



**THE REGIONAL
TRANSPORTATION PLAN
CYCLING NETWORK
STUDY**

2041 Regional
Transportation Plan

Prepared by IBI
2017



An agency of the Government of Ontario



FINAL REPORT | CONTRACT NO. 141519

Regional Transportation Plan Cycling Network Strategy



October 29, 2017

Cover images may be copyright to project delivery agent(s) associated with the project names and locations below.

Top row left to right: Rendering of Eglinton Connects (City of Toronto), Rendering of Hurontario LRT (Cities of Mississauga and Brampton – Region of Peel), photo of Cannon Cycle Track (City of Hamilton)

Bottom row, left to right: Queens Quay Revitalization (City of Toronto, VIVA BRT (Cities of Vaughan, Markham and Town of Richmond Hill - York Region)

PREPARED BY:

IBI Group
7th Floor – 55 St. Clair Avenue West
Toronto ON Canada M4V 2Y7
1 416 596 1930
www.ibigroup.com

PREPARED FOR:

Metrolinx
97 Front Street West
Toronto, ON Canada M5J 1E6

PROJECT TEAM:

Lisa Orchard, Metrolinx
David McElroy, Metrolinx
Brian Hollingworth, IBI Group
Christina Bouchard, IBI Group
Tony De Crescenzo, IBI Group

PROJECT ADVISORS:

Municipal and Regional Active Transportation Practitioners - Aneesah Luqman, Roy Prasenjit, Sandra McEleney, Amanda Spencer, Angie Ning, Elysia Leug, Martin Derond, Nick Calutcci, Ron Albright, Nadeem Zahoor, Kevin Arsenaault, Ben Kester, Tara Painchaud, Jeffery Reid, Dan Tovey, Sarah Cannon, Stephen Harrison, Kaylan Edgcumbe, Danijel Ozikovic, Maureen Van Ravens, Jill Stephen, Yvonne Kaczor, Shawn Smith, Darryl Young, Brian Lee, Richard Nethery, Dan Terziewski, Josh Ward, Dorothy Kowpak, Andrew Pearce, Melissa Rossi, Ben Gomberg, Pauline Craig, Matthew Sweet, Henrick Zbogor, Nelson Cadete, Wayne Chan, Arthur Lo, Brandon Quigley, Erica Duque, Darryl Bender, Julia VanderLaandeVries, Steve Robichaud, Steve Molloy, Mike Wehkind, Shawn Dillon, Jennifer Hyland.

Metrolinx Active Transportation Advisory Committee (MTAC) - Steve Robichaud, Alan Kirkpatrick, Dan Tovey, Sarah Cannon, Kaylan Edgcumbe, Jill Stephen, Barb Koopsman, Maureen Van Ravens, Sabbir Saiyed, Susan Tanabe, Henrik Zbogor, Richard Hui, Paul May, Melissa Rossi, Andrew Pearce, Selma Hubjer, Loy Cheah, Joseph Palmisano, Dan Terziewski, Richard Nethery, James Perttulla, Mike Wehkind, Mark Mis, Chris Leitch, Prasenjit Roy, Ranjit Gill, Jeff Brooks, Hubert Ng

Table of Contents

Glossary of Terms	1
Executive Summary	3
1.0 Introduction	5
1.1 Cycling Network Strategy Study Purpose Statement.....	5
1.2 Regional Cycling Network Strategy Goals.....	5
1.3 Traits of Regionally Significant Cycling Facilities	5
1.4 Cycling Infrastructure to Support Public Transit.....	5
1.5 Identifying Opportunities for Investment	6
2.0 Study Inputs	7
3.0 Functions of a Regional Cycling Network.....	8
3.1 Directness.....	8
3.2 Linking Urban Growth Centres.....	9
3.3 Connections to Local Networks	9
4.0 Understanding Cycling in the GTHA	11
4.1 Demographics in the GTHA.....	11
4.2 Physical Environment and Cycling in the GTHA	15
4.3 Recent Transit Projects and Cycling Facilities	20
4.4 Existing Regional Cycling Facilities.....	21
4.5 Draft Province-wide Cycling Network	22
5.0 Process to Design the Regional Cycling Network	23
5.1 Consolidation of Transportation Plans.....	23
5.2 Municipal Consultations.....	24
5.3 Preliminary Analysis	29
5.4 Analysis of Municipal Strategic Priorities Feedback.....	29
5.5 Finalization of the Network.....	32
6.0 Study Limitations	34
6.1 Trails in Hydro Corridors.....	34
6.2 Trails in Rail Corridors	34
7.0 Conclusions.....	37
7.1 Role of the Regional Cycling Network.....	37
7.2 Coordinating Cycling Infrastructure with Rapid Transit	37

8.0 Regional Transportation Plan - Cycling Network Strategy	51
8.1 Identify Feasibility Constraints and Implementation Costs	51
8.2 Inform Funding Priorities	51
8.3 Lead Ongoing Data Coordination	51
8.4 Review Infrastructure Delivery Policies	52

Appendices

Cycling Facility Types	53
Cycling Network Facility Types	55
Desirable Cycling Facility Quality.....	59
Route Quality	61
Choosing Appropriate Cycling Facility Types	62
Corridors Identified by the Regional Cycling Network Strategy	63
Corridors Identified by the Regional Cycling Network Strategy	65

List of Exhibits

Exhibit 3-1: Characteristics of Local and Regional Cycling Facilities	8
Exhibit 3-2: Urban Growth Centres Identified in the Greater Golden Horseshoe Growth Plan	10
Exhibit 4-1: Existing Cycling Trips in the GTHA.....	12
Exhibit 4-2: Cycling Mode Share by Age Group	13
Exhibit 4-3: Auto Driver Mode Share by Age Group	13
Exhibit 4-4: Cycling Mode Share by Job Type	14
Exhibit 4-5: Trip Distance Frequency in the GTHA (All Modes)	15
Exhibit 4-6: Areas of High Cycling Uptake Potential	16
Exhibit 4-7: Population and Employment Density	18
Exhibit 4-8: Metrolinx Station Access Plan Mode Hierarchy	20
Exhibit 5-1: Existing and Planned Cycling Networks in the GTHA.....	25
Exhibit 5-3: Strategic Priorities Feedback from Municipalities.....	27
Exhibit 5-4: Analysis of Corridors that Cross Jurisdictional in the GTHA.....	33
Exhibit 6-1: Hydro Corridors in the GTHA	35
Exhibit 6-2: Rail Corridors in the GTHA	36
Map 7-1: Regional Transportation Plan Cycling Network	
Map 7-2: City of Hamilton	
Map 7-3: Halton Region	
Map 7-4: Peel Region	
Map 7-5: York Region	
Map 7-6: City of Toronto	

GLOSSARY OF TERMS	
Active Transportation Master Plan (ATMP)	Jurisdictional transportation planning studies that inform the strategic directions of cycling and pedestrian infrastructure and programs. See “Transportation Master Plan” (TMP)
Arterial Road	Thoroughfare that has been classified as an major road by a municipal jurisdiction. Road classifications systems typically identify roads that carry high volumes of motorized traffic at high speeds as arterial roads. Within the functional hierarchy of a road classification system, arterial roads are intended to provide the highest level of service possible.
Barrier when Cycling	Includes waterways, highways, railways and that are difficult to travel across without the provision of infrastructure.
Cycling Network	A policy design tool that stipulates locations and standards where the inclusion of cycling infrastructure as an integrated component of the broader road transportation system must be accommodated. Appendix A summarizes the types of cycling facilities that are included in GTHA cycling networks.
Cycling Facility	Infrastructure that facilitates cycling. A list of cycling facility types is included in Appendix A of this report.
Cycling Network Route	May refer to both dedicated and non-dedicated cycling facilities that make up a cycling network, but must adhere to minimum standards for cycling network facility design.
Dedicated Cycling Infrastructure	A cycling facility that provides a space that is dedicated exclusively for cycling. This includes cycle tracks and bike lanes, where municipal bylaws typically prohibit motor vehicles from driving, standing or parking. In Ontario, infrastructure with lanes dedicated to a specific travel mode can be recognized by a diamond symbol in the lane. For a complete list of cycling facility types, see Appendix A
Draft Province-wide Cycling Network	The Draft Province-wide Cycling Network includes of variety of existing municipally and regionally managed cycling facilities, as well as proposed new connections.
Existing Cycling Facility	Any cycling facility that has been constructed.
Greater Toronto and Hamilton Area (GTHA)	The GTHA represents a contiguous urban region consisting of the City of Hamilton, Halton Region, Peel Region, the City of Toronto, York Region and Durham Region.
Jurisdictional Boundary	The geographic limit where the practical authority granted for one government to administer transportation planning ends and another begins.
Planned Cycling Facility	A cycling facility that has been identified in a planning document, but has not yet been constructed/installed. As there are a number of stages between the planning of cycling facilities and their construction, this may refer both to conceptual ideas that are unfunded and facilities that are still under study. Planned cycling facilities may alternately refer to facilities where detailed design has been completed, including projects where funding and bylaws have been adopted by a local jurisdiction but construction has not yet been completed.
Regional Road	Thoroughfare that is operated by a regional transportation authority. In the GTHA, the upper-tier regional transportation authorities of Durham Region, Halton Region, Peel Region and York Region operate regional roads. The single tier municipalities of Hamilton and Toronto do not have regional roads, as all roads are operated by the municipality.
Regional Transportation Plan (RTP)	The 25-year multi-modal transportation plan for the Greater Toronto and Hamilton Area.
Transportation Cycling	Also called “utilitarian cycling”, this term refers to cycling travel that is not recreational in nature.
Transportation Master Plan (TMP)	Jurisdictional transportation planning studies that are produced to inform the strategic directions of all travel modes, including motor vehicles, and transit. Most Transportation Master Plans in the GTHA reference the jurisdiction’s commitments to providing cycling and pedestrian infrastructure.
Urban Growth Centre (UGC)	A location identified by the 2017 Growth Plan for the Greater Golden Horseshoe. This study identifies 24 Urban Growth Centres where mixed-use, high-density, and public transit oriented developments, are meant to become focal points.

Executive Summary

A Regional Cycling Network for the Greater Toronto and Hamilton Area

The Regional Cycling Network Strategy seeks to support existing municipal cycling plans by identifying corridors that are regionally significant for transportation cycling (also referred to as utilitarian or commuter cycling in this report). Infrastructure on these regionally significant corridors would help to link shorter local cycling network facilities across the Greater Toronto and Hamilton Area (GTHA).

Regional cycling facilities would represent the highest order within a functional network hierarchy for transportation cycling. Regionally significant cycling facilities are those that:

- Support cycling to rapid transit stations, or
- Cross municipal boundaries to link Urban Growth Centres, or
- Provide infrastructure that facilitates cycling for longer distances.

Supporting Cycling to Rapid Transit Stations

An important function of the corridors identified in the Cycling Network Strategy is to facilitate cycling the “first-mile/last-mile” to and from rapid transit stations. Roadways that will be used to access GO stations, end of line subway stations and other Mobility Hub locations must be safe and comfortable for cycling in order for people to ride to them and on them.

The Regional Cycling Network Strategy identifies major arterial roads that can be used by persons wishing to cycle to transit. Recommendations from the Cycling Network Strategy will work together with recommendations from the GO Rail Station Access Plan to inform the updated Regional Transportation Plan (RTP) for the GTHA.

Linking Urban Growth Centres

Infrastructure that connects Urban Growth Centres needs to be direct in order to be a practical transportation option. In the GTHA, the provision of cycling infrastructure has historically been delivered by local levels of government. Local cycling plans have been primarily designed to support trips within each jurisdiction, not between jurisdictions, and are often fragmented.

The corridors identified in the Regional Cycling Network are continuous roadways that cross multiple jurisdictions. Connections between local networks that are currently discontinuous will better serve people living near jurisdictional boundaries. As many local plans include facilities to the edge of their borders, the Regional Cycling Network will help to coordinate infrastructure between municipalities by identifying priorities and optimal linkages.

Facilitate Longer Trip Distances

Local networks will typically serve journeys by bicycle travelling shorter than 2km to 5km distances. The design of regional network facilities is to provide facilities that are continuous for distances between 5km and 30km. Longer continuous facilities minimize travel time and are easier to follow when travelling longer distances. They present a viable option for those wishing to undertake a trip completely by bike.

The analogy of a highway is helpful for understanding this concept. Just as highways provide direct links between cities (that minimize delays), regional cycling facilities similarly must function as direct links. The total journey for most trips that a cyclist will use will combine both local facilities and regional ones. Providing regional facilities will enhance the travel experience by providing high quality cycling infrastructure.

1.0 Introduction

As the regional transportation agency for the Greater Toronto and Hamilton Area (GTHA), Metrolinx plans, builds and operates transit and is committed to a high quality of life, a thriving, sustainable and protected environment and a strong, prosperous and competitive economy. Under provincial legislation, Metrolinx has a mandate to provide leadership in the co-ordination of an integrated, multi-modal transportation network. Metrolinx works closely with provincial ministries, the region’s municipalities and transit agencies to implement the Regional Transportation Plan (RTP). The first RTP for the region, The Big Move, was published in 2008 and is currently being updated. This study is intended to inform the development of the next RTP.

1.1 Cycling Network Strategy Study Purpose Statement

The Regional Cycling Network Strategy supports the vision and goals of the next Regional Transportation Plan for the GTHA to 2041. This Network will highlight opportunities to cycle for utilitarian or commuter (rather than recreational) transportation, with a focus on identifying where the need is. This includes identifying areas of high cycling potential, significant cross-boundary facilities that serve multiple jurisdictions, and improved integration between cycling facilities and GO transit stations.

1.2 Regional Cycling Network Strategy Goals

The Cycling Network Strategy has two main goals;

1. To identify a network of regionally significant corridors that would connect Urban Growth Centres across jurisdictional boundaries, support cycling to rapid transit and encourage longer trips by bicycle.
2. To recommend Priority Actions, that would support the development of a regional cycling network in the GTHA.

1.3 Traits of Regionally Significant Cycling Facilities

This study has identified corridors where introducing cycling infrastructure as part of a cohesive network would achieve the goals defined in section 1.2. This study further recommends strategies to help realize cycling infrastructure investments on the corridors that have been identified as significant.

