






City of Thunder Bay

TRANSPORTATION MASTER PLAN

Final Report

September 2019

CITY OF Thunder Bay Superior by Nature

Prepared by IBI Group

Acknowledgements

The creation of the City's Transportation Master Plan took considerable time, thoughtful debate and commitment from many individuals and groups. I would like to acknowledge their contributions and thank them for sharing their knowledge to improve the City of Thunder Bay.

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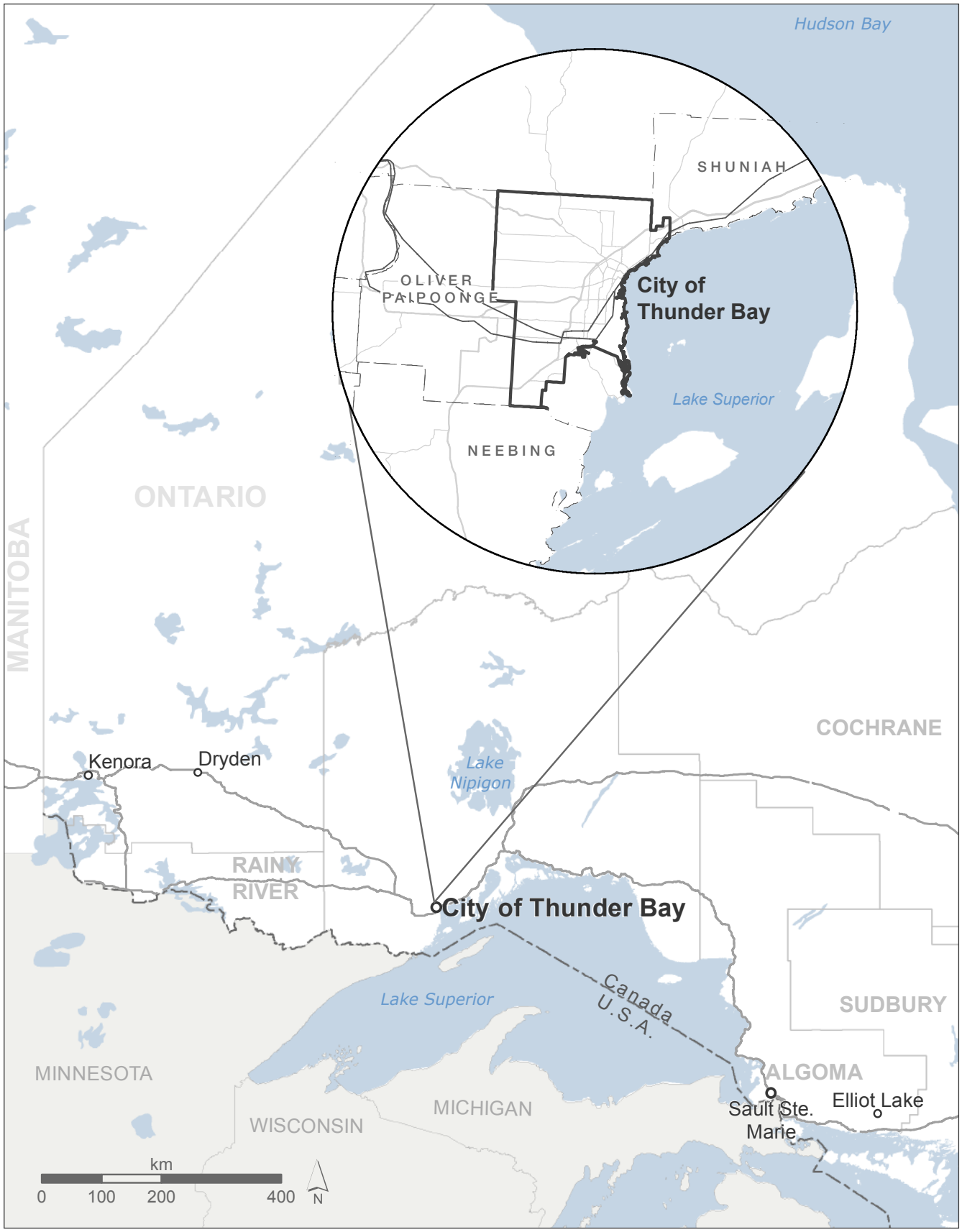
Context Map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OLIVER PAIPOONGE
City of Thunder Bay
Lake Superior
NEEBING
ONTARIO
MANITOBA
COCHRANE
Kenora
Dryden
Lake Nipigon
RAINY RIVER
City of Thunder Bay
Lake Superior
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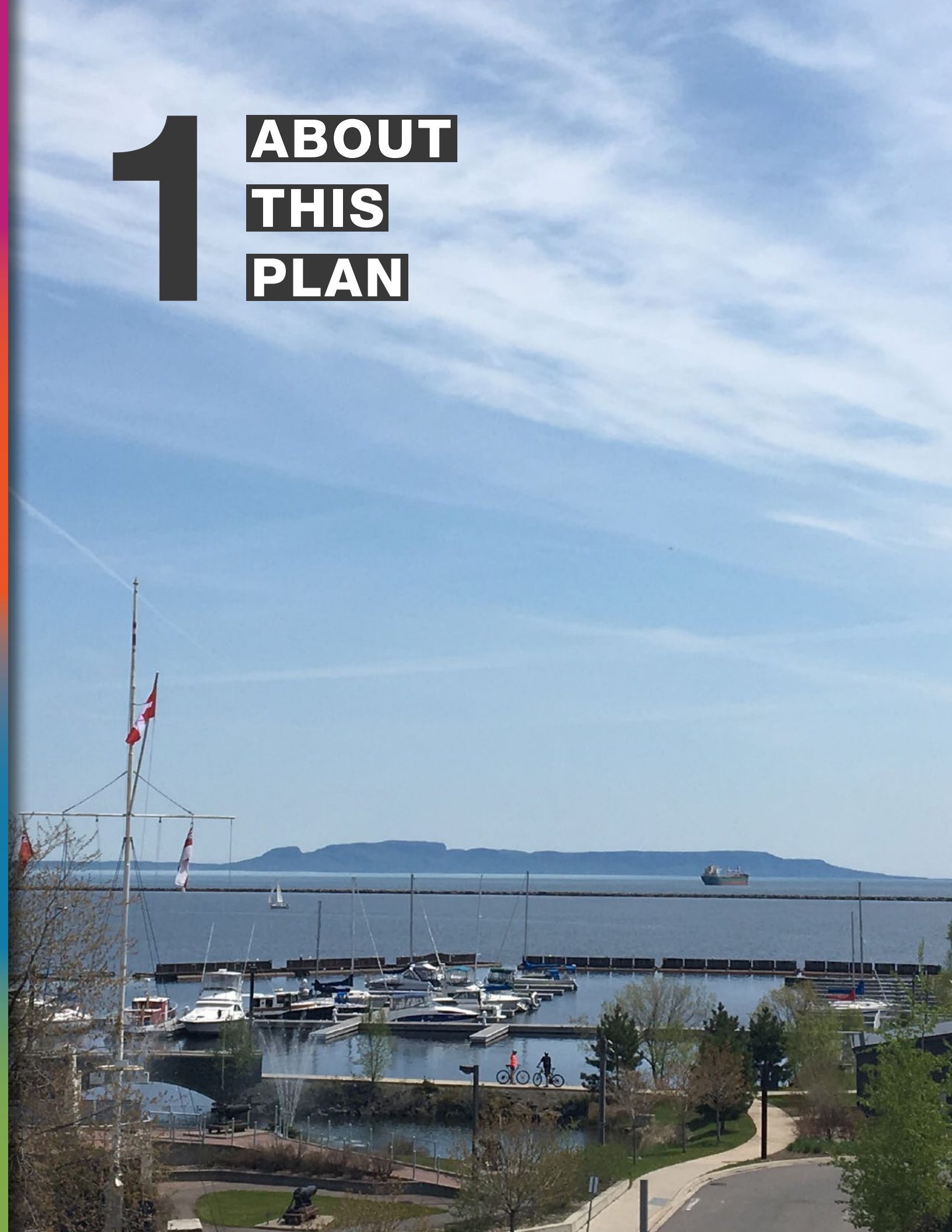
1 ABOUT THIS PLAN



1.1 Purpose

The Thunder Bay Transportation Master Plan (TMP) is a strategic, long-range planning document that is intended to be a practical guide to direct transportation planning and investments. The TMP establishes a vision, provides a framework, and sets the direction for transportation infrastructure, policy and programs for the City of Thunder Bay for the next 20 years and beyond. It is a living document in that some of the detailed recommendations of this Plan may change subject to growth, economic conditions, political conditions, external funding, subsequent environmental assessment studies and other uncertainties. It is anticipated that the TMP will be updated from time to time to reflect changing needs.

Two previous transportation plans were adopted since the amalgamation of Fort William and Port Arthur in 1970 to form the City of Thunder Bay. The first was issued the same year as amalgamation, while a second followed in 1989.

The focus of previous iterations of the TMP was primarily on vehicle-oriented infrastructure. This TMP differs significantly by taking a multimodal approach to transportation planning with policies, projects, and programs for walking, cycling, transit, and driving. This TMP recognizes the potential for the transportation system, and other built environment features of the City, to influence healthier lifestyle behaviours for the community.

The TMP endeavours to fulfill the vision and objectives that have been shaped through consultation with the public and stakeholders under the guidance of the study Steering Committee, and review of other plans and policies enacted by the City of Thunder Bay.

Process

1.1.1 Plan Development

The development of the TMP was structured around 4 main stages:



Stage 1: Study Foundation

Stage 1 laid the groundwork for the TMP study in three distinct parts. First, a review of all relevant policy documents at the municipal, provincial, and federal levels was conducted, as well as an assessment of the current trends and best practices in TMP development. Second, local population and employment growth forecasts were developed. These were inputs to the transportation model that estimate future travel demand to be used in network analysis in the next stage. Finally, the multimodal needs and opportunities facing the transportation system were identified and high-level alternative strategies were developed to address them.

Stage 2: Develop and Test Alternative Strategies

The second stage involved detailed analysis and review of specific multimodal needs and opportunities, and the development of solutions and strategies required to address them. Stage 2 resulted in the development of a Complete Streets policy, a strategy to implement roundabouts, an updated traffic calming strategy and warrants, and proposals to improve road network and intersection operations, among other recommendations.

The recommended road, cycling, and pedestrian networks were the result of Stage 2.

Stage 3: Develop Implementation Strategies

In the third stage, a practical implementation strategy was developed for the recommendations identified in Stage 2. This involved high-level cost estimates for all recommended projects, prioritizing the projects with higher returns on investment, and a phasing plan to implement the recommendations over the upcoming 20 years. Additionally, an action plan was developed outlining clear actions the City will take to move the plan forward.

Stage 4: Prepare the Transportation Master Plan

The final stage was the preparation of the TMP and the completion of the supporting documents and reports. A draft TMP was presented to Thunder Bay City Council and was available for a 30-day public review and comment period. The final TMP presented to Council for adoption included changes that arose from public review.

1.1.2 Environmental Assessment Process

All transportation construction projects are subject to Environmental Assessment (EA) legislation and processes to identify and mitigate impacts to the environment. The Municipal Class EA allows municipal projects, such as road, water and wastewater, and transit infrastructure projects, to be carried out using a pre-approved process.

The TMP study was conducted in accordance with the Municipal Class EA process for Master Plans (Approach #1). The TMP fulfills the requirements of Phase 1, identifying and describing problems or opportunities, and Phase 2, identifying, evaluating, and selecting alternative solutions, preparing solutions to the problems, preparing a general inventory of the existing environment, and initial public and stakeholder consultation.

At the conclusion of the TMP, individual projects will proceed to Phases 3, 4, and 5 of the Municipal Class EA process, with requirements depending on projected cost and scale. Phase 3 includes additional public consultation, as well as more detailed alternative solutions, and more detailed studies on environmental impacts. Phase 4 consists of the completion of the Environmental Study Report, while Phase 5 involves the implementation of the preferred design.



1.1.3 Engagement and Consultation

Stakeholder engagement and public consultation is integral to any planning activity. The ideas and suggestions of residents and stakeholders who participated in the TMP's engagement activities helped to shape the final TMP. Engagement and consultation activities included:

- Three public open houses over the course of the study
- Two online questionnaires
- Listening sessions with Indigenous communities
- Three stakeholder advisory committee meetings
- Information booths at two community events

Further Reading

Background Report A – Engagement and Consultation Summary

What We Heard

Several broad themes emerged. In general, residents and stakeholders wanted the City of Thunder Bay to:

- Improve road conditions with more frequent maintenance and rehabilitation;
- Improve road network operations through changes to signal timing and signal coordination;
- Improve safety for all road users;
- Improve cycling facilities by creating a connected network including a continuous and direct link between the north and south cores;
- Improve pedestrian facilities by filling in gaps in the sidewalk network and increasing the number of controlled crossing locations;
- Improve attractiveness of public transit by offering more frequent service, more direct service, and express routes; and
- Improve the financial and environmental sustainability of the transportation network.

1.2 What's Inside

This document is structured into the following chapters:

- **Chapter 2 –** Reshaping Transportation in Thunder Bay sets a vision, describes the present day context, factors driving the need for a new TMP, and key community outcomes that can be achieved.
- **Chapter 3 –** Moving Towards a Multimodal Future describes the overarching projects, policies, and actions recommended by the TMP that help move Thunder Bay towards an increasingly multimodal future.
- **Chapter 4 –** Shaping the Future Transportation Network highlights the mode-specific networks and projects recommended by the TMP.
- **Chapter 5 –** Achieving the Plan presents the costs and challenges to implementing and monitoring the plan.

Supporting the main TMP report are the **Active Transportation Plan** and several background reports.

Active Transportation Plan

The Active Transportation Plan is a companion document to this TMP that focuses on the initiatives and programs that support and enhance walking and cycling in Thunder Bay.

Both the TMP and the Active Transportation Plan can be read as standalone plans, but were developed in tandem and are fully integrated.

This TMP provides an overview of the Active Transportation Plan, focusing on the recommended pedestrian and cycling networks, key actions and how these relate to the transportation network as a whole. The Active Transportation Plan provides more detailed documentation of the Plan as well as additional actions, projects, and policies.

Background Reports

Nine technical background reports accompany the TMP and are intended to provide a greater level of detail on specific components of the TMP. The key themes and recommendations were carried forward from the background reports and form the basis for the TMP.

Pointers to these background reports can be found under various sections of the TMP document to indicate that more information on a given topic is available in a background report.



2 RESHAPING TRANSPORTATION IN THUNDER BAY

2.1 A Transportation Vision for 2038

Thunder Bay Council's Corporate Strategic Plan identified the strategic vision for the City:

Thunder Bay

Healthy | Vibrant | Connected | Strong

In response to the strategic vision, and with input from City staff, stakeholders and the community, a new transportation vision was identified that incorporates the City's strategic priorities and principles:

In 2038, the City of Thunder Bay's transportation system will support a healthy, vibrant and prosperous community, offer integrated, seamless mobility to individuals, families and businesses, and be responsibly and accountably delivered.

The transportation vision addresses why the TMP is important (to support a healthy, vibrant and prosperous community), what the TMP will achieve (integrated, seamless mobility for individuals, families and businesses) and how the TMP will be implemented (responsibly and accountably delivered).

2.2 Existing Context

Located at the head of Lake Superior, the City of Thunder Bay resides on the traditional lands of Fort William First Nation, signatory to the Robinson-Superior Treaty of 1850, with significant contributions by the Métis people. Thunder Bay is the largest city in northwestern Ontario, and home to 108,000 people as of the 2016 Census. Thunder Bay covers a large geographic area of nearly 330 km^2, but the existing built-up area is concentrated in approximately 100 km^2, built mostly between the shores of Lake Superior and the Thunder Bay Expressway.

This section provides a summary of the current conditions in Thunder Bay.

2.2.1 Social and Economic Environment

The City boasts two historic downtown core areas, each of which date to the 19th century when the city now known as Thunder Bay developed as the two separate towns of Fort William and Port Arthur. Primarily residential areas radiate from each of the cores, and the two cores are now bridged by the "Intercity" area. Exhibit 2.1 shows the residential, commercial, industrial and institutional areas of Thunder Bay. Beyond the urban boundary to the north, west and south, several hamlets and small developments dot the extensive rural parts of the City.

Fort William First Nation (FWFN) is located to the south of the Kaministiquia River. The City of Thunder Bay and FWFN are close partners on many initiatives and City services such as Thunder Bay Transit also serve FWFN.

Thunder Bay is the most populous city in northwestern Ontario. The City's 2016 Census profile indicates a steady population of 108,000. The average household has 2.2 persons and an average income of $66,200, both of which are lower than the provincial average. Thunder Bay has an aging population, with a median age of 44.5 years, higher than the provincial average (see Section 2.3.1 for more information).

The City of Thunder Bay is the economic centre of northwestern Ontario with over 54,000 in the labour force and strong sectors in healthcare, education, resource industries and manufacturing. Major employers and institutions include Thunder Bay Regional Health Sciences Centre, Lakehead University, Confederation College, and the Port of Thunder Bay.

Thunder Bay has been ranked as the best city in Ontario for home affordability (based on 2016 Census income and 2018 average home prices). Coupled with an average commute time of less than 15 minutes, Thunder Bay is an attractive base for employers and workers.

2.2.2 **Natural Environment**

Located on the shores of Lake Superior, Thunder Bay has significant watercourses including Kaministiquia, Neebing, Mission and McKellar Rivers, many smaller creeks and Boulevard Lake. Provincially significant wetlands are located in the west and north parts of the City. An overview of the City's Natural Heritage System, as presented in the Official Plan is shown in Exhibit 2.2.

The City places a high priority on the long-term health of its natural heritage system, which consists of significant wetlands, watercourses, shorelines, riverbanks, floodplains, valleys, ravines, and forested areas. Part 2 of the Thunder Bay Official Plan documents the City's protection and management of the natural heritage system for future generations. Further information on species of conservation concern, source water protection zones, mineral resources, and noise restriction areas can be found in Figures 1 to 4 of the Official Plan.

In some cases, natural heritage features are barriers to the transportation network. The limited number of bridges over the Kaministiquia River or Neebing-McIntyre Floodway, for example, reduce connectivity between communities. These barriers are especially apparent for walking and cycling as alternative crossing opportunities may not be practical. Other natural heritage features may limit access to existing neighbourhoods and reduce opportunities for growth.

Exhibit 2.1: General Land Use in Thunder Bay

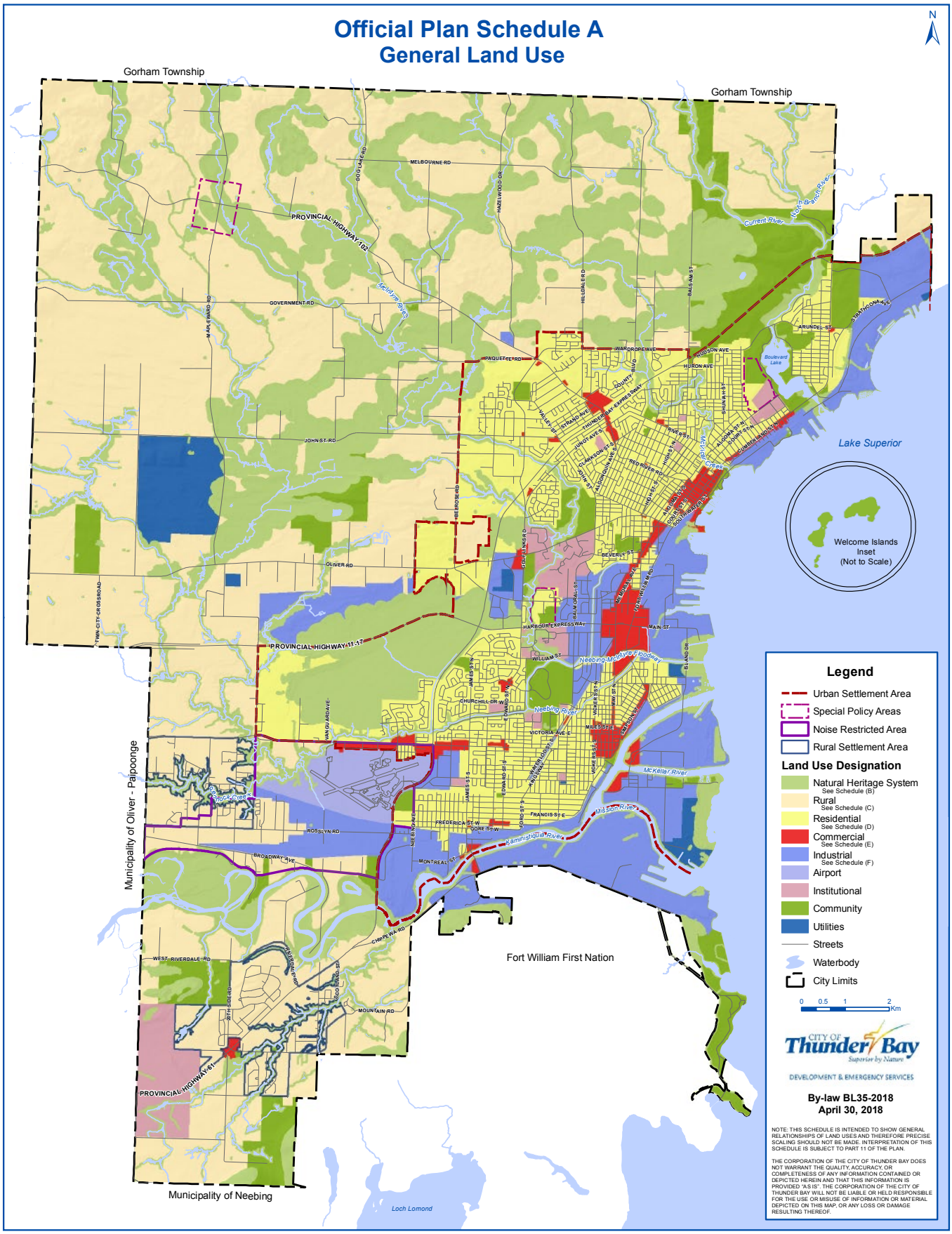
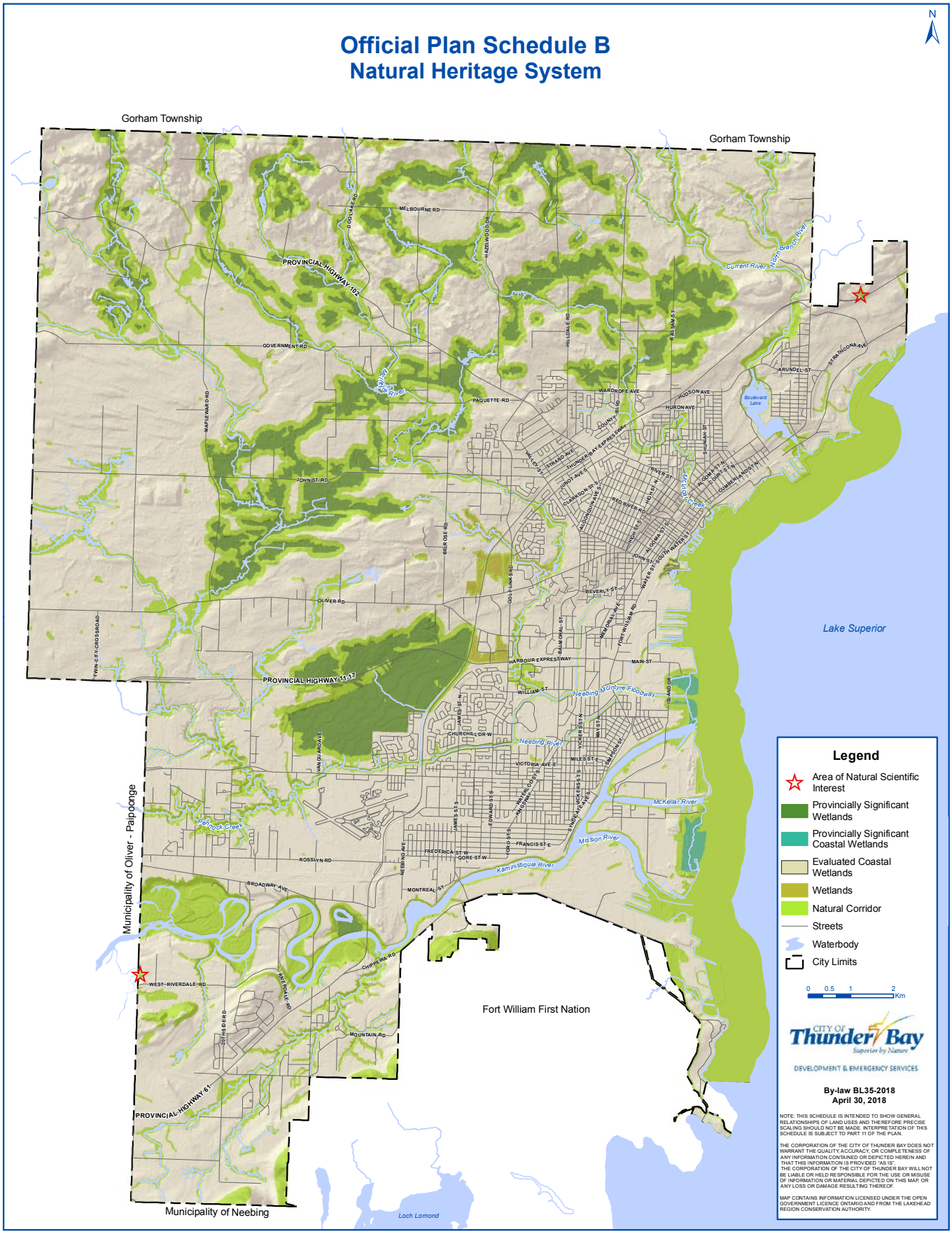


Exhibit 2.2: Natural Heritage Features in Thunder Bay



2.2.3 **Planning Policy**

The most important planning policy document in Thunder Bay is the Official Plan. The Official Plan guides the implementation and advancement of Council's strategic goals. The new Official Plan is based on three approaches: environmental sustainability, climate adaptation, and healthy and safe communities.

These three approaches have been guiding policy in Thunder Bay over the last decade, and similar or related themes are found in policy documents such as:

- Becoming Our Best – 2015-2018 Corporate Strategic Plan,
- Climate Ready City: City of Thunder Bay Climate Adaptation Strategy, and
- EarthCare Thunder Bay Sustainability Plan 2014-2020.

These themes also echo important Provincial policy documents such as the Provincial Policy Statement and the Growth Plan for Northern Ontario.

Beyond the three main themes, the Official Plan discusses six important guiding principles: complete and compact, accessible and active, creative and diverse, responsible growth management, age-friendly, and healthy, safe, and inclusive.

Through these Council-approved documents, Thunder Bay is moving towards a more sustainable transportation system. These documents and their respective guiding principles have helped guide the development of the Transportation Master Plan.

2.2.4 **Transportation**

Thunder Bay plays an important role in regional and national transportation. The City hosts an international airport, a major port on the Great Lakes/St. Lawrence Seaway System, rail facilities for both CP Rail and CN Rail, and a portion of the Trans-Canada Highway. The international border with the United States is located 40 km south of Thunder Bay.

