. Smart Cities rely on automation and the "Internet of Things" (IOT)—which refers to the collective network of devices that have the capability of exchanging data between each other and larger networks/servers. In simple terms Smart Cities use phones to collect large amounts of data that can be used for a variety of services.

Coupled with the Smart City trend is the Open Data trend, which is an initiative to make the data that is collected transparent and easily accessible by the public. This initiative functions to increase engagement on municipal projects while concurrently creating a collective intelligence for all members of society.

With respect to the TMP and Welland, Smart Cities and Open Data can be used to inform the municipal investments that will optimize the efficiency of transportation facilities within the City.

Smartphone Applications

The use of smartphone applications to plan trips and interact with the transportation network is the new normal. Many of these applications allow users to more efficiently complete trips by providing real-time access to transit schedules, ridesharing programs (i.e., Uber, Lyft, etc.), and more mobility avenues. In Welland, transit users can leverage apps such as Niagara Region Transit Plus or NRT OnDemand to initiate transit and ridesharing trips, respectively, which includes specialized transit options such as Chair-A-Van.

Mobility as a Service (MAAS)

Mobility as a Service (MAAS)—or otherwise known as Smart Mobility—is a culmination of various transportation services to provide a single, streamlined and accessible transportation service. In other words, MAAS is intended to let users plan, book, and pay for a trip that could include walking, transit, cycling, ridesharing, or a combination thereof, through the use of a single application on their device. The intent of MAAS is to make mobility easy and remove any complications that could come with planning a trip that utilizes more than one (1) mode of transportation.

The full adoption of MAAS programs in North America are still rare, although some municipalities have implemented certain aspects of it. An example of this would be transit apps that also have an integrated ridesharing service to allow users to complete the "last mile" of their trip. In this

case, users would typically have to plan and pay for a transit trip, and then do the same for the ridesharing trip; however, the MAAS concept allows them to do both at the same time, thereby making the whole trip more convenient.

Electric Vehicles (EVs)

Electric Vehicles (EVs) and plug-in hybrids are becoming much more prevalent, with Transport Canada forming the Zero-Emission Vehicle (ZEV) Council in March 2023 in hopes of hastening the switch to zero-emission vehicles in Canada.

In fact, Transport Canada intends to decarbonize the transportation sector by committing to achieving 100% zero-emission vehicle sales by 2035 for all new light-duty vehicles. The influx of EVs will require substantial investment in new infrastructure to support it.

3.1.4 Problem and Opportunity

As part of Phase 1 of the MCEA process, the TMP project team developed the following Problem and Opportunity statement:

"The City of Welland is forecasted to experience considerable growth in residential and employment population by 2051. This growth will impose significant demand on the transportation system, creating an increased need for multi-modal adoption and facilities across the municipality.

The TMP will seek to develop a barrier-free network that is well-connected, safe, environmentally sustainable, and efficiently operating, through the implementation of strategic transportation infrastructure that accommodates all modes of travel over the next twenty (20) years".

3.1.5 Vision Statement

The Vision Statement is meant to insert transportation into an overarching unity of Welland's interrelated objectives such as those documented in other City plans or policies, and/or those identified by the public in the early stages of the public consultation process. The Vision intends to recognize the impact that mobility has on the quality of life of residents, the ability to foster safe and welcoming communities, and the foundation for thriving businesses and economic vitality. The Vision Statement represents the desired outcome of the TMP—or in other words, what can be plainly perceived after all of the objectives of the TMP have been fulfilled.

The following Vision Statement was prepared to unite the objectives of the TMP, related City documents, and public interest:

> *"An inclusive and barrier-free transportation system that promotes the development of vibrant and livable communities through multi-modal mobility, safe roads, intraregional connectivity, and conservation of Welland's rich heritage and water features."*

3.2 Future Building

As part of Phase 2 of the MCEA process, the TMP has developed an evaluation criteria for each improvement, inclusive of the following:

Connectivity – Does the corridor require improvements to achieve multi-modal connectivity with the existing local and regional network?

Safety – Is the corridor empirically and perceivably safe? Will mitigation measures improve the livability of the surrounding neighbourhood?

Operations – Are there operational constraints (i.e., excessive delays or vehicle queueing) that can be effectively alleviated through TMP recommendations?

Community – Can the livability of the surrounding community be enhanced through transportation improvements? Can heritage and natural landscape be protected?

Cost – What are the monetary and resource implications associated with the required improvements?

3.2.1 Future Growth Projections

The City of Welland recorded a population of 55,750 residents in 2021 but is currently undergoing a considerable shift in residential landscape. The population growth was previously projected at 105,975 residents by the year 2041 in the 2022 Development Charges Background Study; however, the ongoing OP Update has noted an even greater growth projection as a result of increased intensification within the downtown and substantial growth in the north Welland areas. As part of the OP Update, revised land use schedules, dwelling unit projections, and employment population forecasts were provided to the TMP project team. The dwelling unit and employment projections were organized into traffic analysis zones (TAZ) that each exhibit their own unique travel characteristics, population context, and spatial attributes that could impact travel patterns. The TAZ boundaries are illustrated in Figure 3.2.

Utilizing the revised population forecasts for each zone in conjunction with the revised land use schedules and known developments, the growth areas within Welland were illustrated for residential and employment populations, shown in Figure 3.3 and Figure 3.4, respectively. It is important to note that these figures are intended to show approximate high-level planning distributions within the City; the coverage of these growth areas are not exact, and the fruition of these projections are subject to numerous dynamic circumstances including approvals, changes in economic landscape and more.