Regional cycling facilities function best within a network, building on local cycle infrastructure and on other modes of transport. The intention is that these facilities would together constitute main arteries in the aggregate of urban connections and in the dense system of other transportation connections. As such, a regional cycling route should be recognizable and fit logically into the network of local bicycle connections.

Regional cycling facilities play an important role within a functional hierarchy of facilities, by providing main connections that link local cycling network facilities.

Regionally significant cycling facilities are those that:

- Support cycling to rapid transit stations, or
- Cross municipal boundaries to link Urban Growth Centres, or
- Provide infrastructure that facilitates cycling for longer distances.

1.4 Cycling Infrastructure to Support Public Transit

When designing regional cycling facilities, it is advisable to give as much consideration as possible to existing public transport stations and stops, and mobility hubs identified in The Big Move. The provision of infrastructure for a regional cycling route can enhance a major transit station’s catchment area.

Surrounding communities that are too far from a transit station to walk may be within cycling distance if investments in cycling infrastructure are made.

The station access mandate of this study is important as Metrolinx undertakes the transition to Regional Express Rail (RER), which is anticipated to result in substantial GO Transit ridership growth. The level of parking expansion required to accommodate motor vehicle station access for this ridership growth is not financially or environmentally sustainable. Furthermore, the congestion resulting from increased traffic around stations will negatively impact the overall travel time of transit riders, door-to-door. It is therefore critical that RER is supported by cycling infrastructure to connect stations to a network of cohesive, direct and safe cycling facilities.

This study builds on previous work, including Metrolinx’s Cycling Behaviour and Potential in the Greater Toronto and Hamilton Area Study, the GO Rail Station Access Plan, Regional Transportation Plan Review Active Transportation Paper and Mobility Hub background papers. This Cycling Network Strategy is intended to support the work of municipalities by highlighting near-term opportunities and identifying a longer-term network vision for coordination across the region.

1.5 Identifying Opportunities for Investment

The analysis provided within this study may be used by practitioners as a rationale for infrastructure investments that together achieve a cohesive network of regional cycling facilities.

Investments in facilities with demonstrated regional significance would generate high quality infrastructure that could facilitate journeys by bicycle over longer distances (between 5km and 30km).

Providing High Quality Infrastructure

Regionally significant cycling facilities also require a high level of infrastructure quality, to ensure cycling comfort for a wide range of ages and abilities, including where they cross physical barriers such as 400-series highways, waterways and other fixed landmarks. The desirable level of quality for Regional Cycling Network includes:

- Separation from motor vehicle traffic at locations where traffic speeds exceed 50km/h,
- Intersection designs to include retro-reflective signs and markings,
- A paved riding surface, 1.8m wide (minimum) to 2.2m wide (preferred), for each travel direction,
- Routine maintenance to ensure smooth riding surface free of debris, and/or
- Provision of wayfinding signage.

2.0 Study Inputs

The Regional Cycling Network Strategy is intended to be supportive of municipalities that are planning, designing and building cycling infrastructure. Consultation with municipal stakeholders to identify key strategic directions was therefore a central part of the study process.

Developing the Regional Network Corridor Recommendations

To identify the corridors recommended in the Regional Cycling Network Strategy, the following inputs were considered:



ANALYSIS

To identify candidate routes on a technical basis. TTS data was mapped in GIS and used to score major roadway in the GTHA. Information was mapped and scored for:

- population and employment density
- existing cycling trips and uptake indicators
- ability to serve rapid transit and Urban Growth Centres
- barriers and jurisdictional boundary crossings



CONSULTATION

To identify strategic priorities, meetings were held in each of the four regions and two cities of the GTHA in spring 2017. These meetings facilitated a two-way information exchange between Metrolinx staff and cycling infrastructure delivery practitioners in the Regions of Durham, Halton, Peel, York and the single-tier municipalities of Hamilton and Toronto.



COORDINATION

The regional cycling network strategy for the GTHA was developed concurrently with the Draft Province-wide Cycling Network.



DRAFT CYCLING NETWORK STRATEGY

The routes identified will be considered for inclusion in the Draft and Final 2041 Regional Transportation Plan. Following the adoption of the recommended cycling network in the Regional Transportation Plan, implementation planning will be undertaken.

3.0 Functions of a Regional Cycling Network

Designated cycling facilities can serve a regional transportation function in two ways: by linking local networks across jurisdictional boundaries, or by supporting access to transit so that longer regional trips may be travelled. Exhibit 3-1 below summarizes the characteristics that distinguish local cycling network facilities from facilities that are regionally significant.

A growing number of jurisdictions are recognizing the term “bicycle highways” to describe higher-order infrastructure where investments are made in facilities of regional significance. This term can be useful for understanding the function of a regional cycling route. While a user may not travel on a highway for the entire length of every trip they take, the presence of the highway will link with local road networks, improving the quality of travel overall. This principle is similar when considering the relationship between higher-order cycling facilities, and local cycling networks.

Regionally significant cycling facilities do not need to be on roadways under the jurisdiction a regional municipality, but the regional and major arterial corridors have been the primary focus of analysis in this study because they efficiently facilitate direct travel over long distances, link Urban Growth Centres and are necessary links to achieve meaningful connections to most rapid transit stations.

3.1 Directness

Regional cycling facilities should connect cyclists’ most significant origins and destinations as directly as possible. The provision of direct facilities is critical when travelling distances longer than 5km by bicycle. The need for facilities to provide a direct and efficient transportation option informed both the road class of corridors that were examined, and the scoring of the relative value of different route options.

Local Cycling Route	Regional Cycling Route
Serves a single municipality or town	Crosses jurisdictional boundaries
Serves a single urban centre	Links Urban Growth Centres
Supports cycling to local destinations	Supports cycling to rapid transit stations
Facilitates cycling for local trips. (Typically serving shorter journeys of 2km to 5km distances.)	Facilitates cycling for short and longer trips (typically serving journeys of 5 km to 30 km distances.)
Infrastructure types may include bike lanes, cycle tracks, multi-use trails, as well as shared roadways.	Infrastructure types may include bike lanes, cycle tracks, multi-use trails, but will infrequently include shared roadway cycling facilities.
Infrastructure designs informed by the safety needs of cyclists using the facility.	Infrastructure designs informed by the safety needs of cyclists using the facility, but may also target standards to facilitate cycling longer distances efficiently and without delay.

Exhibit 3-1: Characteristics of Local and Regional Cycling Facilities

The desired outcome of using directness as a network design value is the minimizing of detours ⁱ. While circuitous, scenic or otherwise indirect facilities may be pleasant when designing for recreation, when the objective is efficient transportation, indirect facilities are not desirable over longer distances. Directness is determined by factors such as traffic flow speed, delay and detour distance that influence the cyclist's overall journey time. The detour factor for a journey on a Regional Cycling Network Route should be smaller than 1:1 ⁱⁱ.

It was a requirement that the corridors selected for analysis would represent a direct and efficient path of travel. In addition to travel time, the straightness of the route may help make it recognizable and easy to find. While facilities that wind through a maze-like neighbourhood may be suitable for local trips, these types of facilities would not provide the requisite quality (e.g. time-savings) desirable for a regional cycling network route.

3.2 Linking Urban Growth Centres

A key objective of the proposed Regional Cycling Network is to provide links between urban growth centres. This study looked at the GTHA Urban Growth Centres identified in the Growth Plan for the Greater Golden Horseshoe (2017). These Urban Growth Centres include both the well-established urban areas such as downtown Toronto and Hamilton, as well as the emerging urban centres of municipalities that have historically been more suburban in character, such as in the cities of Mississauga, Markham or Vaughan.

Within a corridor between two Urban Growth Centres, regional cycling facilities may serve either a transportation function or recreational function as a connector between urban and less urban. The intention is that the route will provide a direct connection between origins and destinations at a regional scale ⁱⁱⁱ.

Local facilities should form a web that connects local origins and destinations, such as between home and school. The regional network cannot serve all local origins and destinations. An important role of the facilities that make up the Regional Cycling Network is to provide a direct connection to the most central areas of an Urban Growth Centre and from there connect to local cycling network facilities.

3.3 Connections to Local Networks

The analogy of regional cycling facilities as “bicycle highways” is a simple way of describing the function of a higher-order facility that acts as a trunk connecting local network branches. It is also useful for describing how the length of the route helps to provide a travel option of sufficient length to attract users and provide connectivity.

A route that is regionally significant will typically follow a single corridor for at least 10km, ensuring multiple opportunities for connections to local cycling facilities. In locations where local networks are well developed these, facilities are often within 2km of each other.

The aggregation and analysis of the existing and planned cycling facilities within GTHA capital programs found that cross-border connections have not been given the same priority as connections within each municipality.

There are cross-border cycling trips being made across GTHA urban municipalities, where local cycling networks are typically under-developed or disconnected. This reveals an under-served market ^{iv}.



Source: Growth Plan for the Greater Golden Horseshoe, 2017
 Exhibit 3-2: Urban Growth Centres Identified in the Greater Golden Horseshoe Growth Plan

Fortunately, in many cases around the GTHA, the gaps between existing disconnected networks are quite small. For example, the two networks in Brampton are separated by less than 0.5km. Small connected networks (such as in the northern half of Toronto, or in York Region) tend to be separated by larger gaps.

Local networks in the GTHA generally do not span municipal boundaries. A number of factors may be attributed to this, including a focus by municipalities on serving internal (rather than external, or regional) trips and the lack of a coordination mechanism between adjacent municipalities. As many local plans include facilities to the edge of their borders, a key objective of the recommended Regional Cycling Network is to support the coordination of infrastructure delivery priorities between and among municipalities.

4.0 Understanding Cycling in the GTHA

4.1 Demographics in the GTHA

A GTHA-wide analysis was undertaken to evaluate areas of cycling potential across the region. Areas that have high population and employment density, or high rates of existing cycling travel were identified in order to understand the approximate network route spacing that would be desirable in different parts of the region. The prevalence of short auto trips was also mapped as an indicator, in areas where the number of cycling trips being made today is low. In areas where the number of existing cycling trips is low, short trips may be understood as those most easily shifted from driving to cycling with the provision of infrastructure.

Local networks serve the local transportation needs within an urban area. Local cycling networks typically consist of facilities that form a mesh spaced 250m to 1,000m apart. Within this range, the tighter the spacing between the cycling facilities, the greater the flexibility of route choice options between origins and destinations. While cohesion remains important for any cycling network, mesh width is only relevant inside built-up urban or suburban areas. In low- density suburban or rural areas between municipalities, regional facilities provide direct connections between the higher density areas, and a minimum spacing between facilities is no longer applicable.

The amount (total length) of linear cycling infrastructure within a municipality is not a useful measure of provision, as larger municipalities tend to have more cycling infrastructure. A more useful measure is cycling network route density, that refers to the linear cycling infrastructure measured by length, divided by the area of the municipality. By this measure, Brampton scores highest, with a cycling route density of over 2,000m/km² due to its many multi-use paths. The GTHA's most dense and populated urban area, the City of Toronto², has a cycling route density of 291m/km². Some largely rural GTHA municipalities have a density close to zero, as a reflection of both their low population bases and the absence of cycling infrastructure.

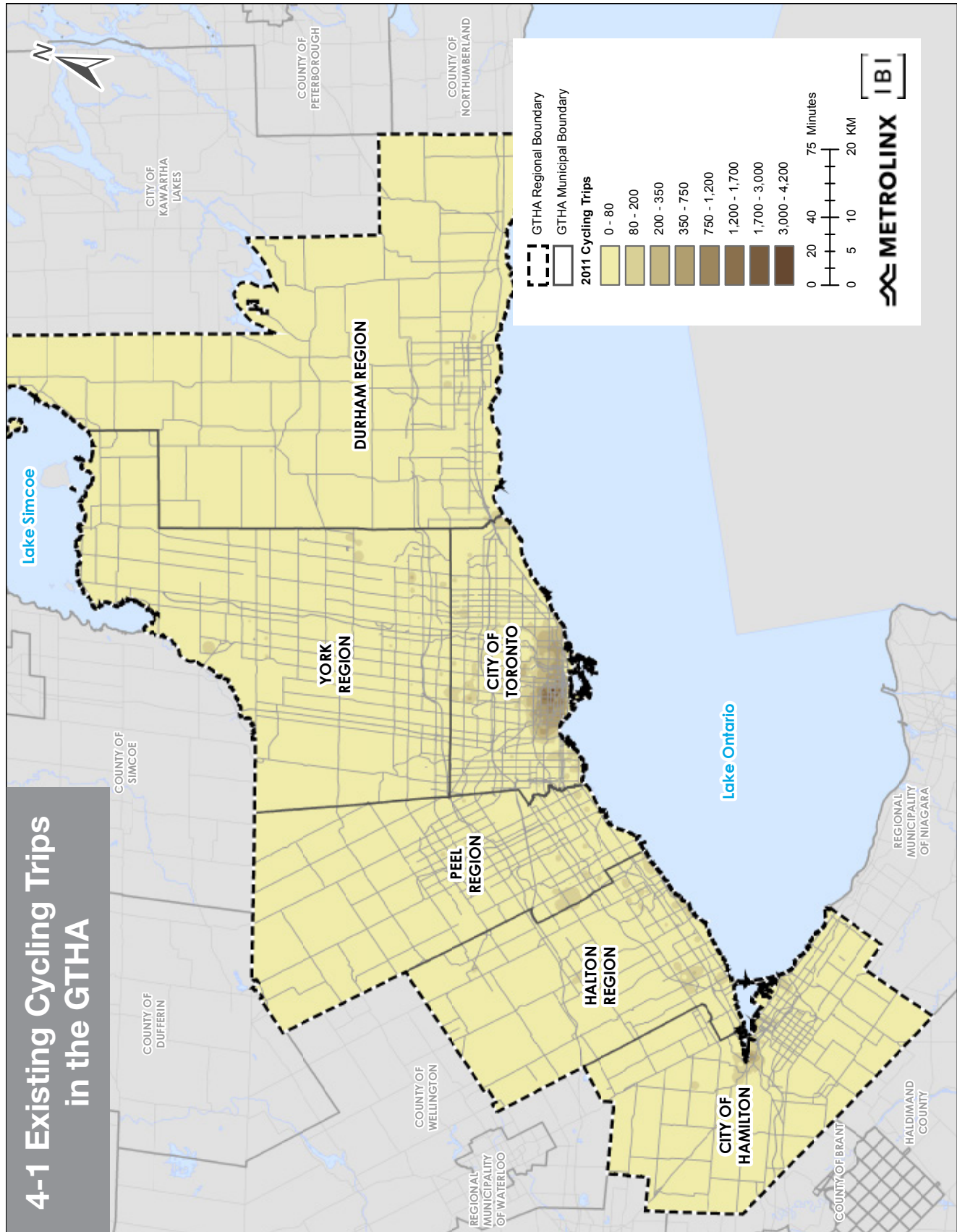
In order to understand cycling travel characteristics, key indicators of existing and future cycling travel patterns were explored and summarized. These indicators were then used to inform the analysis to identify facilities of regional significance. This work builds on a number of previous studies, that have identified the factors that impact the propensity of cycling in the GTHA.