Local transportation in Thunder Bay is largely dependent on the City's well-developed road system. Currently, cars and trucks dominate travel in Thunder Bay, with 88% of travellers getting to work by personal vehicle (82% drive and 6% are passengers) according to 2016 Census Journey to Work data. For commuting purposes, the share of travel by private vehicles has been fairly constant over the last two decades as shown in Exhibit 2.3.

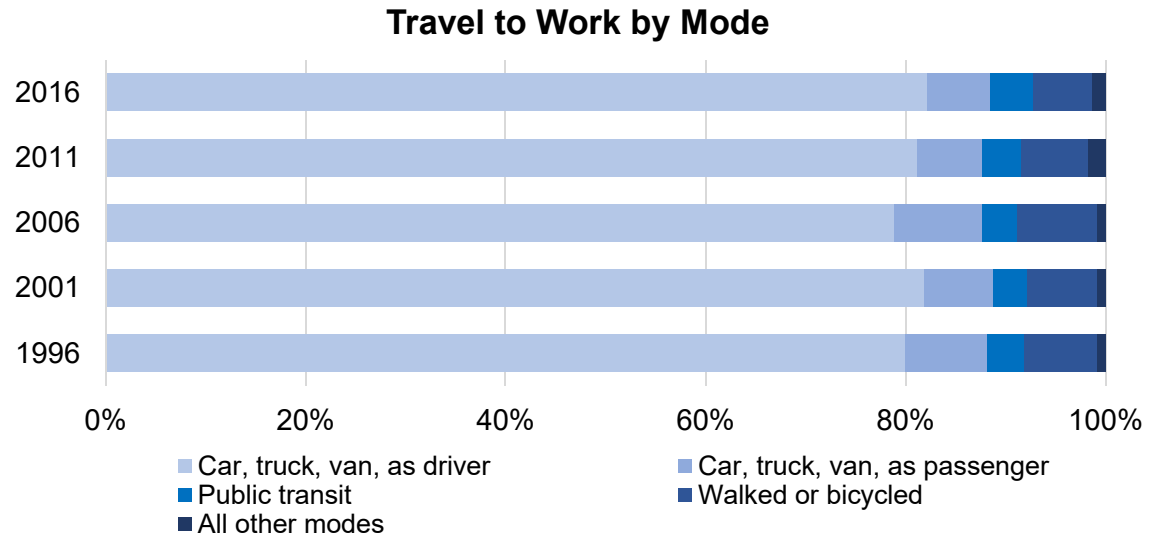
The road network is anchored by the Harbour Expressway and a network of arterial corridors. Unlike many other Canadian cities, severe traffic congestion is not a primary concern for most residents in Thunder Bay. The road network is well-connected and has sufficient capacity to serve travel demand in almost all situations. There are, however, periods of localized congestion and isolated delays at a few locations across the city.

Thunder Bay features a transit system consisting of 17 bus routes that cover the majority of the urban area, and is supported by active transportation infrastructure including sidewalks and multi-use paths. After seeing decreases in ridership in the late 1990s, ridership has increased steadily as shown in Exhibit 2.4. Thunder Bay Transit carried almost 3.8 million passengers in 2017.

High-quality facilities for cyclists include multi-use trails and segments of protected bike lanes and cycle tracks. The City has incrementally added cycling facilities over time by taking advantage of other infrastructure construction projects to add cycling facilities. This has resulted in cycling facilities that are not well-connected. At present only about 6% of residents walk or cycle to work.

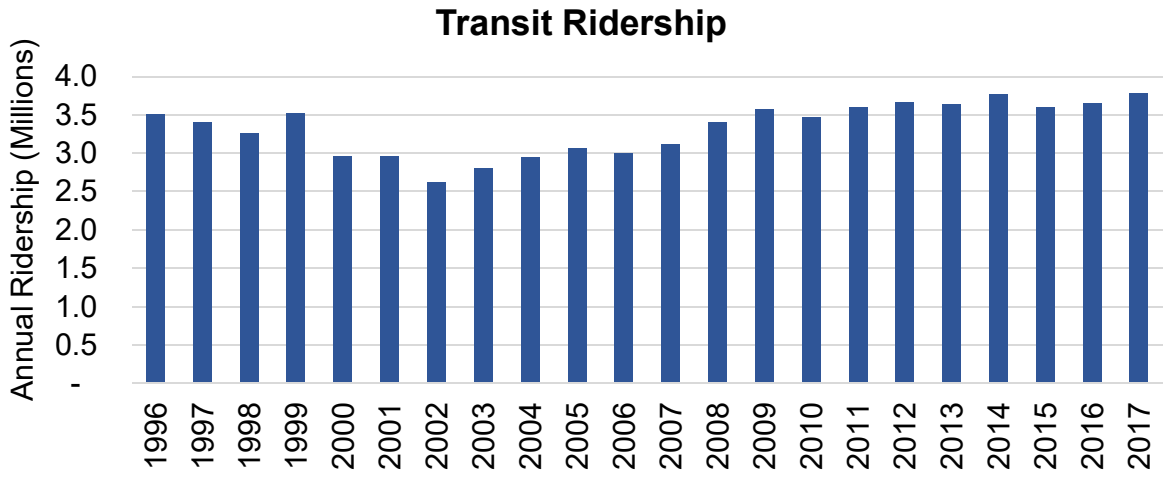
Further background on existing conditions for each mode are presented in Chapter 4.

Exhibit 2.3: Travel to Work by Mode for Thunder Bay Residents



Source: Statistics Canada, Journey to Work, 2001 to 2016 Census.

Exhibit 2.4: Thunder Bay Transit Ridership



Source: Canadian Transit Fact Book, 1996 to 2017.

2.3 Trends

The TMP is driven by what we know about existing conditions, how trends will change transportation needs and how the City will respond to those needs.

2.3.1 Shifting Demographics

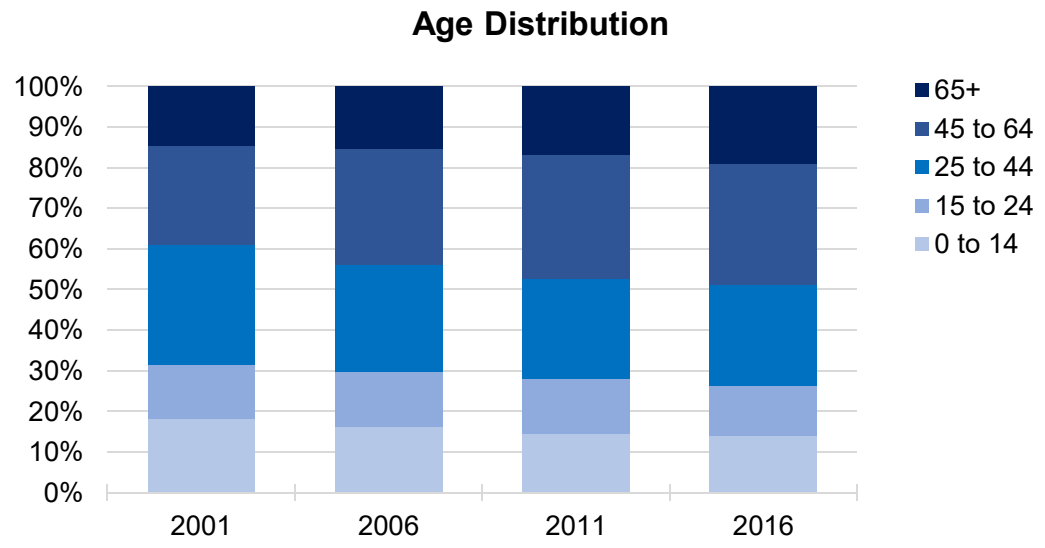
The population in Thunder Bay has not changed significantly over the last 15 years. The Census indicated a population of 109,000 in 2001 and a population of 108,000 in 2016.

Projecting current trends in development and building permits results in a relatively stable total population in the city through 2038. However, the make-up of the population will change as Thunder Bay, like many municipalities in Ontario and the rest of Canada, is faced with a rapidly aging population.

The median age in the City of Thunder Bay is 44.5 years (2016 Census) compared to 41.3 years in the rest of Ontario. The median age has also been increasing over time—in 2001, the median age in Thunder Bay was 39.2 years. Within Thunder Bay and the surrounding areas, the over-50 population has grown by 33% since 2001 while the under-50 population has shrunk by 18%. Exhibit 2.5 shows the changes in age distribution since 2001.

The aging population will impact Thunder Bay in a number of ways. A higher proportion of the population may be unable to drive or may require assistance to travel from place to place. Prudent for planning for the future will be to direct investments towards an accessible transportation system that includes pedestrian and transit infrastructure designed to accommodate the increasing mobility challenges of the City's residents.

Exhibit 2.5: Aging Population in Thunder Bay (Census Metropolitan Area)



Source: Statistics Canada, 2001 to 2016 Census.

Secondly, the number of younger adults will not be able to fill the labour force needs as the baby boomer generation retires. Attracting new population growth is needed to support the City's economic vitality.

Finally, demand for City services, including community support, health care and transportation, will increase pressure on the City's financial resources.

2.3.2 Changing Urban Structure

Over the past decades new development is expanding and reshaping the urban structure of Thunder Bay. Although there has not been significant growth in population, there continued to be new residential development in the City. On average, the number of persons per household has been slowly decreasing and this trend towards smaller householders is expected to continue.

The City's Official Plan identifies areas where growth should be directed. It proposes that growth should first be directed within the existing designated residential areas as shown in Exhibit 2.6—a minimum target of 20% of new dwelling units is to be realized through intensification of the existing residential areas, and the City has been exceeding this target in recent years. Next, the Official Plan directs development growth within a defined growth area, generally located in the northwest corner of the city, as shown in Exhibit 2.6.

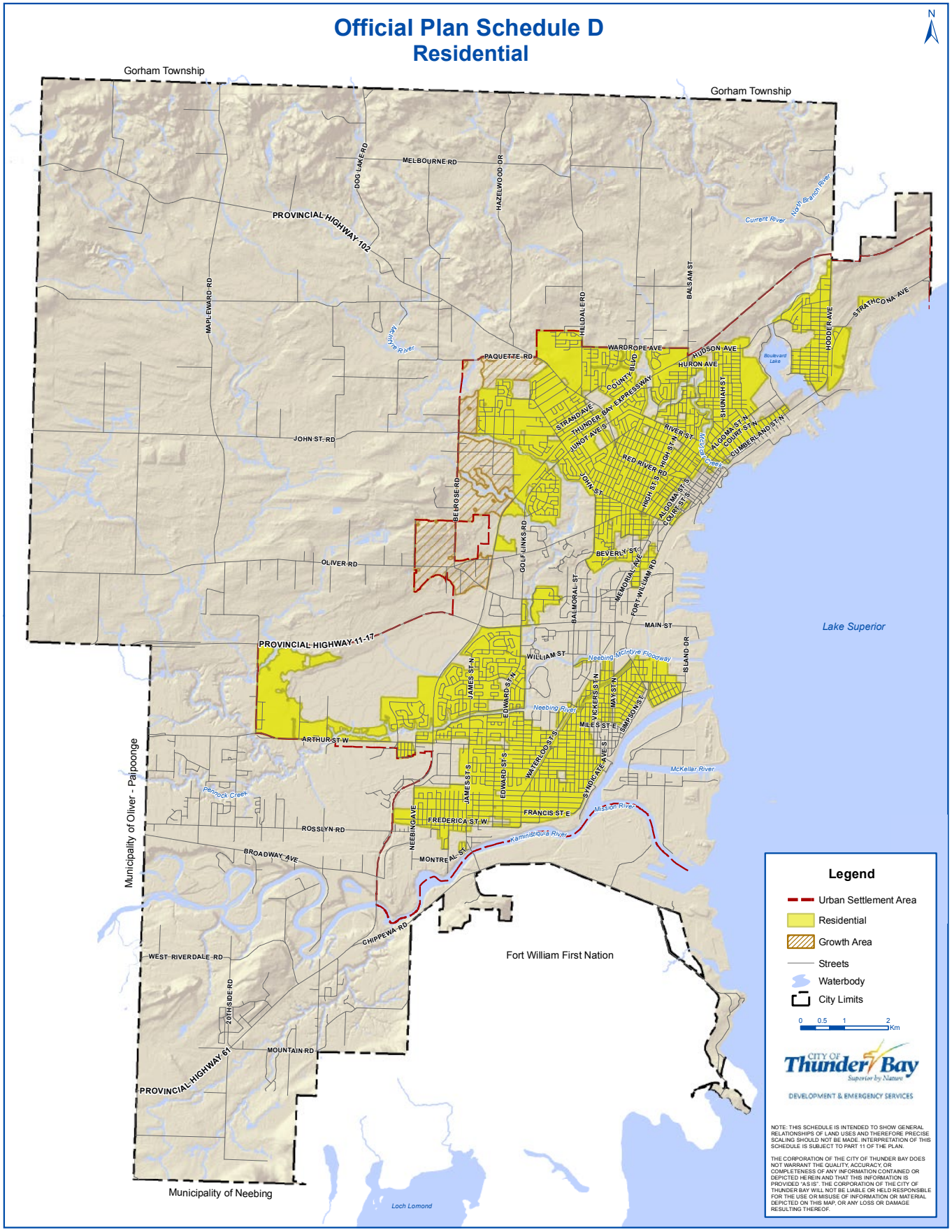
The changing urban structure could impact the transportation network in two distinct ways. Residential growth within the existing built-up areas will maximize use of the existing infrastructure and increase the viability of transit and active transportation, while growth in the city's periphery will increase demand for longer distance travel into the cores and Intercity where jobs and shopping opportunities are clustered.

2.3.3 Optimizing Existing Infrastructure

The City has a well-established road network, with over 3,000 km of roads. The increasing cost of maintaining aging infrastructure is a leading concern for the City as Thunder Bay's population and tax-base is not growing. In some cases, infrastructure has been overbuilt, where earlier predictions for growth and increased demand have not materialized. The increasing maintenance burden typically presents two options: a) increasing taxes or b) deferring maintenance and deteriorating conditions.

A third option can be considered for Thunder Bay. Right-sizing or downsizing existing transportation infrastructure where possible to reduce the on-going maintenance and operating burden, enabling the City to keep its maintenance backlog to a minimum while keeping taxes stable. Actions and projects have been identified in the TMP to maximize the efficiency of what already exists and to right-size the transportation network for existing and projected demands. This may be done through reducing roadway widths where there is excess capacity or by encouraging more sustainable travel modes such as walking and cycling.

Exhibit 2.6: 2018 Official Plan Designated Growth Areas



A Changing Economy

Ontario's 2011 Growth Plan for Northern Ontario included six guiding principles, one of which was "Developing a highly educated and skilled workforce to support an evolving knowledge-based economy and excellence in the trades." This goal, along with a number of recent developments that support its achievement, has been emphasized by the Thunder Bay Community Economic Development Commission:

> **"Thunder Bay's economy has been buffeted by the changes in the world economy... there has been a decline in the size of the forest industry throughout Northwestern Ontario that has greatly impacted Thunder Bay's labour force directly and indirectly through suppliers and service providers.**
>
> **However, changes have occurred to our economy to diversify it from its past strengths. Examples such as the Northern Ontario Medical School, Thunder Bay Regional Research Institute, Thunder Bay Regional Health Sciences Centre becoming a regional health/science/education hub for Northwestern Ontario and, most recently, Lakehead University's new law school that opened in September of 2013. All examples of Thunder Bay and Northwestern Ontario demonstrating the capacity to build and sustain a knowledge-based economy that provides a diversity of good jobs and academic opportunities for our citizens.**

- Thunder Bay Community Economic Development Commission, Strategic Action Plan 2014-2017

2.3.4 Aligning with Thunder Bay's Plans and Policies

The TMP presents an opportunity to ensure transportation investment aligns with the vision and objectives approved in previous planning and policy work, including the Official Plan (2018), the Corporate Strategic Plan (2015), the EarthCare Sustainability Plan (2014), the Climate Adaptation Strategy (2015), the Multi-Year Accessibility Plan (2013), and the Age Friendly City Services Action Plan (2015). The City has also identified three Image Routes that will play a role in improving the City's image and attractiveness for economic development and tourism.

2.3.5 Adapting to Emerging Technology

Technology in the transportation sector is advancing faster than ever. Cities need to contemplate how technology integrates into the broader transportation network and implement proactive policies to achieve the desirable outcomes and fully leverage the benefits of the technology.

Technologies that have the potential to vastly change the way residents experience urban mobility include connected and autonomous vehicles, electric vehicles, ridesharing, shared mobility, on-demand technology, bike sharing, and driverless trucking and commercial drone delivery. Cities need to prepare for the swiftly approaching future.

2.4 Opportunities

Transportation plays a key role in how Thunder Bay becomes a healthier, more vibrant and prosperous community. This section summarizes why transportation matters to Thunder Bay, and four important ways that the TMP supports a healthier, more vibrant and prosperous community:

CONNECTION AND OPPORTUNITY



- Linking Neighbourhoods
- Access to Opportunity
- Improving Equity

PUBLIC HEALTH



- Active Lifestyles
- Safer Roads
- Reducing Pollution and Noise

A GREENER CITY



- Compact Development
- Green Spaces
- Climate Change

GOOD FOR BUSINESS



- Revitalizing Older Areas
- Supporting Goods Movement
- Attracting Tomorrow's Workers

Transportation and Poverty Reduction in Thunder Bay

In 2013 the Lakehead Social Planning Council published Building a Better Thunder Bay for All: A Community Action Strategy to Reduce Poverty, with support from the City. The strategy observed that transportation can be a barrier to accessing programs and services for low income residents:

> **"The geography of the city, the distance to some services, and the cost of public transit were identified during our consultations as real barriers for low income people. Also related to this was the issue of food security, and the ability of low income individuals to access healthy food…. Solutions to these barriers ranged from encouraging affordability in public transportation, the facilitation of alternative transportation methods, enhanced urban densification to reduce distances to programs and services, and coordinating transportation to retail grocery outlets from low income neighbourhoods.**

The strategy recommended three ways to improve transportation affordability and accessibility:

- Encourage public transportation accessibility and affordability for low income individuals and the integration of all public transportation methods.
- Facilitate alternative methods of transportation through the expansion of pedestrian walkways, bike paths, and commuter trails.
- Support urban densification strategies.



2.4.1 Connections

Linking Neighbourhoods

Thunder Bay is a city of neighbourhoods, but some neighbourhoods are more complete than others. Many residents have a corner store or school nearby, but others do not. For people who do not drive, getting to the next neighbourhood by foot or bike can mean overcoming barriers like major roads, rivers or rail lines. For people of all ages and abilities, better walking and cycling connections within and between neighbourhoods make it easier to reach important opportunities like schools, parks, stores, services, friends, recreation facilities and natural areas.

Neighbourhoods grow stronger when streets are "exchange spaces" rather than just "movement spaces". People who walk or bike are more likely to interact with friends and neighbours, shop in local stores, and visit local parks.

Access to Opportunity

Thunder Bay's transportation system offers access to opportunity—helping people get to work, volunteer, attend school, and get medical care. It is critical to maximize access to opportunities across the entire city for everyone. Someone who is unemployed has a better chance of finding work when there are more jobs within a reasonable commute. People who rely on transit and active transportation to get around will have more limited opportunities than someone who owns a car.

This challenge of maximizing access to opportunity for non-drivers is growing because of the centralization of government services in the south core and the growing concentration of jobs in the Intercity area which is relatively remote from residential areas. For non-drivers, including many youth, seniors, low-income families and persons with disabilities, these trends reinforce the importance of comprehensive transit and active transportation networks.

Improving Equity

Since the 1950s, the development patterns in Thunder Bay have largely assumed that residents travel by car, creating real barriers for those who do not drive. This group of "mobility disadvantaged" residents include children and persons with disabilities, along with many seniors and low-income families. Improving equity through transportation means making changes that distribute more mobility benefits to those who are most disadvantaged. For example, improving walking, cycling and transit to access affordable and healthy food options helps to address food insecurity issues in Thunder Bay.

Decisions about the transportation system need to give higher priority to people whose mobility situation limits their ability to earn a living, get an education, buy groceries or socialize with friends. Developing services for the most vulnerable in the community will service and benefit the whole community.

Creating the Bay Street Active Living Corridor

In 2015, the City of Thunder Bay upgraded seven blocks along Bay Street to prioritize walking and cycling. Previously, the street lacked sidewalks and pedestrians on Bay Street did not have the right-of-way to safely cross higher-speed side streets. By adding a new sidewalk on Bay Street and reconfiguring stop signs at several intersections, the City improved access to two elementary schools and created an important connection for pedestrians and cyclists between Carrick Park and Hillcrest Park. The project contributed to a successful and sustainable all-season "walking school bus" that allows students to safely and actively travel to and from École Gron Morgan.

The Bay Street Active Living Corridor was so successful that, in 2017, the City extended the active living corridor farther west by adding sidewalks along Windsor Street to reach Algonquin Avenue South and a third elementary school.

2.4.2 Public Health



Active Lifestyles

People who live more active lives—such as those who walk, bike or take transit more often—have a reduced risk of developing diabetes, heart disease, stroke, cancer and depression. These benefits are especially important for rapidly growing children, seniors who want to preserve their good health, and sedentary adults at risk of diabetes. By reducing the overall rate of illness and death, these personal benefits help society in general by reducing health care costs and increasing labour force productivity.

Data from Public Health Ontario indicated that, in 2012, Thunder Bay residents had higher rates of death as a result of cardiovascular disease, cancer and diabetes compared with provincial averages. Across Ontario in 2012, Thunder Bay had the second highest rate of diabetes mortality (37.1 deaths per 100,000 people).[1]

Achieving real health benefits requires people to adopt new habits, meaning that walking and biking must be attractive for a wide range of users and trip purposes.

If we create transportation facilities and services that work for the most vulnerable populations, they will automatically work for everyone else.

Safer Roads

The safety of all users must be the highest priority of any transportation system. The prevention of death, injury and property damage is achieved through the planning, design and operation of roads, sidewalks, cycle tracks and trails, as well as through education, enforcement and encouragement of user behaviour.

Conventional road safety programs focused on minimizing the number and severity of motor vehicle crashes. Today's leading-edge road safety programs give equal priority to the protection of vulnerable road users of all ages and abilities—combatting the often negative perceptions of safety for walking and cycling.

Reducing Air Pollution and Noise

Cars are getting cleaner, quieter and more efficient, but ground-level ozone readings remain a concern in many Canadian communities. Ozone and other air pollutants contribute to asthma, heart disease, stroke, lung cancer and other ailments, and children are particularly vulnerable. Active transportation is a great way to reduce air pollution, and when car drivers shift to transit they reduce their emission of nitrogen oxides and volatile organic compounds that combine to form ozone.

[1] Thunder Bay District Health Unit. (2017) Walkability and Pedestrian Safety in Thunder Bay.

Over time, reducing the dependence of Thunder Bay residents on motor vehicles will also minimize the pollutants in stormwater runoff from roads into streams and aquifers. Innovative road designs incorporating green infrastructure and low-impact development can also help reduce stormwater runoff and protect ecosystems from pollution and flooding risk.

The World Health Organization has concluded that outdoor noise levels between 42 and 60 dBA, which are common in urban areas, can cause negative cardiovascular, cognitive, sleep and mental health effects. In large cities such as Toronto, nearly 60 percent of noise can be attributed to traffic.[2] Steps to reduce environmental noise, such as traffic management and promoting more active lifestyles that include walking and cycling, can contribute to better health.

The Impact of Walking on Diabetes and Healthcare Costs in Thunder Bay

The Thunder Bay District Health Unit has studied the power of walking in fighting type 2 diabetes. First, it predicted that current physical activity levels would lead to about 9,350 adults aged 20 to 74 years (or 11% of all adults in that age group) being diagnosed with type 2 diabetes over 10 years, starting in 2013. Then it used the Diabetes Population Risk Tool to predict how many fewer adults would develop diabetes if they walked more:

- **Low scenario—**120 new cases of type 2 diabetes could be prevented over 10 years if 10% of residents aged 20-74 years walked 30 minutes more each week.
- **High scenario—**1,080 new cases of type 2 diabetes could be prevented over 10 years if 30% of residents aged 20-74 years walked 150 minutes more each week.

Fighting diabetes can have big economic benefits, partly because the average lifetime excess healthcare costs for a new diabetes patient in Ontario is about $24,250 (Improving Health by Design in the Greater Toronto-Hamilton Area, 2014). Applying this cost to the TBDHU study results would lead to estimated annual healthcare cost savings of between $300,000 and $2.6 million per year—and that's not even including benefits from reduced cardiovascular illness and cancer.

[2] ***How Loud Is Too Loud?*** Health Impacts of Environmental Noise in Toronto, Toronto Public Health, 2017

Breathing Easy in Thunder Bay

While Thunder Bay's air quality is better than most Canadian cities of similar size, studies have shown that there are no safe levels of air pollution, especially airborne particulates. This is particularly true for children, whose lungs are still developing and who inhale more air relative to body weight than adults do.

Because municipal governments have little influence over vehicle and fuel technologies, their fight against transportation emissions tends to focus on shifting travel from cars to walking, cycling and transit. Thunder Bay has also worked to reduce idling, which can decrease air quality around homes and schools. A bylaw prohibits idling within the City limits during moderate temperatures for more than two minutes by private vehicles with two axles, and for more than five minutes by larger vehicles. Anti-idling campaigns at schools and other destinations have also been delivered by community organizations including EcoSuperior.

2.4.3 A Greener City

Compact Development

Many North American cities are prioritizing land use intensification over expansion—growing in and up, rather than out.

Many cities are also finding that intensifying already-developed areas has not led to unacceptable levels of congestion; rather, they are proving that intensification and more sustainable travel go hand-in-hand.

By accompanying intensification with an increase in transportation "person capacity" through expanded active transportation and transit networks, cities motivate travellers to choose healthy and sustainable modes. If any additional congestion does arise, it simply creates an additional incentive for people to leave their cars at home. In short, people adjust to new traffic conditions and available travel options, and a new balance results—keeping congestion manageable even in large areas with dramatic intensification, like the urban cores of Vancouver and Toronto.

Sustainable transportation and compact development support each other, creating a "virtuous circle". Better travel choices in intensifying areas end up attracting more people to live, work and play there, especially young adults, families and retirees who value compact neighbourhoods with local destinations they can reach by foot, bike or bus.

The City of Thunder Bay is moving in this direction—in 2014, over 40% of the City's new development was infill and intensification projects.

Green Spaces

The process of rebuilding its streets will, over time, give Thunder Bay the chance to add new trees and planting areas to its rights-of-way. Other projects to make roads safer and improve facilities for walking, cycling and transit—such as new roundabouts, sidewalk boulevards and curb extensions—are also opportunities to beautify neighbourhoods and improve the urban forest.

Climate Resiliency

Even though cars are becoming more efficient, increases in the number of cars we own and the amount we drive have led to more greenhouse gas emissions from transportation. Active transportation and transit are the keys to meeting emission reduction objectives in the short and medium terms: they are more efficient than single-occupant vehicles, they reduce congestion and idling, and they support compact development that reduces trip lengths. Electric vehicles, including trucks and transit buses, may provide additional benefits in the long term.

Thunder Bay needs to adapt to the reality of climate change by making its transportation system infrastructure—roads, trails, bridges, buildings, drainage and electrical systems—more resilient to higher temperatures, stronger winds, greater rainfall and snow accumulation, and more frequent freeze-thaw cycles, among other expected conditions.

