Ottawa Cycling Plan

November 2013

Building a Liveable Ottawa 2031

Stage / Étape 2

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Executive Summary

The 2013 *Ottawa Cycling Plan* (OCP2013) is a long-term strategy to strengthen and support cycling in the city. It is an update of the 2008 *Ottawa Cycling Plan* (OCP2008), and reflects the evolution of cycling in Ottawa over the past five years. It has been developed as part of the Building a Liveable Ottawa process, which also led to updates of the City's *Official Plan*, *Transportation Master Plan*, *Ottawa Pedestrian Plan* and *Infrastructure Master Plan*.

The OCP2013 provides an overarching vision for cycling in Ottawa, sets key objectives, identifies a comprehensive cycling network and supportive operational activities, and recommends policies to guide cycling facility planning, design, implementation and maintenance. Its goal is to create an "ecosystem" of policies, facilities and programs that will make cycling an attractive everyday mobility option for a range of residents across Ottawa, leading more women, men, children and seniors to use their bikes.

The City of Ottawa has made considerable progress toward becoming a more cycling-friendly city since 2008 (**Chapter 1**), and is the only designated Gold-level Bicycle Friendly Community in Ontario. Cycling's share of morning peak period travel grew by 41% between 2005 and 2011, while the City has boosted its investment in new facilities. The updated OCP2013 Vision (see below) reflects and capitalizes on this momentum; it highlights the need to make the most of cycling's synergies with transit, and emphasizes the goal of serving a wide range of cyclists in urban, suburban and rural areas. Success in achieving this vision will yield a range of health, environmental, social and economic benefits.

OCP2013 Vision

Develop a city-wide, connected network of cycling facilities actively used by all types and ages of cyclists to meet their transportation needs. This network will be supported by policies and programs that establish Ottawa as having one of the best cycling networks in North America, while maximizing the synergy of transit and cycling. Cycling facilities will be selected to complement local land uses and match the needs of all areas of the City.

A variety of data are available to describe the number, timing, location, length and purpose of cycling trips in Ottawa, as well the demographics of cyclists (**Chapter 2**). Among other things, these data reveal rapid progress toward the OCP2008's goal for cycling activity levels. The City has also made significant advancements toward other targets and policies of that plan. These changes in the context for cycling, combined

with new Council priorities and a better understanding of cyclists' needs, have led to the need for an updated plan.

The OCP2013 increases Ottawa's target for city-wide cycling mode share in 2031 (i.e. the proportion of all morning peak period trips made by bicycle) to 8% inside the Greenbelt and 5% city-wide, which is significantly greater than the OCP2008's target of 3% of all morning peak hour trips. It also introduces more specific targets for internal cycling mode shares in different areas of Ottawa (**Chapter 3**). Short journeys present the greatest opportunity to expand the number of cycling trips, especially in the dense Inner Area where about half of all trips are shorter than 4 km. In suburban areas, the City will focus on improving cycling route connections to schools, community centres, employment areas and other local destinations. To track progress toward these mode share targets, the City will work to improve its monitoring of cycling activity. The City also monitors the rate of cycling collisions per trip, which has been decreasing since 2005.

City policies provide an essential framework of support for tangible improvements to cycling facilities and programs (**Chapter 4**). Planning policies, such as those in the *Official Plan* and *Transportation Master Plan*, aim to make built developments, road networks and pathway systems more cycling-friendly in both urban and suburban environments. The City will support better multimodal travel options such as the opportunity to combine transit and cycling to make a single trip, and the availability of bikesharing and carsharing services; the importance of such options is highlighted by the fact that over 60% of cyclists who do not ride during winter switch to other sustainable travel modes such as transit, walking or carpooling. The City will maintain and expand its short-term and long-term bicycle parking facilities, and strengthen its zoning provisions for bicycle parking on private property. It will also seek a more refined approach to managing the use of eBikes on roads and pathways.

To improve the safety, effectiveness and consistency of cycling facilities, the City will update its design guidelines and practices for the varied facilities (e.g. shared lanes, bike lanes, multi-use pathways, and cycle tracks) that are needed to provide an appropriate cycling environment in different contexts. As well, it will work to implement a new performance measure that assesses the quality of cycling facilities, based on the "level of traffic stress" experienced by cyclists.

The OCP2013 identifies the infrastructure that is needed to support its cycling vision (**Chapter 5**). Within the Ultimate Network Concept a number of spine routes, local routes and pathways have been prioritized for implementation by 2031, and have been mapped using the online GeoOttawa tool (see Annex C). The overall network reflects

input from several initiatives including the Downtown Moves study, station area plans for the Confederation Line LRT, and an analysis of key employment and education nodes.

The cycling network implementation plan includes three phases of investment leading to 2031, with a requirement for $70 million in direct funding for Cross-Town Bikeways, Neighbourhood Bikeways, transit-oriented development (TOD) links, employment centre links, missing links and bike parking. In addition, other cycling facility improvements will be funded and implemented through road construction and reconstruction projects, shoulder resurfacing on rural roads (which provides opportunities for paved shoulders), and the construction of new developments or rapid transit projects. An additional $40 million in funding will be dedicated to new cycling/pedestrian bridges and tunnels.