Over the past two decades, extensive research has been dedicated to exploring the factors that influence the propensity of a given population to cycle for transportation. Urban form, climate, terrain, infrastructure, travel patterns, demographics and cycling culture are often referenced as prime indicators in this area of research. Since many of these factors vary considerably across different parts of the GTHA, it is important to identify where these indicators of high cycling use are most prominent so that the investments made to improve cycling infrastructure can be optimized. Although many of these indicators are interdependent, they can be grouped into two categories: characteristics of individuals, and characteristics of the built environment.

Characteristics of Individuals

The propensity to cycle for transportation varies considerably across demographic and socio-economic categories. These relationships can be used to inform estimates of the potential propensity for cycling in a given area or for a population sub-group. Demographics can also be used to inform the existing condition of cycling in a given area. Since these demographics vary by location throughout the region, exploring the cycling tendencies of different population groups is an important part of recognizing current cycling patterns, as well as estimating the potential for additional cycling activity in different areas of GTHA.

² The amalgamated City of Toronto includes the former Cities of Etobicoke, Scarborough East York, York and North York that are more suburban in character than the former City of Toronto.



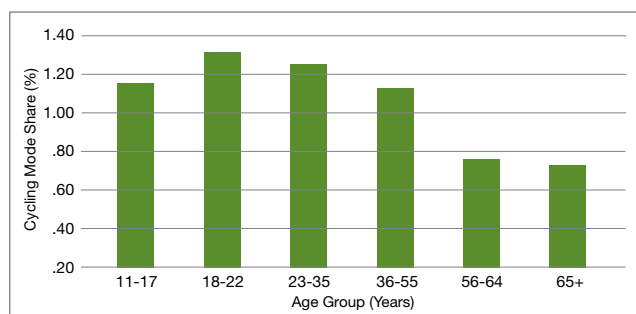
Source: 2011 Transportation Tomorrow Survey

The recent growth in cycling has included a high share of younger adults (20-34 years old). A large share of this cohort is located in the City of Toronto, and concentrated in the downtown and central areas. Older adults and families with children continue to locate outside of the City of Toronto, mainly due to the availability of affordable family-oriented housing ³.

Given the capacity of family-oriented housing in the regional municipalities, much of the population growth in the GTHA has gravitated outside of Toronto, notwithstanding the recent condo boom in downtown Toronto. These moves to family-oriented housing in communities that are lower density can be understood as a factor for why persons in the age group having children may be less likely to cycle. The pursuit of a family home that affords more space than an apartment, condo or small townhouse may seem more financially feasible in areas outside urbanized areas where the housing market is most competitive, and property values are highest.

Age

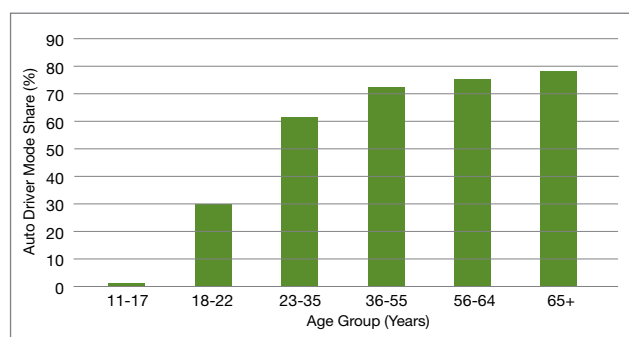
Age and stage of life influence a person’s propensity to cycle. Based on 2011 TTS data for home-based work and home-based school trips, the cycling mode split varies by age group ⁴.



Source: 2011 Transportation Tomorrow Survey
Exhibit 4-2: Cycling Mode Share by Age Group

Although health and age may be a limiting factor for cycling in some cases, data for the GTHA suggests that stage of life, rather than simply age, may influence the propensity to cycle. The 18-22 age group is less likely to have dependents and therefore less likely to have linked trips that require them to pick up family members or other passengers. Persons in the higher end of the 23-35 age group, demonstrate a shift toward greater auto use.

While these stage of life considerations are a way of understanding the relationship between age and auto mode share in the GTHA today ⁵, it should be noted that many factors may affect these mobility choices in the future. In addition to anticipated increases in cycling infrastructure, the construction of infill communities, increased investments in transit and emerging transportation options such as car-sharing may affect the trends observed in the GTHA today. The provision of Regional Express Rail to areas that do not currently have frequent train service has the potential to impact the travel decisions being made by people in these communities.



Source: 2011 Transportation Tomorrow Survey
Exhibit 4-3: Auto Driver Mode Share by Age Group

Furthermore, the relationship between stage of life and cycling propensity is further magnified by the locations where the 18-22 and 23-35 age groups tend to locate within the GTHA, suggesting age is not a completely independent influencer of cycling. Younger generations are drawn to the major urban centres to seek a cosmopolitan life style, to access a network of new service-based jobs, and to avoid congested commutes from suburban areas ⁶. Dense urban centres typically make auto ownership more expensive and less necessary. In dense urban centres, active transportation, including cycling, become more practical because a greater number of destinations will be a short distance away, with free parking for bicycles, and in some places support bike sharing.

³ Family-oriented housing refers to larger residential units that have historically been the housing type of choice for families. These units tend to be ground-oriented (i.e. having front door, proximate outdoor space and parking), such as single-detached, semi-detached and row housing types.

⁴ 2011 TTS Data ⁵ 2011 TTS Data

Gender

Gender is consistently used as an indicator of the health of a cycling environment. In the world’s most cycle-friendly environments, the gender split of cyclists is close to 50/50. By comparison, in North American cities, cyclists are predominantly male. As of 2011, 30% of cyclists in the GTHA were female, similar to other urban regions in North America.

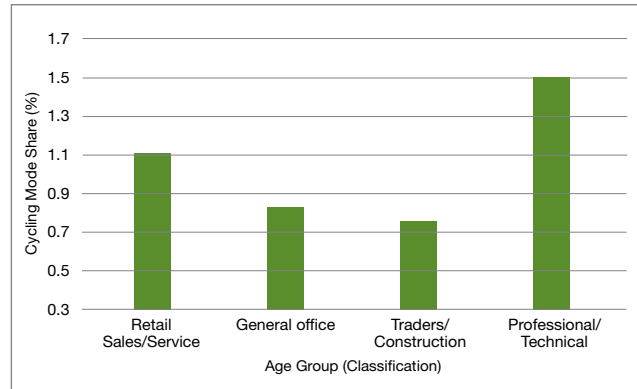
However, even within the context of the GTHA, this gender split varies considerably from one municipality to the next. For example, the City of Toronto, which has the highest cycling mode split of any region within the GTHA, also has the highest gender split at 33%. In more suburban municipalities, that have lower cycling mode splits, the gender share of cyclists is less than 20% ^{vi}.

These findings are in line with studies that suggest that males may be more likely than females to cycle in built environments that were not designed for cycling comfort. These studies suggest that females will be likely to respond to the provision of safe cycling infrastructure, increasing the proportion of females who cycle ^{vii}.

Employment Type

The nature of a job and its requirements may influence whether or not someone will choose to cycle. For example, some jobs, such as trades and construction jobs can require the use of a service vehicle to transport tools and equipment or travel great distances. Professional and technical jobs tend to be more stationary; however, they may lack the workplace facilities like secure bike parking and change rooms that would encourage cycling.

Exhibit 4 4: Cycling Mode Share by Job Type, shows the cycling mode choice for four different employment types in the GTHA. As illustrated by these data, employees with professional, technical or management jobs are more likely to cycle than those of other professions. Jobs in trades or construction are the least likely employment type to bike to work.



Source: 2011 Transportation Tomorrow Survey
Exhibit 4-4: Cycling Mode Share by Job Type

The location of the types of jobs with a high proportion of cyclists is also an important consideration. Jobs in industrial areas or many office parks in the GTHA are in less dense areas, may be along major freight corridors, and are generally less likely to hold the attributes of cycling-friendly places. The attributes of land use and the built environment are investigated in more detail in Section 4.2

Journey Distances

Beyond just employment type and location, the characteristics of an individual's journey to work also influence the propensity to cycle. Of various trip characteristics, trip distance is the most telling factor that determines an individual's propensity to cycle to work or for other types of trips. The average distance to work varies considerably throughout different areas of the GTHA ^{viii}, and the built environment between someone's home and workplace also influences the propensity to cycle. Typically, shorter trip distances are inherently more common in bike-friendly urban areas; however, many people may cycle to a transit station or stop.

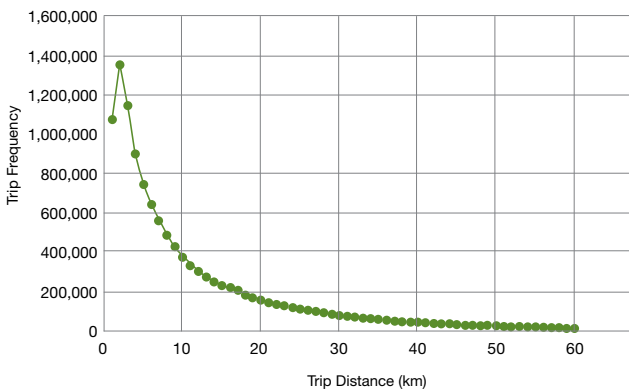
This phenomena and the potential for bikability as indicated by trip distances across the region is investigated thoroughly in Ryerson University's TransForm study on Cycling Potential in the GTHA . This paper suggests that trips to work that are under 5km are considered to be trips that can comfortably be cycled.

Currently, of all the trips in the GTHA that are under 5km, only 2.51% are completed by bicycle.

The low proportion of cycling trips, even among trips that are considered to be within a comfortable distance to cycle, suggests that distance is just one of the many factors that influences cycling. The built environment where these trips take place is also a key piece of the puzzle investigated in more detail in the following section.

This study recognizes that travel by bicycle for most people of average fitness requires a suitable destination within a sufficiently short distance. The maximum distance (and hence travel time) for a trip to be considered ‘bikeable’ varies depending on the source. To identify a distance that may be considered as one that could reasonably be cycled in the GTHA context TTS data about existing cycling trips was considered.

TTS data (2011) revealed that 90% of existing GTHA bike trips are under 6.1km in length, and 90% of walking trips are under 1.75km. Across the GTHA, 56% of trips (by all modes) are 6.1km or less, and 22% are 1.75km or less ^{ix}. For this study, the distance that was considered to be a trip that could reasonably cycled was therefore conservatively set at <5km in length.



Source: 2011 Transportation Tomorrow Survey
Exhibit 4-5: Trip Distance Frequency in the GTHA (All Modes)

Travel patterns in the GTHA today suggest that people generally try to reduce the number of modes and transfers in a single trip as they are perceived to decrease convenience and increase travel. It should therefore be recognized that to build a culture where cycling to rapid transit stations is normative, a range of investments may be needed beyond infrastructure. These may include a variety of promotion and education programs.

4.2 Physical Environment and Cycling in the GTHA

A wide range of indicators suggests that both land use patterns and the built environment of an area directly affect the likelihood of cycling for transportation.

4.2.1 Land Use

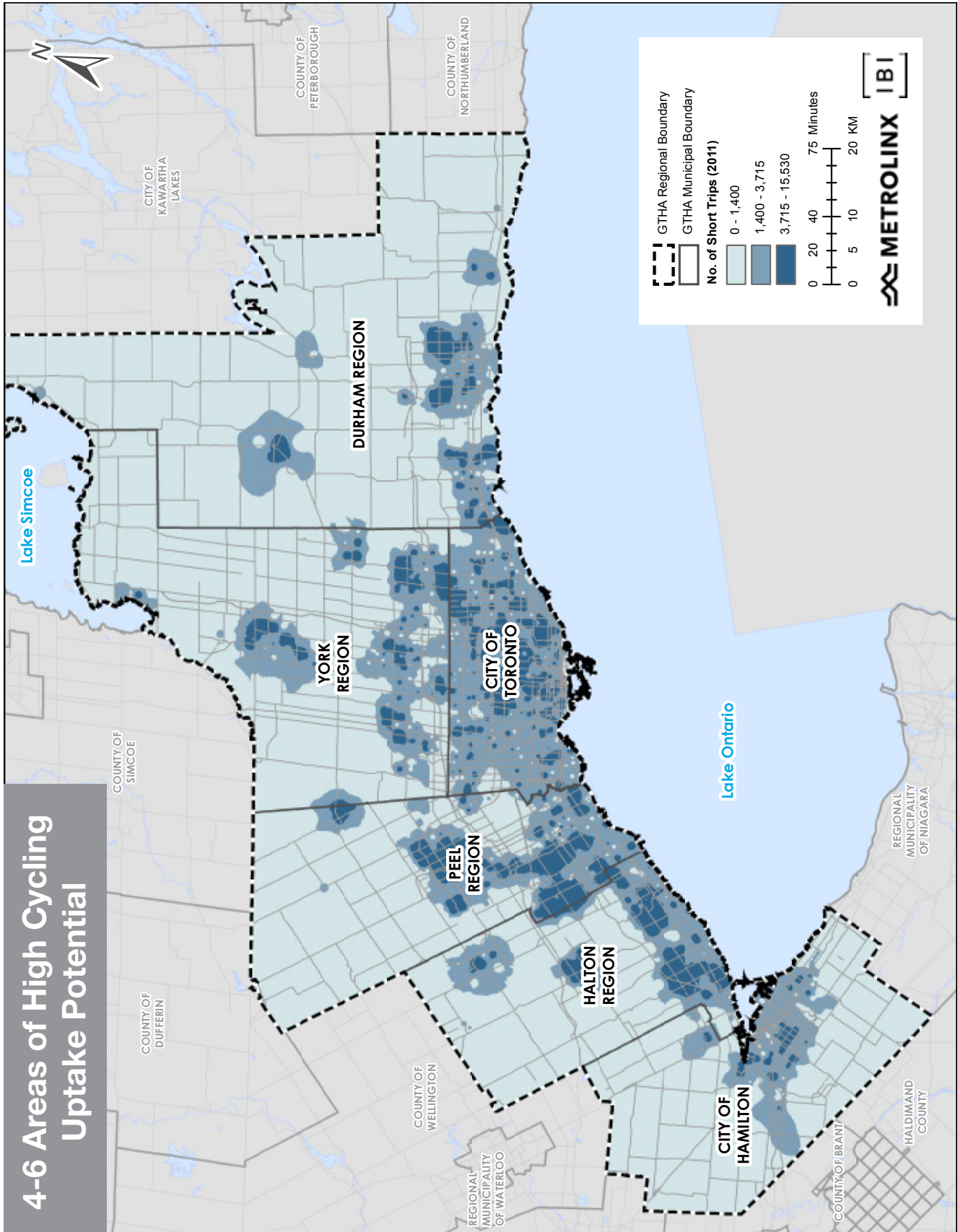
Land Use Mix

Land use mix is an important indicator of cycling propensity. A mix of residential land uses in close proximity to a high density of commercial land uses and employment makes for more short distance trip opportunities. In Ryerson University’s TransForm study on Cycling Potential in the GTHA ^x, density of commercial uses within a given census tract was measured to indicate land use mix and was found to be positively correlated with more cycling trips.