Transportation Directions from the *Earthcare Sustainability Plan 2014-2020*

The City's *EarthCare Sustainability Plan* 2014-2020 aims to reduce community energy use and GHG emissions by 20% between 2009 and 2020. The 2016 inventory indicates that 33% of Thunder Bay's GHG emissions come from transportation sources. To reduce these emissions the Plan recommends actions in four main areas:

- Create seamless options for walking, cycling and transit use
- Motivate and enable all citizens to choose active modes more often
- Improve tools and processes for transportation planning, design, consultation, performance measurement and decision-making



Walkability as Economic Development

> **[W]alkable environments should be viewed as economic infrastructure that attract employment and should be invested in accordingly. This means that just as investments are made to ensure suburban business parks have the required infrastructure to make them centres of private investment, walkable environments need to be created, enhanced, and maintained in order to attract jobs for other sectors. Practically speaking, this points to a whole host of planning issues ranging from pedestrian-friendly urban design to intensification…. With limited resources to spend on economic development, decision makers need to ensure they are investing in parts of their cities that will provide a sustained return on investment, and create jobs that will attract and retain mobile talent.**
>
> *- "How Pedestrian and Transit-Oriented Environments Attract Creative Jobs," Paul Shaker, Civicplan*

2.4.4 Good for Business

Revitalizing Older Areas

Thunder Bay is working to revitalize its two historic downtown cores and to bring new economic life to its waterfront areas including Prince Arthur's Landing. This plan will help ensure that new developments in these older areas can be accessed easily by a variety of modes. For some areas that have been reliant on motor vehicle access (e.g. industrial areas), improving multimodal accessibility—by adding new routes that shorten walking and cycling trips, or by building facilities that separate pedestrians and cyclists from cars and trucks—will be challenging but necessary. Potential major redevelopment projects—such as the Waterfront Master Plan's Cultural Campus, and the conversion of a large grain elevator to a new park—will require substantial rethinking of transportation connections.

Supporting Goods Movement

Delays due to traffic congestion are not a major problem today, and this plan aims to protect this economic advantage. While the provincial corridors (Thunder Bay Expressway, TransCanada, Highway 61, Highway 102) carry the highest truck volumes, local City roads also connect trucks between these provincial corridors and the City's industrial and commercial areas including marine ports and rail terminals. Planning for and supporting a road network that accommodates goods movement efficiently will be key to supporting economic prosperity in Thunder Bay.

In an increasingly multimodal environment, trucks will continue to share Thunder Bay roads with other users. Road design can help ensure that trucks move safely side-by-side with other modes. For example, in older urban areas where roadway widths are constrained and turning radii are small, the ability of large trucks to manoeuver through intersections can be preserved through the use of advanced stop bars.

Thunder Bay's economy depends on the ability of businesses to move goods in to, out of, and within the city, primarily by truck, but also by rail, air or sea.

Attracting Tomorrow's Workers

Because of Thunder Bay's slow population growth and aging demographics, the City needs to attract new residents, particularly skilled young workers and their families, and to keep young adults from leaving the city to further their careers. Increasingly, quality of life is a key factor in where workers want to live, and thus where businesses choose to locate. Surveys show that many of today's "knowledge workers" are not looking for a conventional suburban lifestyle—instead, they prefer older, walkable neighbourhoods with parks, coffee shops, independent stores, quality transit service and car sharing. They want healthy, active travel options that save time and help them avoid the need to own a car. By improving transit and active transportation options across Thunder Bay, this plan can help attract workers the city's economy needs.

Goods Movement and the Local Economy

Thunder Bay's airport, port, railways and highways make it easy for businesses to move goods in and out of the area, and to capitalize on the city's central location and convergence of rail, road, air and marine facilities. Trucks can travel quickly and conveniently to and from the United States via the Pigeon River border crossing, just 45 minutes away. The Port of Thunder Bay is the source/destination of much of the commercial highway traffic through the city.

> **"Trucking in Thunder Bay has always enjoyed great importance. Our strategic location in the heart of the country and at the only major east-west road link has ensured a healthy industry. The growth of trucking in Thunder Bay should continue as proposed deregulation comes into effect and a greater use of intermodal services, utilizing our extensive port and rail facilities, is undertaken.**
>
> - *Thunder Bay Community Economic Development Commission*

2.5 Cornerstones and Priority Actions

In the following sections and sub-sections, actions that include initiating programs, adopting policies and building infrastructure to achieve the City's transportation vision have been identified. For many of the actions identified in the TMP, the City will partner with agencies and organizations, such as the Thunder Bay District Health Unit, that are working towards common goals and can help to increase the capacity to achieve results.

Of all the actions identified in subsequent sections, five **Cornerstone Actions** emerged as strategically important initiatives that will lay the foundation for the rest of the Plan. Twelve actions have been identified as **Priority Actions** that will offer tangible user benefits for which the City of Thunder Bay should focus staff and funding resources.

Cornerstone Actions



- **Complete Streets Policy –** Adopt and implement a complete streets approach to transportation planning and infrastructure design that considers the needs of all users. (See Section 3.3.1.)
- **Road Safety Action Plan –** Expand the scope of the City's Traffic Safety Committee to oversee the development and implementation of a Road Safety Action Plan. (Section 3.2.1)
- **Ultimate Road Network –** Plan for the proposed road network, protecting future corridors as required for implementation with corresponding development. (Section 3.3.1)
- **Pedestrian Priority Network –** Complete the network of Priority Corridors and Greenways to provide pedestrians with comfortable, accessible routes connecting to services and opportunities. (Section 4.2.1)
- **Ultimate Cycling Network –** Adopt and implement the Ultimate Cycling Network as the long-term goal for cycling facilities across the City. (Section 4.2.2)

Priority Actions – Policy

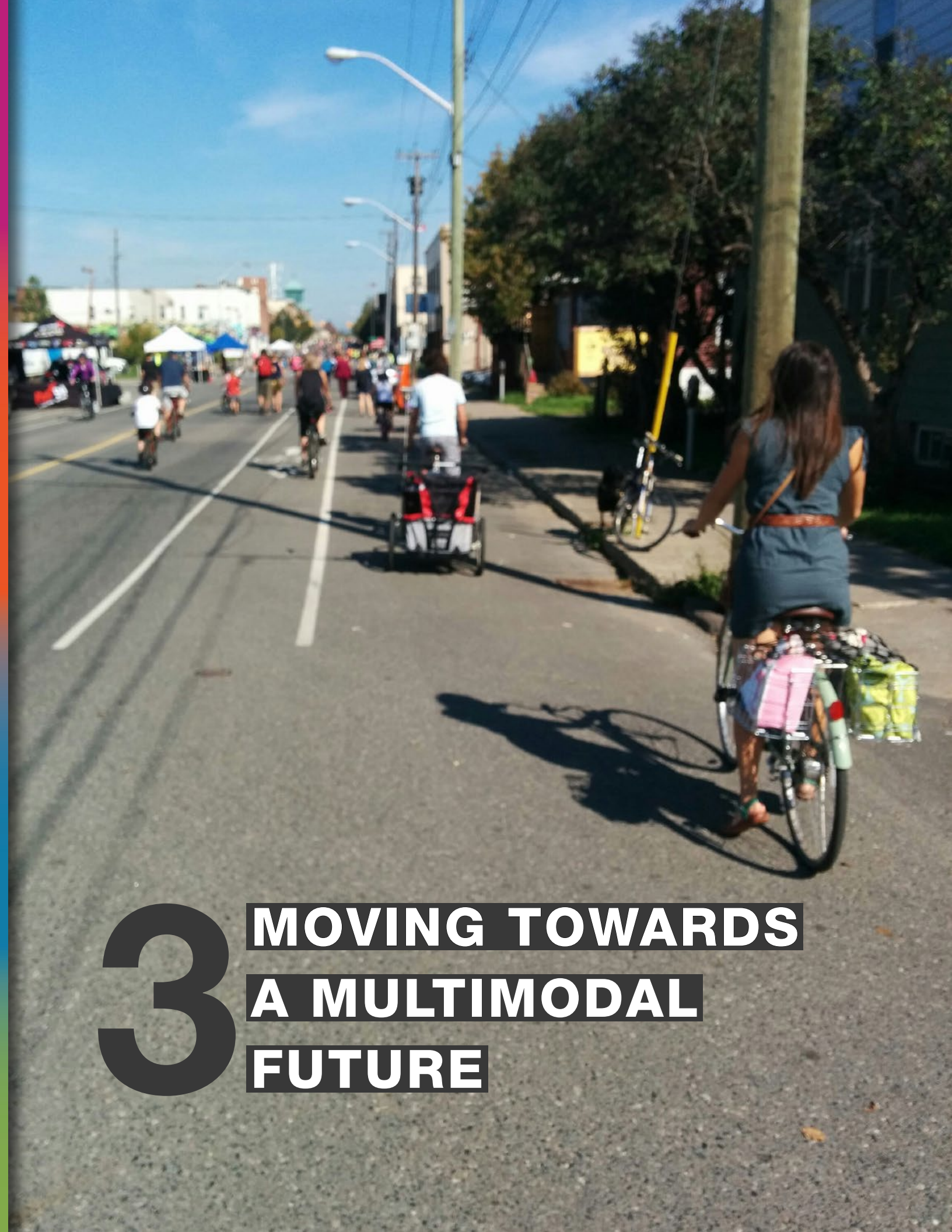
- **Multimodal Level of Service –** Adopt a Multimodal Level of Service approach in evaluating transportation network performance for all road users for Traffic Impact Studies and other transportation analysis. (Section 3.1.3)
- **Traffic Calming Process –** Adopt a traffic calming process that will provide the City with a consistent and transparent approach to addressing traffic calming requests. (Section 3.2.2)
- **Travel Planning at Schools –** Provide municipal support to pilot school travel planning processes through collaborative effort with stakeholders. (Section 3.3.2)
- **Route Rationalization –** Implement route and stop modification, schedules and service plans as identified by the Transit Route Rationalization Study. (Section 4.3.1)

- **Demand-Responsive Transit Service –** Initiate and fund a pilot project with a transportation service company to provide demand-responsive transit service in low-density areas of Thunder Bay where current fixed-route services are performing poorly and/or where transit service is not yet provided. (Section 4.3.2)
- **Data Collection –** Support data collection initiatives that assist in the regular monitoring of the TMP, including traffic counts, transit ridership counts, new cyclist and pedestrian counts and origin-destination travel survey (Section 5.4.1)

Priority Actions – Capital Projects

- **James Street Road Diet –** Reallocate road right-of-way along James Street from Victoria Street to Edward Street-Golf Links Road to accommodate on-street bike lanes. (See Section 3.1.2)
- **Upgrade Signal Communication System –** Develop a migration strategy for implementing a new signal communication system that considers the City's budget and resource limitations. (Section 4.1.2)
- **Sidewalk Gaps –** Systematically address sidewalk gaps along pedestrian priority corridors, transit routes and neighbourhood greenways. (Section 4.2.1)
- **Pedestrian Crossings –** Explore the addition of formal pedestrian crossings along pedestrian priority corridors and neighbourhood greenways, with the intent to add one to two crossing locations annually. Prioritize replacing sidewalk at intersections on corridors that do not have curb drops and bring them to accessible design standards. (Section 4.2.1)
- **Fort-to-Port Express Cycling Route –** Adopt and implement the Fort-to-Port Express Route in the short-term and pursue the longer-term vision of the north-south Ultimate Route as roads are reconstructed. (Section 4.2.2)
- **Priority Cycling Network –** Adopt and implement the Priority Cycling Network. (Section 4.2.2)

All actions are summarized at the end of the report.



3 MOVING TOWARDS A MULTIMODAL FUTURE

Travel in Thunder Bay is primarily by private automobile, and much of the City's infrastructure has developed around the automobile being the main mode for accessing employment, delivering goods and services, and travelling for social and recreational reasons.

Key to promoting equity for all road users, and supporting the health and economic vitality of the community, is for the City of Thunder Bay to provide greater transportation choice such that all residents, regardless of age or ability, can enjoy a high quality of life. The City has taken great strides in moving towards increasing multimodal options by investing in Thunder Bay Transit and a network of cycling and pedestrian facilities that provide residents with a range of options for getting around and meeting their daily needs.

3.1 Creating Streets for Everyone

A Complete Streets approach and consideration for universal design are two concepts that work together to provide a transportation system that supports the movement of people of all ages and abilities in Thunder Bay. Transportation infrastructure must adhere to provincial accessibility standards to serve people with mobility, cognitive, hearing and vision impairments, including the accommodation of mobility aids and service animals. The Accessibility for Ontarians with Disabilities Act (AODA) requires all new public buildings, spaces and infrastructure, as well as modifications to existing facilities, to comply with accessible design standards.

An accessible transportation system is particularly important to Thunder Bay. As noted in the Age Friendly City Services Action Plan, more than one third of the City's population will be over the age of 60 over the time frame of the TMP.

Action Areas

3.1.1 Building Complete Streets

Complete Streets are streets that are carefully and thoughtfully planned, designed, constructed and maintained to account for the safety and comfort of intended road users of all ages and all abilities, regardless of the mode of transportation they choose.

The Complete Streets philosophy is intended to be integrated into every City department so that all new roads and road reconstruction projects are planned and designed with a Complete Streets lens.

Thunder Bay has an established street design process, and has been building Complete Streets almost exclusively for reconstruction projects in recent years. Examples include the reconstruction of Balmoral Street, Algoma Street and Valley Street. While it has previously been understood that streets should to be designed for all users, adopting a Complete Streets policy makes it explicit as the City moves forward. Planning roads with consideration for drivers, pedestrians, cyclists and transit users and implementing green infrastructure to improve the public realm will be an integral part of the design process from the initial project conception through to construction.

Further Reading

Background Report D – Complete Streets

Context-Sensitive Approach

Complete Streets will be delivered in an adaptable and context-sensitive approach based on the needs of the local community and the intended function of the street. Though the Complete Streets policy will be applied to all new road and road reconstruction projects, not all streets will receive the same treatment or the same Complete Streets elements. The existing and intended function of the street, as well as the community vision of the corridor, will be considered and evaluated in the selection and design of Complete Streets elements for each project.

Network Approach

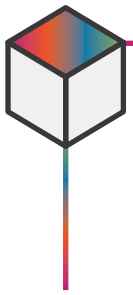
Not all streets are able to accommodate all users to the highest level of service. The City will strive to implement complete and connected networks for each mode of transportation, enabling safe, efficient movement for all residents, regardless of how they choose to travel.

Outcomes

Complete Streets supports desired public health outcomes by promoting and encouraging the use of transit, walking and cycling as attractive ways to get around Thunder Bay. With the increased consideration for alternative modes in a Complete Streets approach, reliance on personal vehicles is reduced along with a decrease in vehicular emissions – a crucial step towards mitigating the impacts of climate change. Similarly the body of science is growing that supports the positive health impacts of green infrastructure.

Implementing Complete Streets supports sustainable development and builds pride in well-rounded communities. Several case studies in the US attribute increased sales for local businesses as a result of implementing Complete Streets and cycling facilities, which drew more activity to the street and encouraged people to linger.

Complete Streets can include elements such as wider sidewalks, pedestrian-scale lighting, street trees, furniture, bike lanes or trails, transit amenities, vehicular travel lanes, vehicular parking, bicycle parking, and accessory uses such as patios or sidewalk displays. By explicitly considering the needs of vulnerable road users in the initial design process, Complete Streets will maximize the safety and comfort of all road users.



CORNERSTONE ACTION

A1. Complete Streets Policy

Adopt and implement a Complete Streets approach to transportation planning and infrastructure design that considers the needs of all users.

3.1.2 Reallocating Road Space

A key objective of the TMP is to better use existing infrastructure. In cases where available capacity far exceeds projected travel demand, opportunities to re-purpose road space to other uses and modes become available. Capitalizing on these opportunities can result in improving the public realm, decreasing the City's operational burden, and improving the function of the corridor for all users.

Reallocating Road Right-of-Way or "Road Diets"

A road diet is broadly defined as the removal of a vehicular travel lane from a roadway and re-purposing that space for other uses. The reclaimed space can be reallocated to new or upgraded cycling infrastructure, new or widened sidewalks, on-street parking, transit infrastructure, or accessory features such as patios or sidewalk displays. The most common road diet is the transformation of a 4-lane road to a 3-lane road with a centre two-way left-turn lane and on-street bike lanes. The City has implemented this strategy on Victoria Avenue.

Road diet corridors should be carefully chosen to minimize the impacts on travel times on the selected corridor and parallel routes. Though a small increase in delay may affect drivers on some streets receiving road diet treatments, many road diets have resulted in shorter travel times due to the removal of left-turning traffic from the through travel lanes.

Road diets allow for the addition of safer and more comfortable infrastructure for cyclists, provide pedestrians with a buffer from vehicular traffic, and reduce vehicle collisions by lowering the speed differential and decreasing the number of conflict points between vehicles.

The TMP recommends the application of a road diet to create low-cost bike lanes on two corridors. These corridors demonstrate great opportunities to reallocate existing road space to cyclists while continuing to effectively move vehicles, transit and goods. Pilot projects of road diets to assess traffic impacts and bike lane usage will be important to gain community buy-in. These corridors are:

- James Street from Victoria Street to Edward Street-Golf Links Road, connecting residential areas to community facilities; and
- Oliver Road-John Street from Balmoral Street to Court Street, completing an important link to Lakehead University.

Further Reading

Background Report G – Public Realm Improvements and Lane Reassignments

ACTIONS

A2. Priority Action: James Street Road Diet

Reallocate road right-of-way along James Street from Victoria Street to Edward Street-Golf Links Road to accommodate on-street bike lanes.

A3. Reallocate road right-of-way on Oliver Road-John Street from Balmoral Street to Court Street to accommodate on-street bike lanes.

The Importance of Street Trees to Thunder Bay

Thunder Bay's Urban Forest Management Plan (2011) found that each street tree in Thunder Bay provides $85 in public benefits each year—totalling more than $1.5 million annually. These benefits arise from better stormwater management, reduced energy consumption and carbon emissions, and improved aesthetics and air quality. Furthermore, each dollar the City spends to manage street trees returns more than two dollars in benefits.

> **"Increasingly, green infrastructure is seen as an integral part of a city because of the wide range of benefits it provides to both humans and wildlife. Not only are trees being noticed for their ecological and environmental services to society, but a large body of research has exposed the social, cultural, and economic benefits they provide. Green infrastructure is an essential tool in the fight against climate change, air and water pollution, crime, and a plethora of other urban challenges. A city's urban forest can be strategically used to provide a cleaner environment while increasing the health, wellbeing, and economic prosperity of a city.**
>
> *- EarthCare Thunder Bay Sustainability Plan*

Improving the Public Realm

While the core function of most urban roads is to allow residents, workers, and goods to travel between different areas, many cities are increasingly recognizing the value of streets as public spaces. Adopting the view that streets are public spaces means re-organizing roadways to reclaim space as vibrant destinations where people would like to be, rather than simply pass through. This can be achieved in a number of ways, such as relocating on-street parking to provide parklets and patios, or removing a lane of traffic to widen sidewalks and provide landscaping or allow shops to set up sidewalk displays. In addition to reallocating street space, adding green infrastructure including street trees and low impact developments make the road right-of-way more inviting. The opportunity to add green infrastructure should be considered during initial project design.

Thunder Bay already recognizes the importance of creating beautiful and balanced streets and the importance of their role as public spaces. The City's *Image Route Guidelines* acknowledged that streets that are "designed and maintained successfully… will catalyze new investments in these corridors as great places to live, work and shop." Streets as destinations, in turn, "will enhance Thunder Bay's ability to attract visitors and retain existing residents." In short, investing in the public realm is good for the local economy.

Red River Road through the historic core presents a prime opportunity to reallocate road space to improve the public realm. The section of Red River Road between Court Street and Cumberland Street is already among the most diverse and vibrant in the City. Tremendous potential exists to increase pedestrian space and dedicate outdoor space for commercial use such as patios.

A road diet is proposed for Red River Road outside of the core area, extending incrementally from Court Street west towards Algonquin Avenue, as a means of achieving the public realm envisioned for this designated Image Route. Roadway space will be reallocated to accommodate expanded pedestrian areas and public realm improvements such as wider sidewalks, landscaping, street trees, and benches, in line with the City's Image Route Guidelines.

ACTIONS

A4. Red River Road North Core Pilot Project

Implement a pilot project using temporary measures (bollards, planters, ramps, seasonal sidewalk extensions, etc.) to expand space allocated for pedestrians and patrons of the businesses along Red River Road from Court Street to Cumberland Street.

A5. Reallocate road right-of-way on Red River Road from east of Algonquin Avenue to Court Street to accommodate expanded pedestrian areas and public realm improvements.

3.1.3 Changing the Approach to Level of Service

Municipalities have traditionally focused on the performance of vehicular traffic when evaluating the level of service (LOS) of road networks. A letter grade is assigned with LOS A representing good conditions to LOS F representing poor conditions. Recommended network modifications aimed at improving vehicle operations often degrade the operating condition of alternative modes. In other words, the trade-offs between vehicle delay and its impacts on the level of service for transit, cycling and walking have often been overlooked.

Multimodal Level of Service

Multimodal Level of Service (MMLOS) is an alternative approach to evaluating the performance of the transportation network. For each road segment and intersection, criteria are established to assess the network performance experienced by people on foot, on bicycles, riding transit, and driving cars.

While a technical approach is taken for vehicle level of service, evaluating the experience for pedestrians, cyclists, and transit riders is a qualitative exercise. An overview of the multimodal approach is shown in Exhibit 3.1.

Exhibit 3.1: Overview of Multimodal Level of Service Approach

MODE	ELEMENT	LEVEL OF SERVICE	
		GOOD	POOR
Pedestrian (PLOS)	Segments	High level of comfort	Low level of comfort
	Intersections	Short delay, high level of comfort, low risk	Long delay, low level of comfort, high risk
Bicycle (BLOS)	Segments	Low level of traffic stress	High level of traffic stress
	Intersections	Low level of risk and stress	High level of risk and stress
Transit (TLOS)	Transit Stop	Easy access, many amenities	Difficult access, few amenities
Vehicular (VLOS)	Intersections	Low delay	High delay

A brief description of the pedestrian, bicycle, transit and vehicular level of service assessment is provided below.

- Pedestrian LOS (PLOS) examines the comfort and safety levels of pedestrians travelling along a corridor and at intersections. It includes an assessment of sidewalk and boulevard widths, presence of on-street parking, adjacent vehicular volumes and speeds, signals phasing and delays incurred by pedestrians. Typically, roadways with wider sidewalks that also provide more separation between pedestrians and vehicles result in a better level of service to pedestrians.
- Bicycle LOS (BLOS) measures the relative level of traffic stress experienced by cyclists travelling along a corridor. Corridors with the lowest level of traffic stress are suitable for cyclists of all ages and skill levels. These include roads where cyclists are physically separated from traffic or the riding zone is located adjacent to lower volumes of slow traffic. High traffic stress corridors are only suited for very confident and experienced cyclists. These corridors may require cyclists to integrate with multiple lanes of traffic without exclusive riding zones for cyclists. Bicycle LOS includes an assessment of travel lanes, type and width of cycling facility, vehicular speeds, and the manner in which cyclists cross the flow of vehicles at intersections.

- Transit LOS (TLOS) typically looks at the level of service for transit vehicles, that is, how a bus is impeded by vehicular traffic and whether priority is given to buses to improve transit service. In Thunder Bay, traffic congestion is not at a level where special transit priority treatments (such as bus only lanes or queue jump lanes) are required. A better measure of transit level of service for Thunder Bay residents is the ease of access to transit (sidewalk or path connections) and the availability of amenities (mobility pad, shelter, seating, information, etc.) at transit stops, where a better level of service would be expected at higher demand stops.
- Vehicular LOS (VLOS) is the typical measure of how well the transportation system is performing. Well-established practices to measure performance at signalized and unsignalized intersections are used across North America that determine the level of service based on the average delay incurred at an intersection. This delay includes the time to slow down, queue at a red light or stop sign, and clear the intersection. Larger intersections with more complex signal phases (for example, advanced turn signals for one or more approaches) typically have higher delays.

Using the MMLOS tool, the City will be able to measure the experience of all road users, and evaluate the impact of proposed changes to the network and the trade-offs between the different modes of travel.

Targeted levels of service will vary in differing contexts and will be a function of City policy depending on the relative priority desired for each mode in the local context. For example, major transit corridors may prioritize transit users and pedestrians by setting targets of TLOS A or B and PLOS A or B, while industrial corridors may prioritize the movement of vehicles and goods and set lower targets for transit.

ACTIONS

A6. Priority Action: Multimodal Level of Service

Adopt a Multimodal Level of Service approach in evaluating transportation network performance for all road users for Traffic Impact Studies and other transportation analysis.

Further Reading

Background Report I – Multimodal Level of Service

3.1.4 Adapting to Changing Technology

Technology is rapidly changing how people travel. The extent to which current technology and new technologies that have yet to arise will continue to shape future travel is uncertain. The City will need to keep apprised of how technology impacts traditional transportation services (i.e., conventional transit, taxi, personally-owned vehicles) to adapt to and leverage new opportunities to manage transportation in Thunder Bay.

Mobility as a Service

In recent years, new options and services that sell Mobility as a Service (MaaS) to users through online platforms have been introduced in many North American cities. These mobility options include facilitated carpooling, car-sharing, ride-hailing, bike and scooter sharing, and micro-transit services in place of personally-owned modes of travel. The most widely known of these services is Uber, which does not currently operate in Thunder Bay. Similar mobility services in Thunder Bay include Uride (uses limo services to provide rides) and Driverseat (provides driver services for your own vehicle). Also gaining in popularity in Canadian cities are car-sharing services such as Zipcar, car2go, and AutoShare. These services allow members to use a shared fleet of vehicles when needed without the cost of private car ownership.

The City should approach new forms of MaaS with an inviting, yet cautious approach. Regulating mobility service providers has been an issue in other cities where regulated forms of travel, such as taxi services, are losing business to unregulated providers. Encouraging competition for transportation in Thunder Bay may result in better conditions for residents, but the City must be aware of the trade-offs involved.

Thunder Bay can get ahead of the curve by being proactive with MaaS providers before they establish themselves within the City. Setting regulations after the fact has been a challenge for cities where companies like car2go, Uber, and Lyft have already entrenched themselves in the market. By crafting policies and engaging with MaaS companies early on, the City can better shape the outcomes of MaaS that satisfies both residents and businesses.

Connected and Autonomous Vehicles

Connected and autonomous vehicles (CAVs), or driverless vehicles, are still in the early stages of implementation. Ontario only began allowing CAV testing on its roads in 2016. There are many unknowns on the impacts of CAVs and it will be important for the City to monitor CAV developments and plan for ways to leverage benefits and minimize drawbacks. For example, CAVs should be leveraged for shared transportation services to maximize efficient usage. As CAVs become more readily available and affordable, it will be important to de-incentivize undesirable trips such as short CAV trips replacing walking and cycling trips. It will also be important to de-incentivize behaviour that results in empty CAVs driving around the city.