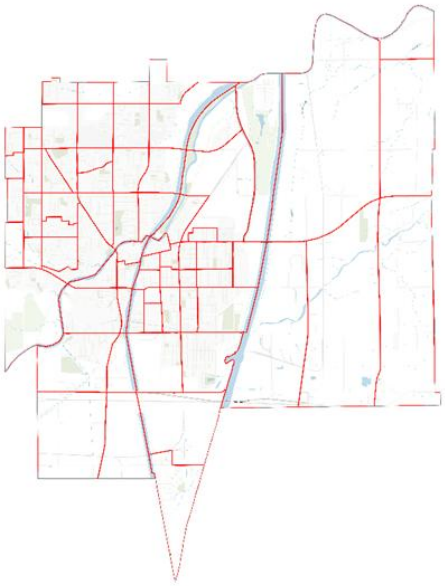


Figure 3.2 – Traffic Analysis Zone Boundaries

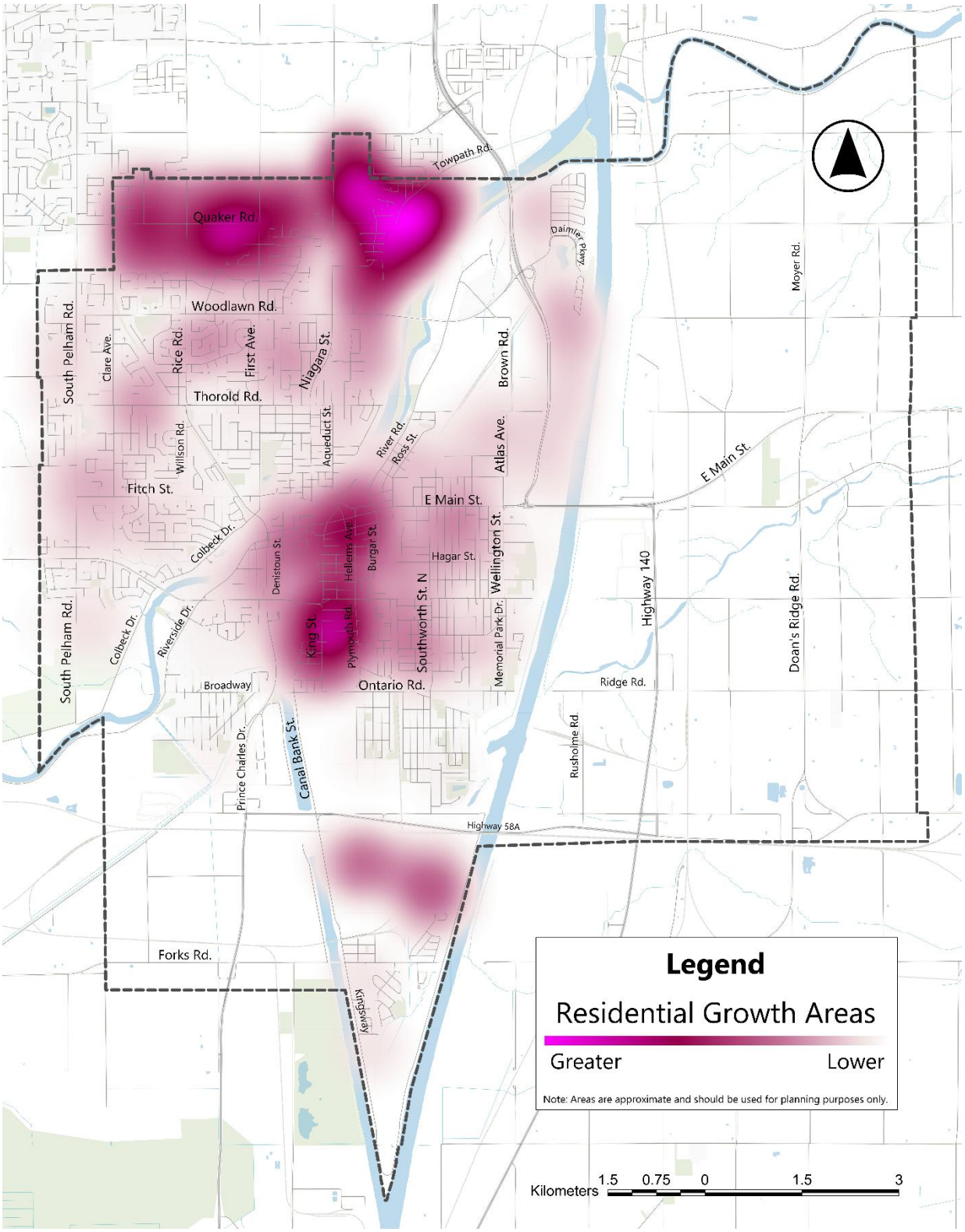


Figure 3.3 – Residential Growth Areas

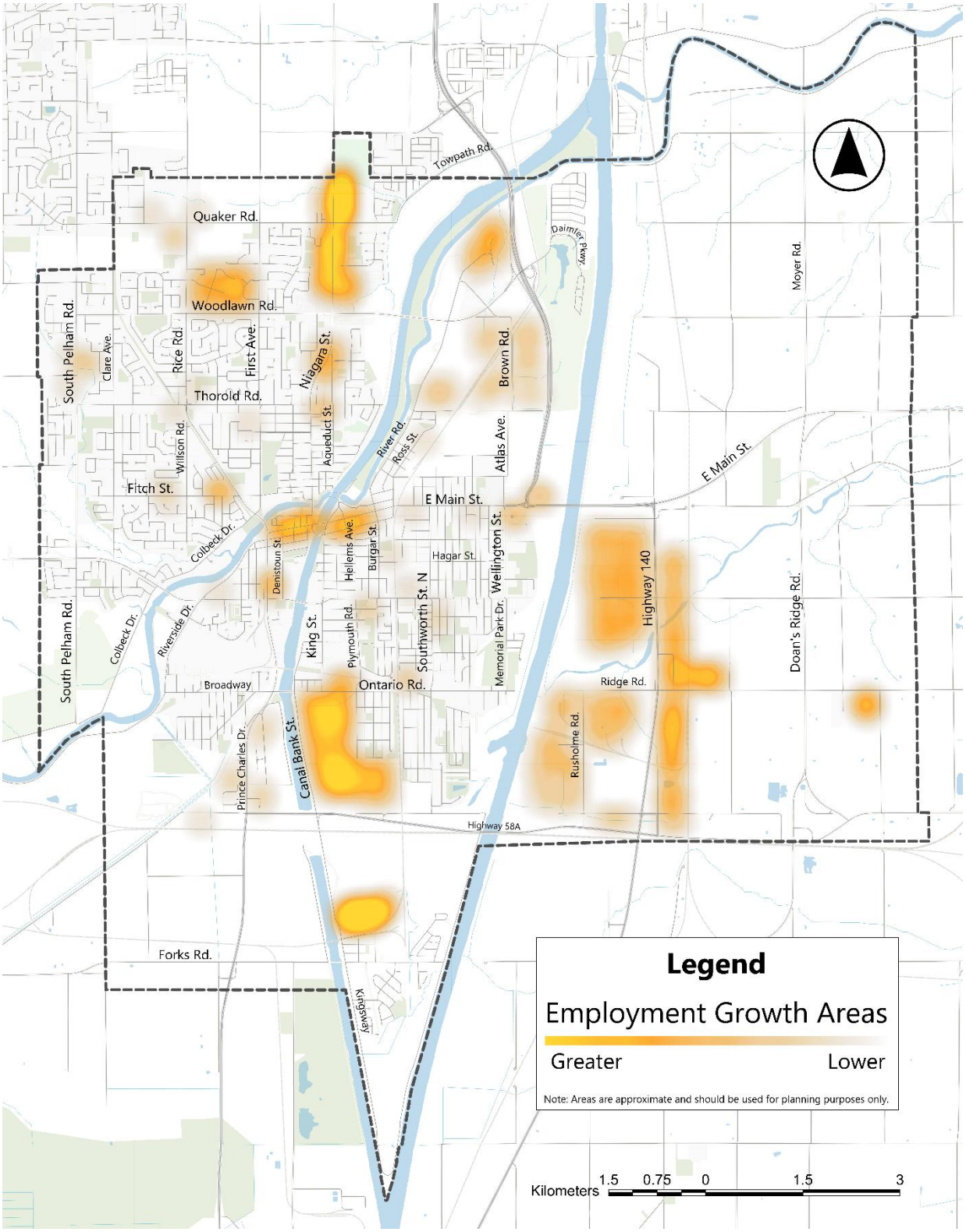


Figure 3.4 – Employment Growth Areas

Residential Growth

The principal share of the residential growth is expected to occur within the downtown and northern Welland areas, although there is notable growth associated with other developments throughout the City including the Dain City developments (southern Welland) and other various development efforts in the northwestern quadrant of Welland.

The area surrounding Quaker Road, which is forecasted to accommodate substantial residential development efforts, is a combination of multiple developments with the two (2) primary developments being the Northwest Welland Secondary Plan (NWWSP) and Northern Reach developments.

The DC Study projected the City-wide housing type mix for the 2041 horizon year to reflect a shift towards medium-to-high density housing such as townhomes and apartment units. The DC Study also projected a housing type mix for the Northwest Welland Secondary Plan area in isolation, containing primarily single and semi-detached dwelling units. These housing type distributions are shown in Figure 3.5.

It should be noted that the OP Update includes enhanced intensification opportunities as compared to the DC Study, and therefore, the future housing type distribution may favour medium-to-high density housing (i.e., row homes & townhomes, apartments) to a greater degree than what is quoted in the DC Study.

Employment Growth

Some notable areas of planned employment growth within the City include the areas surrounding Highway 406, the lands on the southeast corner of Ontario Road & Canal Bank Street, the areas surrounding Niagara Street and Quaker Road, the lands surrounding Power Drive, the lands adjacent to the Niagara Street Bridge, as well as a collection of areas scattered throughout the City, many

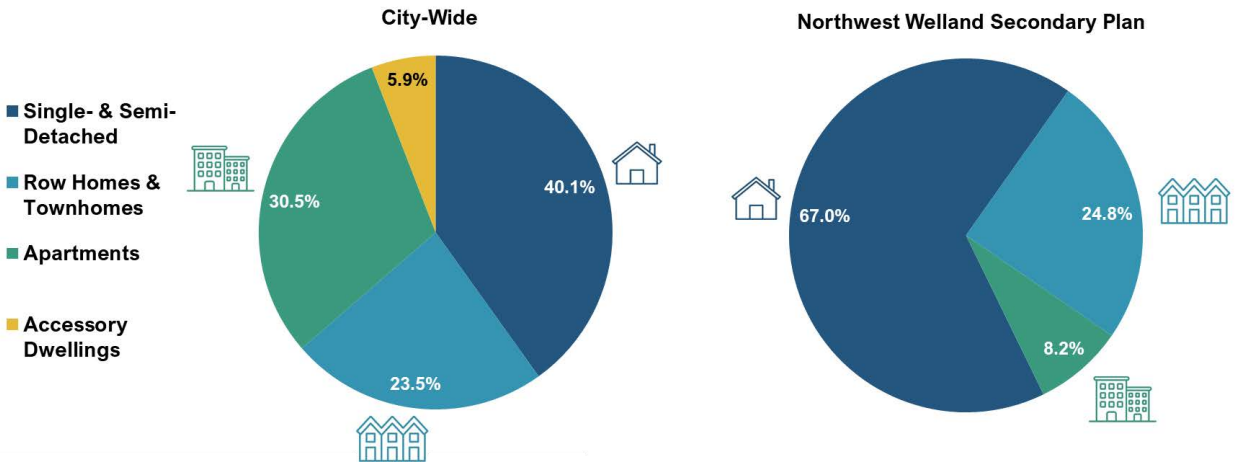


Figure 3.5 – City-Wide and Northwest Welland Secondary Plan Housing Type Distributions

of which are situated north of East Main Street.

3.2.2 Focus City Corridors

Using the evaluation criteria outlined in Section 3.2, localized investigation was supplemented by traffic and link analysis, collision reviews, property constraints, and review of historical traffic data. The focus City corridors are shown in Figure 3.6 and are briefly described below:

Wellington Street

Wellington Street is an existing two-lane collector roadway situated in the heart of Welland. The corridor is only approximately one (1) kilometre in its entirety but is adjacent to both the Franco-Niagara Elementary/Secondary School and Eastdale Secondary School.

Despite servicing two (2) different schools in close proximity, Wellington Street is an important route for north-south connection and freeway access. The corridor is posted at 40km/hr to support the safety of students in the vicinity. The objective for this corridor is to maintain and improve pedestrian safety while mitigating traffic constraints that are forecast under future horizons, specifically at the northern terminus of the street.

First Avenue

First Avenue is an existing two-lane roadway that is classified as a collector from Prince Charles Drive to Woodlawn Road and an arterial from Woodlawn Road to its northern terminus (Thorold boundary). First Avenue serves as one of the spinal north-south corridors on the west side of the canal and abuts the east side of Niagara College.

A review of existing traffic conditions and planned developments shows that improvements along First Avenue—specifically near Quaker Road—are necessary to alleviate prevailing delays and impending demands associated with future developments in northern Welland.

Lincoln Street

As a primary east-west arterial route in central Welland, Lincoln Street provides access to various land uses including residential, commercial, and institutional areas. The street is one (1) lane in each direction, with the eastern portion of the roadway providing a two-way centre left-turn lane.

Lincoln Street was identified as a focus corridor to ensure that it is prepared to accommodate multi-modal mobility and goods movement safely and efficiently as intensification efforts in central Welland reach their realization.

Daimler Parkway

Daimler Parkway has been identified as a focus corridor in response to substantial development efforts on the east side of Highway 406. With the lands being bounded by Highway 406 to the west, East Main Street to the south, and water features to the east and north, Daimler Parkway currently serves as the sole public access to the existing and future residential land uses. Furthermore, a rail

line resides approximately sixty (60) metres east of the Highway 406 northbound off-ramp intersection, servicing approximately one (1) to two (2) rail movements per day

Quaker Road

With substantial developments such as the Northwest Welland Secondary Plan and Northern Reach developments, Quaker Road is expected to inherit a vital role in Welland's road network. Improvements to the corridor will be necessary to adequately equip Quaker Road for these new strains.

Additional Regional Corridors

The regional road network within the City is comprised of urban and rural arterial corridors that achieve widespread coverage of Welland's major traffic generators. Many of these corridors—specifically East Main Street, Woodlawn Road, Prince Charles Drive, and Niagara Street—carry majority of the vehicular traffic that moves through and within

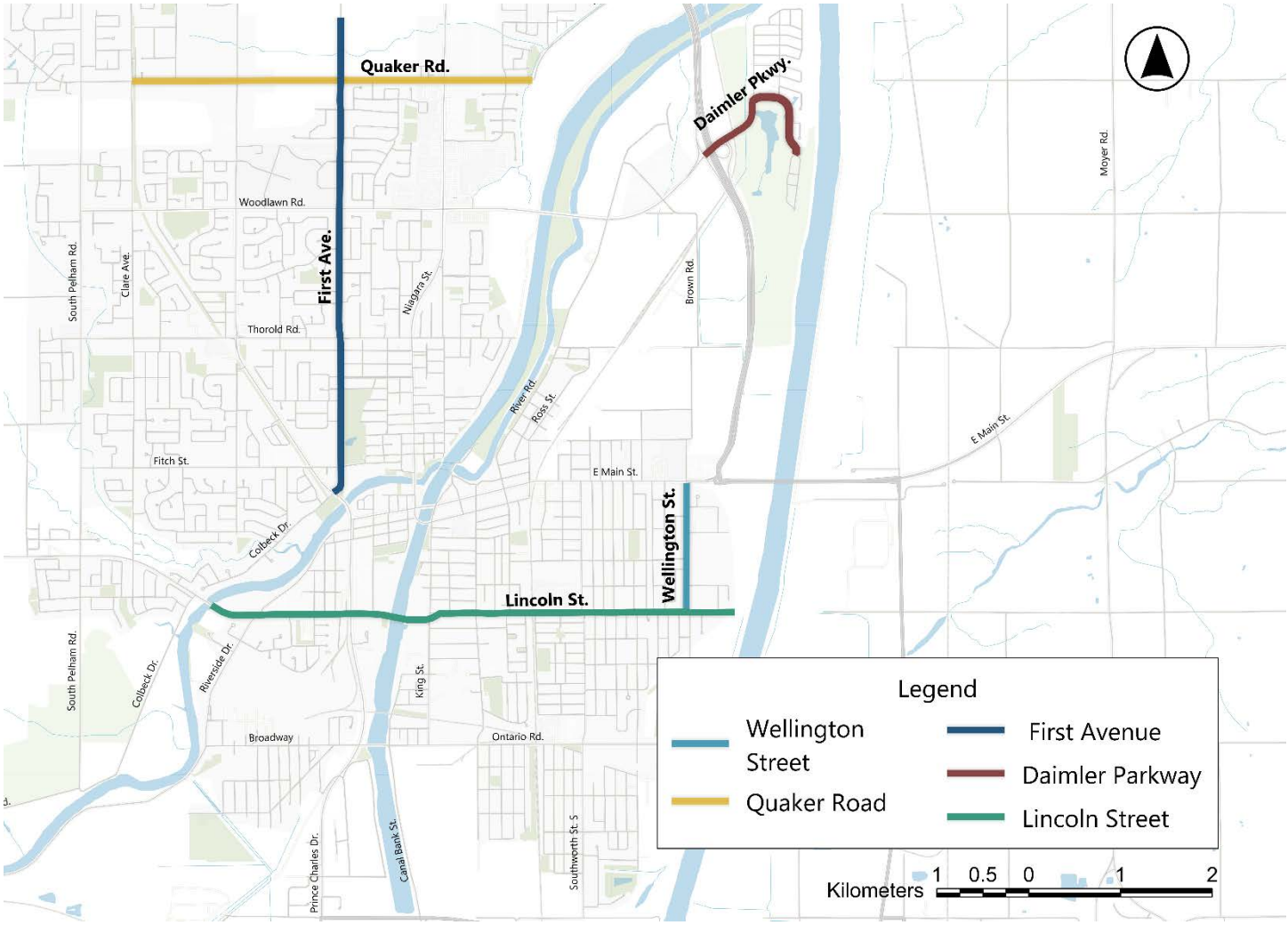


Figure 3.6 – Focus City Corridors

Welland. The forecasting exercise identified East Main Street and Niagara Street for reflecting potential capacity constraints in the future. As such, these corridors may require collaboration with the Region to mitigate traffic constraints.