With the exception of some urban centres and older neighbourhoods, in much of the GTHA existing land use is heavily segregated. This is a result of prioritizing the separation of land uses over the course of much of the region’s most rapid periods of growth. However, since the implementation of the Growth Plan for the Greater Golden Horseshoe (2006), local land use policies have been adapting to encourage mixed use development in both new greenfield developments and through intensification. In Urban Growth Centres and Major Transit Station Areas in particular, land use mix is a significant component of the intensification strategies in these areas.

Population Density

Population density is a recognized key indicator of cycling potential. Similar to land use mix, density creates shorter trip distances: a greater number of potential destinations are in close proximity to trip origins, compared to less dense areas. This notion is supported by findings in several research sources and further confirmed by findings in Ryerson University’s TransForm study on Cycling Potential in the GTHA ^{xi}.



Source: 2011 Transportation Tomorrow Survey

Population density is also a common metric for other types of transportation choices, including the prevalence of the use of taxis, ride-hailing services, carsharing, walking, and public transit. As population density increases, auto ownership can become less competitive with other modes and the use of alternative transportation modes increases. It is important to note that cycling alone cannot eliminate the need to own and use a vehicle, but that access to cycling facilities, in addition to range of other transportation options, can decrease the need to drive and/or own a personal automobile.

For cycling to improve in areas outside of dense areas like Urban Growth Centres, so too do the conditions for other transportation options such as walking, transit and ride-sharing. In order for Urban Growth Centres to achieve a cycling culture, densities will need to be reached that are also supportive of other alternative transportation options.

Land Use

A wide range of indicators suggests that the land use patterns and built-form of an area directly affect the likelihood of cycling for transportation. This study considers land use forecasting within the GTHA, balancing two inputs;

- The Growth Plan for the Greater Golden Horseshoe (2017) identified Urban Growth Centres with density targets for each. Municipalities have responded with policy and zoning measures to help build density that would in turn be supportive of cycling. The Growth Plan assumes significant growth is to be accommodated in these areas, that are urban and/or suburban in character. Metrolinx recognizes Urban Growth Centres in a number of policy areas, including in relation to mobility hubs major transit station areas and rapid transit corridors.
- The population and employment growth forecasts that were identified for Toronto and Hamilton’s Urban Growth Centres have already been reached. The growth rate in Toronto has been significantly more rapid than previous forecasts had assumed.

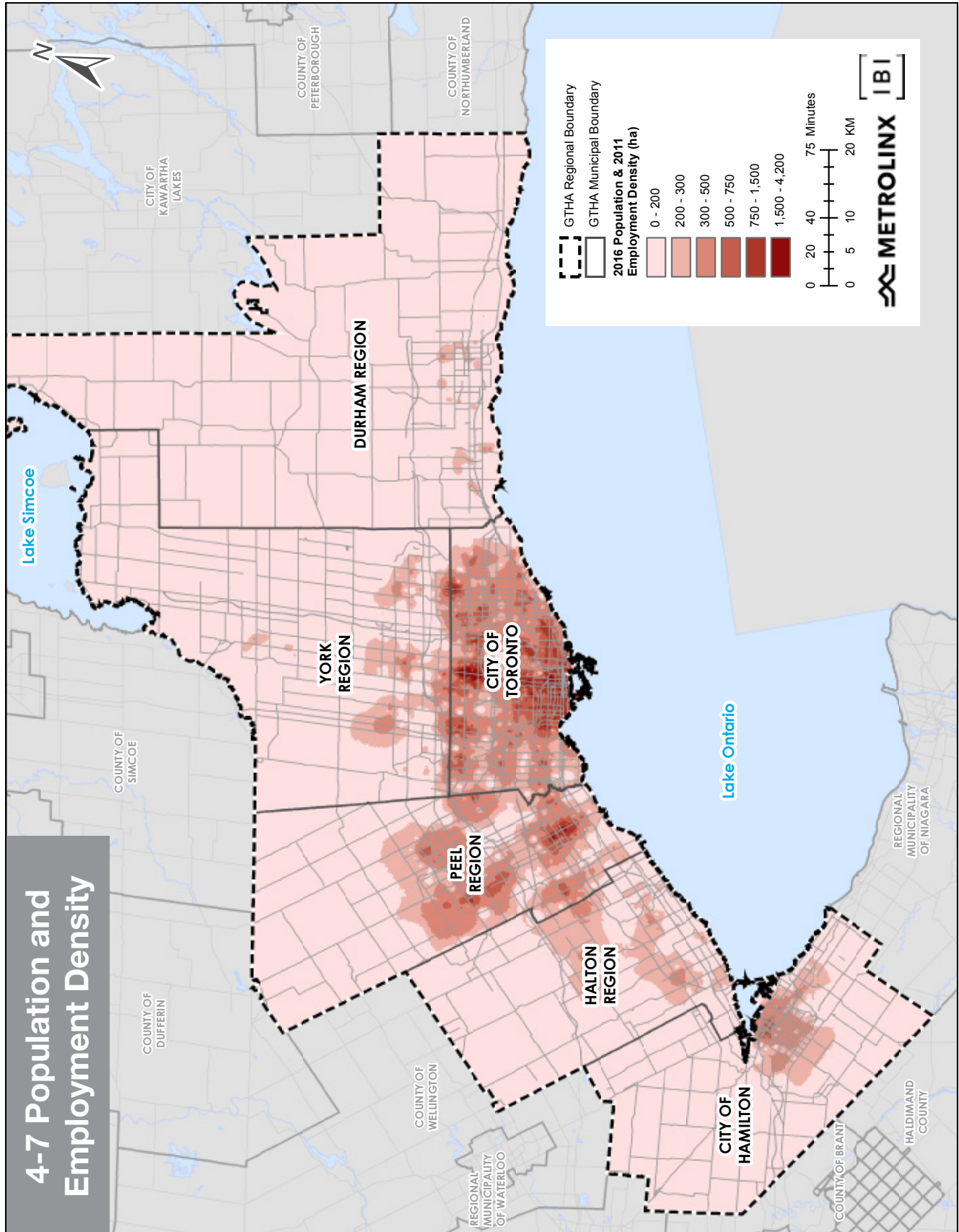
4.2.2 Policies Areas to Support Multi-Modal Travel

GO station access improvement and cycling network connectivity have the potential to address first-mile/last-mile challenges. The first/last mile challenge refers to the notion that once riders leave a station, they still need to reach their final destination and vice versa. Destinations include the residence or workplace of the traveler, depending on the type of trip being taken.

Currently, there is inconsistent use of cycling as a station access mode across the GO rail network. This outcome results from several factors, including street connectivity and quality of the cycling environment on both municipal infrastructure and GO station sites. The implementation of infrastructure recommendations within the GO station access Plan will be critical to link GO stations to cycling infrastructure networks. There is a need to consider bridges and tunnels that enable walking and cycling to GO stations from adjacent communities. Similarly, the provision of walkways and trails from neighborhood cul-de-sacs or crescents are an important strategy to ensure access to GO stations by walking or cycling.”

In more urban environments, the distance to the final destination may be short and easily travelled by walking. However, in less built-up areas that are suburban in character, the distances between a station and the final destination of the traveler may not be a comfortable walking distance. Cycling is a transportation option to help travel the first/last mile between a station and a final destination in these areas.

The Cycling Network Strategy will build on past work undertaken as part of the GO Station Access Plan and the Mobility Hub Guidelines (2012).



Source: 2011 Transportation Tomorrow Survey

4.2.3 Urban Environments

The Mobility Hub concept consist of a major transit stations and the surrounding area. They serve a critical function in the regional transportation system as the origin, destination, or transfer point for a significant portion of trips. They are places of connectivity where different modes of transportation – from walking to riding transit – come together seamlessly and where there is an intensive concentration of working, living, shopping and/or playing. The Metrolinx Mobility Hub Profiles were originally released in September 2012 as a means of summarizing useful demographic and transportation data for the 51 mobility hubs identified in The Big Move (2008).

Subsequently, a Mobility Hub Cycling Interface Analysis was undertaken to examine the strengths and weaknesses of the existing and planned infrastructure networks. This analysis focused on a 2km radius from each mobility hub, and included visual, quantitative, and qualitative analysis of the cycling infrastructure environment.

The Mobility Hub concept has continued to be refined by Metrolinx in order to advance benchmarking and monitoring of their development and connectivity. New indicators and data sources have been applied to the more consistent and comprehensive presentation information.

When considering how investments in cycling infrastructure may serve higher-order transit, the surrounding urban form of a mobility hub must be considered as it will affect the cycling experience and potential mode. Metrolinx's Mobility Hubs Guidelines provide categorizations that help to navigate the expected outcomes as infrastructure investments are made. The following urban environment categories are being reviewed, as the mobility hub guidelines are updated.

- **Urban Centres**

Mobility Hubs categorized as 'Central Toronto' and 'Urban Transit Nodes' are areas where cycling trips are already taking place at relatively high levels for the GTHA. Census tracts in Toronto's downtown west end have recorded mode shares exceeding 18%. This places the cycling activity levels for these neighbourhoods at over 180 times the frequency of the GTHA's least cycled areas where cycling comprises only 0.1% of the mode share.

Investments in higher-order regional cycling network infrastructure near urban transit nodes such as in central Toronto would immediately serve a large number of people travelling by bicycle. The provision of infrastructure in these locations will improve cycling comfort and safety for people who are already cycling.

Furthermore, in areas where the cycling mode share is already high, investments in infrastructure are often in demand. Cycling in the absence of infrastructure leads many people to feel infrastructure investments would make their trips by bicycle safer.

While most GO stations in the 'Central Toronto' and 'Urban Transit Node' Mobility Hubs have relatively less GO Train ridership than other areas of a suburban character, improving cycling infrastructure options in these areas is critically important to support the safety of road users who are already cycling in the area and continuing to grow the cycling mode share. Supporting cycling infrastructure in proximity of these stations will not only serve the stations, but local cycling as well. Infrastructure supporting these existing road users and networks aligns with the goal of the Regional Transportation Plan to encourage cycling as a form of active transportation.

- **Emerging Urban Growth Centres and Historic Suburban Town Centres**

Mobility Hubs categorized as 'Emerging Urban Growth Centres' and 'Historic Suburban Town Centres' have the highest GO Train ridership, with individual stations ranging from high to very high transit ridership. The stations with the highest ridership suggest the highest number of people who could undertake regional travel, by combining train travel with cycling.

The ‘middle belt’ beyond ‘Central Toronto’, but before the GTHA’s most recently constructed suburbs, currently has high transit ridership, low cycling mode-shares, and many people travelling by car for short distances to higher-order transit stations. This suggests that Mobility Hubs in these locations present the greatest opportunity for shifting behaviours so more people can cycle “the last mile” from the transit station to their home.

Opportunities for cycling infrastructure that would serve Mobility Hubs in ‘Emerging Urban Growth Centres’ and ‘Historic Suburban Town Centres’ should be pursued in order to catalyze the emergent urban culture in these established communities.

• **Suburban Rapid Transit Nodes**

These locations are typically low density with little opportunity for cycling. However, these communities also tend to be the areas where development opportunities continue to introduce new roadways. The neighbourhoods that host suburban transit node Mobility Hubs may represent significant opportunities to capitalize on the design and construction of these new streets, so cycling infrastructure is included as they are built. This approach could help to rapidly expand local networks in the communities around suburban transit nodes.

4.2.4 GO Rail Station Access Plan



Exhibit 4-8: Metrolinx Station Access Plan Mode Hierarchy

Metrolinx’s GO Rail Station Access Plan identifies a hierarchy of access station access investments, that will be generally prioritized based on an ideal hierarchy of access favouring pedestrians, followed by transit, cycling, pick up/drop off and parking. This hierarchy was devised to help ensure a more

efficient use of transit assets and enable growth in ridership without requiring an increase in footprint to accommodate more parking spaces.

The GO Rail Station Access Plan further identifies mode-specific guidelines to support station access. For cycling, the guidelines stipulate that safe, comfortable, and direct bicycle facilities will be provided to GO Rail stations and are to be complemented with clear wayfinding. Key streets and locations for boulevard construction will also be identified to enhance cyclist accessibility to stations.

The recommendations for cycling station access infrastructure would link to the major roadways identified in this study, and provide connections between major corridors and GO stations. As part of the implementation of the GO Rail Station Access Plan moves forward, the information from this study can be used to gauge the benefit of introducing or upgrading cycling infrastructure on major roadways near the stations.