There are also potential land use opportunities for the City when CAVs become more common in Thunder Bay. As a roving fleet of shared, fully autonomous vehicles, CAVs will not require as many parking spaces as traditional vehicles resulting in opportunities to re-purpose underused infrastructure such as downtown parking lots. CAVs also require less road space than conventional vehicles, meaning that unneeded road capacity could be reallocated for other uses.

Regardless of the specific development and influence of CAV technology, the City will need to craft policy and make infrastructure decisions to help ensure that CAVs contribute to positive outcomes in Thunder Bay.

ACTIONS

A7. Monitor existing and emerging mobility service options to protect the interests of Thunder Bay residents and leverage new opportunities to manage the City's transportation system.

A8. Develop a CAV policy to ensure the arrival of CAVs contribute to positive outcomes for Thunder Bay.

A9. Develop an Electric Vehicle Strategy for the City, in cooperation with industry, including consideration of potential partnership and funding opportunities from provincial programs or other agencies.

Electric Vehicles

Electric Vehicles (EVs) and hybrid electric vehicles are becoming more affordable and widely used. In 2010, the Ontario government introduced an incentive program to encourage EV adoption. An electric vehicle charging station incentive program was also introduced by the Province to encourage individuals and businesses to install charging stations. A network of public charging facilities can help make electric vehicle use more convenient and provide drivers with the assurance that they will not be stranded when batteries run low.

Thunder Bay could become an EV-friendly city by installing charging stations at City-owned parking lots and facilities, and by encouraging private businesses to do the same. Other cities in Ontario, including Ottawa and Toronto, have installed charging stations at municipal facilities to support EV and hybrid vehicles.

Further Reading

Background Report H – Future Vehicle Developments

3.2 Safer Streets

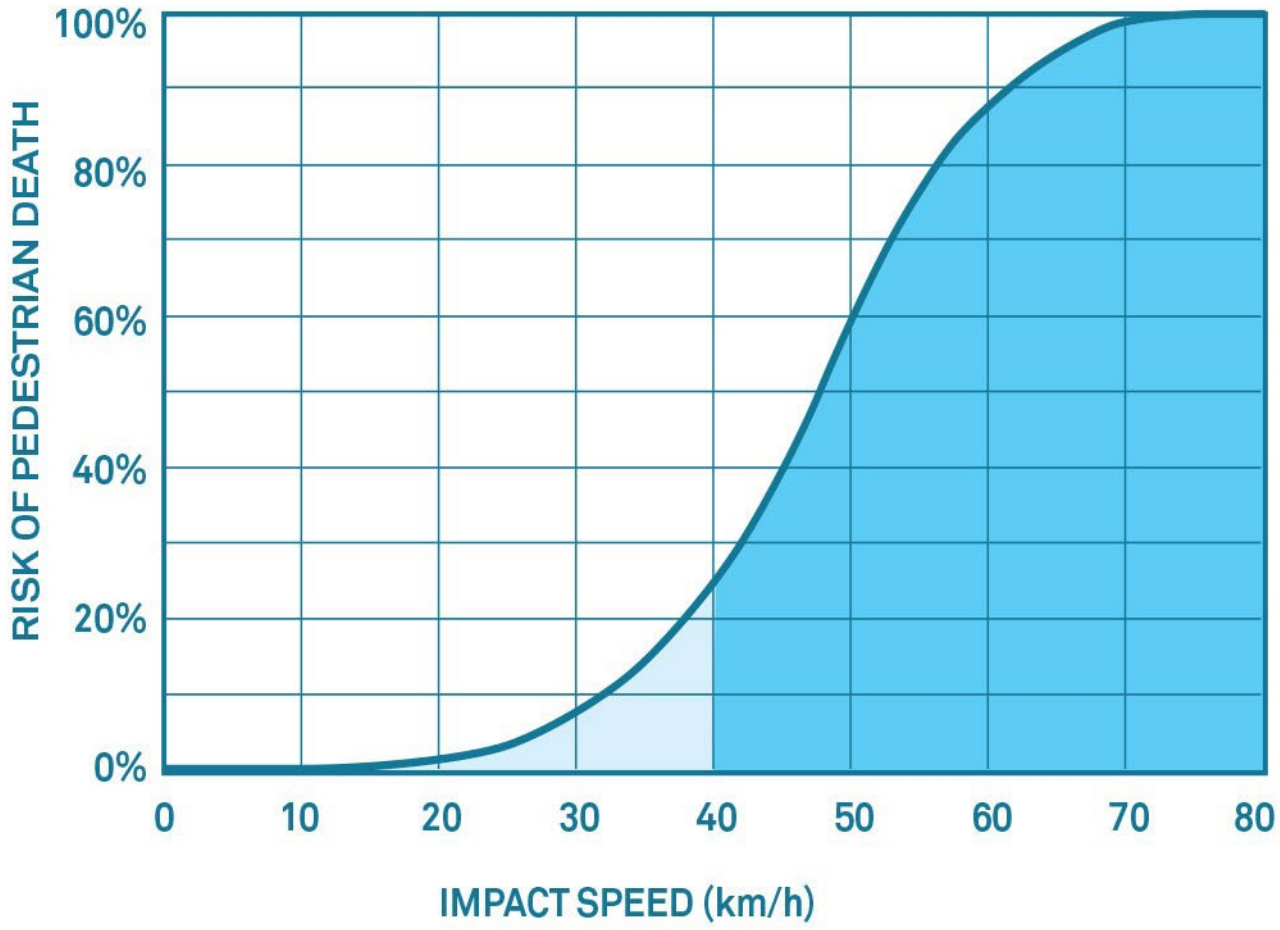
Road safety is a concern for everyone.

The most vulnerable road users are pedestrians and cyclists who share the road with vehicles. A collision review completed by Thunder Bay District Health Unit and Lakehead University as part of the Walkability and Pedestrian Safety in Thunder Bay (2017) report noted that nearly half of all collisions with pedestrians occurred at locations without a traffic control, including almost all of the mid-block collisions.

One of the most effective tools that cities can apply to improve road safety is managing traffic speeds through design. Speed is a major factor in automobile collisions, and higher speeds are strongly correlated with higher risk of death or serious injury for pedestrians as illustrated in Exhibit 3.2.

Designing streets with the objective of encouraging appropriate driver behaviour for the specific context and designing appropriate infrastructure for vulnerable road users make roads safer for all users.

Exhibit 3.2: Relationship between impact speed and risk of pedestrian death.



Source: Global Street Design Guide (NACTO, Global Designing Cities Initiative, 2013)

3.2.1 Road Safety for All Users

Road safety has become an increasingly important issue for municipalities in recent years. Across Ontario, a total of 483 fatalities and 35,972 personal injuries[3] were attributed to traffic collisions in 2016. There is an increasing awareness across Ontario that concerted efforts and policy decisions are needed to mitigate and eliminate traffic fatalities and serious injuries.

Road Safety Action Plan

A Road Safety Policy will be developed to provide overall road safety direction towards eliminating traffic deaths and serious injuries that occur on the transportation network in Thunder Bay. There are multiple road safety policies that have been implemented across geographies and levels of government including: Safer Journeys (New Zealand), Toward Zero Deaths (Minnesota), Vision Zero (Sweden, Manitoba, Toronto), Sustainable Safety (Netherlands), Safe System Approach (World Health Organization, Australia), Every Accident Is One Too Many (Denmark), and Road to Zero (US Highway Traffic Safety Administration). These policies all share the foundation that traffic deaths and serious injuries are not acceptable, but vary in the application of a safety framework within each respective jurisdiction.

The Safe System Approach, which all of these policies are based on, includes the following principles:

- Humans make errors: Humans make errors, but the Safe System Approach acknowledges that routine errors should not be fatal.
- Humans are vulnerable to injury: Transportation systems can be designed to reduce or eliminate the possibilities of crash forces exceeding what the human body can tolerate.

Crashes Involving Pedestrians

The City recently collaborated with the Thunder Bay District Health Unit and Lakehead University to publish the comprehensive Walkability and Pedestrian Safety in Thunder Bay. The study reviewed where, when and how 634 pedestrians were hit by vehicles—including eight fatalities—over the decade between 2004 and 2013:

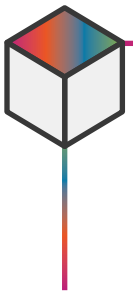
- Between 45 and 76 pedestrians were hit by vehicles each year.
- More than half of pedestrian deaths happened in November, December or January.
- Half of pedestrian collisions occurred at intersections, one-quarter occurred mid-block between intersections, and the remainder occurred in parking lots, driveways or other locations.
- Pedestrians had the right-of-way in 70% of the collisions.
- Two-thirds of pedestrian collisions occurred in daylight conditions, with the remaining occurring in the dark, dusk or dawn.
- The worst intersection for pedestrian collisions was at Algoma Street and Bay Street (prior to its redesign) while the next four worst intersections are located along Arthur Street.

[3] Preliminary 2016 Ontario Road Safety Annual Report Selected Statistics (Ministry of Transportation, Ontario)

- Responsibility is shared: Those who design, operate and maintain roads and those who use roads all share in the responsibility for road safety.
- No death or serious injury is acceptable: No amount of lives lost should be considered an acceptable by-product of the transportation network. Lack of safety should not be a trade-off for faster mobility. The mobility system should be both safe and efficient.

The Safe System Approach is an integrated, proactive approach that strengthens all parts of the system to multiply their safety impacts and anticipates user error.

A review of the successes and shortcomings of the above and other policies will be completed to develop a Road Safety Policy customized for the City of Thunder Bay with a holistic approach to improving safety outcomes. The Policy will go beyond education and enforcement and will consider other efforts that impact transportation choices. These include land use and mobility planning, promotion of environmentally-friendly travel modes, improved public transit, intersection and road design, and emergency response and care.



CORNERSTONE ACTION

A10. Road Safety Action Plan

Expand the scope of the City's Traffic Safety Committee to oversee the development and implementation of a Road Safety Action Plan.

The Road Safety Action Plan will implement the Road Safety Policy. The Action Plan will be updated annually to identify priority areas to address to maximize impact. The City will continue to partner with community organizations with common goals, such as Thunder Bay Police Services, Highway Safety Education Committee and the Community Traffic Awareness Committee (CTAC) to implement the Road Safety Action Plan and share resources to increase capacity to move the Plan forward.

The scope of the City's existing Traffic Safety Committee should be expanded to oversee the recommendation of a Policy and development and implementation of the Road Safety Action Plan. The Action Plan should be set yearly to reach long-term goals with specific, detailed actions based on root cause analysis. Goals of the plan may be network-wide or focus on individual areas where a high incidence of collisions or other safety concerns are identified. The Road Safety Action Plan should complement the Thunder Bay Police Services' Traffic Safety Plan.

Short-term actions should focus on "quick win" type objectives that may include targeted enforcement and education, speed limit reductions on residential and core area streets, low-cost traffic calming interventions, and updating engineering and design guidelines. The medium to longer-term actions should be geared towards implementing physical design changes to support lower vehicular travel speed, improving safety at intersections, installing red light or speed cameras, and completing cycling and pedestrian network infrastructure.

3.2.2 Traffic Calming

Traffic calming is the use of traffic management measures to reduce vehicular travel speeds and discourage through traffic on streets that are not meant to provide such functions to create safer conditions for all users, especially pedestrians and cyclists. Traffic calming can take the form of the physical street design elements or educational and enforcement techniques.

Standardizing the Process

In the past, the installation of traffic calming measures in Thunder Bay was done on a case-by-case manner, without a formalized procedure or specified guidelines. This resulted in inconsistent, complaint-based implementation of traffic calming measures.

A formalized process is proposed for traffic calming with specific warrant criteria to guide decision-makers and City staff to increase consistency and reduce administration time for unwarranted complaints. The proposed process is initiated in one of five ways:

- Upon receipt of a petition signed by at least two-thirds of affected residents;
- A deputation to Council followed by a vote in favour;
- A community survey conducted by the ward Councillor;
- A request by the Traffic Safety Committee; or
- A recommendation by City staff.

ACTION

A11. Priority Action: Traffic Calming Process

Adopt a traffic calming process that will provide the City with a consistent and transparent approach to addressing traffic calming requests.

Updating Street Design in the North Core

Businesses and pedestrians are benefitting from two recent projects in the north core. Algoma Street now features narrower pavement, sidewalk extensions, about 40 street trees, public art and street furniture. Crossing Algoma Street is also easier with a new pedestrian crossover. Similarly, on St. Paul Street the City added angled parking, wider sidewalks, decorative lighting and street trees.

Greener and more pedestrian-friendly environments encourage residents to get out and shop locally, and new businesses have opened in both locations since the redesign—clearly a situation where everyone wins.

Safety Benefits of Traffic Calming

> **Traffic calming measures can have significant road safety benefits. The Insurance Corporation of British Columbia (which has funded traffic calming projects to reduce insurance claims) commissioned a study in the mid-1990s to examine the impact of different traffic calming schemes in four Greater Vancouver neighbourhoods. The study found that annual collision frequencies and insurance claims both decreased by about 40%. Combining this research with information from Europe led to the finding that measures like speed humps, road narrowings, chicanes (lateral "zigzag" deflections) and traffic circles can all reduce site-specific collisions by 75% to more than 80%.**
>
> *– Transport Canada, "Traffic Calming in Urban Areas"*

Following the initiation of the traffic calming process, a high-level assessment of the safety and operational criteria (road grade, speed limit, emergency response, and transit operations) would be conducted by the Traffic Safety Committee. If traffic calming measures are feasible, then a technical review would be undertaken by City staff to identify the nature of the traffic calming concern, identify appropriate traffic calming solutions if required and produce a preliminary design.

Two approval stages would then be required. First, affected area residents are surveyed, seeking approval of the proposed changes. Second, the proposed measures must pass through City Council. Council will be informed by the area resident survey, but would make the final decision. Following approval by Council, the traffic calming measure would be prioritized based on the City's public works schedule and available budget.

Traffic Calming Toolbox

In 2017, the City developed a Traffic Calming Primer that identified a wide variety of traffic calming measures suitable for Thunder Bay, including considerations on appropriate types of installation in different contexts. The Primer expanded the traffic calming tools applicable to the City. These additional tools help ensure the success of traffic calming implementation and allows designs to be tailored instead of a one-size-fits-all approach.

Further Reading

Background Report F – Traffic Calming

3.3 Transportation Demand Management

Transportation Demand Management (TDM) aims to reduce travel demand by single-occupant vehicles. Traditionally, TDM programs are implemented when traffic congestion has reached intolerable levels and shifting travel demand to other modes (carpooling, transit, walking and cycling) or other time periods (non-rush hours) can relieve pressure on the road network.

Thunder Bay does not experience the severe traffic congestion problems experienced in many other cities. Instead, the *Thunder Bay Transportation Demand Management Plan* (December 2011) aims to make more efficient use of the City's transportation system, provide opportunities' for all residents to travel by sustainable modes, and improve accessibility and mobility for residents who do not drive.

The TMP supports the continued implementation of the Transportation Demand Management Plan to promote sustainable modes and support travel planning to schools and workplaces.

To initiate and sustain recommended actions under the following action areas will require the City to create and maintain partnerships with other organizations that share common goals.

3.3.1 Promoting Sustainable Modes

Sustainable modes are often affordable modes for users. Carpooling, taking transit, walking and cycling are all lower cost alternatives to car-ownership and travel by single-occupant vehicle. The City's role in promoting and supporting sustainable modes reduces barriers to mobility for those who do not drive.

The **Active Transportation Plan** documents existing initiatives and programs already in place to support alternative transportation options and outlines opportunities to further promote walking and cycling.

The following are the main methods for promoting sustainable modes:

Raise Awareness

A number of existing initiatives and programs provide excellent resources and skills to residents. EcoSuperior Environmental Programs (a non-profit organization funded in part by and working in partnership with the City of Thunder Bay) offers safe cycling courses to help develop riding skills.

Thunder Bay has achieved significant milestones in recognition for active transportation initiatives to date. In 2016 Thunder Bay was recognized as a bronze level bicycle-friendly city by *Share the Road.*

Opportunities to raise the profile of active transportation and the availability of programs to support active modes should be pursued at large community or City-wide events to engage with 'interested but concerned' residents. Initiatives could include Open Streets, Bike to Work Week/ Bike Month, and Bike Valet and TDM support programs at major events.

Make It Irresistible

Experience in other municipalities have demonstrated the power of investments and programs that help attract new riders through visibility. Two key high-visibility initiatives that help make walking and cycling irresistible include pedestrian and cycling wayfinding signage and a public bike share system (see Section 4.2.2). The City of Hamilton launched a bike share system in 2015 that has rapidly grown to 12,000 active users in 2017.

Lead by Example

The City can promote active transportation by taking a leadership role in supporting walking, cycling and transit through staff commuting behaviours, bikes available for staff use, and end-of-trip facilities at City offices and buildings.

Further Reading

Thunder Bay Active Transportation Plan

3.3.2 Travel Planning at Schools

Encouraging active travel as a means to get students to school can reap substantial benefits. These include healthier youth (physically and mentally), decreased traffic and pollution, safer school zones, and better academic performance.

School travel planning is a resource-intensive, grassroots process led in partnership by school administrations, teachers, parents and students. In a positive development, both the Thunder Bay Catholic District School Board and the Lakehead Public School Board recently endorsed a school travel planning pilot project led by the Thunder Bay District Health Unit and EcoSuperior.

The City can be an important partner in the success of individual school travel plans and in spreading their adoption by schools across the city. Elected officials can be particularly effective champions of school travel plans and Active School Travel initiatives.

In addition to programs aimed at elementary schools, the City's secondary and post-secondary institutions should be viewed as major partners in advancing active transportation.

3.3.3 Travel Planning at Workplaces

Workplaces can play an active role in promoting carpooling, transit, walking, and cycling to contribute to the City's transportation vision, while offering opportunities for improved quality of life for its employees and customers. Every year, the City of Thunder Bay works with partners to organize and participate in the national Commuter Challenge with great success.

The TDM Plan outlined several programs to encourage sustainable travel including carpooling initiatives, employer transit pass programs, active transportation end-of-trip facilities, and flexible hours that accommodate travel to work outside of rush hours.

ACTIONS

A12. PRIORITY ACTION: School Travel Planning

Provide municipal support to pilot school travel planning processes through collaborative effort with stakeholders.

[Action ECY-1 in the Active Transportation Plan]

A13. Raise awareness of active transportation through broad-reaching community events.

[Action BCC-1 in the Active Transportation Plan]

A14. Take on a City ambassador role to demonstrate leadership in active transportation initiatives.

[Action BCC-4 in the Active Transportation Plan]

A15. Prioritize education and engagement programs to maximize benefit to the City and increase active mode share.

[Action BCC-5 in the Active Transportation Plan]

A16. Continue implementing actions and recommendations of the City's Transportation Demand Management Plan.

4 SHAPING THE FUTURE TRANSPORTATION NETWORK



Changing demands on how people and goods move within, around and through Thunder Bay highlight the need for a connected, safe and sustainable transportation network. Infrastructure improvements and strategies to better manage the system will add capacity at key locations and maximize the efficiency of the existing roadways. The TMP aims to create a transportation system that meets the needs of Thunder Bay for the next decades.

The recommended road network, active transportation network and transit service are described in the following sections.

4.1 Road Network

The TMP presents a vision for the future road network and highlights the key projects required in the coming decades to meet the needs of the residents and businesses in Thunder Bay.

The focus of the TMP is predominantly on improving existing infrastructure and making better use of what already exists. A conservative approach has been taken to building new roads or widening existing ones. The substantial costs of constructing, operating, and maintaining roads make adding new roads a challenging proposition for the City. However, strategically protecting logical future corridors for city expansion is prudent transportation planning.

FAST FACTS

- 1,900 lane-km of city roads
- 112 signalized intersections
- 1 roundabout
- 88%[4] of commuters travel to work by car (82% drive, and 6% are passengers)

Existing Conditions

The existing road network in Thunder Bay is extensive and provides a relatively easy driving experience. It is fast and efficient to travel between most areas at almost any time of the day by car.

The existing network features two high-capacity corridors—Thunder Bay Expressway, operated by the Province, and Harbour Expressway. The Ministry of Transportation (MTO) completed an environmental assessment study to upgrade the Thunder Bay Expressway to a limited-access freeway with grade separated interchanges. Roads under the jurisdiction of Thunder Bay are classified under the following five categories, as adopted in the Official Plan:

- **Expressway –** Expressways are planned, designed, and constructed to carry large volumes of long distance and intra-municipal traffic travelling at relatively high speeds. Pedestrian and cyclist traffic is permitted on Expressways when appropriate facilities to separate them from vehicles are provided. The minimum right-of-way width of an expressway is 100 metres. No direct access from private property to an Expressway is permitted.

[4] 2016 Census Journey to Work data

Building Active Lifestyles With Better Infrastructure

In 2012, the City of Thunder Bay used the reconstruction of Arundel Avenue to improve accessibility and connectivity for walking and cycling. The former two-lane rural road is now the Arundel/Hudson Active Living Corridor, and connects residents to transit, parks and trails. Features include a bike lane, a two-way multi-use trail with connections to other trails, and a safer intersection at Lyon Boulevard West. After the initial project stage, walking and cycling demands increased. The City has further expanded the project to include flexible bollards, an additional 1.5 km along Hudson Avenue, and high-visibility cross-rides at all intersections to increase the visibility of trail users.

- **Major Arterial –** Major arterial roads are planned, designed, and constructed to carry large volumes of through-traffic (vehicles, transit, pedestrians, cyclists) travelling at moderate speeds throughout the City. The minimum right-of-way width of a major arterial road is 30 to 36 metres. No direct access from private property will be permitted where a lesser road classification is available for access. Driveway restrictions, joint access points and turning movement restrictions may be required.
- **Minor and Rural Arterial –** Minor and rural arterial roads are planned, designed, and constructed to carry moderate volumes of through traffic (vehicles, transit, pedestrians, cyclists) travelling at moderate speeds throughout the City. The minimum right-of-way width of a minor arterial road is 24 to 30 metres. Direct access will not be permitted where a lesser classified road is available. Direct access will only be permitted as approved by the City Engineer.
- **Collector –** Collector roads are planned, designed, and constructed to carry moderate volumes of medium-distance traffic (vehicles, transit, pedestrians, cyclists) travelling at moderate speeds between local and arterial roads. The functions of accommodating traffic movements and providing direct access to properties are of equal importance. The minimum right-of-way width of a collector road is 20 to 24 metres.
- **Local –** Local roads are planned, designed, and constructed to provide property access and carry low volumes of traffic (vehicles, transit, pedestrians, cyclists) travelling at relatively slow speeds between points of origin and collector roads. The minimum right-of-way width of a local road is 20 metres.

The City's road network classification is presented in Exhibit 4.1 and designated right-of-way widths for each corridor are shown in Exhibit 4.2.

Exhibit 4.1: Road Network Classification

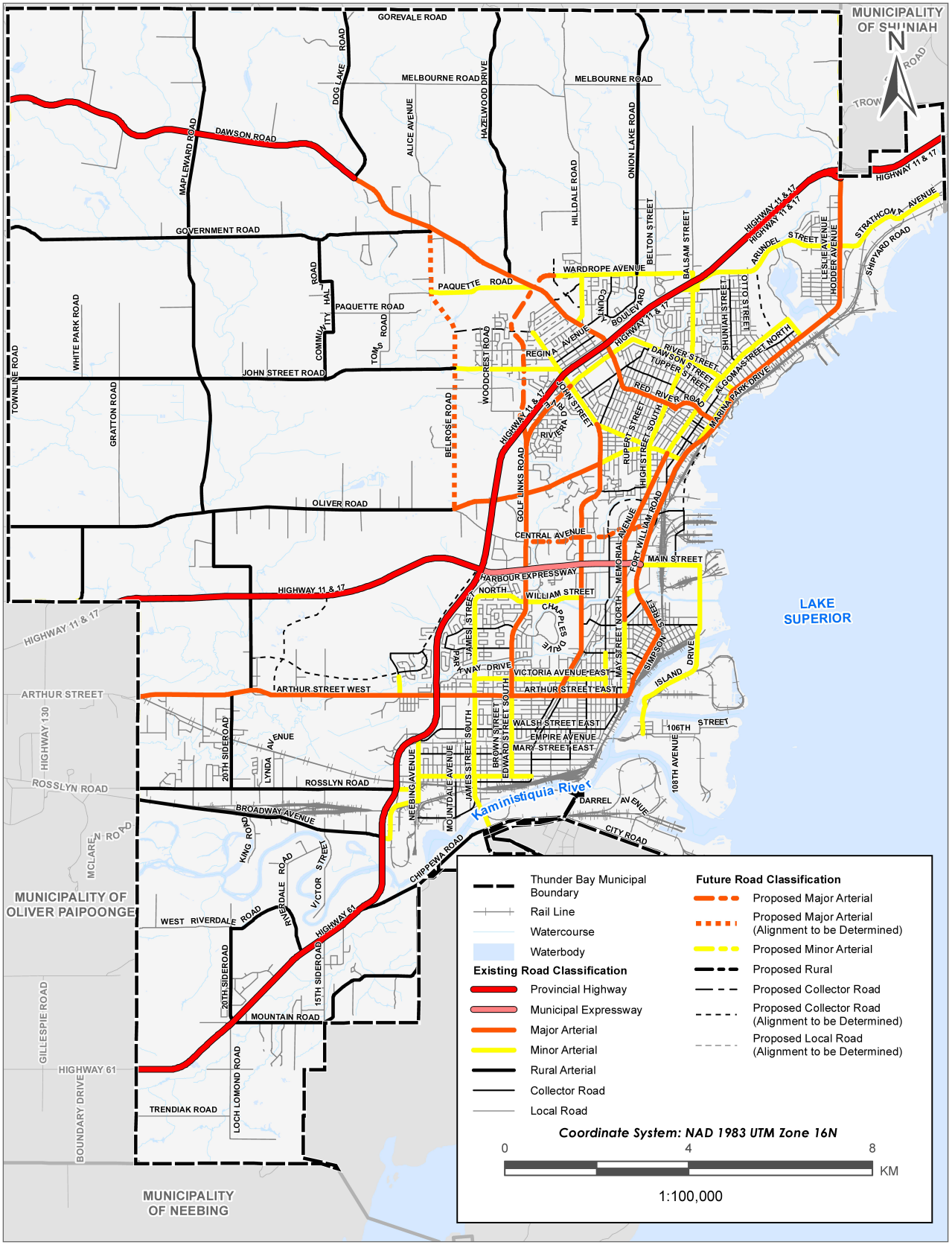
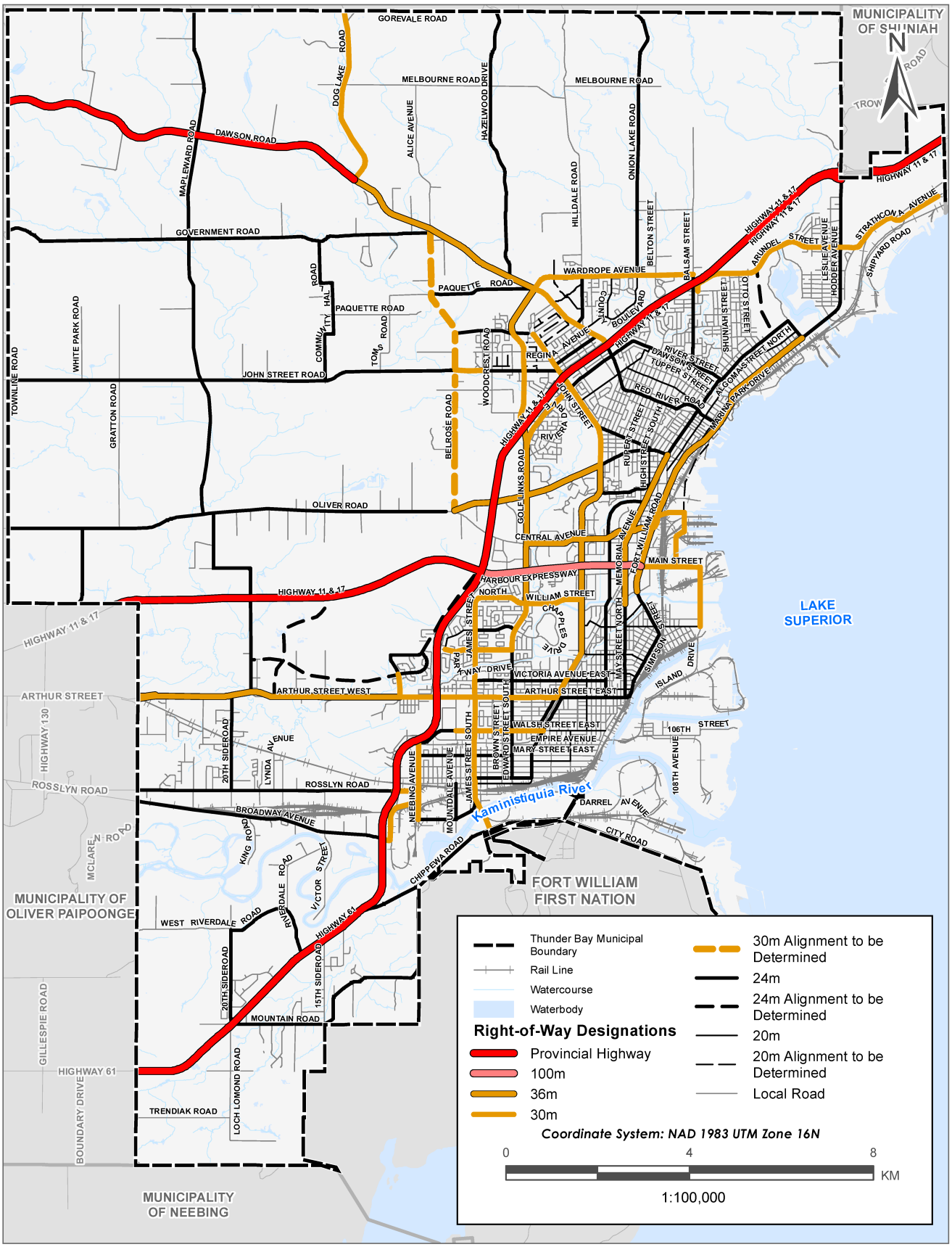


Exhibit 4.2: Road Right-of-Way Designation



The road network is generally under capacity at most times of the day. During the peak rush hours, there are localized congestion hotspots where intersections operate with comparatively poor levels of service.