Regional Water Crossings

The transportation network is confined by the vast network of waterways that flow through the City. Under peak periods, these water crossings could pose as a limitation for the transportation network. The modelling exercise identified congestion along the water crossing routes in the downtown area, primarily for the regional bridges along Prince Charles Drive, Niagara Street, West Main Street, and Division Street.

Rail Crossings

Welland's history of commerce has stemmed an extensive rail system that intersects with vehicular travel paths across the City. The TMP explores ways of optimizing these rail crossings through an operations and safety lens.

3.2.3 Transportation Modal Split Targets

The selection of travel mode is largely a function of convenience, comfortability, accessibility, available infrastructure, and safety. The TMP seeks to foster a multi-modal network to alleviate congestion, improve sustainability, and promote healthy lifestyles for Welland residents.

Defining modal split targets is an effective method of quantifying the degree to which alternative modes are being adopted, thereby allowing the City to gauge the realized impacts of various infrastructure investments. The TMP utilizes short-term (2031), medium-term (2041), and long-term (2051) horizon years for transportation analysis and solutions. For modal split targets, desired splits have been defined for the short-term and medium-term, with the understanding that future TMP updates will benchmark current progress and define suitable and achievable 2051 targets thereafter.

The commuter modal split targets are shown in Table 3.1. It is noted that while the mode splits are measured for commuters, it is expected that the acceptance of sustainable modes as a commuting option will reasonably translate to the acceptance

Table 3.1 – Modal Share Targets

Primary Mode of Commuting	2011 TTS	2016 TTS	2031 Target	2041 Target
Automobile Driver	71%	74%	69%	61%
Automobile Passenger	19%	15%	15%	18%
Public Transit	6%	7%	10%	12%
Cycling	1%	1%	2%	4%
Walking	3%	3%	4%	5%
Other	<1%	<1%	<1%	<1%

of sustainable modes for all types of trips that are within a reasonable distance.

As noted in Section 2.2.2, the percentage of Welland residents that work in Welland exhibited a significant decrease from 2011 to 2016. Furthermore, recent transportation trends such as work-from-home and hybrid work arrangements necessitate a reduced need for people to live near their workplace. However, with a resurgence of in-person industrial-type jobs in Welland over the next twenty years, the City may realize a shift in the number of residents who work within the municipality.

The 2031 modal share target reflects a moderate decrease in single-occupancy vehicles and a greater adoption of other modes—particularly public transit. This is mainly attributed to the new, higher density development that is on the short-term horizon, increased familiarity with the new NRT transit and OnDemand services, and anticipated increases in industrial-type employment surrounding the Highway 406 corridor.

The 2041 modal share target reflects an even greater adoption of transit, in addition to more aggressive cycling and walking mode splits. These splits have been calculated based on short-to-medium term cycling and walking infrastructure improvements that will make active transportation a more viable method of mobility.

It is understood that changing commuter trends for longer trips, such as those beyond Welland and its neighbouring municipalities, will prove to be more difficult as modes such as walking and cycling will no longer be realistic alternatives. As such, the modal split targets are primarily focused on urban trips (i.e., less than 15 minutes in length), which will largely consist of trips within Welland or the bordering municipalities.

3.2.4 Previously Planned Improvements

A number of transportation-related improvements within Welland are already planned for, with these improvements including those under provincial, regional, and local jurisdiction.

Road Improvements

Urbanization and multi-modal improvements are currently planned for Rice Road (Regional Road 54) north of Quaker Road.

Active Transportation

Improvements to walking and cycling within the City are documented in the Welland Community Trails Strategy (2021) and are shown in Figure 3.7.

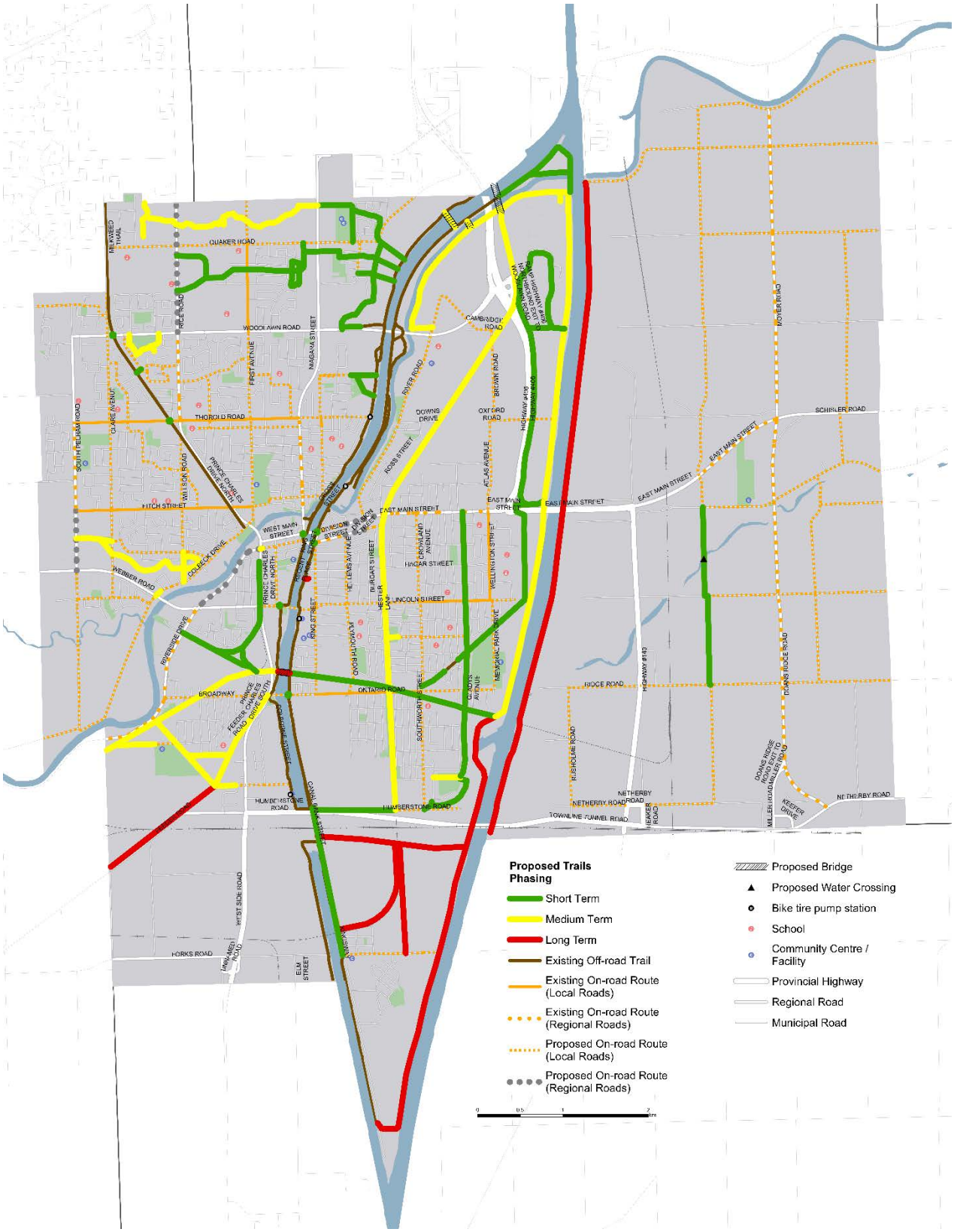


Figure 3.7 – Recommended Active Transportation Infrastructure Phasing – Cycling Network (Welland Community Trails Strategy 2021)

Bridges

An environmental assessment (EA) was completed for the Niagara Street bridge in 2022. The preferred alternative for the bridge design includes a sidewalk, a bicycle lane, and a vehicular travel lane in each direction.

The Forks Road Bridge Replacement was opened to vehicular traffic in August 2024. The bridge design includes bicycle lanes, vehicular travel lanes, and a sidewalk on the north side of the bridge.

Transit

The Niagara Region Transportation Master Plan (2017) outlines strategies, policies, programs, and projects to be undertaken by the year 2041. An important facet of the overarching theme of the Niagara Region TMP is to improve the efficiency and adoption of public transportation within Niagara, as a means of optimizing mobility, social equity, and economic vitality.

Some high-level improvements identified for the City of Welland include providing a high-frequency transit network with headways of 15 minutes or less along key corridors, in addition to providing inter-municipal transit to all Niagara Region municipalities through a combination of fixed-route and demand-response transit services. The TMP also recommends improving active transportation connections to transit hubs, introducing a subsidized co-fares program that promotes transfers between NRT and GO transit services, and policy improvements. Specific objectives for Welland include optimizing the existing inter-municipal routes with St. Catharines, Port Colborne, and Niagara Falls.

The TMP mentions a rapid transit system which could utilize existing rail systems within Welland. However, these recommendations are merely conceptual and will require further study. The conceptual opportunities for higher-order transit corridors are shown in Figure 3.8.

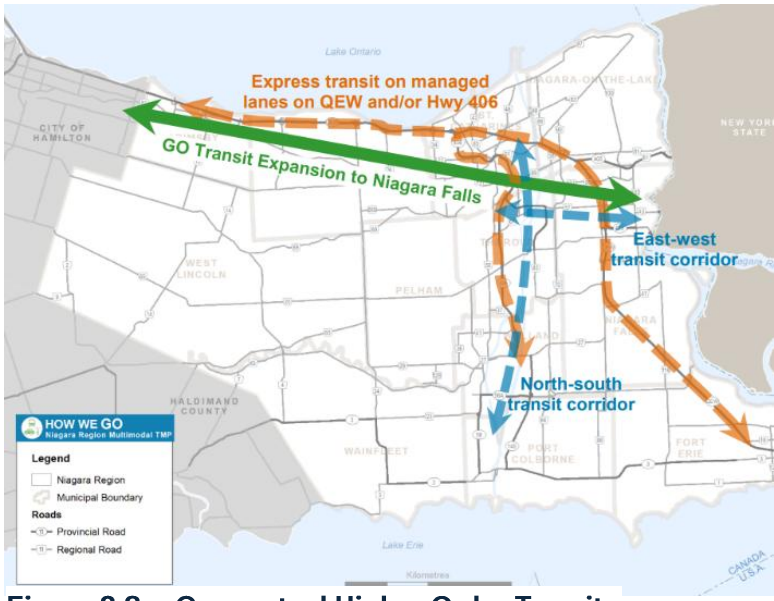


Figure 3.8 – Conceptual Higher Order Transit Routes (Niagara Region TMP 2017)

3.2.5 Needs and Opportunities

The following needs and opportunities were derived through a consolidation of existing conditions, public feedback, stakeholder consultation and anticipated changes.

Needs

Roadway Safety – A consistent theme from the public and stakeholder consultation was that there is ample room for improvement regarding roadway safety.

In particular, respondents noted excessive operating speeds on City roads and a desire for greater separation between pedestrians and the roadway.

Active Transportation – A key theme from the existing conditions review was that the existing active transportation network—specifically with respect to cycling—is discontinuous. Many respondents during the engagement process noted discomfort switching between dedicated and shared facilities, with these respondents also expressing that drivers are not respectful of cyclists on the roadway. A focus item for active transportation is to improve wayfinding within the City, specifically in the downtown and along the canal.

Intraregional Travel – In a central location to the Niagara Region, travel patterns and public feedback indicate a need for strong connectivity between Welland and other municipalities within the Region. A multi-modal network that is interconnected with its neighbouring municipalities has the potential to boost industry and recreation.

Adoption of Alternative Transportation Modes – As similar to almost all largely suburban Ontario municipalities, Welland exhibits a relatively high dependence on single-occupancy automobiles with approximately 74% of commuters arriving by car, truck or van. Although this distribution is moderately close to the provincial average of 71%, there is still a need for a more balanced network as Welland grows.

Accessibility – An accessible network is one that provides equal opportunity to programs, services, devices, or environments without any challenge or barriers, regardless of ability. Members of the stakeholder working group highlighted certain areas where the City could improve accessibility. These areas included sound queues at traffic signals, pavement and sidewalk quality, and decreased operating speeds.

Opportunities

Desire for Traffic Calming – Respondents of the public consultation and stakeholder working groups voiced support of utilizing traffic calming to create safer roadways. Physical traffic calming measures are oftentimes met with discord among residents, but a general consensus throughout the engagement process was that traffic calming measures are supported by the community.