It is anticipated that the RER program will increase the existing levels of GO train ridership, with four times as many trips being taken on evenings and weekends and twice as many trips being taken during peak periods. From a station-access standpoint, this will increase the existing pressures currently being experienced in parking lots. Locations with extensive parking provision can end up with conflicting movements between cyclists and cars. From a safety perspective, this will heighten the need for suitable facilities from public roads and cycling networks to cycle parking facilities.

The GO Rail Station Access Plan infrastructure recommendations provide direction and advance the progress of bicycle-accessibility infrastructure being built throughout the GO Station network, while leaving flexibility for additional measures to be incorporated as evolving local-level needs evolve.

4.3 Recent Transit Projects and Cycling Facilities

Metrolinx participates in the planning, design and delivery of infrastructure around the GTHA. The Big Move’s Next Wave is a \$34-billion slate of projects and programs that continued Metrolinx’s transformation of the GTHA’s transportation system by expanding the regional transit network and providing resources for local transit walking and cycling infrastructure. The vision is intended to help transform the way the

region moves, by building a seamless, convenient and integrated transit network across the GTHA. The Big Move is currently being updated to 2041.

Investments in Regional Express Rail will constitute an important expansion of GO Transit to enable 15-minute service on most corridors with electrified trains. It is anticipated that this will result in four times the number of GO Train trips being made on evenings and weekends, and twice the number of GO Train trips being made during peak periods ^{xii}.

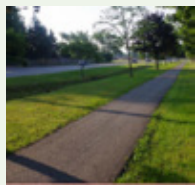
The GO Station Access Plan forecasts that GO Rail ridership will increase from about 100,000 in 2016 to about 240,000 in 2031, which will require that access to stations by sustainable modes (i.e. modes other than single-occupant vehicles) increase from 38% to about 64% due to limitations in parking supply.

The list below summarizes corridors where significant transit investments are being made and can include a cycling component as part of the design. These corridors meet the criteria for cycling facilities of regional significance, and as such, were considered as part of the development of the Network for the Regional Cycling Network Strategy:

TYPES OF CYCLING INFRASTRUCTURE



Raised Cycle Tracks
On-road bike lane vertically separated from the general-purpose travel lane.



Multi-Use Path
Located in a boulevard or green space and shared with pedestrians but separate from motorized traffic.



Separated Bike Lanes
On-road bike lane separated from the general-purpose travel lane by a semi- or full barrier



Bike Lanes
On-road bike lane delineated by pavement marking lane line. Some designs may include a painted “buffer”.

For more details, please see Appendix A

- Cycle Tracks are being designed along Eglinton Avenue for the entire length of Crosstown LRT in the City of Toronto. These Cycle Tracks will be installed in coordination with the LRT, scheduled to be completed in 2021.
- The West Toronto Rail Path is a Multi-Use Trail in the City of Toronto, that runs adjacent to the Barrie and Kitchener GO Rail corridors. The Environmental Assessment Study has been completed to extend this trail from its existing terminus at Dundas Street West into downtown Toronto. Construction is anticipated in 2018.
- The Scarborough Waterfront Multi-Use Trail follows the Lake Shore East Regional Express Rail Corridor in the City of Toronto. Improvements to the existing trail near Rouge Hill GO are anticipated 2017-2019.
- Bike lanes and multi-use paths are being designed along the length of the Finch West LRT in the City of Toronto. It is anticipated that these cycle tracks will be installed in coordination with the LRT, scheduled to be completed in 2021.
- Bike lanes or cycle tracks have been recommended for installation in coordination with the Hurontario LRT in the Cities of Mississauga and Brampton. It is anticipated that these bike lanes or cycle tracks would be installed in coordination with the LRT, scheduled to be completed in 2022.
- Buffered bike lanes were implemented on Highway 7 as part of the VIVA rapid transit line in York Region.
- Bike lanes or cycle tracks are planned on the Yonge Street VIVA rapid transit corridor.

4.4 Existing Regional Cycling Facilities

There are presently three cycling facilities crossing multiple jurisdictions that are constructed or actively in development. These are the Waterfront Trail, the Greenbelt Cycling Route and the Lake-to-Lake Route.

The Waterfront Trail is a signed route, that includes multi-use paths, stone dust trails and shared roadways, with some sections that include bike lanes. The Waterfront Trail follows the shoreline of Lake Ontario, through Niagara Region, the City of Hamilton, Halton Region, Peel Region, the City of Toronto and Durham Region. This route is continuous, but indirect in some sections and projects are being undertaken to upgrade the trail with new infrastructure on an ongoing basis.

The Greenbelt Cycling Route is a signed route, that includes multi-use paths, stone dust trails and shared roadways. The Greenbelt Cycling Route follows protected lands within the Niagara Escarpment, Oak Ridges Moraine and lands legislated as Protected Countryside in the provincial Greenbelt Plan. The route passes through Niagara Region, the City of Hamilton, Halton Region, Peel Region York Region, and Durham Region.

The Lake-to-Lake Cycling Route is a project currently in development between Lake Ontario and Lake Simcoe. This route builds upon the existing sections of the Don Trail in the City of Toronto, with new sections of trail and on-street bike lanes being constructed in York Region.

These facilities serve an important function as they are foundational to the provision of cycling opportunities today. The Waterfront Trail, Greenbelt Cycling Route and Lake-to-Lake Route primarily serve recreational or tourism functions. However in certain areas where the facilities pass through towns or employment centres, they may also be used for transportation cycling. The analysis undertaken as part of this study considered the presence of these existing assets, while looking forward to facilities that may support, enhance or provide more direct options for transportation cycling as roads are resurfaced or redeveloped.

4.5 Draft Province-wide Cycling Network

This study was developed in consultation with the Ontario Ministry of Transportation, to align with Ontario's Cycling Strategy. Ontario's Cycling Strategy, Draft Province-wide Cycling Network, looks ahead 20 years from 2013 to 2033 and outlines what needs to be done to promote cycling across the province. Its recommendation 2.2 is "to identify a province-wide network of cycling facilities" to support recreational cycling and cycle tourism across the province. This Regional Cycling Network Study included a review of the Draft Province-wide Cycling Network, to look for opportunities to complement/coordinate between the recommendations being developed provincially and the strategy presented in this study for the GTHA.

The vision presented by the Draft Province-wide Cycling Network represents a critical step forward, necessary to catalyze cycling culture across Ontario. The Draft Province-wide Cycling Network would connect a number of well-loved trails and cycling assets that currently are not linked into a cohesive network. The Draft Province-wide Cycling Network would provide recreational trails and facilities intended for cycle tourism in more rural areas, serving the important function of getting people riding. Cycle tourism represents a gateway for people who do not regularly travel by bicycle for commuting purposes, improving their fitness and comfort on a bicycle.

The proposed Regional Cycling Network Strategy does not propose facilities in the rural areas of the GTHA. The Regional Cycling Strategy uses a needs-based lens. In areas that were identified in the study analysis as having mid-to-high population and employment density, major corridors were analyzed for their potential to serve the needs of transportation cyclists to complement the Draft Province-wide Cycling Network. In low-density rural areas it is expected that the need for recreational and cycling tourism facilities would predominantly be served by the Draft Province-wide Cycling Network.

5.0 Process to Design the Regional Cycling Network

The identification of GTHA corridors that have a regional significance for cycling was an iterative process. To identify corridors where cycling facilities may prospectively fulfill the study’s regional transportation mandate, the following steps were undertaken.

1. Consolidation of Transportation Plans

Working with municipal and regional agencies that design and deliver cycling facilities, GIS shapefiles were shared to identify existing and planned infrastructure assets.

2. Meetings with Regional Municipalities

Consultation meetings with municipal stakeholders took place between February 23 and March 27, 2017. These meetings were a two-way information exchange, that allowed for a discussion of those existing or planned facilities that local practitioners thought would benefit from inclusion in the RTP. See section 5.2

3. Determination of Regional Cycling Network Design Parameters

The study mandate and network function were defined, as described in sections 1.2 and 1.3 of this report.

4. Applying a Needs Based Lens

Key indicators of existing and future cycling travel patterns described in section 4 of this report were used to inform the analysis measures chosen.

5. Preliminary Analysis

Major public right-of-ways across the GTHA were analyzed in order to understand their potential value for cycling. For this exercise, GIS was used to apply aggregated scores to regionally managed (two-tier) and arterial class roadways (single-tier jurisdiction).

6. Final Analysis

The final analysis applied GIS scoring to a refined draft regional network based on the core goals of the planning exercise: to highlight regionally significant corridors that would connect Urban Growth Centres across jurisdictional boundaries and to identify where these corridors would provide better access to higher-order transit.

5.1 Consolidation of Transportation Plans

As a variety of infrastructure types and naming practices for cycling facilities are presently employed around the region, a scan of existing types was undertaken to identify existing facilities and their characteristics. For more information about different cycling facility types, please see Appendix A.

Municipalities were then engaged to identify their existing cycling networks, as well as planned new projects. This information-gathering consolidated information about cycling projects designated within municipal or regional Transportation Master Plans (TMPs) or Active Transportation Master Plans (ATMPs). Transit projects that had a cycling component were also identified during this information-gathering stage.

This data-gathering exercise identified approximately 4,763km of existing cycling facilities and 7,381km of planned cycling facilities. In total, existing and planned facilities across the GTHA currently represent over 12,000km. These assets include a variety of facility types, such as painted bike lanes, trails, cycle tracks and signed shared roadways.

Across the GTHA, infrastructure is built to varying levels of quality. For example, different municipalities may observe different minimum standards for the width of their cycling facilities, or the frequency of spacing when signing these facilities. Some municipalities designed trails primarily for recreation, while others have built assets with the intention that they be used for transportation cycling.

Many regions and local municipalities within the GTHA have adopted policies whereby cycling facilities are built at the time roads are reconstructed, as part of a roads capital plan program. These capital programs will continue to provide the foundation of many cycling infrastructure delivery programs going forward. However, progress towards achieving connected, coherent networks implies a need to go beyond relying exclusively on capital plan coordination opportunities to schedule the installation of walking and cycling facilities. “Retrofit” or “infill” projects are being targeted by many GTHA municipalities to connect networks more rapidly than has been done in the past.

In order to achieve the objectives of the next RTP, a more rigorous approach to network build-outs will be needed. Connecting and enhancing networks will require a careful balance of near-term implementation to build momentum, with aspirational goals to encourage ongoing support for the network programs. Opportunities to coordinate with and leverage transit investments should also be realized. To accelerate the implementation of both local and regional cycling infrastructure, strategic near-term and long-term cycling network targets are needed.

Municipal and Regional cycling planning programs were reviewed to identify planned investments with a near-term delivery horizon. To identify opportunities, the records were consolidated across the GTHA in the following areas:

- **Planned Capital Investment** – In keeping with ongoing practice, 10-year capital planning documents were reviewed for near-term opportunities to provide cycling facilities where roads are programmed for reconstruction.

- **Trail Systems** – Existing and planned trail projects that were regionally significant in length were also considered. The utility of trails for transportation purposes varies depending on the location and design of the trail. When constructed following design guidance intended for transportation cycling, trails may be more useful for utilitarian applications than trails designed for recreational purposes. For example, trails that are direct following a boulevard and provide high quality crossings at the intersections of roadways will offer more utility than winding trails that are inaccessible to the street network for long distances.
- **Transportation Master Plan (TMP) and Active Transportation Master Plan (ATMP) Infill Corridors** – A number of transportation plans identify the strategic priorities of local cycling networks. Where applicable, these are recognized in this study.