The Thunder Bay Asset Management Plan identified that the aging road infrastructure is challenging the City's financial resources to maintain and operate the network. As of 2015, the City owned 7.4 million square metres of paved roads with a replacement cost of $564 million[5] and 57% of the road network required rehabilitation or reconstruction capital work based on their condition. The estimated annual pavement funding requirement of $13 million[6] to maintain the road network in its current state whereas the current average funding is $8.4 million (2015 to 2019).

It is noted that the Asset Management Plan identified an existing shortfall in annual funding for the existing road network. The expansion of the road network as proposed in the TMP will incur additional replacement as well as operations and maintenance costs. Expansions are only recommended if corresponding development occurs.

Action Areas

4.1.1 Network Modifications

The proposed road network modifications presented in this Plan aim to improve the efficiency and safety of travel across the road network. Map A shows the ultimate road network

Twinning the Thunder Bay Expressway

MTO has planned significant modifications to the Thunder Bay Expressway (TBE) that will impact future travel patterns, particularly in the northwest area of in Thunder Bay. MTO's *Transportation Environmental Study Report* (November 2016) for the TBE from approximately 1 km south of Arthur Street to 1 km north of Balsam Street included the following changes:

- Shifting the southbound lanes westerly to create a grassed median between the northbound and southbound travel lanes ("twinning" of the highway corridor)
- Constructing new grade-separated interchanges at:
  - Arthur Street
  - Highway 11/17-Harbour Expressway (partial freeway-to-freeway interchange)
  - Future Northwest Arterial
  - Red River Road-Dawson Road
  - Balsam Street
- Constructing a new flyover at Oliver Road plus a northbound to eastbound off-ramp from the TBE to Oliver Road (all other access to/from the TBE at Oliver Road will be removed)
- Constructing a new flyover at John Street (with no access to/from the TBE at John Street)

More Information

Map A: Ultimate Road Network

[5] Asset Management Plan for the City of Thunder Bay (2016)
[6] Corporate Report No. R 5/2018.

Planning the Northwest Arterial

With the construction of new flyovers at Oliver Road and at John Street, access to/from the road network at these locations will be eliminated (with the exception of the off-ramp from northbound TBE to eastbound Oliver Road). Without access to/from the TBE at these two locations, advancing the Northwest Arterial is needed to provide access to the highway network from the areas to the north and west of TBE.

As part of the TBE twinning project, it is assumed that the Province will construct a new interchange at the proposed Northwest Arterial and the City will be partially responsible for constructing the arterial approaches to the interchange. It is expected that other levels of government will provide funding for this major infrastructure project.

The combined impacts of the TBE and the Northwest Arterial will result in changes to traffic patterns in the area. Traffic will redistribute and shift to the Northwest Arterial and reductions in traffic volumes are expected on Oliver Road, John Street and Dawson Road-Red River Road. With the twinned TBE, some traffic will also shift away from parallel roads to take advantage of faster travel times on the provincial highway.

Protecting Vickers-Carrick Corridor

Vickers Street and Carrick Street are two north-south collector roads that are disconnected by Neebing-McIntyre Floodway. A bridge connection over the floodway would provide a continuous route from the south core to Central Avenue, with the potential to continue north-easterly on a new alignment to connect at Memorial Avenue in the vicinity of Second Avenue. A continuous Vickers-Carrick corridor would provide an alternative to Balmoral Street and May Street-Memorial Street for crossing the floodway and improve connectivity between the south core and the Intercity.

The Vickers-Carrick corridor has also been identified to support sections of the Express Route, an achievable north-south cycling route that can be completed over a five to ten year timeline. The Express Route would connecting existing pieces of infrastructure and explore opportunities to cross the floodway through improvements to the rail bridge. In the longer-term, a connection between Vickers Street and Carrick Street would benefit motorists, cyclists and pedestrians.

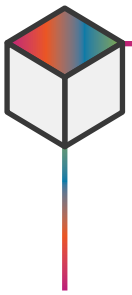
Re-establishing the Connection to Fort William First Nation

The TMP recognizes the importance of re-establishing a road connection between Thunder Bay and the adjacent Fort William First Nation across the Kaministiquia River. In 2013, the James Street Swing Bridge was closed to vehicular traffic when fire damaged the bridge. Current access between Thunder Bay and Fort William First Nation is by Highway 61 only. Restoring a local connection at or near the former bridge crossing will reduce travel by up to 70,000 vehicle-km per day along with the associated greenhouse gas emissions. A more direct and efficient local connection to supplement the Highway 61 connection will decrease travel distances and times for drivers.

Supporting New Neighbourhoods

While a general objective of the TMP is to discourage unnecessary expansion of the road network, a number of new collector roads that support development growth in the city have been identified. Under current growth projections, it is not anticipated that all of the new development areas identified in the City's Official Plan will see significant growth within the TMP horizon. Collector road corridors have been protected in the event future development occurs sooner than expected. It is important that the transportation needs of the growing community are planned and addressed from the outset. It is also important to note that any expansion of the road network has a corresponding increase in ongoing maintenance and operation costs for the City, therefore expansion are not recommended without corresponding development.

Areas with proposed roads include Parkdale and Parkdale West, the former Lakehead Psychiatric Hospital lands, and the waterfront. These proposed roads are intended to act as the main collector road for potential developments or to improve safety of existing corridors. The timing of these roads will be determined in partnership with the City Planning department and the development industry. Alignments for these proposed corridors are subject to change.



CORNERSTONE ACTION

A17. Ultimate Road Network

Plan for the proposed road network, protecting future corridors as required for implementation with corresponding development.

4.1.2 Intersection Operations

The City's network of road infrastructure generally operates with excess capacity. Capacity and congestion issues, as identified by the stakeholders and the public, are usually related to traffic signal operations and queueing at specific intersections.

Modernizing the Signal Communications System

The City's existing signal control system is dated and some elements of the system have been in place for over 30 years. The age of the system severely limits the ability of the City to manage the traffic signal system effectively to maximize the capacity potential of the road network.

The central software for the existing traffic management system is a legacy product that relies on dated, low bandwidth technologies. In addition, 70% of the local controllers are obsolete and can no longer be updated to work with a modern traffic control system.

A new traffic control and communication system will provide the City with a number of benefits, including:

- Information availability: An upgraded central system would allow the City to determine the overall status of an intersection or system more frequently and in real-time.
- Maintenance cost reductions: Increased availability of real-time information reduces the need to send maintenance staff out into the field. Any malfunctions or operational concerns raised by the public can be verified and often corrected through the system.
- Multiple systems integration: Modern traffic signal control systems can

integrate multiple systems, such as traffic count collection, traffic cameras, and road weather monitoring, into a single platform.

- Operational improvements: Signal timings can be adjusted remotely as needed and signals will have pre-emption capabilities for emergency medical services, fire, transit and rail.

Updating the central system and communications network is a significant investment. A migration strategy will identify how to implement the system and system components as budget and resources allow.

Updating Signal Timing and Coordination

Ten intersections across the City were reviewed in detail. The analyses identified the potential to optimize signal cycle lengths and phase lengths at intersections along Harbour Expressway. Coordinating the signals on Harbour Expressway could improve traffic flow and reduce travel times by 12% to 17% during the peak periods.

Signal timing changes would also improve intersection performance at Memorial Avenue at High Street and Simpson Street at Pacific Street.

Modifying Intersections

The intersection review also identified three intersections where physical modifications could improve performance:

- Harbour Expressway at Memorial Avenue: Construct dual eastbound left turn lanes.
- Harbour Expressway at Balmoral Street: Construct dual left turn lanes in all directions (as identified in the 2016 update of the Environmental Assessment for Balmoral Street).
- Bay Street at Algoma Street: Convert Bay Street to one-way westbound between Court Street and Algoma Street to eliminate the left turn movement from Algoma Street to Bay Street. Reconfigure the southbound approach on Algoma Street to include a dedicated right turn lane and a dedicated through lane.

ACTIONS

A18. Priority Action: Upgrade Signal Communication System

Develop a migration strategy for implementing a new signal communication system that considers the City's budget and resource limitations.

A19. Update and coordinate signal timings on Harbour Expressway between Balmoral Street and Fort William Road to improve traffic flow and reduce travel times.

4.1.3 Roundabouts

Roundabouts are increasingly being used by municipalities across Canada as an alternative to traditional signalized or stop-controlled intersections. At present, there is only one roundabout in Thunder Bay—at the intersection of Pearl Street and Sleeping Giant Parkway. Constructed in 2014, the single-lane roundabout replaced an all-way stop intersection.

Feedback from City staff and the public identified an appetite for roundabouts in Thunder Bay. Advantages of roundabouts include:

- Improved safety
- Reduced severity of collisions
- Improved traffic flow
- Reduced delay
- Increased intersection capacity
- Reduced fuel consumption and air quality impacts
- Reduced operational costs

When a new intersection is planned or when an existing intersection is considered for reconstruction or upgrade, the City should apply a screening process to identify the suitability and feasibility of a roundabout. If a roundabout is a potential solution, then a more rigorous assessment could be undertaken to evaluate a roundabout against other traffic control methods.

Accommodating Pedestrians and Cyclists

Typically, pedestrians need only cross one or two lanes of traffic at a time at a roundabout and have access to a refuge island between the entry and exit lanes. In the Region of Waterloo, signage is installed to give pedestrians the right of way at crosswalks in the roundabout and drivers must yield to pedestrians who are crossing, waiting to cross, or about to arrive at the crosswalks. The Region of Waterloo has been upgrading crossings at roundabouts to Level 2 Pedestrian Crossovers[7] to reinforce pedestrian priority.

Cyclists are most vulnerable at a roundabout within the circulatory roadway. Cyclists can be better protected with a roundabout design that provides a separated cycling path adjacent to or combined with the sidewalk and pedestrian crossover.

Engaging the Community

Travelling through a roundabout will be a new experience for many residents in Thunder Bay, the construction of the next roundabout should be accompanied by a city-wide public information campaign. Although the existing roundabout has been complete for almost four years, its location by the waterfront park means that it is not on the route for many typical day-to-day trips (i.e. commuting, school, errands, etc.) and many residents may not have had a chance to familiarize themselves with how to travel through a roundabout.

A public information campaign would educate drivers, cyclists, and pedestrians on how to safely use a roundabout and highlight who has the right of way in various situations. This campaign can be achieved through direct mail or online means. A popular tactic for cities in recent years is to develop a website with frequently asked questions and animations showing the correct and safe way to use a roundabout for all potential users. The City recently took a similar educational approach when pedestrian crossovers were first installed in Thunder Bay.

Further Reading

Background Report E – Roundabouts

[7] Ontario Traffic Manual Book 15, Pedestrian Crossing Treatments. June 2016.

ACTIONS

A20. Adopt a policy to consider a roundabout when a new intersection is planned or an existing intersection is being reconstructed or upgraded.

A21. Consider opportunities to implement a roundabout at the following locations:

- Victoria Street and Ford Street
- Edward Street and Redwood Avenue
- Lyon Boulevard West and Algoma Street
- Mapleward Road and John Street Road

A22. Develop and execute a public information campaign to educate drivers, cyclists, and pedestrians on how to safely use a roundabout.

4.1.4 Goods Movement

FAST FACTS

- 393 vessels and 8.8 million tonnes of cargo passed through the Port of Thunder Bay in 2017
- Multiple railway facilities for both CN Rail and CP Rail

An essential function of the road network is to support goods movement. However, heavy commercial vehicle (truck) traffic is a contentious issue in Thunder Bay, as in most urban municipalities. The movement of goods is essential to economic development, but commercial vehicle traffic often conflicts with residents' desires and perception of what makes for safe, efficient community roads.

Moving goods is vital to the economy in Thunder Bay. The road network must provide for connections to major industry, freight rail terminals, the international airport and the Port of Thunder Bay, the largest export port on the St. Lawrence Seaway. The TMP vision acknowledges the role of the transportation system in supporting businesses for a prosperous community.

Designated Truck Route Network

Public concerns regarding commercial vehicle traffic on several road corridors in Thunder Bay have been brought before Council on multiple occasions. The City has been working, through a separate assessment and consultation process, to implement a by-law for a network of Designated Truck Routes. The truck route study recommended a hybrid system that consists of the existing restrictive system (based on load restrictions) coupled with permissive "Preferred" Truck Routes that direct truck traffic to the provincial highways, Harbour Expressway, Main Street, Island Drive and other specific City streets. Off the preferred truck routes, commercial vehicles must travel the shortest distance on City roads to their final destination (delivery address, port, etc.).

The Preferred Truck Route network requires informational signage at key decisions points to advise truck drivers of the preferred truck route and on-going driver education and enforcement.

Other recommendations from the truck route study included:

- Simplifying the current heavy load restriction by-law to improve both driver understanding and enforcement.
- Developing and distributing educational materials and engaging with the industry regarding the heavy vehicle traffic management system that will be in effect in the City of Thunder Bay.
- Working closely with Thunder Bay Police and Ontario Provincial Police to enforce the system of heavy vehicle traffic management that is adopted by the City, and providing front-line officers access to educational materials on the application and intent of the related by-laws.

ACTIONS

A23. Work with Ministry of Transportation, Provincial Police and Thunder Bay Police to implement and enforce a preferred truck route network through Thunder Bay.

A24. Simplify the heavy load restriction by-law to improve driver understanding and enforcement.

4.2 Active Transportation Network

FAST FACTS

- 503 km of sidewalks
- 59 km of multi-use trails
- 60 km of bike lanes
- 800 m of cycle tracks
- 5 pedestrian crossovers
- 6% active transportation mode share (2016 Journey to Work Census Data)

The City has repeatedly stressed the importance of sustainability, both fiscal and environmental, through the Official Plan and other strategic documents. Enhancing mobility options such as walking, cycling and other human-powered modes (wheelchairs, skateboards, scooters, etc.) is one way the City can provide sustainable and affordable options for travel in Thunder Bay.

Active transportation, which includes walking, cycling and other non-motorized forms of travel, is integral to the TMP. All residents and businesses in Thunder Bay benefit from a robust, year-round active transportation network. Those who drive as their primary mode of travel are often dependent on sidewalks to reach their destination after they park their vehicle. Transit riders benefit from connections between the bus stop and their destinations. Cyclists benefit from routes that are more safe and attractive. A well-designed active transportation network moves people effectively and efficiently, at a low cost to the user.

In support of the TMP, a companion **Active Transportation Plan** was prepared to provide additional detail on the pedestrian and cycling networks, initiatives and programs for Thunder Bay.

The Active Transportation Plan was developed around six key themes:

1. Fostering Walkable Environments;
2. Connecting and Growing the Cycling Network;
3. Engaging Children and Youth;
4. Supporting Year-Round Travel;
5. Building Community Capacity; and
6. Tracking Progress

The TMP provides an overview of the Active Transportation Plan, focusing on the pedestrian network (Fostering Walkable Environments) and cycling network (Connecting and Growth the Cycling Network). The Active Transportation Plan covers all six themes in detail and provides corresponding actions, projects, and policies. An overview of supporting programs and policies aimed towards education and engagement can also be found in Section 3.3 (Travel Demand Management).

Further Reading

Thunder Bay Active Transportation Plan

Existing Conditions

The City's existing active transportation network consists of sidewalks for pedestrians, bike lanes and cycle tracks for cyclists, and multi-use trails which support both walking and cycling.

Most major roads in Thunder Bay have a sidewalk or multi-use trail on at least one side of the road. The City has been making on-going pedestrian infrastructure improvements, including the following recent initiatives:

- Installing new Pedestrian Crossovers on Algoma Street (2016), Walsh Street (2017), Simpson Street (2017), James Street (2018) and Arundel Street (2018) with a plan for more in the coming years;
- Improving connectivity in the multi-use trail system; and
- Filling gaps in the sidewalk network (e.g., Mountdale Avenue and Arthur Street west of Thunder Bay Expressway).

Similar to roads, the Thunder Bay 2016 Asset Management Plan identified a shortfall in annual funding to replace sidewalks at the end of their useful life. The estimated cost to replace the sidewalk network life is $4.6 million[8] per year, but the average funding has been $1.6 million per year in the five years previous (2011-2015).

The City has made significant progress installing cycling infrastructure, particularly since about 2010 when active transportation began to be integrated into City initiatives more broadly. There is now over 60 km of dedicated cycling facilities in Thunder Bay.

[8] Asset Management Plan for the City of Thunder Bay (2016)

The nature of the road network means that the quickest path between two points often involves using arterial roads, but for most cyclists high traffic volumes and speeds are deterrents from using these roads. Cycling facilities that are separated from traffic are more appropriate on major roads but there are few such facilities currently in Thunder Bay. A connected cycling network is needed particularly along major north-south and east-west routes.

The City has developed a network of cycling infrastructure, but only a small percentage of the network is physically separated from vehicular traffic. Industry best practices[9] have evolved to recognize the need for a core network of protected facilities to be safe and comfortable for residents of every age and skill level.

The City's multi-use trail system complements sidewalks and dedicated cycling infrastructure. Multi-use trails follow several of the waterways that flow through Thunder Bay and offer a comfortable environment for pedestrians, cyclists, and other forms of active transportation.

Action Areas

4.2.1 Fostering Walkable Environments

The ability to walk comfortably to nearby destinations is fundamentally important to building an inclusive, integrated and sustainable transportation system. It is well publicized how the design of a community can impact public health. Supporting public health is especially important in Thunder Bay where there is a prevalence of physical inactivity, obesity, cardiovascular disease, diabetes, and an aging population.

With finite and limited funds, the challenge will be prioritizing infrastructure investment across the many needs of Thunder Bay. Through the TMP process, a pedestrian priority network was defined to help direct investment in pedestrian infrastructure. The pedestrian priority network incudes Pedestrian Priority Corridors, Neighbourhood Greenways and off-road multi-use trails.

Pedestrian Priority Corridors

Pedestrian Priority Corridors represent the "arterial" connections in the pedestrian network. Pedestrian Priority Corridors include corridors with mixed commercial and residential uses such as the core area of Fort William as well as corridors serving major pedestrian destinations across the City (such as Confederation College, Lakehead University and Thunder Bay Regional Health Sciences Centre). The City's Image Routes are included in the Pedestrian Priority Corridors, building upon and supporting previous planning and momentum around the development of the City's signature streets.

Neighbourhood Greenways

Neighbourhood Greenways are the key "collector" and "local" connections of the pedestrian network. Neighbourhood Greenways define routes that pedestrians and cyclists find desirable due to lower vehicular volumes and may incorporate traffic calming measures, green infrastructure, or other pedestrian amenities.

More Information

Map B: Pedestrian Priority Network

[9] Ontario Traffic Manual Book 18, Cycling Facilities. December 2013.

Neighbourhood Greenways are feeder routes that connect community destinations such as schools and recreation centres to and from Pedestrian Priority Corridors. While the designation of a corridor as a Neighbourhood Greenway is not intended to dictate a strict set of infrastructure improvements, the City should pursue a continuous pedestrian facility on at least one side of a Neighbourhood Greenway.

Filling Sidewalk Gaps

Providing continuous pedestrian facilities is important to improving pedestrian safety outcomes. There is currently 34 km of sidewalk gaps within Pedestrian Priority Corridors, Neighbourhood Greenways and roads that serve transit. The AT Plan is intended to provide a clear policy on how sidewalk gaps will be addressed moving forward. The phasing of retrofit sidewalks will depend on budget availability, but it is intended that sidewalk gaps along Pedestrian Priority Corridors, Neighbourhood Greenways, and those serving transit will be prioritized.

One challenge to filling gaps in the sidewalk network is the Local Improvement Charges Regulation and petition process. In many established neighbourhoods across the City, the cost of constructing sidewalks is shared between the City and property owners directly abutting the new sidewalk. This process requires agreement between the City and multiple impacted owners, which can be a challenge to negotiate. Community support from residents and property owners is required to advance a walkable environment in Thunder Bay. If this process becomes a barrier, a review of the City's policy and implementation practice should be considered.

Providing Convenient and Safe Crossings

In addition to sidewalks, pedestrians also require locations to safely and comfortably cross roads. Walkability and Pedestrian Safety in Thunder Bay, a 2017 report prepared by the Thunder Bay District Health Unit, Lakehead University, and the City, included a detailed analysis of pedestrian-vehicle collision data from 2004 to 2013 to explore collision trends. A number of existing intersections emerged as focus areas for pedestrian improvements, due to a higher number of pedestrian collisions. Potential high-priority intersections for improvement include:

- Arthur Street / Edward Street
- Arthur Street / Mountdale Street
- Arthur Street / Waterloo Street
- Arthur Street / James Street
- Memorial Street / Isabel Street

Additional key findings related to pedestrian safety are summarized below:

- 50% of pedestrian-vehicle collisions occurred at intersections;
- Among pedestrian-vehicle collisions at intersections, 50% were the result of a turning vehicle while a pedestrian crosses with the right-of-way.
- Almost 50% of pedestrian-vehicle collisions occurred within 500 m of a school; and
- Most collision hotspots, where more than three pedestrian-vehicle collisions were reported within the 10-year period, were located along the City's Image Routes where many business and services are located.

The City of Thunder Bay should continue to partner with the Thunder Bay District Health Unit and Lakehead University on safety initiatives. One such initiative is an intersection review program to identify both short term (immediate) actions and longer term improvement strategies based on the five 'E's: Engineering, Education, Enforcement, Encouragement, and Evaluation and Planning. Short term initiatives may include upgrades that are relatively inexpensive and simple to implement such as lane narrowing, curb extensions, enhanced crossing markings, the use of paint and bollards to tighten corner radii and/or signal timing modifications. Longer term upgrades could include more significant measures such as raised intersections, elimination or modification of right turn channelization or reconstruction of intersection geometry.

Intersections on the Pedestrian Priority and Neighbourhood Greenway corridors should be reviewed for the presence of curb drops. Where no curb drops exist, reconstruction of the sidewalk at these locations should be advanced to meet AODA standards.

Providing More Opportunity to Cross Safely

In addition to upgrades at existing crossings, feedback from the public consultation pointed to the need for more crossing opportunities. The pedestrian-vehicle collision analysis indicate that almost all the mid-block collisions occurred at locations that lacked traffic control. Along many roads in Thunder Bay, formal pedestrian crossings are often located more than 400 m apart.

Walking and Cycling Help Revitalize Neighbourhoods

Thunder Bay's first neighbourhood association, Evergreen a United Neighbourhood, was created to make Fort William's Simpson-Ogden community more vibrant, prosperous, inclusive, resilient, healthy and clean. The association has worked to improve safety and comfort for pedestrians by installing solar lighting in area laneways and creating a Walking Night Club.

> **"As we continue to connect with our neighbours and invest in social capital, we must not forget the connections between our sidewalks, laneways and easy access to services and shops. In older neighbourhoods it is vital to everyday existence to have folks walking to schools, jobs and community centres.**
>
> *– Linda Bruins, Executive Director, Evergreen a United Neighbourhood*

Providing Network Amenities

Many of the reasons why pedestrians choose to walk, or avoid walking, are related to surroundings along the route in terms of perceived and actual safety, access to greenspace and natural areas, and a pleasant walking environment. For these reasons, access to amenities is important to attracting new walkers.

The City's guidelines for Image Routes provide direction on enhancing streetscaping and improving the public realm to provide a better environment for pedestrians, and also improve the experience for all road users including drivers.

A survey conducted as part of the *Walkability and Pedestrian Safety in Thunder Bay* study indicated that pedestrian lighting was highly desirable for pedestrian safety. Accordingly, opportunities to bundle pedestrian-scale lighting into the delivery of trail and Image Route sidewalk projects should be considered where beneficial and integrated into the multi-year capital budgeting process.



CORNERSTONE ACTION

A25. Pedestrian Priority and Trail Network

Complete the network of Priority corridors and neighbourhood greenways to provide pedestrians with comfortable, accessible routes connecting to services and opportunities.

ACTIONS

A26. PRIORITY ACTION: Sidewalk Gaps

Systematically address sidewalk gaps along pedestrian priority corridors, transit routes and neighbourhood greenways.

[Action FWE-2 in the Active Transportation Plan]

A27. PRIORITY ACTION: Pedestrian Crossings

Explore the addition of formal pedestrian crossings along pedestrian priority corridors and neighbourhood greenways, with the intent to add one to two crossing locations annually.