Support for Lower Speeds – Similar to the traffic calming techniques, many respondents at the PICs and stakeholder working groups were strongly in favour of reducing vehicle operating speeds along local and minor collector streets.

Recreational Cycling – Although cycling is not a widely adopted method of commuting, recreational cycling was broadly endorsed by PIC attendees, indicating that a passionate cycling culture already exists within Welland.

Road Design – In conjunction with the TMP, the City developed new cross sections for each of the different road

classes. This provided a unique opportunity to cater the design to the identified safety, multi-modal, and accessibility needs of Welland.

Electric Vehicles – With substantial development in the pipeline, an opportunity exists for the City of Welland to proactively address impending electric vehicle infrastructure demands.

Welland Farmers Market

4 A Vision for the Future

4 A Vision for the Future

4.1 Adjustments to Road Classification

As part of the road network review process, an in-depth evaluation of City roads was conducted to determine the conformance of each roadway to its existing classification and thereafter determine if the roadway should be re-classified. This process involved the formulation of an objective urban road classification criteria which could be applied to each roadway within the City. The formulated criteria considered a number of roadway characteristics including intended service function, typical traffic volumes, posted speeds, active transportation accommodation, parking accommodation, traffic calming feasibility, and more. This criteria can be found in Appendix 5.

Moreover, the re-classification exercise aggregated the collector road type into two (2) sub-types: the minor collector roadway and the major collector roadway. This change was made to refine the rather wide variety of collector roadways into sub-types that more accurately reflect the function and feel of the roadway. For example, Wellington Street and Colbeck Drive are both appropriately classified as collector roadways, yet are vastly different in their purpose and operation (i.e., Wellington Street carries much larger traffic volumes and provides access to institutional uses, whereas Colbeck Drive is surrounded by residential land uses). Separating the collector road type into two (2) sub-types allows for unique roadway remedies to be prescribed while not contravening the intended function of the roadway. In general, the function of the two (2) collector type roadways are similar; however, minor collectors are more outfitted to residential areas as they utilize reduced posted speeds and allow for traffic calming devices where warranted.

The results of the road network review and collector road aggregation comprise the proposed road hierarchy, which is shown in Figure 4.1.

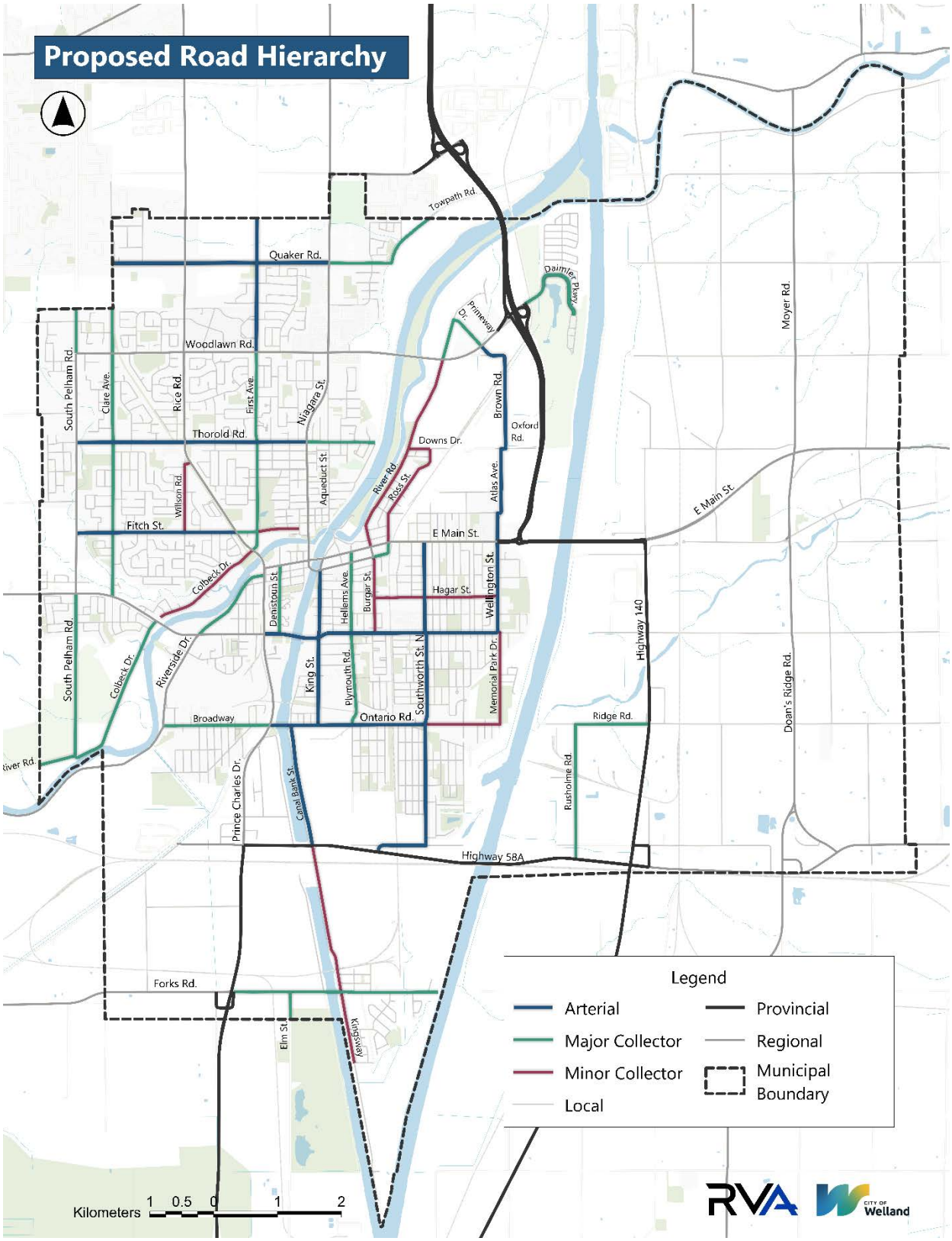


Figure 4.1 – Proposed Road Hierarchy

4.2 Complete Streets

In conjunction with the road re-classification, the City developed new standard cross sections for municipal roads through an iterative process among the project team—these standard cross sections include local, collector, and arterial corridors.

4.2.1 Local Road Cross Section

The local road typical cross section provides inclusive mobility to residential land uses, eventually connecting to higher order roadways for more unimpeded travel. The local road typical cross section includes a 1.5-metre sidewalk on either side of the roadway and 4-metre-wide vehicular travel lanes. In general, on-street parking is permitted on one (1) side of the roadway, with motorists and cyclists expected to share the roadway unless a dedicated cycling facility is provided. The typical right-of-way width required for local roads is 20 metres.

Figure 4.2 represents an exemplary local road cross section that supplements shared cycling facilities through the use of various Ontario Traffic Manual (OTM) signage and pavement marking attributes.

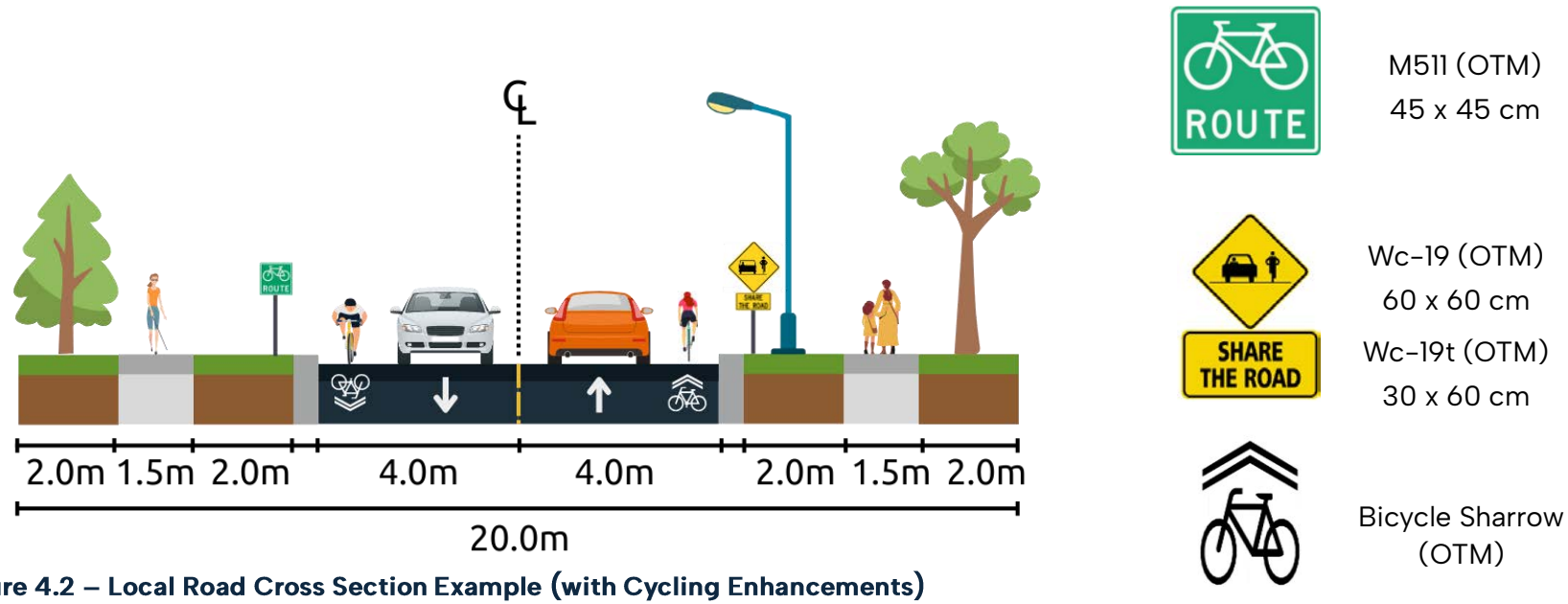
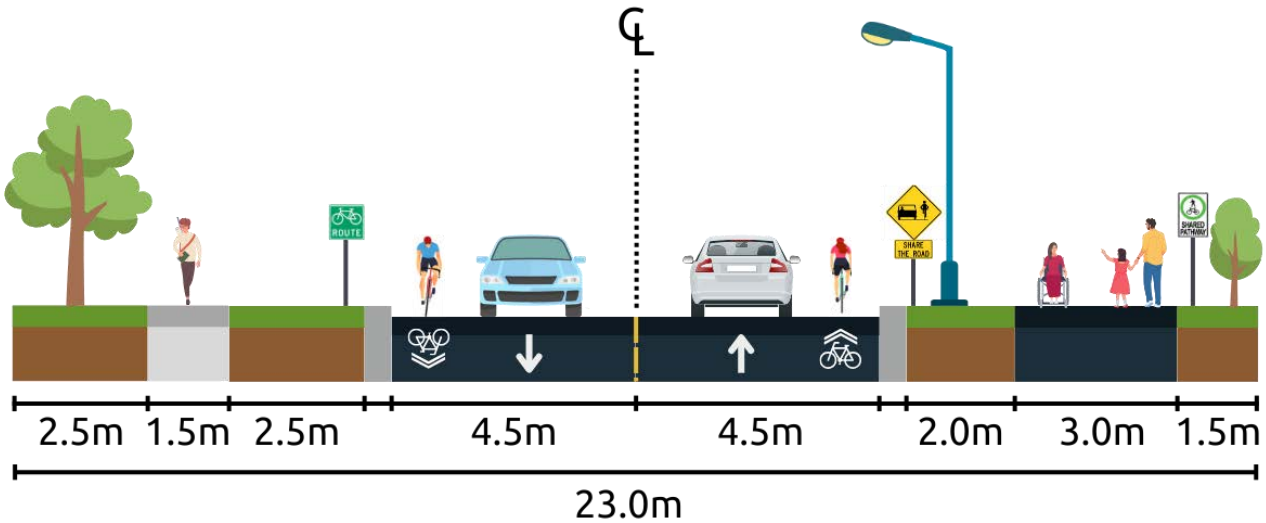


Figure 4.2 – Local Road Cross Section Example (with Cycling Enhancements)

4.2.2 Collector Road Cross Section

The collector road typical cross section connects road users to the spinal transportation network while also providing multi-modal accommodation to residential land uses and neighbourhood level generators such as schools. The collector road typical cross section requires a 1.5-metre-wide sidewalk on both sides of the street, unless a 3-metre-wide multi-use path (MUP) can be provided instead. On-street parking will be permitted on one (1) or both sides as needed, and cyclists and motorists are expected to share the 4.5-metre-wide travel lanes unless a dedicated cycling facility is provided as per OTM Book 18. Awareness for various modes of transportation along the MUP should be raised through the use of Shared Pathway signage (Rb-71 OTM). The typical right-of-way width required for collector roadway is 23 metres. The collector road typical cross section applies to both the major collector and minor collector roadways.