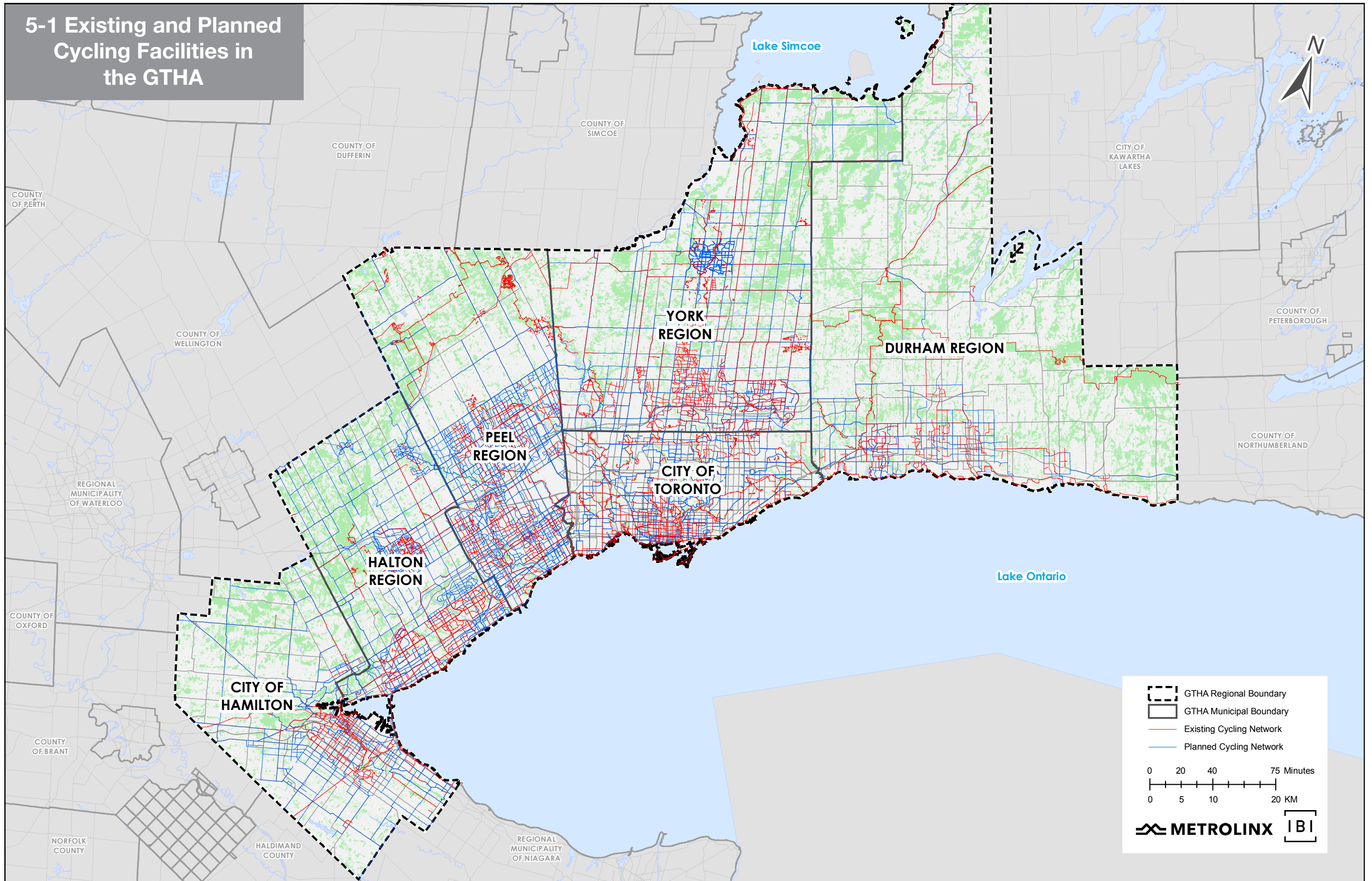
5.2 Municipal Consultations

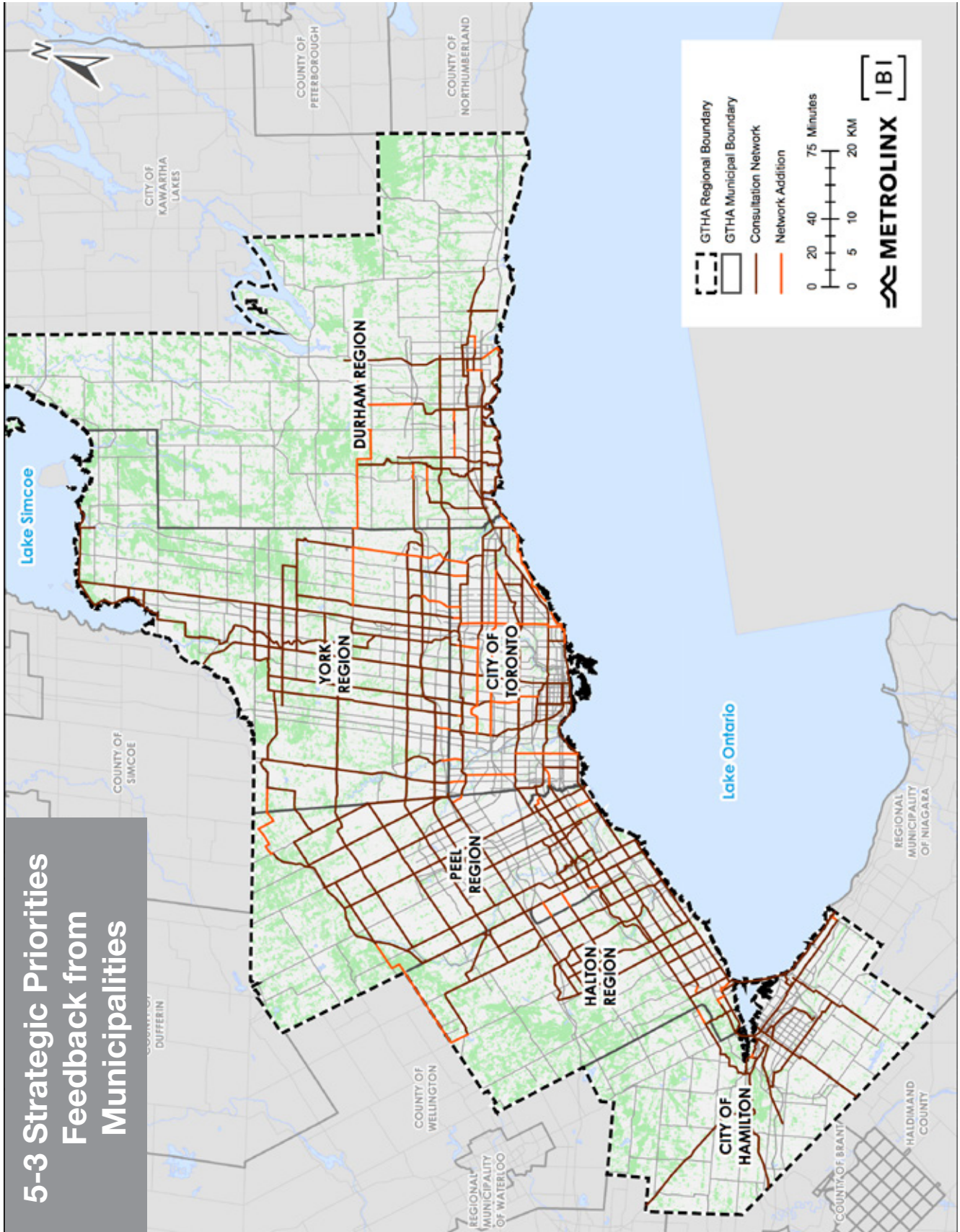
Meeting with key municipal stakeholders was a critical step to identify those facilities within TMPs/ATMPs that stakeholders felt had strategic significance. Consultation meetings with municipal stakeholders took place between February 23 and March 27, 2017.

These meetings were a two-way information exchange, that, using preliminary maps, allowed for a discussion of the existing or planned cycling facilities that practitioners thought would benefit from inclusion in the RTP. These conversations provided a preliminary sorting of existing and planned facilities that serve local networks from facilities that would serve the study’s regional mandate.

From the total 12,000km of existing and planned cycling network facilities, identified during the consolidation of transportation plans a subset of 1,965km of corridors that may have regional significance were identified.

5-1 Existing and Planned Cycling Facilities in the GTHA





Source: Consolidated shapefiles and planning documents provided by area Regions, Municipalities and Towns.

As shown in Exhibit 5 2 Strategic Priorities Feedback from Municipalities, the consolidation of feedback from municipal meetings, a Strategic Priorities Feedback map was developed and refined by with the manual addition of 143km of linkages, where facilities were necessary to connect discontinuities between jurisdictionally identified strategic priorities. To confirm the accuracy of this consolidated feedback, the strategic priorities feedback map was circulated back to municipal stakeholders between April 4 and 10, 2017.

The project purpose statement was discussed in the context of the Regional Transportation Plan Review process, including priorities from the perspective of Metrolinx. Feedback regarding opportunities and challenges being experienced by practitioners at the municipal and regional level was received. During these meetings, a number of similar comments were recorded from multiple jurisdictions, including interest in:

- The establishment of an overall route hierarchy of Draft Province-wide Cycling Network Facilities, Regional Cycling Network Facilities, and Local Cycling Networks.
- A Metrolinx role in the coordination and implementation of cycling infrastructure.
- The potential for the Regional Cycling Network Strategy to act as a mechanism to secure funding for cycling facilities and programs.
- Opportunities to engage the Ministry of Transportation regarding the integration of active transportation infrastructure where roadways under municipal jurisdiction cross 400-series highways.

The consultation points above were consistently heard at nearly all of the consultation meetings. In addition to this feedback, municipal cycling practitioners also suggested a number of additional ideas to improve the delivery of cycling facilities within their jurisdictions. These included that:

- Rail corridor projects being undertaken by Metrolinx similarly consider the opportunities and costs to include walking and cycling infrastructure within the scope of the project.

- Metrolinx review and clarify policies applied for where it is appropriate provide an at-grade rail crossing for cyclists and pedestrians. The municipalities expressed that feedback they have received has not been consistent when trying to build cycling infrastructure crossing rail corridors.
- Metrolinx review policies for infrastructure design standards suitable for different types of at-grade rail crossings, as municipalities have experienced conflicting information.
- Metrolinx and the Province explore supportive policies which may facilitate project cost-sharing by Metrolinx and municipalities when funding is required to build a grade-separated crossing of a Metrolinx-owned rail corridor.
- Metrolinx adopt a “complete streets” approach when building rapid transit projects, so that cycling infrastructure is considered as part of the scope of work.
- A provincial standard be established requiring the mandatory provision of pedestrian and cycling infrastructure, as part of the design and delivery of infrastructure installed as part the capital reconstruction, refurbishment and new builds crossing provincial highways.
- The Ministry of Transportation staff who are designing highway ramps and crossings be required to observe Ontario Traffic Manual Book 18, and the Province’s Bikeway Design Guidelines at the time that cycling facility type and design are being selected.
- Both the Ministry of Transportation and Metrolinx review their respective policies surrounding the standards for closures, work-zones and temporary conditions when long term closures affect existing on-street or off road trail cycling infrastructure.

The regional Cycling Network Strategy will feed into the 2041 Regional Transportation Plan. Municipal stakeholder were invited to identify both near term and long-term opportunities that they felt had strategic significance. Near term projects represent feedback from municipal and regional municipalities regarding projects that they believe will be regionally significant and can be delivered within their ten-year capital planning process. These projects may be fully -funded or partially funded.

Corridors identified by municipal stakeholders as ‘long term’ objectives are approached here as more visionary in nature. These long-term corridors will typically have been included because an Environmental Assessment or Planning Study has been initiated. However, unlike projects identified within a capital planning process, these corridors may not include funded infrastructure projects or necessary approvals by the authority that has jurisdiction over infrastructure delivery. Suggestions for more visionary network linkages were generally made, because they have a recognized value as providing direct linkages, serving a significant part of an Urban Growth Centre, supporting rapid transit stations or contributing to the connectivity of local cycling networks.

5.3 Preliminary Analysis

Before analyzing the feedback received from municipal stakeholders, a corridor analysis was applied to 5,087km of major public right-of-ways across the GTHA.

This included “regional roads” – local corridors under the jurisdiction of York, Peel, Halton and Durham regional authorities, and “arterial roads” in the single-tier municipalities of Hamilton and Toronto. These types of roadways are intended for moving large traffic volumes quickly, and generally comprise the most direct connections between locations.

For this exercise, GIS was used to apply aggregated scores to 5,087km of regionally managed (two-tier) and arterial class roadways (single-tier jurisdiction). The analysis was applied to these roads as they provide options for direct connections – a key network design value for facilities of regional significance.

The analysis applied scores for corridors that may link the areas of cycling potential identified above, because of:

- Connectivity to existing cycling network infrastructure, or
- Proximity to higher-order transit, or
- Crossing of major barriers such as rivers or 400-series highways.

This broad analysis of all roads considered the cycling potential for all roads, whether or not they were included in a municipal planning document.

5.4 Analysis of Municipal Strategic Priorities Feedback

Data was gathered from municipalities of all the existing and planned cycling network facilities across the GTHA. In total, the existing and planned bike lanes, cycle tracks, multi-use trails and shared roadways across the GTHA represent over 12,000 centreline kilometres of network. These existing or planned cycling network facilities may represent of range of infrastructure types, as described in Appendix A.

To focus the analysis, an initial list of potential regionally-significant cycling corridors was developed based on the following criteria:

- Links are recommended in municipal, regional or Cycle ON (provincial) cycling network plans
- Corridors have been identified during meetings with stakeholders as potentially having strategic significance
- Regional and major arterial roads that performed well when the analysis of cycling uptake indicators was applied

The Regional Cycling Network Strategy is intended to highlight corridors that enable longer trips that cross jurisdictional boundaries and facilitate cycling to rapid transit and between Urban Growth Centres.

The consolidated data from local networks for all existing and planned facilities was analyzed to better understand that corridors should be identified as having regional significance. This analysis was combined with the feedback received from municipal stakeholders to identify the utility of candidate

corridors. This was a high-level network design exercise that identified the potential utility of cycling corridors. Detailed facility types were not included in the dataset, and measurements for feasibility were not available at this stage in the planning process.

In order to provide justification for the strategic network, and to enable comparisons of the relative value of one infill link over another, a gap analysis tool was developed using ArcGIS. In total, six factors were used to evaluate the overall priority of a link: ability to cross barriers, connectivity, proximity to transit, population and employment density, existing cycling and indicators of potential cycling uptake. Each analysis measure is described in more detail in the sections to follow.

5.4.1 Scoring for Crossing Barriers

Barrier Analysis Rationale

Longer, regional networks and facilities that provide a direct transportation option crossing major barriers, such as rail lines, water bodies or freeways, represent significant linkages from a network design perspective. For this reason, an aggressive scoring was used for cycling facilities that cross a major barrier and provide critical linkages.

It is worth noting that the types of projects that cross barriers are particularly costly to implement, but it is important to recognize the value-added to the network from a connectivity perspective relative to the additional capital cost (i.e. where there are potential users).

A regional approach to highlighting higher-cost but higher-gain projects that municipalities may have difficulty delivering alone represents significant strategic value within the Cycling Network Strategy.

Major barriers identified in the region include:

- All 400-series highways,
- Major linear waterbodies, and
- Rail corridors with limited at grade or grade-separated crossings.

Analysis Approach

Any links crossing a barrier are assigned 15 points.

5.4.2 Scoring for Connecting Existing Cycling Facilities

Connections Analysis Rationale

The primary purpose of the infill corridors is to contribute to improved connections between existing pieces of cycling infrastructure. Cycling infrastructure is also built across many different jurisdictions; as such, providing a connected network is essential for improving the usability of standalone links and encouraging cycling transportation across jurisdictional boundaries. This factor identifies linkage opportunities between local cycling networks, evaluating the network connection(s) that may be achieved by a particular link.

Analysis Approach

The number of links that connect on either end of an infill corridor or midway through the link were calculated and used to determine its rating for the criteria. A link scored differently for connecting to different types of facilities (i.e. existing versus planned) since existing facilities were already in place (less uncertainty around project phasing) and already had established users (expands the reach of the network).

The following points were assigned for a connection to each of these facilities, to a maximum of 25 points:

- Connection to existing network = 10 points
- Connection to a planned cycling project / Funded transit project with cycling deliverables = 5 points

5.4.3 Scoring for Proximity to Transit

Transit Connections Analysis Rationale

At the most basic level, improving regional transportation options is about getting people where they need to go. In order to ensure cycling as a viable option for accessing GO Transit station areas, a supportive infrastructure environment must be provided. GO Transit stations have been identified based on available regional shapefiles to ensure these “first-mile/last-mile” connections.

There was significant potential to combine cycling with transit to increase the catchment area of the transit network in the GTHA. Metrolinx has emphasized the need for connections between regional transit and active transportation as investments are made in RER.