[Action FWE-4 in the Active Transportation Plan]

4.2.2 Connecting and Growing the Cycling Network

Residents and stakeholders expressed a desire for more high-quality cycling infrastructure. Providing safe, comfortable, and integrated cycling infrastructure extends the range of destinations and activities that residents can reach without motorized transportation. Cycling facilities are complementary to pedestrian facilities in an inclusive, integrated and sustainable transportation system.

Planning a Cycling Network

Four important principles guided the development of the future cycling network:

- Serves demand and key destinations;
- Provides cohesive and connected routes;
- Provides comfortable, inviting and safe facilities; and
- Is flexible and responsive to future needs.

The cycling network built upon the existing cycling infrastructure through an iterative process involving consultation with staff, stakeholders, and the public. The proposed network shown in Map C is based on analysis of specific links for cycling impact, feasibility, and overall network connectivity.

The proposed cycling network provides an overarching long-term goal for the City of Thunder Bay to pursue, and should be adopted over the TMP horizon. Map C also shows “conceptual” and “future” projects that are desired as part of the complete cycling network, but unlikely to be constructed within the 20-year horizon of the TMP.

Fort-to-Port Cycling Route

One project of note in the cycling network is the north-south route, or ‘Fort to Port’ cycling route. The desire for a high-quality north-south route was one of the key pieces of input received through public and stakeholder consultation.

The north-south cycling route is proposed to be implemented in two phases:

- Express Route – an achievable cycling route that can be built over a five to ten year timeline, connecting existing pieces of infrastructure through improvements at crossings, key intersections and corridors.
- Ultimate Route – recognizes the desire for a central route providing direct access to services. This corridor will require significant capital investment to accommodate cycling facilities and will be implemented as roads are reconstructed over a longer timeframe.

More Information

Map C: Ultimate Cycling Network

More Information

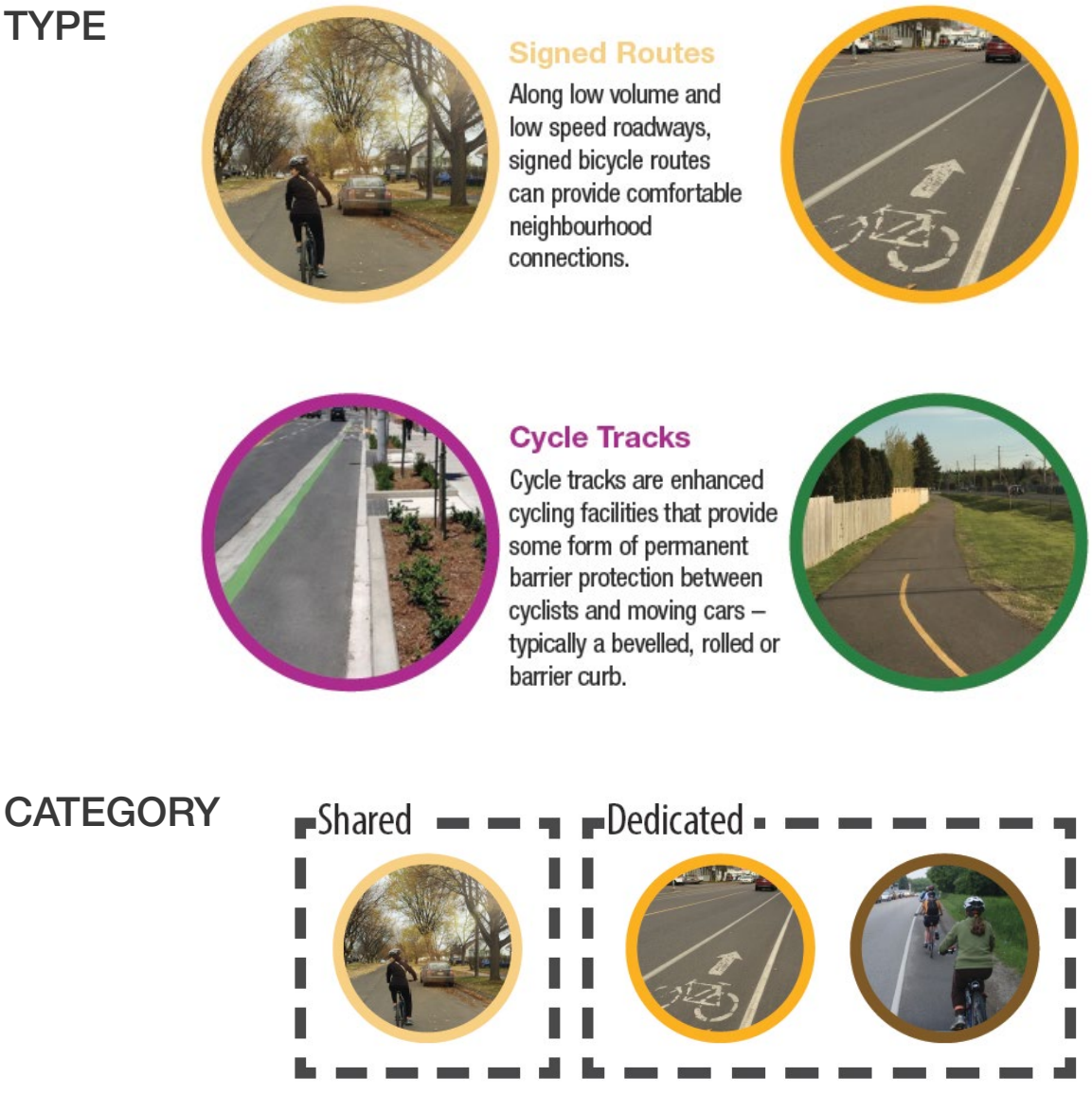
Map D: North-South “Fort-to-Port” Cycling Route

Cycling Facility Types

The facility types that make up the elements on the cycling network depend on several factors: vehicle volumes, vehicle speeds, and desired level of comfort. Exhibit 4.3 illustrate cycling facility types and categories that are appropriate for Thunder Bay. Signed routes are shared facilities that are appropriate for quiet streets. Bike lanes and paved shoulders provide dedicated cycling facilities. Buffered bike lanes and cycle track are separated facilities that separate cyclists from vehicular traffic. Multi-use trails are fully separated and available to all forms of active transportation.

Map C shows the desired facility category for each segment of the cycling network. In some cases a phased approach to implementing the cycling network may be necessary to achieve the desired facility type over time.

Exhibit 4.3: Cycling Facility Types and Categories



Supporting the Cycling Network

End-of-trip facilities are required to support the cycling network and encourage higher cycling demand.

Bike parking is a critical piece of the cycling network. Several studies suggest that fear of bike theft may discourage cycling and that many bike theft victims do not buy a replacement. Combating bike theft is a necessary step toward increasing cycling as a form of active transportation. A designated place to be able to lock a bike at the trip destination can encourage people to cycle. Designated bicycle parking installed properly in a good location prevents damage to street trees and street furniture and prevents bikes from blocking the sidewalk and other pedestrian or vehicular paths.

Short-term bike parking, for less than a few hours, can consist of a simple rack designed to support the frame of the bicycle and allow locking of both the frame and wheels. Short-term bike parking is usually provided for visitors and shoppers. Long-term bike parking typically consists of racks or lockers that are secured or enclosed and sheltered or indoors. Long-term bike parking is typically provided at multi-unit residential developments, workplaces and transit stations for all-day or overnight parking.

Bike Lanes

Bike lanes are travel lanes dedicated exclusively for use by cyclists through a combination of pavement markings and signage.



Buffered or Protected Bike Lanes

Buffered bike lanes are similar to conventional bike lanes but incorporate a painted buffer. Additional physical elements like bollards or rubber curbing may be added to improve comfort.

Multi-use Paths & Trails

Multi-use paths are located off-road, either in the boulevard of a roadway or through land without any roads. Both pedestrians and cyclists can use these facilities.



Shoulder Bikeways

Along roads with a rural cross-section, a paved shoulder may be designated for use by cyclists (similarly to a bicycle lane on an urban roadway). In most cases, a paved shoulder between 1.2 & 1.8m can be designated as a shoulder bikeway.



To ensure that new developments incorporate bicycle parking and end of trip facilities into the site plan, it is critical that bike parking requirements be incorporated in site plan application approval processes.

It is also important to consider showers, change rooms and washrooms to supplement bike parking at destinations such as workplaces.

Public Bike Share

A bike sharing system is where a shared pool of bicycles is available for short-term use for a fee. A bike share system can reduce barriers to cycling such as owning and storing a bike, concern for bike theft, and the need for flexibility if plans or weather changes. Bike share has been successfully implemented in five cities in Ontario and over a thousand cities worldwide. A city-operated bike share system could attract new riders and maximize the City's investments in cycling infrastructure in Thunder Bay.

There are three main types of bike share systems. The first is a system designed with fixed, docking points or kiosks at designated locations. The second is a system with free-floating bikes that can be picked up and dropped off anywhere within a defined service area. The third is a hybrid of the dock and dock-less models with free-floating bikes and designated bike parking hubs. .

The feasibility of a bike share system for Thunder Bay should be investigated. A pilot program can be undertaken to test bike share concepts on a smaller scale before initiating a wider implementation.

A successful bike share system can help accelerate uptake of cycling as an easy and efficient way to get around the city, especially for shorter trips.



CORNERSTONE ACTION

A28. Ultimate Cycling Network

Adopt and implement the Ultimate Cycling Network as the long-term goal for trail and cycling facilities across the City.

[Action CGC-2 in the Active Transportation Plan]

ACTIONS

A29. PRIORITY ACTION: Fort-to-Port Express Route

Adopt and implement the north-south Express Route and pursue the longer-term vision of the Ultimate Route as roads are reconstructed and opportunities arise.

[Action CGC-3 in the Active Transportation Plan]

A30. PRIORITY ACTION: Priority Cycling and Trail Network

Adopt and implement the Priority Cycling and Trail Network.

[Action CGC-4 in the Active Transportation Plan]

4.3 Transit

Transit plays a vital role in the transportation system in Thunder Bay. The City demonstrated the importance of transit by completing the Thunder Bay Transit Master Plan in 2012. The Transit Master Plan guides future transit service to meet the growing travel needs of the community in an effective and efficient manner. The transit-related recommendations in the TMP build upon the Transit Master Plan and do not preclude the findings and recommendations of the Transit Route Rationalization Study that is currently underway.

People who live or work in Thunder Bay without access to a car are at an economic disadvantage. Without a car, individuals and families are less mobile and less able to access employment opportunities that could improve their quality of life. Transit plays a key role in improving social equity by providing access to employment, education, medical care and other basic needs. With an aging population, it is anticipated that more people will rely on public transit in the coming decades.

Transit plays a key role in promoting sustainable community development by influencing long-term decisions on whether to buy a second car, or to buy a car at all. Higher levels of transit service is correlated to higher transit usage among people who are able to drive.

Existing Conditions

FAST FACTS

- 17 bus routes
- 5 major terminals and transfer hubs
- 48 (100%) low-floor fully accessible buses
- 4% of commuters travel to work by transit (2016 Census, Journey to Work data)

Thunder Bay's transit network (Exhibit 4.4) is configured as a hub-and-spoke model, with five major terminals that are located at City Hall, Intercity Shopping Centre, Waterfront, Lakehead University, and Confederation College.

Service is provided to the majority of the City's residents. However, service may be infrequent on some routes or meandering on others resulting in indirect trips with long travel times for some riders.

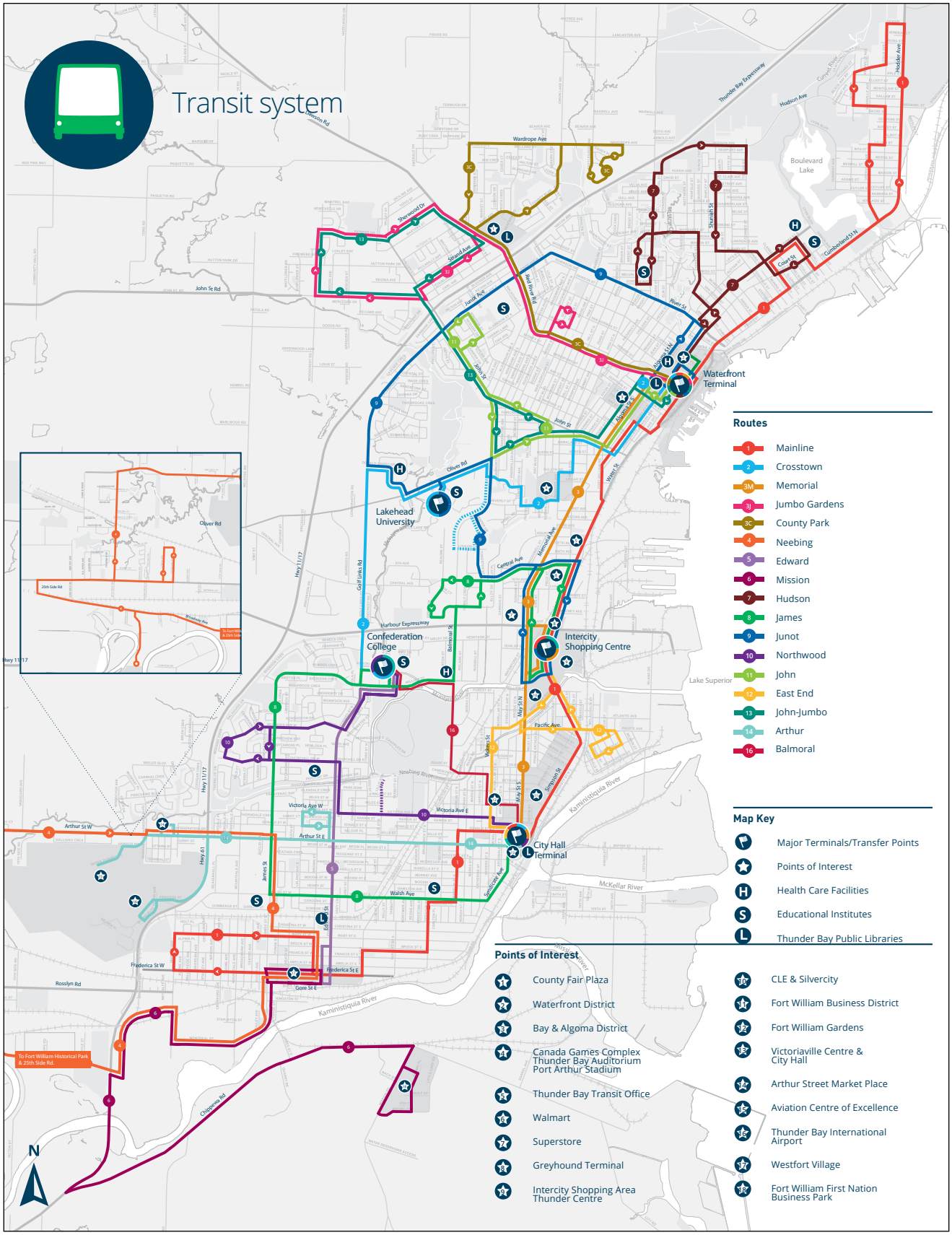
Thunder Bay Transit provides conventional transit service seven days a week. Service is provided for 18 hours a day Monday through Saturday and 15 hours a day on Sundays and statutory holidays. Most services operate at 15 to 30-minute frequencies during daytime hours on weekdays and Saturdays. During other time periods, including Sunday and holidays, most routes operate at 40-minute frequencies.

Thunder Bay also operates a paratransit service called Lift+ that provides door-to-door service for residents and visitors who are not able to use Thunder Bay Transit for all or part of their trips due to a disability. Lift+ serves most locations within city limits at the same fare as conventional transit.

In 2016, the federal government introduced the Public Transit Infrastructure Fund (PTIF) to improve and expand public transit in communities across Canada. The City of Thunder Bay has received matching funds from the federal and provincial governments to complete a number of transit projects including improving bus stop accessibility, adding shelters, improving the City Hall transfer hub, providing pedestrian crossovers, updating bus stop signage and wayfinding signage, renewing the City's fleet, and improving the transit maintenance facility.

In 2017, the City initiated a separate Transit Route Rationalization study to provide a re-assessment of the transit route network in the 2012 Transit Master Plan. The key goals of the Transit Route Rationalization study and its implementation are to develop and implement route and stop modifications, schedules, and an optimized service plan to provide quicker and more efficient travel for customers, while improving financial sustainability for Thunder Bay Transit.

Exhibit 4.4: 2018 Thunder Bay Transit Route Map



4.3.1 Routes and Service

Coverage and Frequency

The Transit Master Plan recommended a service coverage of 95% of the population to be within a 400 m walking distance of a serviced bus stop in residential and commercial areas before 9 p.m. Monday to Saturday, and within a 800 m walking distance of a serviced bus stop in residential and commercial areas during other periods (late evenings, Sundays, and holidays) and industrial areas.

Exhibit 4.5 illustrates the 400 m service coverage of the 2017 transit network. Thunder Bay Transit has progressed towards its recommended service coverage, providing service to most residential neighbourhoods, places of work, secondary and post-secondary schools, major shopping centres, and public facilities.

Service frequencies on two key routes, 2 Crosstown and 3M Memorial, provide 15-minute frequencies during the weekday daytime periods. Matching service frequencies on other key intersecting routes, to provide a spine network of "frequent transit routes", will allow riders to conveniently and quickly access all major destinations in Thunder Bay.

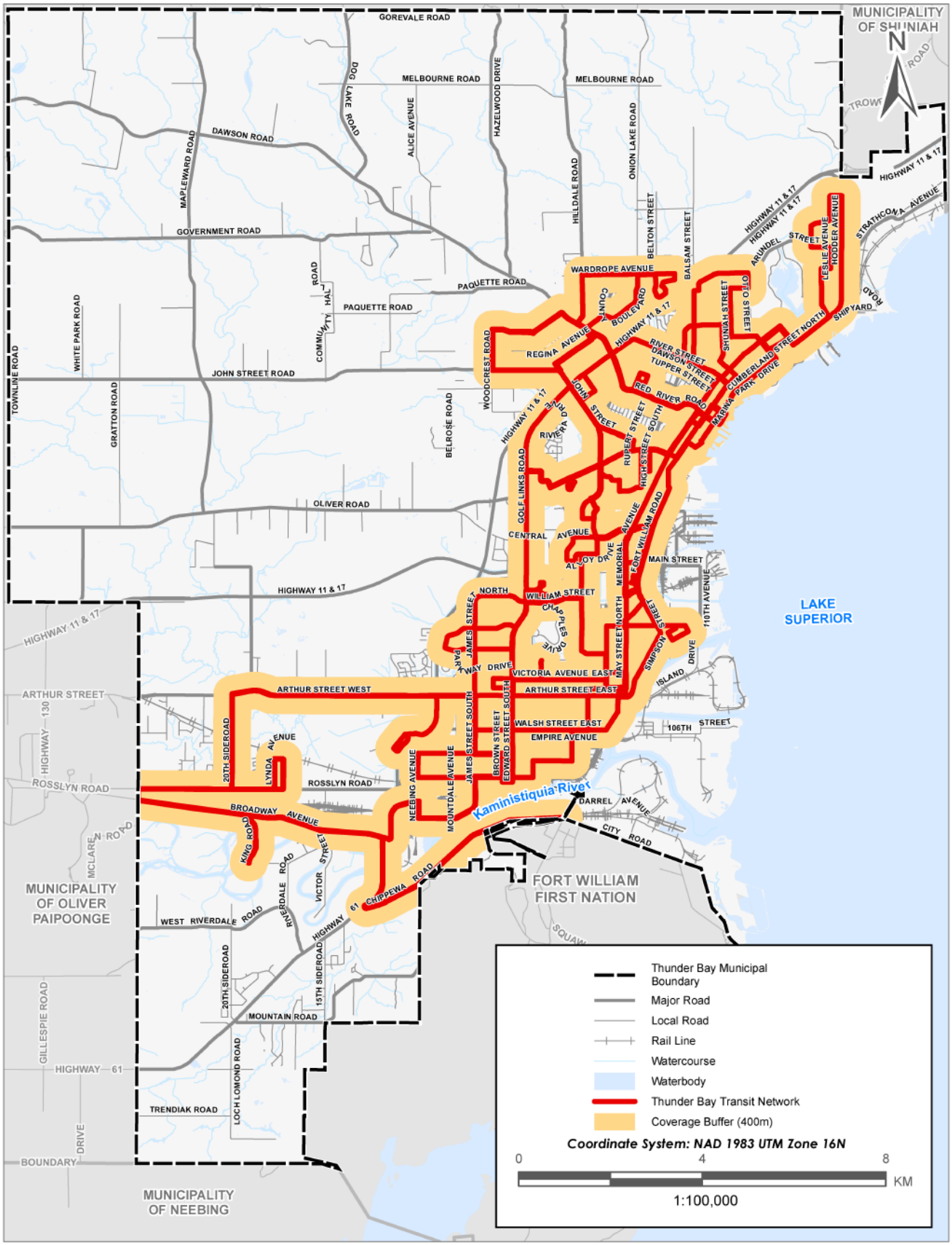
The on-going Transit Route Rationalization Study will identify additional route and service improvements.

What We Heard About Transit

Over the course of the TMP study, residents were invited to provide feedback at three public open houses. The following themes emerged with respect to transit:

- Service hours: Desire for service to begin earlier and end later in the day to serve shift workers and customers of restaurants and bars.
- Frequency: Desire for more frequent service to enable user to go about their daily activities without having to worry about bus schedules. Over 65% of respondents to the Public Open House #2 survey preferred improving frequency of buses over extending service hours.
- Express buses: Implement direct express routes to improve travel times between key destinations such as the transit hubs and the airport.
- Access: Lack of sidewalks and hard surfaces in some locations made it difficult to access bus stops. Similarly, mid-block bus stops without a pedestrian crossing made it difficult to safely reach the bus stop. A frequently noted location was the bus stop across from the CLE grounds on May Street, where much of the southbound bus riders must cross a busy street to access the movie theatre and events.
- Investment: Half (49%) of respondents to the Public Open House #2 survey indicated that the City should be investing "more" or "much more" in expanding/improving transit service.

Exhibit 4.5: Service Coverage (400 m buffer from transit route)



Accessing Transit

Every transit trip starts and ends as a pedestrian trip. Sidewalk connections to transit stops and safe crossing opportunities are important components of the transit network. The analysis completed for the pedestrian network presented in Section 4.2.1 reflects the importance of pedestrian connections to transit.

Concrete mobility pads at transit stops extend the hard surface between the sidewalk and the road, removing barriers for those using mobility devices and providing all users improved access to transit. Thunder Bay Transit is working towards retrofitting all bus stops with mobility pads.

4.3.2 Alternative Service Delivery

Transit demand is low to moderate and dispersed over a large area. It is difficult to provide cost-effective transit using a traditional fixed-route service where population and employment densities are low but there is still a need to provide mobility to residents and workers throughout Thunder Bay. Alternative service delivery methods could provide a solution for Thunder Bay.

With the shift towards mobility as a service (refer to Section 3.1.4), the future role of transit will likely be one part of a multimodal system that includes car sharing, ride hailing, and other forms of transit. In areas or time periods with low ridership demand, a demand-responsive service as an alternative to conventional fixed-route service is more efficient and cost-effective.

Transit Helps Young Adults Juggle Life's Many Demands

Full-time Lakehead University and Confederation College students purchase U Passes that give them unlimited access to Thunder Bay Transit during the school year. Students now use transit more often for work, shopping, recreation and social activities, and enjoy expanded housing opportunities.

A recent study (StudentMoveTO) found that university students in Toronto are heavy transit users, and often travel outside peak periods. It showed that more than half of post-secondary students also hold jobs, and 15 percent work more than 20 hours a week. Frequent and direct transit routes can help minimize the degree to which daily travel between home, school and work eats into study time.

> **"Many youth cannot drive or cannot afford to because of increasing insurance and fuel costs. Instead, they rely on mobility alternatives such as transit, walking and cycling to reach school, work and play. For longer distance trips and in winter weather, their reliance on transit becomes even more pronounced.**
>
> **But just as young people depend on transit, so do transit systems depend on them. Canada's youth account for one-third of transit ridership, nation-wide. In Vancouver, young people 16 to 24 years old are responsible for 28% of ridership.... In small and mid sized cities, they can make up an even higher proportion of transit users—as high as 65% of all riders in cities like Cornwall, Ont., Red Deer, Alta. and Moose Jaw, Sask.**
>
> *- Canadian Urban Transit Association, "Transit's Next Generation: Working with Canada's Youth"*

Reducing GHG Emissions Through Mode Shift

The 2016 Thunder Bay Community and Corporate Greenhouse Gas Inventory Report established that transportation accounts for 33% of all community emissions, and 27% of energy consumption. Of this, 75% of transportation emissions are from on-road transport, while 22% are from non-road transportation.

Such a service concept is not new and has been used by some transit agencies for decades, but was expensive to operate or inconvenient for the user requiring trips to be booked well in advance. New technologies and applications that can dispatch vehicles in real-time has decreased the cost of providing demand-responsive service and increased convenience to customers. The future deployment of connected and autonomous vehicles (driverless vehicles) is likely to reduce this cost even further, and could facilitate the provision of service to areas in which it was not previously economically feasible.

The City can position itself as a leader by being an early adopter of policies that support demand-responsive transit and autonomous vehicles. These policies can improve future transportation options for Thundery Bay residents.

ACTIONS

A31. PRIORITY ACTION: Route Rationalization

Implement route and stop modifications, schedules and service plans as identified by the Transit Route Rationalization Study.

A32. Enable live GPS monitoring of all buses for third party apps

A33. PRIORITY ACTION: Demand-Responsive Transit Service

Initiate and fund a pilot project with a transportation service company to provide demand-responsive transit service in low-density areas of Thunder Bay where current fixed-route services are performing poorly and/or where transit service is not yet provided.