Figure 4.3 shows a typical collector roadway cross section that supports shared cycling facilities and provides a multi-use path on one (1) side of the roadway.



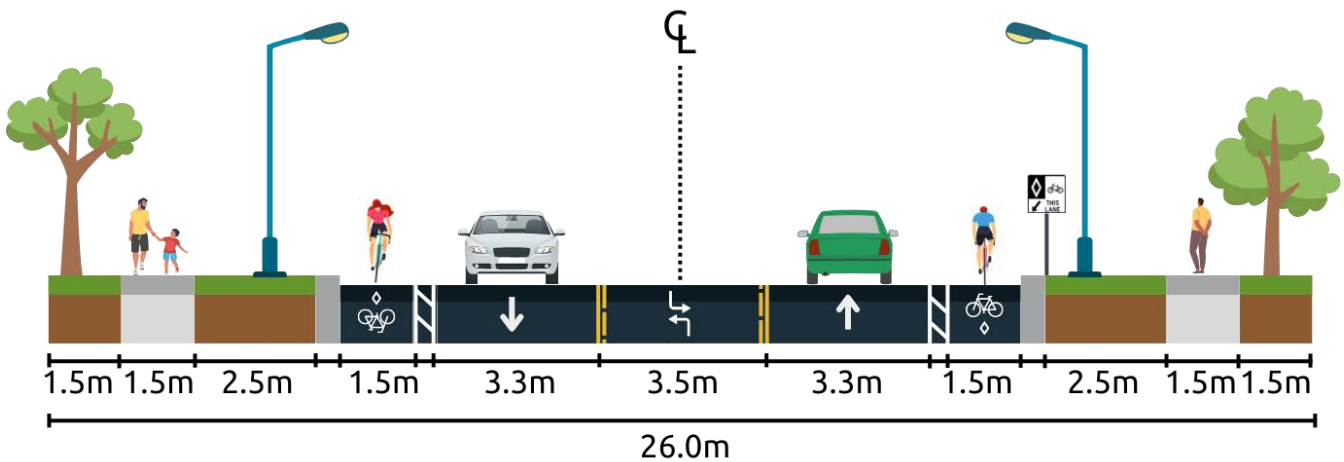
Rb-71 (OTM)
30 x 45 cm

Figure 4.3 – Collector Road Cross Section Example (with Cycling Enhancements)

4.2.3 Arterial Road Cross Section

The arterial road typical cross section is meant to facilitate mobility of all modes by connecting road users to major generators such as shopping centres, as well as to higher order regional and provincial roadways to complete intercity or interregional travel. The arterial road typical cross section provides approximately 14 metres of asphalt width with a 1.5-metre-wide sidewalk on both sides of the street. The provided cyclist facilities are to be based on OTM Book 18. On-street parking is generally prohibited along arterial roadways to maintain safe and efficient flow of vehicles and bikes. The typical right-of-way width for arterial roadways is 26 metres.

Figure 4.4 shows an example of a three-lane arterial road with buffered bicycle lanes that are supported by Reserved Bicycle Lane signage (Rb-84A OTM). However, the cross section for arterials is not a "one-size-fits-all" solution. In many cases, the cross section will need to be adapted to property constraints and corridor-specific needs.



Rb-84 (OTM)
60 x 60 cm

Figure 4.4 – Arterial Road Cross Section Example (Two-Way Left-Turn Lane Configuration)

4.3 Road Safety

Since the inception of the TMP, road safety was an improvement area that resonated closely with the community, with much of the feedback received from the public and stakeholders relating to creating safer roads for road users of all ages and abilities.

4.3.1 Vision Zero

Vision Zero can be adopted as a comprehensive action plan with its objectives being implemented into policies and design. By formally labelling the City as a Vision Zero community, Welland is committing to safer roads for all road users. The following action items can be taken to support the Vision Zero strategy.

- Complete educational outreach programs and campaigns to educate residents on the strategy.
- Provide an avenue on the Welland website for residents to share their thoughts and concerns on road safety in their community.
- Collect and maintain a robust database of traffic data and collisions.

4.3.2 Default 40km/hr Speed Limit

The Road Traffic Injury Prevention Training Manual (2006) published by the World Health Organization (WHO) includes significant discussion regarding the effects of operating speed on collisions and collision severity, particularly in the context of pedestrians. The manual states that pedestrians have a 90% chance of survival for collisions at 30km/hr or below, but have less than a 60% chance of survival for collisions at 45km/hr or above. The relationship between operating speeds and pedestrian fatalities is illustrated in Figure 4.5.

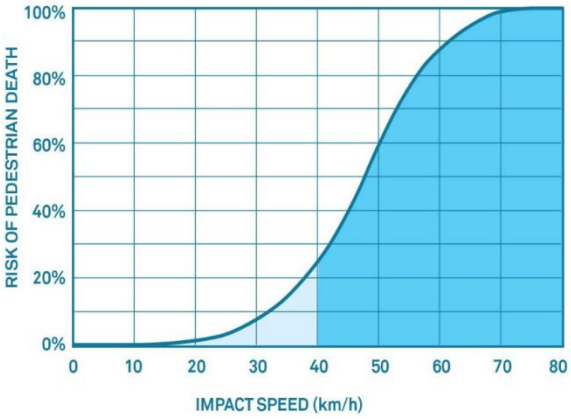


Figure 4.5 – Relationship between Operating Speeds and Collision Severity (Source: NACTO, Global Street Design Guide, 2013)

Based on feedback solicited throughout the engagement process, the respondents were in favour of the notion to reduce operating speeds on local and minor collector roads within the City. Moreover, a reduction in speed limits aligns with many of the other objectives and strategies encompassed in this TMP including Vision Zero and fostering multi-modal travel behaviours. It is therefore recommended that the City of Welland reduce the default speed limit from 50km/hr to 40km/hr City-wide in support of safer roads.

Supporting Initiatives

It is generally understood that changing the posted speed limit in isolation will not have a significant impact on driver operating speeds, and that the desired results are usually achieved through the application of concurrent traffic calming strategies. This is because drivers

generally operate at speeds that they are comfortable at, which is a culmination of perceived safety and perceived risk. As such, without altering the physical characteristics of the roadway or introducing perceived risk (i.e., ladder crosswalks indicating that pedestrian could be present), the signage changes will likely have minimal impacts on operating speeds. This assumption held true for many municipalities across Ontario that completed a pilot program, with the posted speed limit reduction realizing negligible results unless enhanced by other measures.

There are numerous strategies to support the change in posted speed including education, enforcement and engineering. In most cases, municipalities implement some sort of physical alteration to the roadway such as speed humps, flexible bollards, speed radar signs, or other traffic calming devices to supplement the reduction in speed.

Signage

A review of best practices across Ontario indicated that gateway signage is the most cost-efficient and effective way of cultivating reduced posted speeds. Gateway signage consists of signage at the entrance/exit points of the community, with no signage throughout the neighbourhood. This method establishes 40km/hr "areas" rather than specific corridors, thus reducing the cost to implement and maintain, in addition to creating consistency throughout the City which may result in improved compliance.

The 40km/hr area gateway signage is an amalgamation of various OTM signage, as shown in Figure 4.6.

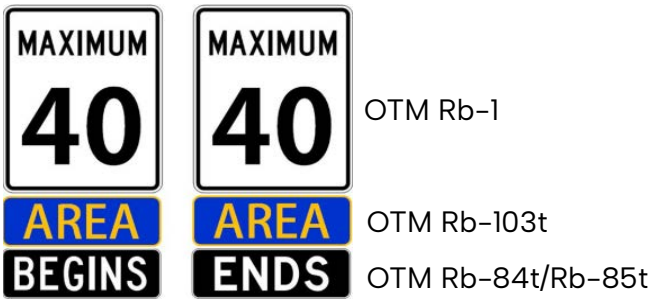


Figure 4.6 – Proposed 40km/hr Gateway Signage

It was noted during a review of the road network that Wellington Street is already posted at 40km/hr despite being classified as a major collector roadway. In conjunction with the 40km/hr default speed limit implementation, it is recommended that Wellington Street in its entirety is increased to 50km/hr, with seasonal and time-of-day speed limit reductions being implemented in support of the adjacent schools.

4.3.3 Traffic Calming

Traffic calming is the act of managing driver behaviour and operating speeds through the application of various passive and/or physical roadway measures. By doing so, the roadway can foster a safe and potentially beautified environment for road users and adjacent residents. A street that is well traffic calmed usually results in operating speeds and traffic volumes that are suitable for the intended function of the street, which reduces cut-through traffic on local streets and creates a safer, more inclusive community.

Traffic calming can be implemented in a variety of ways, although the types of measures can generally be classified as either passive (soft) or physical.

Passive Traffic Calming measures can include road signage, pavement markings, lawn signs, flexible signs and flexible bollards. These measures are typically quick and cost-efficient to implement, with the intended purpose being to reduce driver operating speeds through increased driver workload and perceived risk. Many municipalities start with passive traffic calming and only implement physical traffic calming if the speeding/cut-through issues still persist.

Physical Traffic Calming measures, as the name suggests, are any traffic calming measures that include a physical alteration to the travelled path of the roadway. The City of Welland Municipal Design Standards (February 2013) recognize a number of these measures, including curb extensions, chicanes, traffic circles, textured crosswalks, speed humps, raised crosswalks, lane narrowing, speed cushions and more. While physical traffic calming measures are more effective in reducing operating speeds and cut-through traffic, they are more expensive and are usually met with discord among communities—largely due to the two (2) typical factions of those heavily in favour of traffic calming and those heavily against.

Traffic Calming Policy Update

The City of Welland currently implements traffic calming measures when there is sufficient resident support and technical evidence that a speeding issue exists. However, in alignment with the TMP, the project team has worked closely with City staff and incorporated public feedback to develop a Traffic Calming Policy Update that is custom fitted to the mobility context and resources of Welland. The revised traffic calming policy can be found in Appendix 6.

4.4 Active Transportation

The active transportation improvements within Welland are largely documented in the Community Trails Strategy (2021), with the TMP adding infill links as required based on the network gap analysis and feedback from the public.

4.4.1 Cycling Facility Selection

The new road cross sections seek to provide appropriate cycling facilities that are continuous and connected throughout the City and with neighbouring municipalities. However, merely connecting the network will not dramatically increase adoption of cycling within Welland—but rather, widespread adoption rests on the shoulders of comfortability and safety.

The "Four Types" categorization is an approach to classifying the types of cyclists based on their comfortability and experience on the roadway (R. Geller). The approach categorizes cyclists into the following groups:

- Strong & Fearless
- Enthused & Confident
- Interested but Concerned

- No Way No How

In short, this categorization technique was developed to isolate target markets with respect to cycling, with the intent being to progressively move cyclists from "No Way No How" to "Strong & Fearless".

In the context of Welland, responses throughout the engagement summary indicate the many residents fall within the "Interested but Concerned" category, with some falling in the "Enthused & Confident" category. Based on the feedback received, respondents feel that the existing facilities are not respected by drivers, or that there are simply too few dedicated facilities for them to feel "Strong & Fearless".

In order to encourage cyclists of various ages and abilities to adopt cycling as a viable mode of transportation, varying degrees of separation must be provided within the network, with specific efforts to provide fully separated facilities. Not only is this important as it relates to adjacent vehicle volumes and speeds, but it is also important as it relates to creating an inclusive environment for all categories of cyclists.