Analysis Approach

A 500m buffer was assigned around each corridor capturing GO Stations within the buffer to determine its score. This approach assumes that people are most likely to cycle to GO Transit stations for distances within 500m. The intention was to capture major arterial roadways that are in the immediate vicinity of rapid transit stations.

- Each station that fell in the buffer added 5 points up to a maximum of 15 points.

5.4.4 Scoring for Serving Areas of Population and Employment Density

Density Analysis Rationale

Population and employment density can support additional active transportation trips. From a network design perspective, this measure was used to identify the preferred network mesh (cycling route spacing) between corridors.

As discussed in Section 4.2, areas of higher population and employment density often have built form and land use patterns that are more supportive of active transportation. Local networks will generally be designed to provision facilities at a spacing of 250m-2km intervals. The Draft Province-wide Cycling Network spaces its primary facilities at intervals of approximately 10km-40km. This regional network approach recommends acknowledging these Draft Province-wide Cycling Network provincial facilities, while providing additional regional linkages at intervals of approximately 5-10km in the region's most built-up urban areas.

Analysis Approach

A 500m buffer of the corridor was created. A total density was calculated based on area within the buffer and the density of the zone in that area. Thresholds based on the average density were used to determine the rating for the criteria. The analysis assume that density is evenly distributed throughout the zone.

The following points were assigned based on density thresholds:

- <15 people +jobs /ha = 0 pts
- 15 – 40 people + jobs / ha = 10 pts
- >40 people + jobs /ha = 15 pts

5.4.5 Scoring for Serving Areas that Demonstrate a Propensity to Cycle

Potential Cycling Demand Rationale – In the GTHA, 90% of cycling trips are under 6.1km (TTS, 2011). Once trips are longer than 6.1km, most people being to choose a mode of travel other than cycling. Based on this figure, this study conservatively assumes that trips of 5km or less may be cycled by most people and that trips of this length can therefore be most easily shifted from auto to cycling. Areas where there are many short trips currently being made by automobiles likely have high cycling potential for expanded cycling networks.

Analysis Approach

A 500m buffer of the potential corridor was created. A weighted number of existing auto short trips were calculated based on the area within a buffer and the number of trips in that area. Thresholds based on the number of short trips were used to determine the rating for the criteria. The analysis assumed that the number of short trips is evenly distributed throughout the zone. This approach assumed that a short trip is more likely to be made by bicycle if it is within 500 m of a cycling facility.

The following points were assigned based on the total number of short trip thresholds:

- < 2,000 = 0 pts
- 2,000 – 4,000 = 5 pts
- 4,000- 6,000 = 10 pts
- > 6,000 = 15 pts

5.5 Finalization of the Network

In order to finalize Regional Cycling Network Strategy recommendations, a final round of analysis was applied to identify the most critical parts of the 1,995km Regional Cycling Network. This second round of GIS scoring focused on the core goals of the Regional Cycling Network Planning exercise, to assign Primary and Secondary designations. The ability of a route to serve a rapid transit station was a critical metric to differentiate between a primary and secondary route designation. The outcome of this final screen was the designation of 728km as primary routes, and 1,267km as secondary routes.

5.5.1 Inter-jurisdictional Connections

Inter-jurisdictional Connections Rational - Many higher-order transit stations exist within relative proximity to town centres. In order to further focus on identifying corridors that fulfilled the mandate of the study to provide inter-jurisdictional linkages to GTHA population centres, single corridors that cross multiple jurisdictional boundaries were identified.

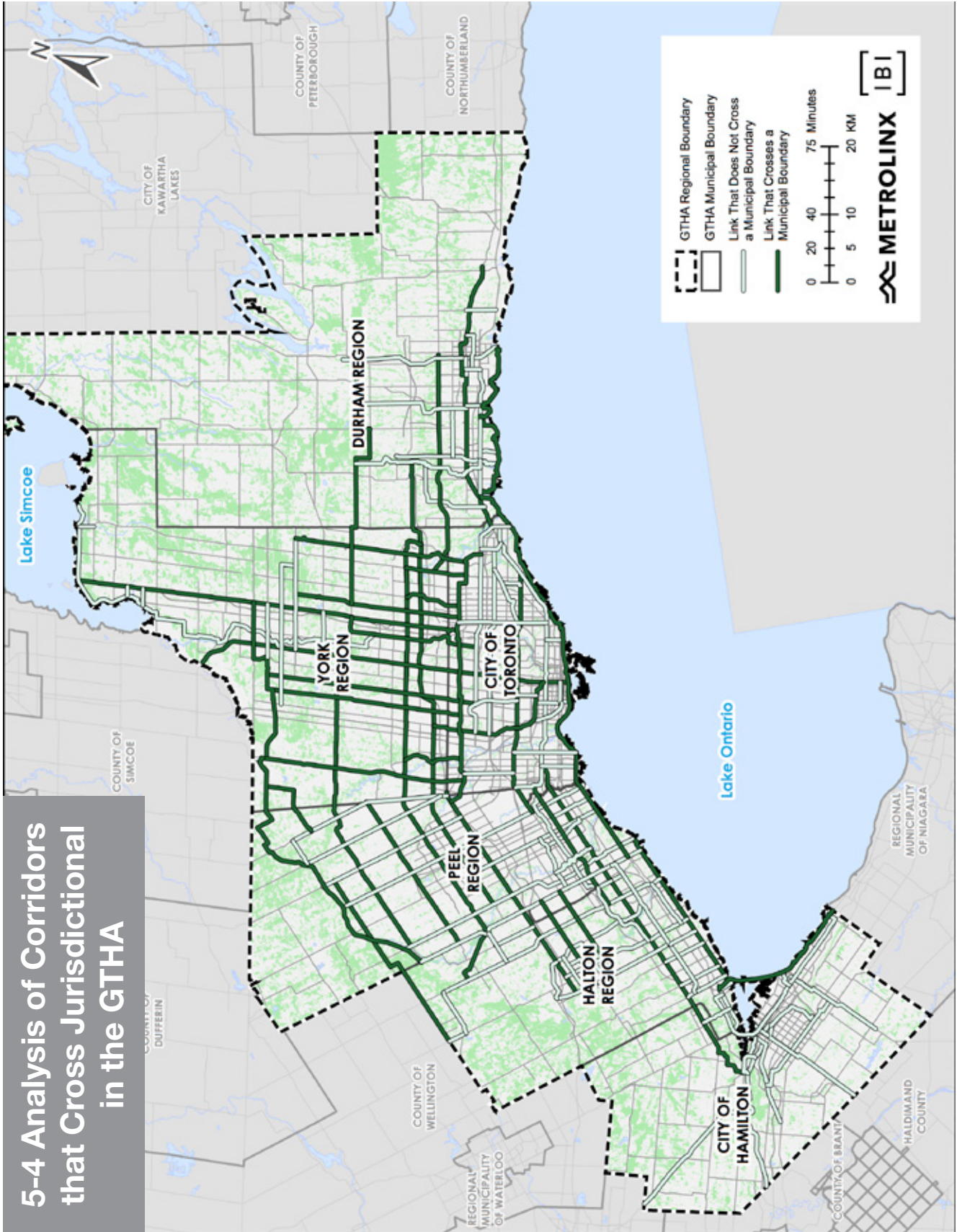
Analysis Approach

Continuous corridors that crossed two or more jurisdictions were assigned a point. Those that were in one jurisdiction were not assigned a point. It was recognized while undertaking this exercise that this approach would highlight the crossing of jurisdictional boundaries.

5.5.2 Corridors in Proximity to Rapid Transit

Proximity to Rapid Transit Rational - To further refine the candidate network, a final round of scoring was applied to candidate corridors that crossed jurisdictional boundaries and supported higher order transit. Corridors that demonstrated high value for their interconnectivity of intra-jurisdictional boundaries were mapped against The Big Move's Mobility Hubs, to better understand the role that additional cycling infrastructure could achieve.

Analysis Approach - A radii of 2km and 500m was applied to each mobility hub, to identify candidate corridors in close proximity to these locations.



Source: IBI Group

6.0 Study Limitations

6.1 Trails in Hydro Corridors

This study has predominantly focused on the analysis of corridors that would host “on-street” cycling facilities such as bike lanes, cycle tracks or boulevard trails as these facilities generally provide better access to destinations, goods and services necessary to fulfill the transportation- mandate of this report. However, as efforts to allocate resources to projects of regional significance moved forward, it is worth noting that cycling trails constructed in Hydro Corridors may in some cases serve a transportation function, when they are designed for this purpose.

In the City of Toronto, the trails in the Finch and Gattineau Hydro corridors serve as important examples of how trails that are designed to promote cycling for transportation may act as significant network connections. The Finch Hydro Corridor Trail connects to Finch Station (the end of line stop for the Yonge Street Line 1 subway). When undertaking consultations with the City of Toronto, municipal stakeholders identified these hydro corridor trails as significant network spines that are helping to re-shape the way cycling is taken up in historically low-cycling mode-share parts of the city.

While the opportunity presented by hydro corridors has been identified in many cycling planning documents across the GTHA, to date, there have not been administrative measures undertaken at the regional level to facilitate the construction of trails. From a project delivery standpoint, individual municipalities are each negotiating land access agreements and local by-laws on a location by location basis. These may also not be the most direct facilities for utilitarian purposes. In addition, there are safety concerns for many cyclists about riding in more isolated areas.

The Regional Cycling Network Strategy includes a limited number of existing hydro corridor trails, where municipal stakeholders identified them as significant parts of their networks. New opportunities for new

hydro corridor trails, beyond those identified by the municipalities were not analyzed as part of the Regional Cycling Network Strategy’s design.

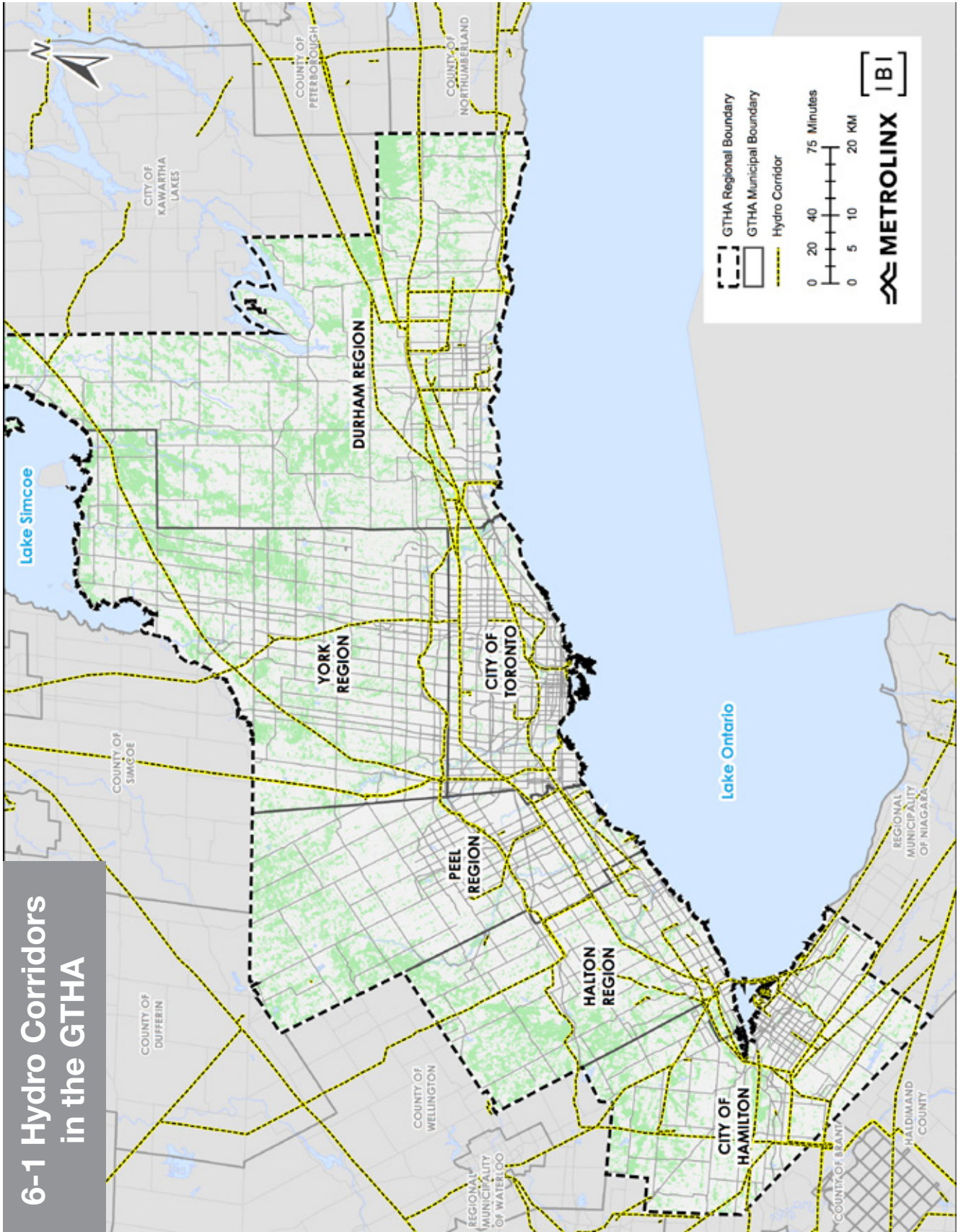
Similarly, during consultations in the City of Hamilton, the escarpment rail trail was identified as an important network link, as it provides a relatively comfortable climb to cross the escarpment. This highlights the potential of existing and former rail corridors, to aid cycling networks, by providing crossings where major land-form barriers exist.

Rail corridors are also frequently identified in local and regional planning cycling network documents as areas that have the potential for multi-use trails. However, as with hydro corridors, rail corridors may not provide direct on-street access to the destinations, goods, and services located in public right-of-ways.