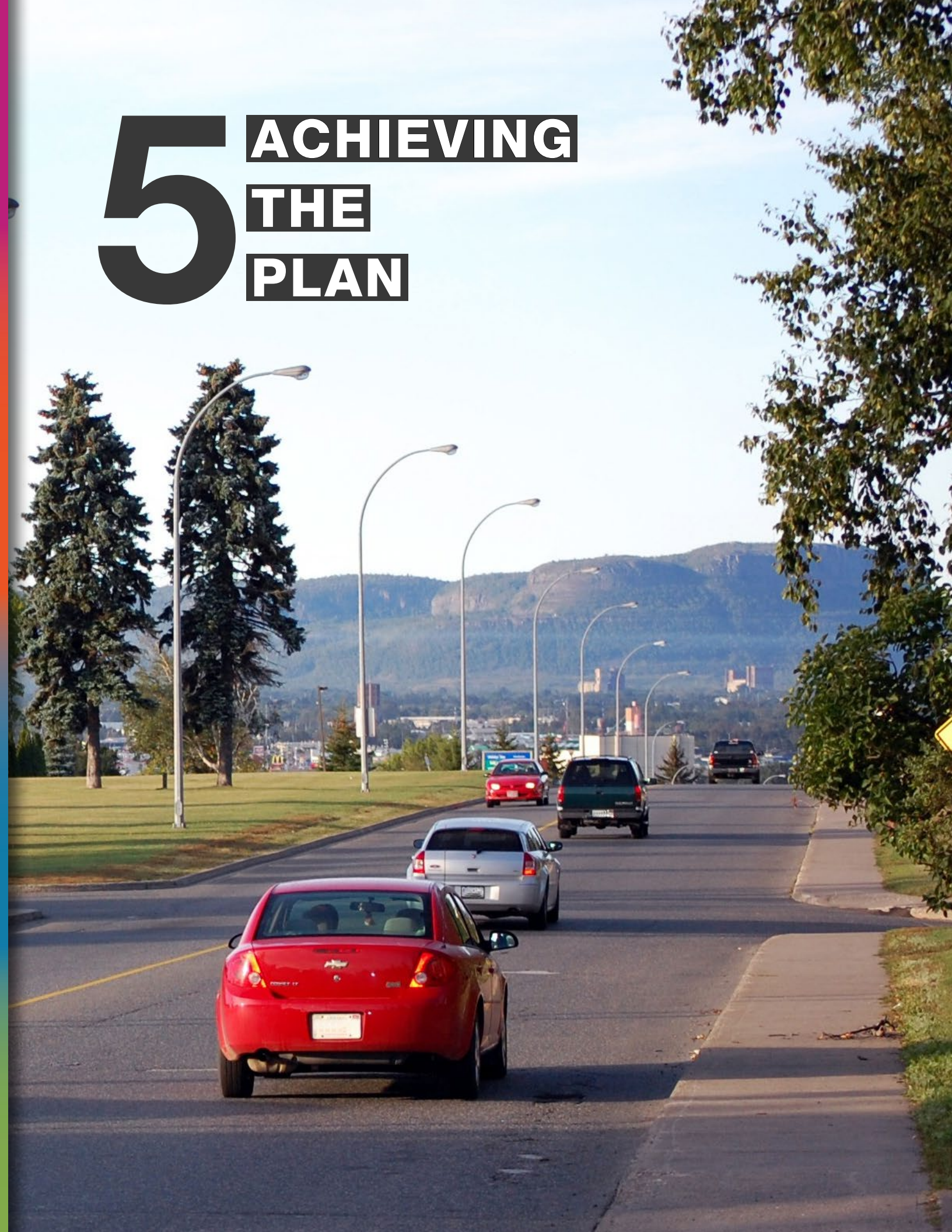
A34. PRIORITY ACTION: Electronic Fare Collection System

Implement system-wide electronic fare collection.

Protecting Mobility for Seniors

Thunder Bay is aging: by 2036, about 37% of Thunder Bay District residents will be over 60 years old, compared to just 24% in 2011. In response, the City's Age Friendly City Services Action Plan (2015) observed that the City offers a travel training program for seniors, a fully accessible bus fleet, and guidelines for accessible bus stops. Continued improvement will be necessary as more residents lose the ability to drive and need help getting around. Transit will be essential to a fully accessible transportation system, and to meeting the needs of a large and diverse population of seniors.

5 ACHIEVING THE PLAN



The Thunder Bay TMP is intended to be a practical guide to direct transportation investments in the City. The recommendations in this TMP are intended to be implemented over a 20-year time period in a manner that is financially and administratively sustainable for the City of Thunder Bay.

The timing and scope of transportation investments may change subject to development growth, economic conditions, political conditions, external funding and subsequent environmental assessment studies. These influences may also change the City's priorities and overall strategic goals. It is anticipated that the TMP will be updated from time to time to reflect the changing needs of Thunder Bay.

5.1 Aligning Land Use

The Thunder Bay TMP needs to be supported by other City plans, strategies and supporting policies, especially land use planning as envisioned by the City's Official Plan.

Action Areas

Since the mid twentieth century, development in Thunder Bay has been designed to accommodate the automobile. The pattern of neighbourhoods, shopping areas, and workplaces have been built up all around the city in a manner that has made walking, cycling and transit less attractive and the private automobile more convenient.

The current outlook on city-building is to grow and intensify within existing developed areas, promoting the efficient use of existing city services and facilities. The City's Official Plan identifies General Goals that include the need to integrate land use and transportation planning:

- *Promote a pattern of land use, and the provision of services and facilities that will enhance the health, safety, and well-being of all present and future residents of the City;*
- *Direct development so that it occurs in an efficient and cost-effective manner;*
- *Maximize the opportunities for choice in employment, housing, recreation, and overall lifestyle for all City residents while emphasizing the need for compact, mixed-land use patterns, and providing people with the opportunity to live close to where they work, learn, shop, and play;* and
- *Promote a cost effective, reliable, accessible and integrated multimodal transportation system.*

The Official Plan presents a land use plan and a suite of tools the City can use to direct land use development. These tools include Secondary Plans, Site Specific Policy Areas, Development Plans, Zoning By-law, and other interim by-laws and provisions to manage and direct how lands are designated and developed.

ACTIONS

A35. Incorporate mobility and access for all users in Secondary Plan, Development Plan and site plan review processes (e.g. pedestrian routing, cycling access, transit access, etc.).

A36. Update Transportation Impact Study Guidelines to consider level of service requirements for all users, including drivers, transit users, cyclists and pedestrians.

A37. Review transportation projects and service to ensure the design supports the City's desired urban structure and minimizes impacts on the natural environment.

Showing the Links Between Mobility Choice and Intensification

In 2017, EcoSuperior hosted three Open Streets Thunder Bay events that closed city roads to motorized vehicles, opening them up for people to walk, cycle, skateboard and rollerblade. The Open Streets event on Simpson Street and Victoria Avenue incorporated a Strong Block event held by EarthCare Thunder Bay. Pop-up design features transformed Simpson Street into an animated community gathering space to show the benefits of denser communities and streets built for people.

> **"We are also bringing people to live, work, play, shop, all in the same area so they are not dependent on vehicle mobility. They can commute easily and comfortably by foot or on their bike.**

- Rena Viehbeck, EarthCare Thunder Bay

5.2 Building Resilience

Recent examples of the impacts of climate change on Thunder Bay are the hail and wind storms of 2011, the heavy rains of 2012, the extreme cold temperatures in 2013-2015, and the severe storms and heat waves in 2015.[10] These events highlighted that extreme weather conditions have the potential to incur high costs to the community. With changing weather patterns around the world, the frequency and intensity of extreme weather events are increasing. Recognizing the need for adaptation to reduce vulnerabilities and build resilience, the City of Thunder Bay developed its Climate Adaptation Strategy (Climate-Ready City, December 2015).



Example of storm damage (Highway 595)

Photo credit: City of Thunder Bay

The warming of the climate system is the result of increasing greenhouse gases in the atmosphere cause by human activities. The transportation sector is cited as being the number one contributor of emissions in Ontario, totalling 35% of all greenhouse gas emissions.[11]

[10] Climate-Ready City, City of Thunder Bay Climate Adaption Strategy, December 2015

[11] Ontario's Five Year Climate Change Action Plan 2016-2020

5.2.1 Climate Change Mitigation

The goal of the Province's Climate Change Action Plan was to reduce 1990 levels of greenhouse gas emissions by 80% before 2050. Key transportation actions areas to achieve this goal included:

- Increasing the use of electric vehicles;
- Supporting cycling, walking and transit; and
- Increasing the use of low-carbon trucks and buses.

Building on the EarthCare Thunder Bay Sustainability Plan 2014-2020, the TMP recommendations to reduce the environmental footprint of the City and the community include:

- Updating the Green Fleet Implementation Plan (2009) in consideration of new technologies and fuel options in a continued effort to reduce emissions from City-owned fleet.
- Supporting cycling and walking in Thunder Bay by developing an Active Transportation Plan that identifies a plan to provide a connected network for cycling and walking.
- Investing in a complete, connected cycling and pedestrian network in the short to medium term.
- Supporting the wide-spread adoption of electric vehicles through policies that encourage the private investment in electric fueling stations, provision of preferred parking spaces, etc.
- Improving public transit services so that transit becomes a preferred mode for travel in Thunder Bay.
- Encouraging infill development and compact land uses that reduce need for new transportation infrastructure in greenfield areas

The Value of Compact Development

The Canada Mortgage and Housing Corporation encourages more compact development because of the many benefits it offers:

- Reduced municipal infrastructure costs
- Increased housing affordability for consumers, arising from lower land and servicing costs
- Smaller environmental footprint, due to less land consumption and support for transit and active transportation
- More inclusive neighbourhoods with more housing variety suitable for different income levels

> **"Residential intensification represents the best opportunity for the provision of affordable housing and is essential to making the most efficient use of land, resources, infrastructure, and public service facilities, while minimizing impacts on air quality and climate change, promoting energy efficiency, and supporting public transit and active transportation.**
>
> *- Thunder Bay's Official Plan (2018), Part 10*

5.2.2 Climate Change Adaptation

Adaptation to the risks posed by climate change is key to minimizing the immediate impacts to the City of Thunder Bay. The *Thunder Bay Climate Adaptation Strategy* is a significant commitment on the part of the City of Thunder Bay. It requires engagement across all City Departments and community stakeholders over many years.

Climate Adaptation Strategy's Goal 4, which is most relevant to transportation infrastructure, is as follows:

Goal 4. Consider Climate Change impacts in the design, construction and maintenance of physical infrastructure while considering affordability and co-benefits.

- *Objective 4.1 Incorporate new technology and best practices in the design, construction and maintenance of new municipal infrastructure and facilities to minimize service disruption and increase resiliency.*
- *Objective 4.2 Identify retrofit opportunities for municipal infrastructure to minimize service disruptions related to extreme weather events.*
- *Objective 4.3 Investigate areas of priority to incorporate best practices and green infrastructure into community and land use planning and design.*

Design measures to minimize future storm impacts include Green Infrastructure and Low Impact Development that reduce and treat stormwater. The City has implemented several Low Impact Development biofiltration facilities including one on Memorial Avenue, as well as part of other road reconstruction projects across the City. The City's Stormwater Management Plan lists over 500 LIDs that can be implemented on City property throughout the Thunder Bay, many that can be incorporated with roadway renewal projects.



Example of Low Impact Development measures on the west side of Memorial Avenue at High Street

Photo credit: City of Thunder Bay

ACTIONS

A38. Continue to implement the actions identified in the Stormwater Management Plan, EarthCare Thunder Bay Sustainability Plan and Thunder Bay Climate Adaptation Strategy to reduce the impacts of transportation on climate change and adapt to climate change through implementation of green infrastructure as part of reconstruction and capital renewal projects.

5.3 Implementation

Transportation infrastructure and operations accounts for a significant portion of the City's annual expenditures. The 2018 capital budget includes $15.3 million of roads and roads-related infrastructure projects, primarily to rehabilitate the existing transportation system. Given the significant level of investment required to build, operate and maintain the transportation system, and the limited financial resources available to the City, the TMP needs to be practical and sustainable.

In addition to the cost to build new infrastructure, the annual costs to operate and maintain infrastructure is a major financial burden on the City. Operations and maintenance costs include repair, resurfacing, street sweeping and winter control (snow removal, sanding, etc.). Expanded road infrastructure also means increased stormwater management needs and associated annual costs.

Action Areas

5.3.1 Phasing and Costs

TMP provides a long-term view of the transportation program for the next 20 years and beyond. With the limited funding in the City's capital and operating budget, the affordability of the Plan for the City of Thunder Bay is a critical consideration. The City will need to prioritize funding among competing demands to meet existing needs and maximize benefit to the transportation system and its users.

The initiation of projects may rely on funding partners such as the Ministry of Transportation for construction of the Northwest Arterial coordinated with the expansion of the Thunder Bay Expressway or private developers for extensions of collector roads as subdivisions develop.

The TMP infrastructure projects have been prioritized into the following groupings:

- **Priority Projects –** projects that have the highest priority within the planning horizon of the TMP
- **Funding Partner Projects –** projects that rely on funding and/or development partners for implementation
- **Proposed Projects –** projects that should be implemented as funding allows or as opportunities arise

The estimated costs for the City to construct full build-out of the infrastructure recommended in the TMP is $127.1 million, including $55.3 million for roads, $58.0 million for cycling and trail facilities and $13.8 million for sidewalks. The cost estimates assume anticipated contributions from private development (for a share of roads built in new development areas).

Exhibit 5.1 shows the estimated cost by phase. A detailed table of phasing and cost for the road infrastructure projects is provided in Appendix A.

Exhibit 5.1: Estimated Capital Costs by Phase

	Priority Projects	Funding Partner Projects	Proposed Projects	Ultimate Network
Road Network	$8,940,000	$30,589,000[a]	$15,732,000	$55,261,000
Cycling and Trails Network	$14,083,000	-	$43,915,000[b]	$57,998,000[b]
Sidewalk Expansion	$5,000,000	-	$8,880,000	$13,880,000
Total	$28,023,000	$30,589,000	$68,527,000	$127,139,000

a. Includes Northwest Arterial Road

b. Does not include Conceptual Future Network

The timing of infrastructure investments will be refined through the City's annual capital and operating budget process. The budget process will consider current transportation issues, development-driven needs, on-going asset management and funding.

The City's single largest investment will be the Northwest Arterial. The need and timing of the Northwest Arterial is tied to the Ministry of Transportation's plan for the Thunder Bay Expressway. The twinning of the Thunder Bay Expressway and replacement of existing at-grade intersections with interchanges and flyovers will require supporting changes to the City arterial road network. The construction of Northwest Arterial will need to be coordinated with the work undertaken by the Ministry to maintain access to the highway and to provide an alternate route across the highway during construction of the flyovers at Oliver Road and John Street. It is expected that other levels of government will contribute to funding for this major infrastructure project.

5.3.2 Life Cycle Costs

Transportation infrastructure requires on-going operational maintenance to maximize the expected useful life and performance of the asset. These costs over the life cycle of an asset are a significant annual investment for the City of Thunder Bay.

Annual operational maintenance costs for transportation infrastructure include road maintenance, roadside maintenance, sidewalk maintenance, summer ditching and drainage maintenance, winter control, and street lighting maintenance. The average annual operational maintenance cost for 1 km of a 2-lane paved road with sidewalks on both side is $18,000 per km, not including the cost to maintain storm sewers.

Exhibit 5.2 presents the incremental annual operating and maintenance costs for the proposed road, cycling and trail, and sidewalk expansion network. As the transportation networks will be built over time, the initial annual costs will be less, but increase yearly as more projects are completed and need to be maintained.

With relatively few new or widened roads identified as priority road projects, there is a small increase in operational maintenance of up to $7,000 per year. It should be noted that although some road projects may be constructed with funding partners (i.e. developers, provincial grants, etc.) these roads become the responsibility of the City to operate and maintain. For example, the Northwest Arterial will account for over a quarter of the total incremental operational maintenance cost of the Ultimate Road Network.

On-street cycling facilities are primarily accommodated within existing roadway space have a small impact to operational maintenance cost. Roads with on-street cycling should be prioritized for street cleaning and bike lane pavement markings should be re-painted when they have faded, preferably annually. These costs are included in the above.

Due to the width of multi-use paths, winter maintenance of paths are approximately double that of a sidewalk. This is a significant component of the operational maintenance costs of the cycling and trails network.

For the sidewalk network, the incremental maintenance cost assumes that 12.5 km of sidewalk gaps will be completed as priority projects, infilling gaps on the pedestrian priority and greenway networks and providing sidewalk connections to transit stops.

Exhibit 5.2: Estimated Incremental Annual Operational Maintenance Costs

	Priority Projects	**Funding Partner Projects**	**Proposed Projects**	**Build-Out of the Plan** (Ultimate Network)
	Annual	**Annual**	**Annual**	**Annual**
Road component	Up to $7,000	Up to $168,000	Up to $85,000	$260,000
Cycling and Trails component	Up to $81,000	Up to $74,000	Up to $431,000	$586,000
Sidewalk component	Up to $39,000	Up to $38,000	Up to $68,000	$146,000
Total	Up to $127,000	Up to $281,000	Up to $584,000	$992,000

Note: Does not include conditions assessment program (pavement inspections, bridge inspections, etc.)

ACTIONS

A39. Continue to plan infrastructure investments recognizing operational maintenance and life cycle costs.

5.3.3 Funding Sources

Funding infrastructure, services and programs in Thunder Bay is a continual challenge. Internal funding sources for the City's road and transit capital program include property taxes and fare box revenue. In addition to capital costs, the City also funds road and structure rehabilitation projects, road operating and maintenance costs, and transit operating costs.

External funding sources for the City's road and transit capital program include provincial and federal grants and transfers. The Province of Ontario distributes to municipalities a portion of its provincial gas tax revenue to support public transit investments. Provincial gas tax revenue remains one of the few stable, predictable sources of government funding for transit. The federal government administers a similar federal gas tax to fund environmentally sustainable infrastructure projects.

The involvement of other levels of government is crucial in the funding of transportation infrastructure and transit in Thunder Bay. As noted in Section 5.3.1, the City's annual capital and operating budget process will refine timing of infrastructure projects based on needs and funding.

ACTIONS

A40. Work with Provincial and Federal governments to maximize funding opportunities for financing transportation infrastructure and services.

5.4 Monitoring the Plan

The TMP is a living document that needs to be reviewed and updated on a regular basis to reflect changing transportation needs in Thunder Bay. To assess the progress and effectiveness of the TMP, a process to monitor change in travel behaviour, modal choice, and performance is necessary.

The objectives of the monitoring plan will be to guide implementation of the TMP and future updates of the TMP by determining:

- what projects have been completed;
- where and how has the City grown; and
- how has the TMP influenced how people travel around the City;

Monitoring of indicators may be done annually, timed with Census updates, or as local projects are completed. All performance indicators should be reviewed as part of all future comprehensive TMP reviews and updates.

5.4.1 Indicators

The monitoring plan will rely on the City's current data collection and reporting programs, supplemented by targeted surveys and data collection activities. Reporting will be undertaken on an annual to 5-year schedule driven by available data, data collection programs and resources.

The City's available data collection and reporting programs include the Capital Program (annual), asset management study, pavement network inspections (every 5 years), transit ridership counts (annual), intersection traffic counts (every 3 years), and Census (every 5 years). Supplemental surveys to support the monitoring program could include: user surveys (which could be incorporated with other City surveys), pedestrian and cyclist counts at key facilities, and origin-destination travel survey.

Exhibit 5.3 presents potential indicators for the City that rely on data that is relatively easy to obtain or readily available.

A travel survey would provide more detailed information regarding the travel characteristics of Thunder Bay residents such as travel purpose, start and end locations, time of travel, duration of trip, modes used and frequency of trip-making. To date, the City does not have a travel survey program to collect detailed travel data. The traditional method of collecting travel data (i.e. household telephone survey) requires a significant financial investment and have become less reliable with the widespread use of personal mobile phones. Other jurisdictions in Ontario are currently developing and testing smartphone-based travel diary tools to collect origin-destination travel data. In the near future, the City may be able to apply a smartphone app to collect travel habits of a sample of Thunder Bay residents at a relatively low cost.

ACTIONS

A41. Priority Action: Data Collection

Support data collection initiatives that assist in the regular monitoring of the Transportation Master Plan, including traffic counts, transit ridership counts, new cyclist and pedestrian counts and origin-destination travel survey.

Exhibit 5.3: TMP Monitoring Indicators

Indicator	Data source	Schedule
Road		
Percent complete of road network	Capital Program	Annual
Reduction in number and severity of collisions	TB Police collision reports	Annual
Intersection level of service	Traffic count program and analysis	Every 3 years
Transit		
TB Transit ridership	TB Transit counts	Annual
TB Transit service hours	TB Transit	Annual
TB Transit service coverage (percentage of residents within 400 m of transit stop)	TB Transit	Annual
Number (or %) of accessible bus stops	TB Transit inventory	Annual
Cycle		
Reduction in collisions involving cyclists	TB Police collision reports	Annual
Percent complete of AT network	Capital Program	Annual
Increase in cycling network usage	Cycling traffic counts at 10 indicative locations	Annual
Walk		
Reduction in collisions involving pedestrians	TB Police collision reports	Annual
Number of accessible intersections	Public works inventory	Annual
Reduction in sidewalk gaps	Capital Program	Annual
All Users		
Commuting mode share	Census Place of Work data	Every 5 years
Commuting distance	Census Place of Work data	Every 5 years
Mode share for non-commuting trips	Future travel data collection/survey	Every 5 years
Mode share for short trips (<2, <5 km) – e.g. increase walking and cycling for short trips	Future travel data collection/survey	Every 5 years
Mode share by trip purpose – e.g. increase walking and cycling for school trips	Future travel data collection/survey	Every 5 years

5.4.2 Mode Share Targets

The availability of comfortable and accessible infrastructure, as well as social and economic perceptions, determine how residents choose to travel in Thunder Bay.

The TMP aims to encourage and support alternative and sustainable modes of transportation that rely less on private vehicles and more on active, healthy, and environmentally-friendly options. The increase in the use of transit and active modes is a measure of how well the TMP is supporting and encouraging the shift in travel choices.

At this time, the City does not have the data to measure mode share for all trips and must rely on Census Journey to Work data to provide an indication of mode share based on the "main mode of commuting" that is collected in the Census. This measure of mode share excludes travel to school as well as discretionary trips (for shopping, for medical appointments, for entertainment, etc.). The Census is still the best available source of travel mode data for Thunder Bay.

With the investments identified in the TMP, the target for 2038 is to at least double the share of commute trips made by more sustainable modes (transit, cycling, walking and carpooling) as summarized in Exhibit 5.4. Although the Census provides mode share for commute trips only, it is assumed that changes in how people travel to work would reflect changes in how people travel for other purposes.

Another aspect of active trips that are not easily measured are recreational trips where the destination is the same as the origin (going out for a walk or a ride, walking the dog, etc.). These types of trips also benefit from improved active transportation infrastructure even if the trip does not serve a "transportation" purpose.

As noted in Section 5.4.1, non-traditional methods of collecting comprehensive travel survey data through smartphone apps are being explored by other jurisdictions in Ontario. The City of Thunder Bay could take advantage of these smartphone apps to collect travel data from a sample of Thunder Bay residents at a relatively low cost. A new base line of travel mode share data could be collected to better identify mode share targets that reflect trips for all purposes and times of day.

Exhibit 5.4: Commuting Mode Share Trends and Target

Main Mode of Commuting	2006 Census	2016 Census	2038 Target
Car, truck, van – driver	79%	82%	67%
Car, truck, van – passenger	9%	6%	12%
Car, truck, van – driver + passenger	88%	88%	79%
Public transit	3%	4%	8%
Active transport (walking and cycling)	8%	6%	12%
Other method	1%	1%	1%

5.4.3 TMP Updates

The TMP should be reviewed and updated regularly to account for development trends, infrastructure improvements and new concepts or technologies that influence the transportation system. The performance of the TMP in achieving the transportation vision can also be reviewed, and necessary adjustments in strategy made.

The Municipal Class Environmental Assessment process recommends a review every five years to determine the need for a detailed formal review and/or update.

ACTIONS

A42. Undertake regular reviews of the Transportation Master Plan to determine the need for a detailed formal review and/or update.

Action Summary

ID	ACTION
Creating Streets for Everyone	
A1 	**CORNERSTONE ACTION: Complete Streets Policy** Adopt and implement a Complete Streets approach to transportation planning and infrastructure design that considers the needs of all users.
A2	**PRIORITY ACTION: James Street Road Diet** Reallocate road right-of-way along James Street from Victoria Street to Edward Street-Golf Links Road to accommodate on-street bike lanes.
A3	Reallocate road right-of-way on Oliver Road-John Street from Balmoral Street to Court Street to accommodate on-street bike lanes.
A4	Red River Road North Core Pilot Project – implement a pilot project using temporary measures (bollards, planters, ramps, seasonal sidewalk extensions, etc.) to expand space allocated for pedestrians and patrons of the businesses along Red River Road from Court Street to Cumberland Street.
A5	Reallocate road right-of-way on Red River Road from east of Algonquin Avenue to Court Street to accommodate expanded pedestrian areas and public realm improvements.
A6	**PRIORITY ACTION: Multimodal Level of Service** Adopt a Multimodal Level of Service approach in evaluating transportation network performance for all road users for Traffic Impact Studies and other transportation analysis.
A7	Monitor existing and emerging mobility service options to protect the interests of Thunder Bay residents and leverage new opportunities to manage the City's transportation system.
A8	Develop a CAV policy to ensure the arrival of CAVs contribute to positive outcomes for Thunder Bay.
A9	Develop an Electric Vehicle Strategy for the City, in cooperation with industry, including consideration of potential partnership and funding opportunities from provincial programs or other agencies.

Action Summary (continued)

ID	ACTION
Safer Streets	
A10	**CORNERSTONE ACTION: Road Safety Action Plan** Expand the scope of the City's Traffic Safety Committee to oversee the development and implementation of a Road Safety Action Plan.
A11	**PRIORITY ACTION: Traffic Calming Process** Adopt a traffic calming process that will provide the City with a consistent and transparent approach to addressing traffic calming requests.
Transportation Demand Management	
A12	**PRIORITY ACTION: School Travel Planning** Provide municipal support to pilot school travel planning processes through collaborative effort with stakeholders. [Action ECY-1 in the Active Transportation Plan]
A13	Raise awareness of active transportation through broad-reaching community events. [Action BCC-1 in the Active Transportation Plan]
A14	Take on a City ambassador role to demonstrate leadership in active transportation initiatives. [Action BCC-4 in the Active Transportation Plan]
A15	Prioritize education and engagement programs to maximize benefit to the City and increase active mode share. [Action BCC-5 in the Active Transportation Plan]
A16	Continue implementing actions and recommendations of the City's Transportation Demand Management Plan.
Road Network	
A17	**CORNERSTONE: Ultimate Road Network** Plan for the proposed road network, protecting future corridors as required for implementation with corresponding development.
A18	**PRIORITY ACTION: Upgrade Signal Communication System** Develop a migration strategy for implementing a new signal communication system that considers the City's budget and resource limitations.
A19	Update and coordinate signal timings on Harbour Expressway between Balmoral Street and Fort William Road to improve traffic flow and reduce travel times.
A20	Adopt a policy to consider a roundabout when a new intersection is planned or an existing intersection is being reconstructed or upgraded.