The Ontario Traffic Manual – Book 18 Cycling Facilities (OTM Book 18) provides a three (3) step process to selecting appropriate cycling facilities. These steps are to:

1. Pre-select facility based on right-of-way availability, adjacent land uses, motor vehicles volumes, and motor vehicle speeds. This can be done through the OTM Urban/Suburban Nomograph as seen in Figure 4.7, and Rural Nomograph as seen in Figure 4.8.
2. Complete a robust review of corridor-specific context, considerations, and constraints.
3. Justify the decision and document potential design treatments.

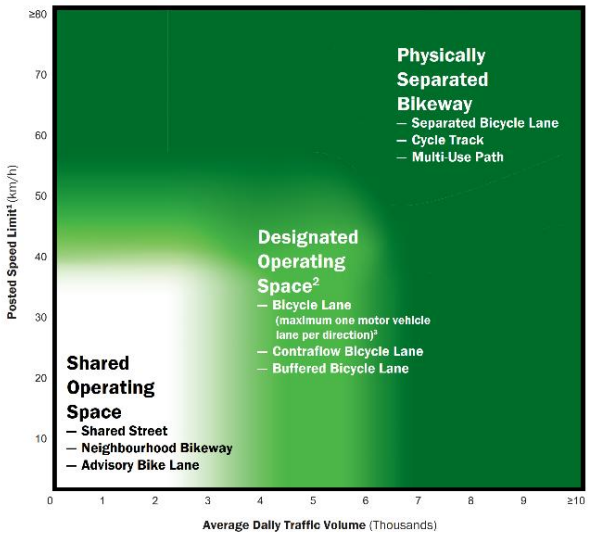


Figure 4.7 – Desirable Cycling Facility Pre-Selection Nomograph – Urban/Suburban Context (OTM Book 18)

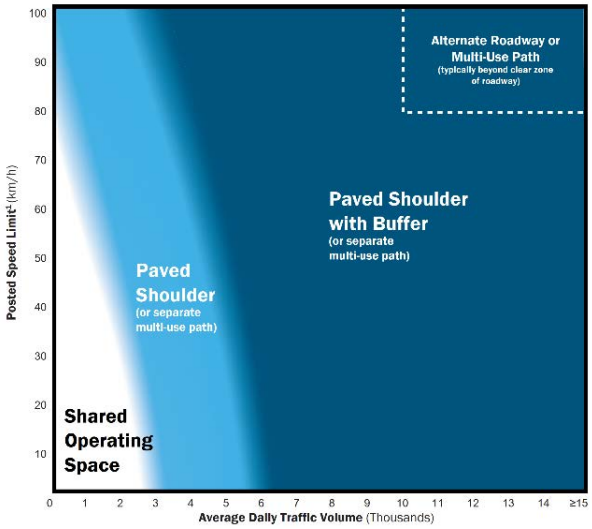


Figure 4.8 – Desirable Cycling Facility Pre-Selection Nomograph – Rural Context (OTM Book 18)

The foregoing methodology was utilized to identify what cycling facilities would be appropriate for the infill cycling links.

4.4.2 Infill Links

The feedback received from the public was that additional accommodation over the water crossings should be provided in a manner that does not necessitate bicycle dismount. The water crossings identified for cycling connectivity were the Webber Road bridge, the Prince Charles Drive bridge, and the Niagara Street bridge. It is understood that these bridges are under regional jurisdiction and are working within right-of-way confines. However, at the time of bridge re-construction, it is recommended that the City work alongside the Region to provide dedicated facilities along these corridors. For the Niagara Street bridge which is scheduled to begin detailed design in 2024, the preferred alternative already includes a dedicated bicycle lane in each direction.

Additional infill links were recommended in support of revised land use schedules, known developments and public feedback. The timelines of each facility have been selected to align with the formation of the spinal cycling network established in the CTS study. The proposed cycling infill links are summarized in Table 4.1, and the resulting complete network is shown in Figure 4.9.

During the public consultation process, a number of responses were received regarding the trail connection south of Cedar Park Drive, between First Avenue and Page Drive, that was previously recommended by the CTS Study. The respondents indicated that residents along the street are not in favour of the trail connection.

Wayfinding

A focus area identified during the public consultation process was improving wayfinding for cyclists in the downtown. Establishing an effective wayfinding system requires a consistent approach that is recognizable in all parts of the City

As such, it is recommended that the City implement “Bicycle Route Marker” signage (OTM M511) along corridors with dedicated and shared cycling facilities. This signage strategy has already been adopted by other Niagara Region municipalities and will therefore serve to integrate Welland with intraregional cycling routes and improve multi-modal connectivity.

M511 (OTM)
45 x 45 cm

Table 4.1 – Proposed Cycling Infill Links

Roadway	Limits	Recommended Facility
Niagara Street	Mill Street to Riverbank Street	Conventional Bicycle Lane
Webber Road	Colbeck Drive to Lincoln Street	Conventional Bicycle Lane
Lincoln Street	Webber Road to Prince Charles Drive	Conventional Bicycle Lane
Prince Charles Drive	Colbeck Drive to West Main Street	Conventional Bicycle Lane
Hagar Street	Approximately 90 metres west of Empire Street to Wellington Street	Signed Bike Route
River Road	Primeway Drive to Northern Limit	Signed Bike Route

Note: Facilities should be included at the time of bridge re-construction.

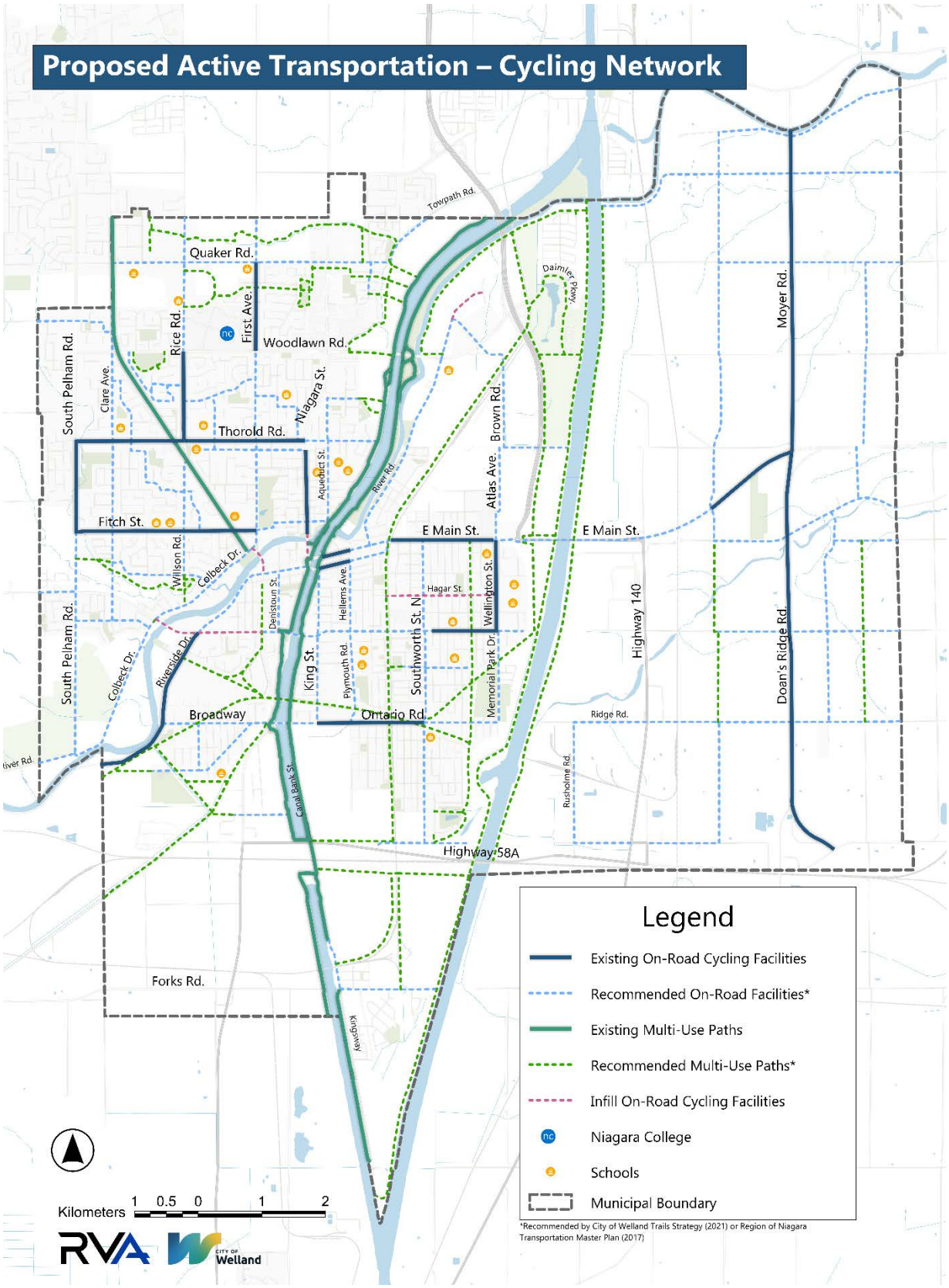


Figure 4.9 – Proposed Active Transportation – Cycling Network

4.5 Roundabout Implementation

Roundabouts are a form of intersection control that are becoming increasingly prevalent in North America, and specifically in the Niagara Region. However, while roundabouts have been proven as a safer and commonly more efficient mode of control as compared to traffic signals, the implementation of roundabouts is usually preceded by a complex planning and justification process. Determining whether a traffic signal or roundabout is more suitable for an intersection is location-specific, with each option presenting unique advantages and disadvantages.

The City of Welland is supportive of roundabouts as a design alternative—and therefore, the TMP includes a Roundabout Implementation Policy to guide decisionmakers on the applicability of roundabouts in certain scenarios. The full policy memorandum is available in Appendix 7.

4.6 Localized Improvements

Throughout the analysis of existing conditions, future conditions, and public feedback, a number of localized improvements were identified as a means of improving operations and safety of existing corridors. These improvements are generally short-term "quick win" recommendations that mitigate existing constraints or prepare the network for developments that are already underway or in the pipeline.

The improvements include mode of control improvements (i.e., traffic signal or roundabout) to two (2) intersections along on Quaker Road, lane configuration adjustments at key intersections, and a study to determine a best path forward for Lincoln Street as multi-modal traffic growth in the surrounding area is realized.

The improvements are summarized in Table 4.2 and are correspondingly visualized in Figure 4.10.

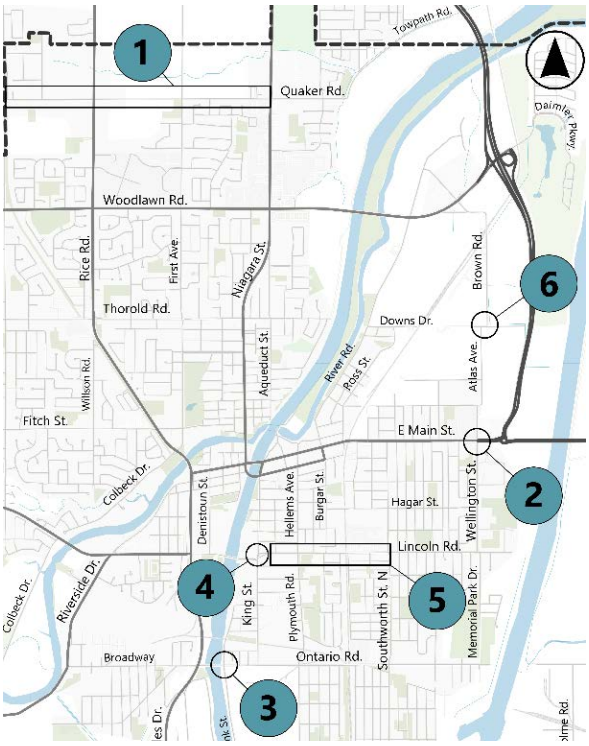


Figure 4.10 – Localized Improvement Locations

Table 4.2 – Localized Improvement Summary

No.	Roadway/Intersection	Recommendation
1A	Quaker Road & Rice Road	Complete an intersection control study to determine the most appropriate form of traffic control (i.e., traffic signal or roundabout); implement traffic signal or roundabout thereafter.
1B	Quaker Road & First Avenue	Complete an intersection control study to determine the most appropriate form of traffic control (i.e., traffic signal or roundabout); implement traffic signal or roundabout thereafter.
1C	Quaker Road	Implement centre two-way left-turn lane from Clare Avenue to Niagara Street.
2	Wellington Street & East Main Street	Implement northbound left-turn lane.
3	Ontario Road & Canal Bank Street	Implement eastbound auxiliary left-turn lane within existing right-of-way; add a southbound left-turn lane; lengthen westbound left-turn lane storage length.
4	King Street & Lincoln Street	Extend westbound left-turn storage length.
5	Lincoln Street between King Street and Southworth Street	Complete corridor traffic operations and safety review to assess the need for additional left-turn lanes or a continuous two-way left-turn lane.
6	Brown Road/Atlas Avenue & Oxford Road	Remove the roadway misalignment between Brown Road and Atlas Avenue.