6.2 Trails in Rail Corridors

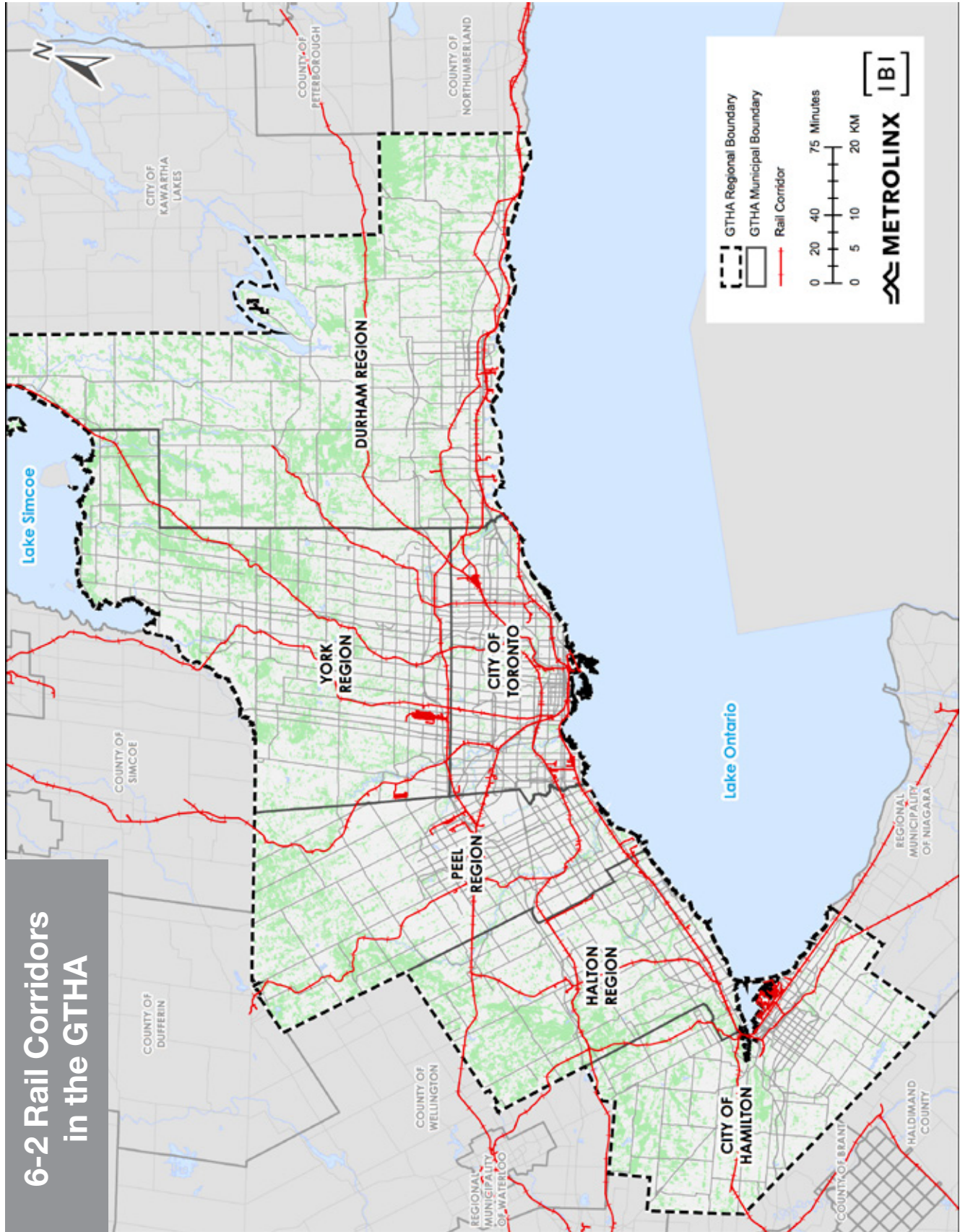
Environmental studies are underway for the entire rail network in order to inform opportunities for the Regional Rail Express program to electrify GO transit corridors and expand service. The primary objective of these studies is to use the lands available within rail corridors to improve levels of train service. However, in the event that the outcome of an environmental study is the identification of locations where a rail corridor has significant capacity beyond the requirements for the GO Train service expansion, the benefit of introducing active transportation infrastructure could be evaluated for this location at the local or regional level.

This Regional Cycling Network Strategy includes a limited number of existing trails that follow rail corridors, where municipal stakeholders identified them. New opportunities for trails that were not identified by municipalities were not analyzed as part of the Regional Cycling Network Strategy’s design.



**6-1 Hydro Corridors
 in the GTHA**

Source: Land Inventory Ontario Database 2016



Source: Land Inventory Ontario Database

7.0 Conclusions

Currently, of all the trips in the GTHA that are under 5km, only 2.51% are completed by bicycle. In order to achieve the objectives of the next RTP, an acceleration of cycling network project build-outs is needed across the region. Connecting and enhancing local networks will require a careful balance of near-term implementation to build momentum, with aspirational goals to encourage ongoing support for the network programs. Opportunities to coordinate with and leverage transit investments must also be realized. To accelerate the construction of a Regional Cycling Network, an implementation program should be developed in partnership with GTHA municipalities that identifies strategic near-term and long-term implementation goals.

7.1 Role of the Regional Cycling Network

The Regional Cycling network would support the Draft Province-wide Cycling Network, playing an important transportation role within a functional network hierarchy. The Regional Cycling Network would provide main connections that link local cycling network facilities for utilitarian cycling.

A key objective of the recommended Regional Cycling Network is to help to support coordination of infrastructure delivery priorities between municipalities. The support of Metrolinx to highlight higher-cost but higher-gain projects that municipalities may have difficulty delivering alone, represents significant strategic value within the Cycling Network Strategy.

This Regional Cycling Network Strategy has identified significant cycling facilities that:

- Support cycling to rapid transit stations, or
- Cross municipal boundaries to link Urban Growth Centres, or
- Provide infrastructure that facilitates cycling for longer distances.

It was a requirement that the corridors selected for inclusion in the Regional Cycling Network would represent a direct and efficient path of travel. Indirect facilities would not provide the requisite quality (e.g. time-savings) desirable for a regional cycling network route. A route that is regionally significant typically follows a single corridor for at least 10km, ensuring multiple opportunities for connections to local cycling facilities.

There are presently a large amount of cross-border trips for all GTHA urban municipalities, where local cycling networks are typically under developed or disconnected. An important role of the facilities that make up a regional network is to cross jurisdictional boundaries and provide a direct connection to the most central areas of an Urban Growth Centres, Mobility Hubs and rapid transit stations to connect to the local cycling network facilities.

7.2 Coordinating Cycling Infrastructure with Rapid Transit

There is significant potential to combine cycling with transit to increase the catchment area of the rapid transit network in the GTHA. Corridors chosen for the Regional Cycling Network would:

- Immediately serve a large number of people travelling by bicycle near urban transit nodes.
- Present a significant opportunity for existing rapid transit commuters to cycle “the last mile” outside of Toronto, ‘where rapid transit ridership is high.
- Catalyze the emergent urban culture at Urban Growth Centres identified as ‘Emerging Urban Growth Centres’ and ‘Historic Suburban Town Centres’.

8.0 Regional Transportation Plan - Cycling Network Strategy

The meetings with municipalities and analysis undertaken identified a number of tactics to achieve the regional cycling network. The recommendations below describes ways that Metrolinx and municipalities may support the development of the Regional Cycling Network, as well as actions that should be taken by other levels of government to support the 2041 Regional Transportation Plan.

8.1 Identify Feasibility Constraints and Implementation Costs

This report identifies a Regional Cycling Network, where 1,005km of new cycling facilities would connect 990km of existing facilities. The intent of the Regional Cycling Network is to help inform cycling infrastructure program delivery priorities. The identification of corridors that together may support regional travel, and enhance local travel by bicycle is intended to help visualize the potential of existing cycling assets beyond jurisdictional boundaries.

Recommendation 1 - This report recommends that follow this planning study, Metrolinx in partnership with municipalities identify feasibility constraints and implementation costs for each corridor identified in the Regional Cycling Network. This implementation stage will identify the resourcing needs to build new infrastructure and upgrades existing infrastructure on the Regional Cycling Network.

8.2 Inform Funding Priorities

During interviews with municipalities, stakeholders communicated that the installation of high quality infrastructure was either underfunded or driven by coordination opportunities with road reconstructions or resurfacing. This approach neglects many areas where cycling infrastructure is needed the most because of network gaps or road safety needs.

Consistent, stable year-over year funding to build the Regional Cycling Network will provide cycling connections to Rapid Transit and Urban Growth Centres, helping to connect first/last mile gaps through improved local network enhancements.

Recommendation 2 - The RTP Regional Cycling Network has been designed in coordination with the Draft Province-wide Cycling Network. This report recommends that the Province of Ontario and Government of Canada define stable year-over-year funding programs to execute the design and construction of the Regional Cycling Network.

8.3 Lead Ongoing Data Coordination

During the collection of municipal shapefiles, the information available was found to be inconsistent and incomplete in many areas. While certain municipalities have open data programs that readily disclose the location and type of cycling assets in the jurisdiction, data sharing policies in other areas are restrictive and generally inhibitive of regional planning.

Recommendation 3.1 - This report recommends that Metrolinx in partnership with the Province of Ontario author a data release and sharing agreement, so that at the end of each calendar year these governments may access municipal records tracking the construction of cycling infrastructure. The agreement would describe data custodianship standards.

Recommendation 3.2 - This report recommends that Metrolinx lead and support ongoing regional planning coordination, and that emerging tools, media or forums that would help to ensure clarity on roles and responsibilities regarding matters that require a coordinated regional planning approach be provisioned.

Recommendation 3.3 - This report recommends that once annually, Metrolinx aggregate and publish a summary of new cycling infrastructure that has been constructed in the GTHA, that may be used as a reference for regional planning by all levels of government.

8.4 Review Infrastructure Delivery Policies

As Metrolinx and the Ontario Ministry of Transportation are responsible for significant linear infrastructure assets, design processes that consider the needs of persons walking and cycling are needed to define the infrastructure design processes observed by these levels of government.

A review of the policies surrounding infrastructure design and delivery by Metrolinx and the Ontario Ministry of Transportation will help ensure that critical opportunities to provision cycling barrier crossings and infrastructure are realized.

While time may be needed to shift existing policies currently in place for these agencies system-wide, policy reviews in a number of infrastructure delivery areas are recommended, as they represent an opportunity to demonstrate to other levels of government that Metrolinx and the Ontario Ministry of Transportation are leading by example. The review of policies, and their application at strategic locations will build momentum towards the development of new standards for all levels of government.

Recommendation 4.1 Require the mandatory provision of safe and comfortable pedestrian and cycling infrastructure, as part of the design and delivery of infrastructure by the Ontario Ministry of Transportation when capital reconstruction, refurbishment and new builds crossing provincial highways are being undertaken.

Recommendation 4.2 Require that the Ministry of Transportation staff who are designing highway ramps and crossings must observe Ontario Traffic Manual Book 18, and the province's Bikeway Design Guidelines at the time that cycling facility type and design are being selected.

Recommendation 4.3 Review the closure and work-zone and temporary conditions policies observed by the Ontario Ministry of Transportation, where long term closures affect existing on-street or off road trail cycling infrastructure.

Recommendation 4.4 That Metrolinx adopt a "Complete Streets" approach when building Rapid Transit projects, so that cycling infrastructure is considered as part of the scope of work.

Recommendation 4.5 At the time that rail corridor projects are being undertaken by Metrolinx the opportunities and costs to include walking and cycling infrastructure be considered within the scope of the project.

Recommendation 4.6 To ensure consistency where Municipalities are trying to build cycling infrastructure to cross a rail corridor, Metrolinx review and clarify policies applied at locations where an at-grade rail crossing is requested.

Recommendation 4.7 Review and harmonize Metrolinx policies for the designs that are suitable different types of at-grade rail crossings

Recommendation 4.8 Explore supportive policies that may facilitate project cost-sharing by Metrolinx and municipalities when funding is required to build a grade-separated crossing of a Metrolinx Rail Corridor.

Recommendation 4.9 At the time that new rail, station and transit projects are undertaken, ensure high-quality pedestrian and cycling access is constructed, ensuring the infrastructure investment links the station to adjacent neighbourhoods and destinations.

Recommendation 4.10 Undertake a Metrolinx parking lot operations review, to identify opportunities to link cycling infrastructure from the public right-of-way, across parking lots to the doors of rapid transit stations.

Recommendation 4.11 Review work zone and temporary conditions policies observed by Metrolinx, when long term closures affect existing on-street or off road trail cycling infrastructure, with a view to mandatory cycling access and minimum detours.

Recommendation 4.12 That the Environmental Assessment Act be reviewed and updated to require a comprehensive assessment of multi-modal transportation, prioritizing transportation sustainability considerations in the study process.

- i CROW - Design Manual for Bicycle Traffic. Chapter 4 – Design of the Cycle Network, December 2016, p.77
- ii CROW – Design Manual for Bicycle Traffic. Chapter 4 – Design of the Cycle Network, December 2016, p.79
- iii CROW – Design Manual for Bicycle Traffic. Chapter 4 – Design of the Cycle Network, December 2016, p.81
- iv Regional Transportation Plan Review: Active Transportation Background Paper, section 3.93 Metrolinx, October 2015
- v Metrolinx context paper on the Regional Economy, Demographics, and Land Use
- vi Mitra, Raktim, Smith Lea, Nancy, Cantello Ian, Hanson Gregory. Cycling Behavior and Potential in the Greater Toronto and Hamilton Area, Transportation and Land Use Planning Research Laboratory, 2016.
- vi Akar, Gulsah, Fischer , Nicholas & Namgung Mi. Bicycling Choice and Gender Case Study: The Ohio State University. 2012. <http://www.tandfonline.com/doi/abs/10.1080/15568318.2012.673694>
- viii Mitra, Raktim, Smith Lea, Nancy, Cantello Ian, Hanson Gregory. Cycling Behavior and Potential in the Greater Toronto and Hamilton Area, Transportation and Land Use Planning Research Laboratory, 2016.
- x Mitra, Raktim, Smith Lea, Nancy, Cantello Ian, Hanson Gregory. Cycling Behavior and Potential in the Greater Toronto and Hamilton Area, Transportation and Land Use Planning Research Laboratory, 2016.
- xi Mitra, Raktim, Smith Lea, Nancy, Cantello Ian, Hanson Gregory. Cycling Behavior and Potential in the Greater Toronto and Hamilton Area, Transportation and Land Use Planning Research Laboratory, 2016.
- xii Metrolinx Website. May 10, 2017. <http://www.gotransit.com/electrification/en/default.aspx>
- xiii CROW - Design Manual for Bicycle Traffic. Chapter 4 – Design of the Cycle Network, December 2016, p.77