Action Summary (continued)

ID	ACTION
A21	Consider opportunities to implement a roundabout at the following locations: ❍ Victoria Street and Ford Street ❍ Edward Street and Redwood Avenue ❍ Lyon Boulevard West and Algoma Street ❍ Mapleward Road and John Street Road
A22	Develop and execute a public information campaign to educate drivers, cyclists, and pedestrians on how to safely use a roundabout.
A23	Work with Ministry of Transportation, Provincial Police and Thunder Bay Police to implement and enforce a preferred truck route network through Thunder Bay.
A24	Simplify the heavy load restriction by-law to improve driver understanding and enforcement.
Active Transportation Network	
A25 	**CORNERSTONE: Pedestrian Priority and Trail Network** Complete the network of priority corridors and neighbourhood greenways to provide pedestrians with comfortable, accessible routes connecting to services and opportunities.
A26	**PRIORITY ACTION: Sidewalk Gaps** Systematically address sidewalk gaps along pedestrian priority corridors, transit routes and neighbourhood greenways.
A27	**PRIORITY ACTION: Pedestrian Crossings** Explore the addition of formal pedestrian crossings along pedestrian priority corridors and neighbourhood greenways, with the intent to add one to two crossing locations annually.
A28 	**CORNERSTONE: Ultimate Cycling Network** Adopt and implement the Ultimate Cycling Network as the long-term goal for trail and cycling facilities across the City. [Action CGC-2 in the Active Transportation Plan]
A29	**PRIORITY ACTION: Fort-to-Port Express Route** Adopt and implement the Fort-to-Port express route in the short-term and pursue the longer-term vision of the ultimate north-south route as roads are reconstructed. [Action CGC-3 in the Active Transportation Plan]
A30	**PRIORITY ACTION: Priority Cycling and Trail Network** Adopt and implement the Priority Cycling Network

Action Summary (continued)

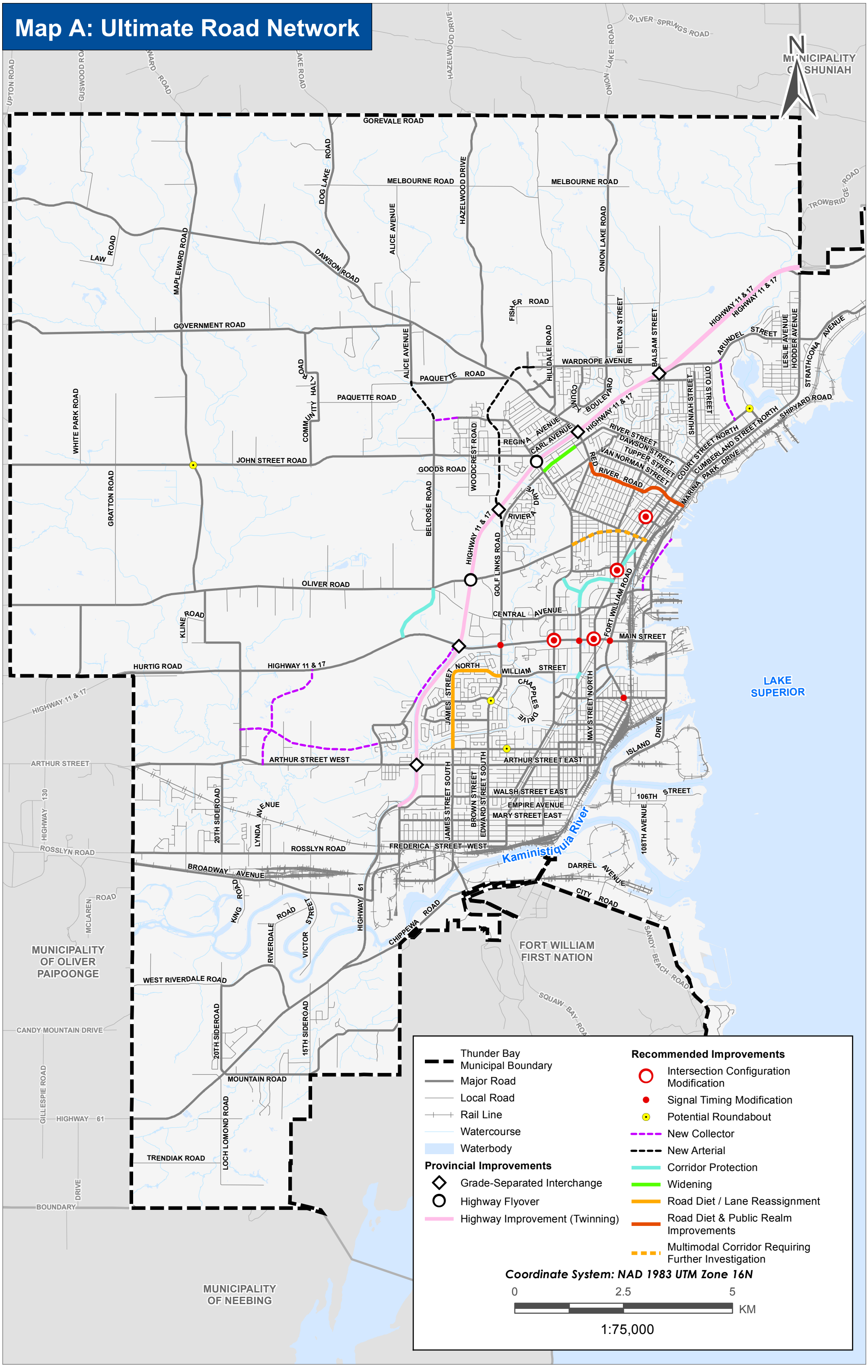
ID	ACTION
Transit	
A31	**PRIORITY ACTION: Route Rationalization** Implement route and stop modification, schedules and service plans as identified by the Transit Route Rationalization Study.
A32	Enable live GPS monitoring of all buses for third party apps
A33	**PRIORITY ACTION: Demand-Responsive Transit Service** Initiate and fund a pilot project with a transportation service company to provide demand-responsive transit service in low-density areas of Thunder Bay where current fixed-route services are performing poorly and/or where transit service is not yet provided.
A34	**PRIORITY ACTION: Electronic Fare Collection System** Implement system-wide electronic fare collection.
Aligning Land Use	
A35	Incorporate mobility and access for all users in Secondary Plan, Development Plan and site plan review processes (e.g. pedestrian routing, cycling access, transit access, etc.).
A36	Update Transportation Impact Study Guidelines to consider level of service requirements for all users.
A37	Review transportation projects and programs to ensure the design supports the City's desired urban structure and minimizes impacts on the natural environment.
Building Resilience	
A37	Continue to implement the actions identified in the Stormwater Management Plan, EarthCare Thunder Bay Sustainability Plan and Thunder Bay Climate Adaptation Strategy to reduce the impacts of transportation on climate change and adapt to climate change through implementation of green infrastructure as part of reconstruction and capital renewal projects.
Implementation	
A39	Continue to plan infrastructure investments recognizing operational maintenance and life cycle costs.
A40	Work with provincial and federal governments to maximize funding opportunities for financing transportation infrastructure and services.
Monitoring the Plan	
A41	**PRIORITY ACTION: Data Collection** Support data collection initiatives that assist in the regular monitoring of the Transportation Master Plan, including traffic counts, transit ridership counts, new cyclist and pedestrian counts and origin-destination travel survey.
A42	Undertake regular reviews of the Transportation Master Plan to determine the need for a detailed formal review and/or update.

Glossary

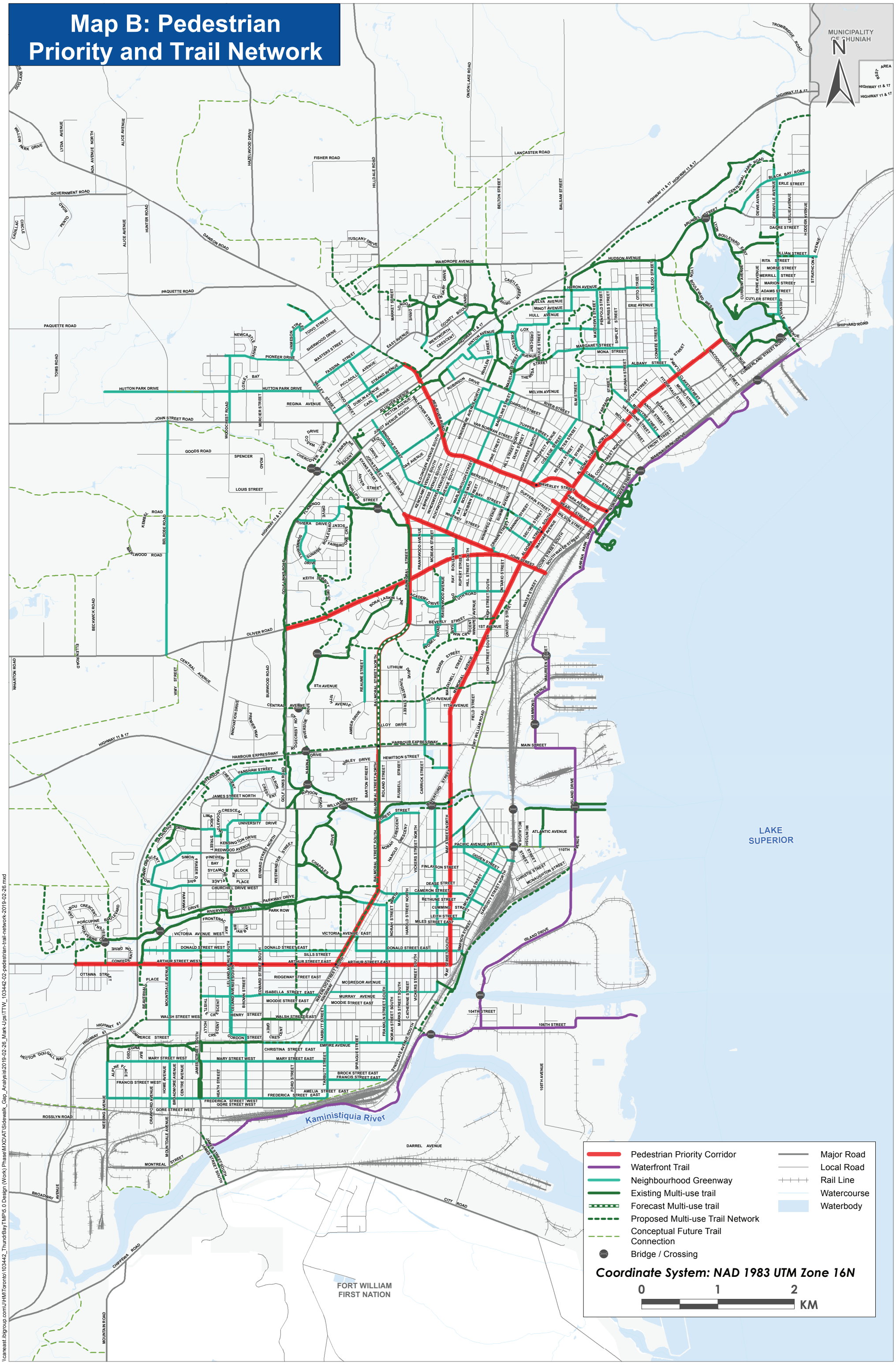
AODA	Accessibility for Ontarians with Disabilities Act
AT	Active Transportation
CAV	Connected and Autonomous Vehicles
EA	Environmental Assessment
LID	Low Impact Development
LOS	Level of Service
MaaS	Mobility as a Service
MMLOS	Multimodal Level of Service
OP	Official Plan
TDM	Transportation Demand Management

MAPS

Map A: Ultimate Road Network



Map B: Pedestrian Priority and Trail Network


MUNICIPALITY OF THUNDER BAY
N
AREA
HIGHWAY 11 & 17
HIGHWAY 11 & 17
TROWBRIDGE ROAD
ONION LAKE ROAD
LANCASTER ROAD
FISHER ROAD
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BALSAM STREET
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HIGHWAY 11 & 17
CENTENNIAL PARK ROAD
BLACK BAY ROAD
ERLE STREET
DEWE AVENUE
GRENVILLE AVENUE
LESLIE AVENUE
HODDER AVENUE
DAGRE STREET
LILLIAN STREET
RITA STREET
MORSE STREET
MERRILL STREET
MARION STREET
ADAMS STREET
CUYLER STREET
STRATHCONA AVENUE
ARUNDEL STREET
LYON BOULEVARD EAST
HUDSON AVENUE
HURON AVENUE
WARDROPE AVENUE
CASTLEGREEN DRIVE
GLEN GARY DRIVE
COUNTY BOULEVARD
WENTWORTH CRESCENT
MARKET STREET
LONDON DRIVE
EAST AVENUE
HIGHWAY 11 & 17
KINTON AVENUE
WHALEN STREET
DELVA AVENUE
MINOT AVENUE
HULL AVENUE
ERIE AVENUE
COX CRESCENT
BRUCE STREET
MADELINE STREET
THESSA AVENUE
MARGARET STREET
MONA STREET
ALBANY STREET
OTTO STREET
TOLEDO STREET
COMMEE STREET
MATTHEWS STREET
PENFOLD STREET
BURRISS STREET
SHIPLEY STREET
MOXAM BOULEVARD WEST
CURRENT AVENUE
DEWE AVENUE
GREENVILLE AVENUE
SHIPYARD ROAD
CUMBERLAND STREET NORTH
MACDOUGALL STREET
ARTHUR STREET
JAMESON STREET
TOYO STREET
SHERWOOD DRIVE
MASTERS STREET
FASSINA STREET
PICCADILLY AVENUE
STRAND AVENUE
DUBLIN AVENUE
CARL AVENUE
TOKIO STREET
PIONEER DRIVE
NEWCASTLE DRIVE
LOXLEY BAY
HUTTON PARK DRIVE
REGINA AVENUE
WALLEY STREET
TOMS ROAD
PAQUETTE ROAD
DAWSON ROAD
HUNTER ROAD
ALICE AVENUE
ADA AVENUE NORTH
LYDIA AVENUE
WILLOW PARK DRIVE
CADILLAC CIRCLE
PINTO ROAD
GOVERNMENT ROAD
DOG LAKE ROAD
JOHN STREET ROAD
WOODCREST ROAD
MERCIER STREET
GOODS ROAD
SPENCER ROAD
LOUIS STREET
CHERCOVER DRIVE
FAIRBAIRN CRESCENT
SEQUOIA DRIVE
JUNIPER DRIVE
WINDSOR STREET
EVANS STREET
AVTEN STREET
BULLIS STREET
OAK AVENUE
ALGONQUIN AVENUE SOUTH
WINDERMERE AVENUE SOUTH
ROCKWOOD AVENUE SOUTH
KENOGAMI AVENUE SOUTH
EMPRESS AVENUE SOUTH
MARLBOROUGH STREET
BERESFORD STREET
WAVERLEY STREET
PARK AVENUE
PEARL STREET
WILSON STREET
DUFFERIN STREET
MCKENZIE STREET
BAY STREET
WHITNEY AVENUE
WINNIPEG AVENUE
SUMMIT AVENUE
DANNING STREET
CROWN STREET
SECORD STREET SOUTH
MACNAB AVENUE
ALGOMA STREET SOUTH
COURT STREET SOUTH
SOUTH WATER STREET
WATER STREET
ONTARIO STREET
HIGH STREET SOUTH
HILL STREET SOUTH
RUPERT STREET
RAY BOULEVARD
FRANKWOOD AVENUE
MCBEAN STREET
BALMORAL STREET
ACADEMY DRIVE
RAVENWOOD AVENUE
SOUTH ROAD
BEVERLY STREET
1ST AVENUE
MARINA PARK DRIVE
FRONT STREET
CAMELOT STREET
ALGOMA STREET NORTH
REGENT STREET
JEAN STREET
PETER STREET
COLLEGE STREET
PROSPECT AVENUE
HIGH STREET NORTH
DUKES STREET
HILL STREET NORTH
PINE STREET
MADELINE STREET
DAWSON STREET
RIVER STREET
VAN NORMAN STREET
TUPPER STREET
WINDERMERE AVENUE NORTH
ALGONQUIN AVENUE NORTH
OAK AVENUE
RED RIVER ROAD
WALLOVER STREET
PRETON AVENUE SOUTH
JUNOT AVENUE SOUTH
PRETON AVENUE
BUTLER AVENUE
ELM STREET
FAIRBAIRN STREET
SHUNIAH STREET
MELVIN AVENUE
ROBINSON DRIVE
THE CRESCENT
PRINCE ARTHUR'S LANDING
MUNRO STREET
FITZGERALD STREET
GLADSTONE STREET
WOLSELEY STREET
VANHORNE STREET
MCINTYRE STREET
ANGUS STREET
EBAN STREET
FRONT STREET
MARINA PARK DRIVE
ISLAND DRIVE
LAKE SUPERIOR
HIGHWAY 11 & 17
HARBOUR EXPRESSWAY
HARBOUR EXPRESSWAY
MAIN STREET
FORT WILLIAM ROAD
HAMMOND AVENUE
MAUREEN STREET
TUNNEL DRIVE
LITHIUM DRIVE
8TH AVENUE
10TH AVENUE
11TH AVENUE
FIELD STREET
MACDONELL STREET
MEMORIAL AVENUE
SOUTH AVENUE
SOUTH ROAD
SOUTH AVENUE
SOUTH AVENUE
SOUTH AVENUE

Map C: Ultimate Cycling Network

Cycling network in growth areas TBD as area develops

MUNICIPALITY OF CHURCHILL

LAKE SUPERIOR

FORT WILLIAM FIRST NATION

Boulevard Lake

Existing Cycling Network
- Signed route
- Bike lane
- Buffered bike lane
- Cycle track
- Multi-use trail
- Shoulder Bikeway

Forecast Cycling Network
- Sharrows or Signed Route
- Bike lane
- Buffered Bike Lane
- Multi-use trail
- Shoulder Bikeway

Proposed Cycling Network
- Signed route
- Bike lane
- Buffered or protected bike lane
- Cycle track
- Multi-use trail
- Shoulder Bikeway
- Future Cycling Network
- Conceptual Future Multi-use Trail

- Waterfront Trail
- Intersection Improvement
- Bridge / Crossing
- Potential Cycling Park & Ride Sites
- Major Road
- Local Road
- BIA
- Park
- Growth Area

0 1 2 KM

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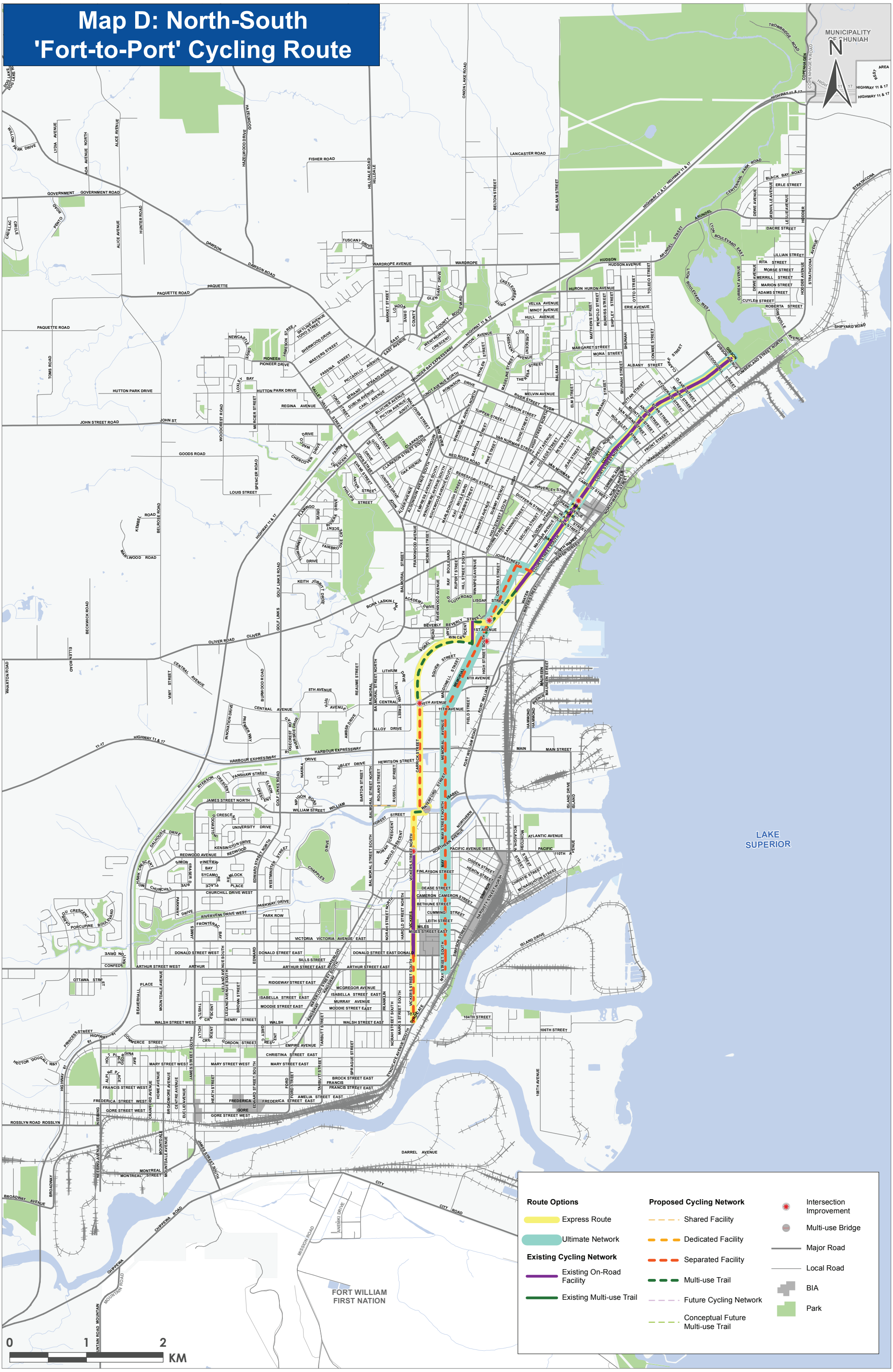
Map D: North-South 'Fort-to-Port' Cycling Route



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APPENDIX

Appendix A: Recommended Road Network Projects

Proj. No.	Corridor	Limits	Type	Description	Phasing	Capital Cost (City share)	Incremental Operations & Maintenance Cost	Comments	Project Schedule (Municipal Class EA)
1	Thunder Bay Expy	Neebing Ave to Balsam St	Capacity improvement	Thunder Bay Expressway twinning (MTO)	MTO	(MTO project)	$ -	To be constructed by MTO - Includes interchanges and flyovers.	Group B (Provincial Class EA) (Completed)
2	Junot Ave	John St to Walkover St	Capacity improvement	Widen to 4 lanes	Priority	$ 3,700,000.00	$ 9,800.00	Expected in 2019.	Schedule C (Completed)
3	Northwest Arterial	Golf Links Rd to Dawson Rd	New road	Build new 4-lane arterial road	Funding Partner	$ 17,997,000.00	$ 108,400.00	Timing depends on Thunder bay Expressway twinning by MTO	Schedule C
4	Wardrope Ave	Wardrope Ave to Dawson Rd	New road	Wardrope Extension to Northwest Arterial	Funding Partner	$ 630,000.00	$ 16,900.00	Timing depends on Northwest Arterial and on development of surrounding area.	Schedule C
5	New corridor (Parkdale Second Access)	Weiler Blvd to Harbour Expy/Thunder Bay Expy future interchange	New road	Build new 2-lane collector road	Proposed	$ 6,069,000.00	$ 21,400.00	Requirement dependent on outcome of EA.	Schedule C
6	Porcupine Blvd (Parkdale E-W Collector)	Parkdale Blvd to Mapleward Rd	New road	Build new 2-lane collector road	Funding Partner	$ 2,682,000.00	$ 70,800.00	Timing depends on development of surrounding area.	Schedule C
7	New corridor (Parkdale N-S collector)	Arthur St to Highway 11/17	New road	Build new 2-lane collector road	Funding Partner	$ 2,178,000.00	$ 50,000.00	Timing depends on development of surrounding area.	Schedule C
8	New corridor (LPH Collector)	Algoma St to Arundel St	New road	Build new 2-lane collector road	Funding Partner	$ 1,116,000.00	$ 25,400.00	Timing depends on development of surrounding area.	Schedule C
9	Sleeping Giant Pkwy	Pearl St to Central Ave	New road	Build new 2-lane collector road	Proposed	$ 5,653,000.00	$ 32,100.00	Timing depends on development of Phase II of Waterfront Master Plan	Schedule C
10	Pioneer Dr	Sunflower St to Belrose Rd/Alice Ave	New road	Build new 2-lane collector road	Funding Partner	$ 480,000.00	$ 10,100.00	Timing depends on development of surrounding area.	Schedule B (C if wetlands impacted)
11	Belrose Road/Alice Ave	John Street Road to Paquette Road	New road	Build new 2-lane rural arterial road	Proposed (and Funding Partner)	$ 665,000.00	$ 22,600.00		Schedule C

Appendix A: Recommended Road Network Projects

Proj. No.	Corridor	Limits	Type	Description	Phasing	Capital Cost (City share)	Incremental Operations & Maintenance Cost	Comments	Project Schedule (Municipal Class EA)
12	Belrose Road	Oliver Road to Highway 11/17	New road	Build new 2-lane rural arterial road	Proposed (and Funding Partner)	$ 525,000.00	$ 17,900.00		Schedule C
13	James Street	Victoria Ave to Edward St/Golf Links Rd	Road diet	Road diet from 4 to 3 lanes for Active Transportation	Priority	$ 365,000.00	$ 700.00		Schedule A+
14	Oliver Rd/John St	Balmoral Street to Court Street	Road diet	Road diet from 4 to 3 lanes for Active Transportation	Proposed	$ 221,000.00	$ 400.00		Schedule A+
15	Red River Road	Algonquin Ave to Court St	Road diet/ public realm	Pedestrian/public realm improvements/potential road diet for expanded sidewalks/trees	Funding Partner	$ 4,404,000.00	$ (4,200.00)	Cost does not include furnuture or public art. Does not include reconstruction or repaving of existing lanes.	Schedule C
16	Red River Road	Court St to Cumberland St	Road diet/ public realm	Pedestrian/public realm improvements	Funding Partner	$ 1,101,000.00	$ 3,400.00	Cost does not include furnuture or public art. Does not include reconstruction or repaving of existing lanes.	Schedule A+
17	Algoma St	at Bay St	Intersection modification/ public realm	Reconfigure southbound approach to a dedicated right turn lane and dedicated through lane, convert Bay Street between Algoma and Court to one-way (westbound)	Priority	$ 250,000.00	$ 600.00	Assume reconstruction of one-lane to widen public realm on new one-way segment of Bay St.	Schedule A+
18	Harbour Expressway	at Balmoral St	Intersection modification	Add dual left turn lanes in all directions		$ -	$ -	Included in Balmoral reconstruction project.	Schedule B (Completed - Balmoral Reconstruction EA)
19	Harbour Expressway	at Memorial Ave	Intersection modification	Add northbound right turn lane	Priority	$ 200,000.00	$ -		Schedule A+

Appendix A: Recommended Road Network Projects

Proj. No.	Corridor	Limits	Type	Description	Phasing	Capital Cost (City share)	Incremental Operations & Maintenance Cost	Comments	Project Schedule (Municipal Class EA)
20	John St Rd	at Mapleward Rd	Intersection modification	Retrofit to roundabout	Proposed	$ 800,000.00	$ -		Schedule A+ (C if wetlands impacted)
21	Edward St	at Redwood Ave	Intersection modification	Retrofit to roundabout	Proposed	$ 800,000.00	$ -		Schedule A+
22	Algoma St	at Lyon Blvd/Gibson St	Intersection modification	Retrofit to roundabout	Proposed	$ 500,000.00	$ -		Schedule A+
23	Victoria Ave	at Ford Street	Intersection modification	Retrofit to roundabout	Proposed	$ 500,000.00	$ -		Schedule A+
24	Arthur St	at Ford Street	Intersection modification	Add pedestrian half signal (with cross-ride) across Arthur for Ford St AT	Priority	$ 225,000.00	$ -		Schedule A
25	Memorial Ave	at High St	Intersection modification	Signal timing update (no capital cost), potential ramp closure	Priority	$ 200,000.00	$ -		n/a
26	Upgrade Signal Communication System				Priority	$ 4,000,000.00	$ -		n/a
27	Harbour Expressway	Golf Links Rd to Fort William Rd	Intersection modification	Signal timing update (no capital cost)	Priority	$ -	$ -		n/a
28	Pacific Avenue	at Simpson St/McKenzie St	Intersection modification	Signal timing update (no capital cost)	Priority	$ -	$ -		n/a