4.7 Additional Links

The identification of new links is a critical first step in creating a seamless transition into Welland's full build-out scenario. The analysis of new links considered a number of items including future modelling results, known development configurations, operational concerns, link analysis, and network connectivity.

It should be noted that major road projects recommended within this section will require coordinated roadway or Environmental Assessment (EA) studies to first confirm their feasibility, and then evaluate suitable design alternatives.

Utilizing the foregoing factors, the Proposed Road Network was established for the City of Welland, which introduced three (3) new collector roadway links, as displayed in Figure 4.11. These new links are as follows:

Northern Reach Collector Road

As either an extension of the existing Seaway Drive or the creation of a new collector road connection to Woodlawn Road, the proposed collector road will run north-south and help service the Northern Reach Development that is planned for the lands between the Seaway Mall and the canal. The new corridor will help alleviate congestion that is forecasted along Niagara Street under future horizon years and should accommodate all modes of travel.

Downs Drive Extension

The proposed Downs Drive Extension will connect the existing Downs Drive area and

Oxford Road area, and will enable the intended function of Brown Road as a primary industrial Arterial whilst employment projections are realized in the surrounding area.

Highway 406 Overpass

The Highway 406 Overpass will serve as an alternate connection to the Hunter's Pointe Golf Course lands as it prepares to welcome considerable housing growth. Under current conditions, the only public entrance to the lands is afforded through Daimler Parkway, which is intersected by a Highway 406 interchange and crossed by an active rail line servicing daily train movements.

The overpass recommendation was made in this study to alleviate link congestion that is forecast along Daimler Parkway, mitigate operational concerns at the Highway 406 interchange, and provide an alternative public entrance/exit point for residents of the area during rail events.

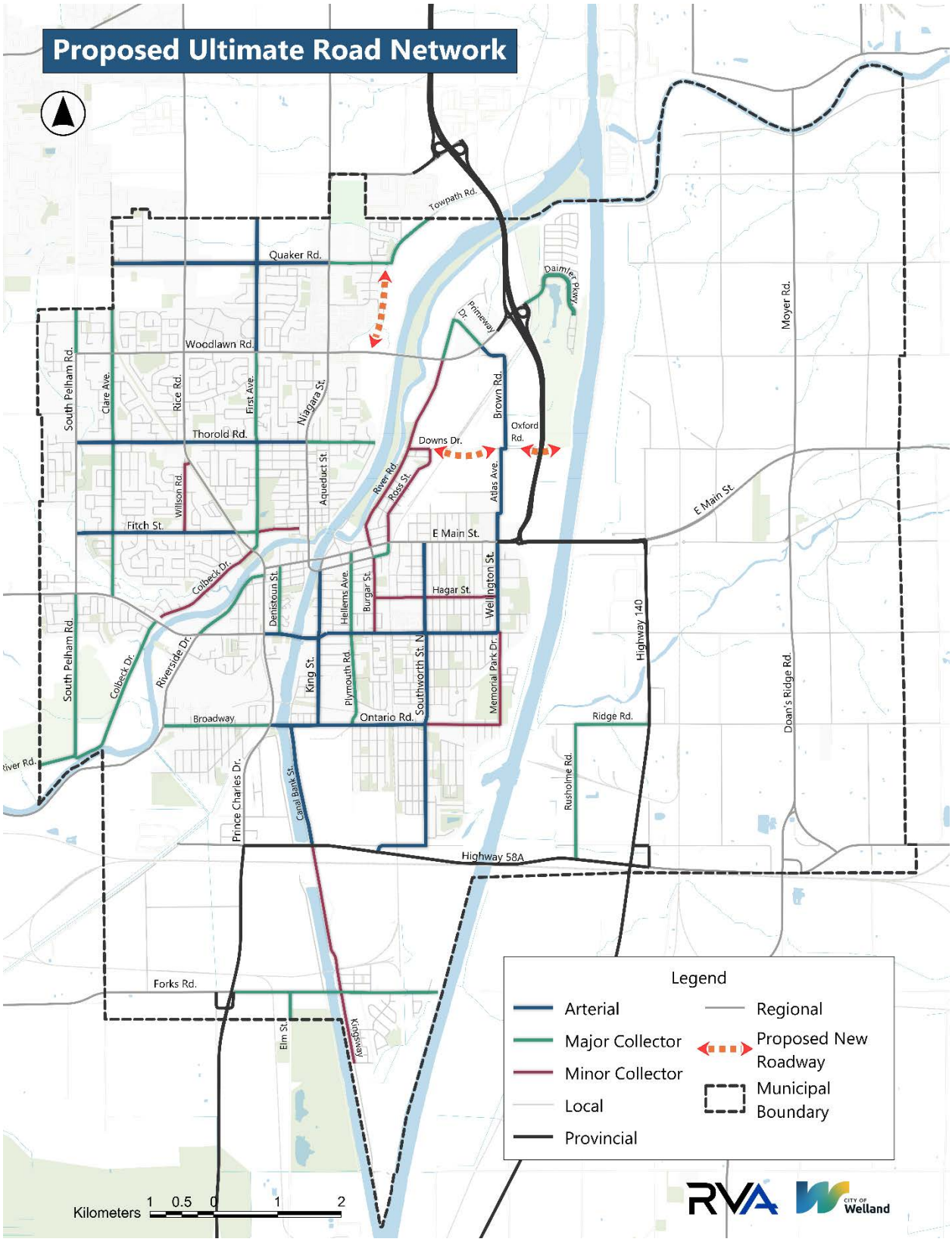


Figure 4.11 – Proposed Ultimate Road Network

4.8 Goods Movement Network

The existing goods movement network was reviewed to evaluate its relevancy in the dynamic face of emerging and diminishing industries within Welland. The review considered a variety of transportation characteristics that could influence truck route feasibility, including:

- Existing truck routes
- Adjacent land uses
- Water crossings/bridges
- Roadway classification
- Number of lanes
- Traffic operations
- Pedestrian/cyclist activity
- Noise
- Geotechnical considerations

Furthermore, the goods movement review considered future developments and revised land use schedules to ensure that the selected network is properly equipped to facilitate Welland's anticipated growth in industry, while balancing the competing need for multi-modal mobility and livable communities. The resulting Proposed Goods Movement Network is shown in Figure 4.12, and a more detailed summary of the methodology adopted and the changes made can be found in Appendix 8.

Signage

The method in which municipalities facilitate truck movements varies by location, with the general options being permissive signage (OTM Rb-61), restrictive signage (OTM Rb-62), or a hybrid signage system (a combination of both permissive and restrictive signage). The City currently utilizes a restrictive signage system, and it is recommended that the City continue with a restrictive signage system to maintain continuity with the existing truck routes that are already well established. In sensitive areas where trucks are only permitted at certain times of the day, the City may utilize restrictive signage with time intervals (OTM Rb-62A).

Rb-61 (OTM)
60 x 60 cm

Rb-62 (OTM)
60 x 60 cm

Rb-62A (OTM)
60 x 75 cm

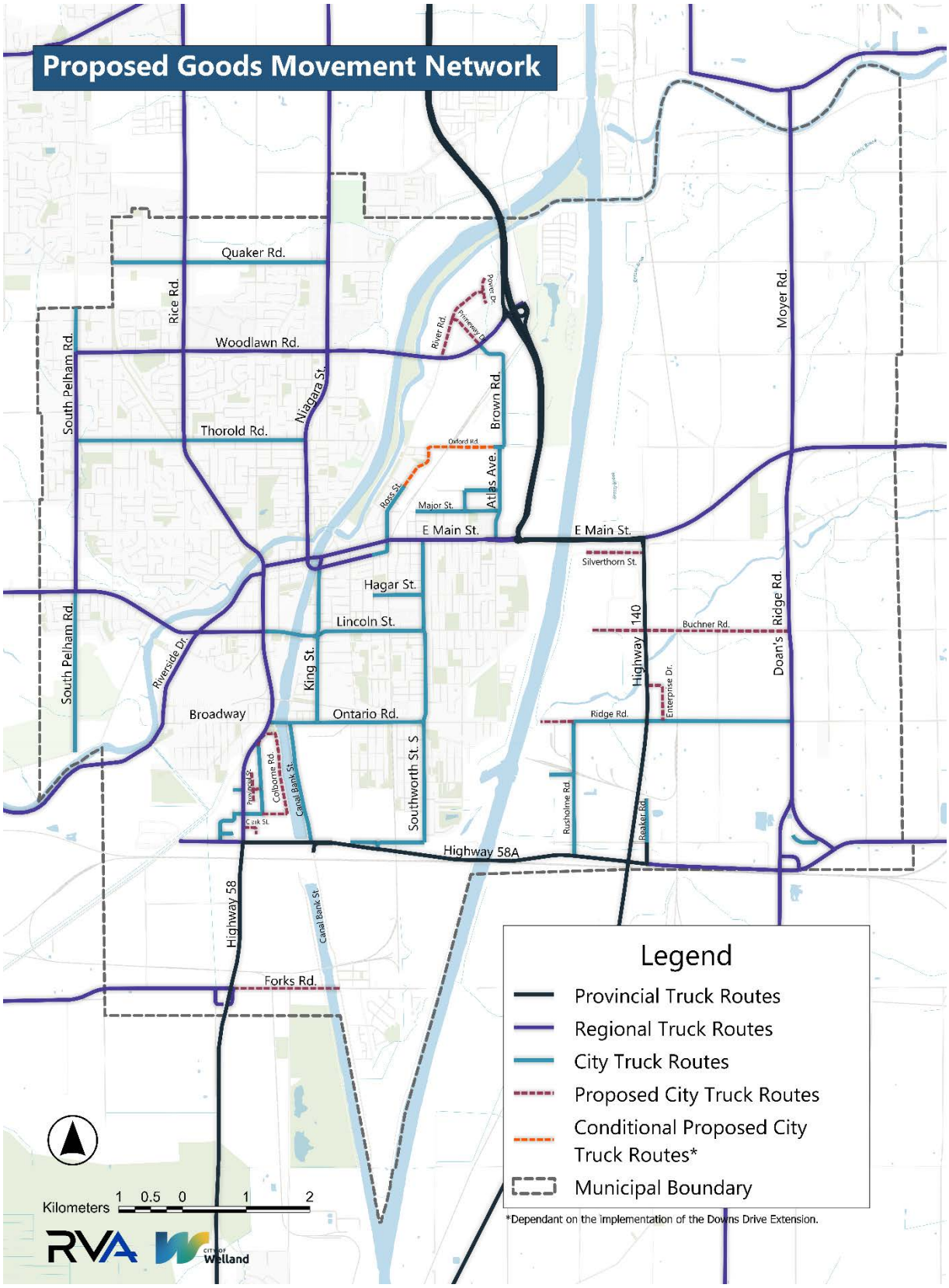


Figure 4.12 – Proposed Goods Movement Network

4.9 Preparing for an Electric Future

The prevalence of electric vehicles (EVs) is experiencing an unwavering onset across North America as the automotive industry shifts to an all-electric market. In the City of Welland, electric vehicle charging stations are already available at various locations such as the Seaway Mall (see Figure 4.13) or City Hall; however, the trends in the automotive industry indicate that investment in electric vehicle infrastructure will become the new normal.

With sizeable development already in the pipeline, an opportunity exists for new, larger developments to provide access to electric vehicle charging stations. The City may choose to incorporate electric vehicle charging minimums into their zoning by-law and require new developers to provide on-site charging for commercial developments.

Figure 4.13 – Electric Vehicle Charging Spaces (Seaway Mall)

4.10 Implementing the Plan

The action items that have been established within the TMP provide a roadmap to achieving the vision for Welland. However, with a finite amount of funding and resources, the recommendations require a phasing strategy that prioritizes key action items and imposes a more digestible set of monetary strains on the City.

4.10.1 Timelines and Categories

The phasing plan provides general timelines for implementation, organized into three (3) different horizon years as follows:

Short-Term (Prior to 2031) – The short-term recommendations are intended to be "quick win" strategies that commonly exhibit a smaller monetary footprint and can be implemented on a relatively quick turnaround. In some cases, short-term recommendations may be made because there is a dire need for improvement under existing conditions or within a short timeline.

Medium-Term (Between 2031 and 2036) – The medium-term recommendations are strategies that fall within the 2031 to 2036 timeframe. These recommendations may be larger in scale, or may not trigger a need until certain developments or plans come into fruition.

Long-Term (Beyond 2036) – The long-term recommendations are to be considered at a time beyond 2036. These strategies address Welland's needs as it reaches its full build-out scenario and may

entail substantial infrastructure investments.

Further to the timeline categories, the recommendations are grouped into categories that demonstrate a similar essence. These recommendation classes are: (1) Policy Documents, (2) Active Transportation, and (3) Capital Improvements.

4.10.2 Implementation Considerations

It is important to note that the implementation of each infrastructure project is subject to its own unique challenges and requirements (i.e., AODA, design standards, etc.) which will be explored at the planning and design stages for each specific project. In fact, the realization of infrastructure projects is commonly impeded by land availability constraints, topography challenges and presence of environmentally sensitive areas.

These potential obstacles are exemplified by the proposed new collector roadway along Seaway Drive—which due to its abutment to a challenging topographical layout—will require further study to first discern its feasibility, followed by its desired lane configuration and alignment.

All major roadway improvements that have potential for some or significant adverse environmental effects are subject to the Schedule 'B' or 'C' Municipal Class Environmental Assessment (EA) process as outlined in the 2023 amendment. This will allow the solution to be further refined through public and technical agency consultation and develop a design that addresses public concerns and mitigates potential environmental impacts. In general, Schedule 'B' EAs have the potential for adverse environmental impacts and can include improvements or minor expansions to existing facilities or new projects that are smaller in scale, whereas Schedule 'C" EAs are anticipated to have more sizeable environmental impacts and can include the construction of new facilities or major expansions to existing facilities. Roadway projects that are limited in scale (formerly classified as MCEA Schedule A or A+) such as rehabilitation works, minor reconstruction, or replacement of existing infrastructure are now exempt from the MCEA process.

4.10.3 Potential Funding Sources

Opportunities for funding transportation projects exist beyond the annual capital budget process through federal, provincial, and regional levels of government. The City should pursue these funding opportunities as they arise to help support the realization of the transportation vision within Welland. Funding opportunities appear intermittently, a number which the City of Welland may be eligible for. As such, it is important for the City of Welland to monitor funding opportunities as they become available to help support the fiscal demands necessitated by the recommendations documented in this TMP. Some potential funding sources include:

Federal

Investing in Canada Plan – The investment is a commitment to achieve three (3) primary objectives: (1) foster long-term economic growth through empowering the middle class; (2) create resilient communities and transition to a clean growth economy; and (3) support social inclusion and socio-economic prosperity for all Canadians. The fund has committed over $95.6 billion in investments over five (5) streams including: public transit; green communities; social infrastructure; trade and transportation; as well as rural and northern communities.

Canada Community-Building Fund (CCBF) – The CCBF supports local infrastructure priorities by committing over $2 billion per year to thousands of communities across Canada. The funding prioritizes 18 different project categories, with those most applicable to the TMP including: public transit, highways, short-line rails, as well as local roads and bridges. This fund was formerly known as the Gas Tax Fund.

Public Transit Program – Beginning in 2026/2027, the Government of Canada will be investing $14.9 billion over eight (8) years to increase reliability, efficiency, affordability, and sustainability of public transit systems. The investment has three (3) priority streams including: rural transit solutions; zero emission transit; and active transportation.

Provincial

Infrastructure Ontario (IO) – The IO program is a loan program that provides long-term financing to municipalities, allowing for larger infrastructure undertakings such as road or bridge revitalizations. The loan program has helped over $18 billion in infrastructure investments across Ontario since its inception.

Regional

Capital Budgeting Process – Proposed infrastructure improvements along regional corridors should be funded through the Niagara Region's capital budget.

Local

Development Charges – Funding for transportation infrastructure projects and transit has been identified in the City's Development Charges Background Study (2022). The City may attempt to recover capital cost expenditures under the provincial legislation to ensure that future growth within Welland is well accommodated.

Capital Budgeting Process – Local infrastructure projects, among other items, are identified on an annual basis through the capital budgeting process.

4.10.4 Implementation Plan

The recommendations, timelines, and associated costs for the TMP recommendations are summarized in Table 4.3.

Table 4.3 – TMP Costing and Implementation

ID	Action Item	Location	Description	Implementation	Total Improvement Cost	Responsibility
P-1	Adopt Proposed Roadway Classifications	City-Wide	Update Schedule E in the Official Plan (OP)	Short-Term (Prior to 2031)	-	City
P-2	Adopt Vision Zero Strategy	City-Wide	Implement Vision Zero Strategy	Short-Term (Prior to 2031)	-	City
P-3	Adopt Revised Traffic Calming Policy	City-Wide	Implement Revised Traffic Calming Policy	Short-Term (Prior to 2031)	-	City
C-1	Adopt 40km/hr Default Speed Limit	City-Wide	Implement 40km/hr default speed limit along local and minor collector roadways	Short-Term (Prior to 2031)	$218k	City
C-2	Adopt Proposed Goods Movement Network	City-Wide	Provide restrictive truck route signage in planned subdivisions.	Short-Term (Prior to 2031)	$34k	Developer
AT-3	Add Conventional Bicycle Lane	Niagara Street	Mill Street to Riverbank Street (pavement markings and signage only)	Short-Term (Prior to 2031)	$5k	Region
C-3	Undertake Intersection Control Study	Quaker Road & Rice Road	Evaluate suitable intersection design solutions.	Short-Term (Prior to 2031)	$20k	Region
C-4	Undertake Intersection Control Study	Quaker Road & First Avenue	Evaluate suitable intersection design solutions.	Short-Term (Prior to 2031)	$20k	City
C-5	Mode of Control Improvements	Quaker Road & Rice Road	Implement traffic signal or roundabout.	Short-Term (Prior to 2031)	$1m - $1.2m	Region
C-6	Mode of Control Improvements	Quaker Road & First Avenue	Implement traffic signal or roundabout.	Short-Term (Prior to 2031)	$1m – $1.2m	City
C-7	Intersection Improvements	Ontario Road & Canal Bank Street	Reconfigure intersection to improve lane alignment and operations (pavement markings only)	Short-Term (Prior to 2031)	$5k	City
C-8	Improve Left-Turn Lane Storage Length	King Street & Lincoln Street	Extend westbound auxiliary left-turn lane storage length (pavement markings only)	Short-Term (Prior to 2031)	$5k	City
C-9	Undertake Lincoln Corridor Improvement Study	Between King Street and Southworth Street	Evaluate corridor design solutions to alleviate future capacity constraints	Short-Term (Prior to 2031)	$60k	City
C-10	Lincoln Street Corridor Improvement	Between King Street and Southworth Street	Implement geometric and traffic control recommendations from study	Medium-Term (2031 to 2036)	TBD	City
AT-1	Provide Shared Cycling Facility (Signed Bike Route and Sharrows)	Hagar Street	Approximately 90 metres west of Empire Street to Wellington Street (pavement markings and signage)	Medium-Term (2031 to 2036)	$5k	City
AT-2	Provide Shared Cycling Facility (Signed Bike Route and Sharrows)	River Road	Primeway Drive to northern limit (pavement markings and signage)	Medium-Term (2031 to 2036)	$5k	City
C-11	Add Left-Turn Lane	Wellington Street & East Main Street	Implement northbound auxiliary left-turn lane (geometric improvements)	Medium-Term (2031 to 2036)	$450k	City/Region
C-12	Add centre two-way left-turn lane	Quaker Road from Clare Avenue to Niagara Street	Three-lane major collector with cycling facility	Medium-Term (2031 to 2036)	$12.5m	Developer
C-13	Construction of new Collector Road east of Seaway Mall	New Roadway from Woodlawn Road to Towpath Road	Two-lane major collector with cycling facility	Long-Term (Beyond 2036)	$16.5m	Developer
C-14	Construction of Downs Drive Extension	New Roadway from Ross Street to Atlas Avenue	Two-lane major collector with cycling facility. This will require a Schedule 'C' EA study.	Long-Term (Beyond 2036)	$3.3m	City
C-15	Construction of Highway 406 Overpass	New Roadway from Brown Road to New Road Connection	Two-lane major collector with cycling facility. This will require a Schedule 'C' EA study.	Subject to Development*	TBD	Developer
C-16	Provide Intersection Improvements	Oxford Road & Brown Road/Atlas Avenue	Remove roadway misalignment and plan for Downs Drive Extension	Subject to Development*	$1.3m	City
AT-4	Add Conventional Bicycle Lane	Webber Road	Colbeck Drive to Lincoln Street (pavement markings and signage only)	Subject to Bridge Reconstruction	$5k	Region
AT-5	Add Conventional Bicycle Lane	Lincoln Street	Webber Road to Prince Charles Drive (pavement markings and signage only)	Subject to Bridge Reconstruction	$11k	Region
AT-6	Add Conventional Bicycle Lane	Prince Charles Drive	Colbeck Drive to West Main Street (pavement markings and signage only)	Subject to Bridge Reconstruction	$5k	Region

P: Policy Documents | AT: Active Transportation | C: Capital Improvements | *Subject to the development of the Hunters Pointe Lands | TBD: To Be Determined

4.10.5 Plan Monitoring and Updates

The City may wish to undertake a TMP monitoring program to track both the degree to which the TMP initiatives have been implemented, as well as their measured impact on mobility within Welland. The monitoring program focuses on key performance metrics as outlined in Table 4.4, which can be measured at regular intervals through various data sources—some of which are collected externally and some of which will require data collection efforts by the City.

It is understood that as Welland continues to reach its full build-out, new realities will emerge that were not contemplated at the time this plan was being developed. It is for this reason that the TMP is a **Living Document**, and as such should be reviewed at recurring intervals to ensure that the assumptions and projections utilized in the TMP remain relevant. The MCEA process recommends a review of master plans every five (5) years.

Table 4.4 – TMP Monitoring Strategy

Performance Metric	Data Source	Review Frequency
General		
Percentage of TMP implemented	TMP	Annually
Mobility Characteristics		
Collision data (i.e., frequency, severity, etc.)	NRPS	Annually
Commuting mode share	TTS	Five (5) Years
Average commute distance	TTS	Five (5) Years
Automobile ownership (number of vehicles per household)	TTS	Five (5) Years
Active Transportation		
Total kilometre length of cycling facility by class (i.e., shared, dedicated, etc.)	Capital Program	Annually
Total kilometre length of pedestrian accommodation by class (i.e., sidewalk, multi-use trail, etc.)	Capital Program	Annually
Number of sidewalk gaps or accessibility barriers within the pedestrian network.	Capital Program	Annually
Transit		
Transit ridership data	NRT	Annually
Transit scheduling and service hours	NRT	Annually
Total kilometre length of transit routes	NRT	Annually
Percentage of fully accessible transit stops	NRT	Annually
Goods Movement		
Total kilometre length of designated truck routes	Capital Program	Annually
Number of truck route violations	NRPS	Annually

NRPS: Niagara Regional Police Service | TTS: Transportation Tomorrow Survey | NRT: Niagara Region Transit