A properly designed, constructed and maintained paved surface is an important feature of cycling infrastructure. The City will prioritize spring and summer sweeping of on-road cycling facilities, consider how design standards can improve facility maintenance, and give more explicit consideration to cycling facilities in its Comprehensive Asset Management program. The OCP2013 also proposes a winter-maintained cycling network, 40 km in length, to be concentrated in the core areas that have the greatest cycling activity levels. Implementation of the winter cycling network will require further consultation and Council approval.

The City will continue to deliver programs that promote cycling and help make it a safer activity (**Chapter 6**). Its multimodal, partnership-based Road Safety Initiative includes several programs related to cycling, such as the Cycling Safety Improvement Program that targets problem locations, and the Cycling Safety Awareness Program that provides bike safety messaging and outreach directed at all road users. The City's current Transportation Demand Management Strategy includes efforts to inform cyclists and promote cycling across the community, in partnership with major employers, universities and colleges. It also supports school travel planning and school-based active transportation education and promotion.

The City of Ottawa relies on partnerships with other governments to achieve the shared goal of a truly cycling-friendly city (**Chapter 7**). It will continue to work with the National Capital Commission and City of Gatineau to improve cycling route connections and continuity, wayfinding, safety, design and promotion. Interprovincial cycling routes, including bridges across the Ottawa River, are a key focus. The City will also work with the Ontario Ministry of Transportation to implement and strengthen the Provincial Cycling Strategy, and to enhance provincial standards and regulations for facility design, pavement markings, signs and signals.

Table of Contents

ANNEXES

List of Exhibits

1.0 Introduction

1.1 Planning Framework

The 2013 Ottawa Cycling Plan (OCP2013) is a long-term strategy to develop, strengthen and support a cycling culture in the city. It is an update to the 2008 Ottawa Cycling Plan (OCP2008) to incorporate new information and reflect the changes in cycling in the city over the past five years. It has been conducted as part of a broader update of the City's Official Plan, Transportation Master Plan, Pedestrian Plan and Infrastructure Master Plan.

The OCP2013 outlines key objectives and is an overarching vision for cycling in Ottawa. It sets forth the basis for further development and implementation of a comprehensive cycling network. It includes policies related to quality cycling facilities, identifying a recommended cycling network, prioritizing facility implementation, reviewing policies for public use and the costs to build and maintain cycling facilities.

The fundamental goal of the OCP2013 is to provide a cycling ecosystem (policies, facilities, encouragement) that makes cycling attractive for all kinds of mobility needs across every part of the city. Cycling can then become an everyday option for a diverse cross-section of residents, resulting in more women, men, children and seniors on their bikes.

The OCP2013 provides a policy and implementation framework in support of the City's Official Plan (in particular, complete communities and transit-oriented development goals)[1] and Transportation Master Plan objectives (in particular, for complete streets[2] as well as sustainable transportation mode shares[3]). This plan also addresses directions to staff included within the "Taking Steps Toward a Cycle Friendly City Motion" passed by Council in 2010,[4] which calls for more aggressive cycling mode share objectives, and suggests additional cycling-supportive policies.

This plan includes a series of recommendations that provide direction to City departments having a role in fulfilling the goals of the OCP2013. All recommendations are highlighted within a green background field, and are consolidated within the List of Recommendations in Annex A.

1.2 Recent Progress

The City of Ottawa has made great strides towards becoming a cycling-friendly city since the approval of the OCP2008. This achievement has been recognized by Share the Road Ontario, which gave Ottawa a Silver award in 2011, followed by a Gold award in 2013. Ottawa is the only city in Ontario that has received this designation.

Exhibit 1.1 – Bicycle Friendly Community Award

Over $28 million will have been invested in cycling facilities over this term of Council, enabling several significant new cycling facilities and enhancements including the O-Train Pathway, rural pathways and the Laurier Avenue segregated bicycle facility to be constructed. Many more projects are in the implementation pipeline, including completion of the 12-km East-West Bikeway.

Residents have responded to the improved cycling environment by using their bikes for more trips of all kinds, resulting in the city-wide cycling mode share growing by 41% between 2005 and 2011 (from 1.7% to 2.4%)[5]. An estimated 16 million cycling trips are made in Ottawa each year (April to November inclusive), complementing the 65 million transit trips[6] taken over the same period. During the winter months, most cyclists (57%[7]) turn to other sustainable modes, such as public transit, carpooling and walking.

There are a number of organizations in Ottawa that are interested or exclusively involved in cycling, most of which are staffed on a volunteer basis. These organizations promote education and training, safety, advocacy and often support City staff efforts in cycling promotion and safety awareness.

1.3 Outline of this Plan

The following exhibit lists the contents of the chapters of this Plan.

Exhibit 1.2 – Chapters of the OCP2013

Chapter	Description
Chapter 1	Provides an overall introduction to the Plan, defines a Cycling Vision, and identifies the key benefits of cycling.
Chapter 2	Provides an overview of recent cycling activity levels and characteristics, updates progress on implementing the 2008 Ottawa Cycling Plan, and summarizes the reasons for this update.
Chapter 3	Sets objectives for cycling in 2031 and discusses monitoring strategies.
Chapter 4	Outlines policies to make Ottawa increasingly cycling-friendly by improving planning, multimodal travel options, cycling facility quality, bicycle parking, and eBike controls.
Chapter 5	Presents the ultimate cycling network concept and its development, explains the approach, processes, phasing and funding for cycling infrastructure implementation, and reviews maintenance and asset management priorities including the creation of a winter network.
Chapter 6	Describes programs to improve cycling safety and promotion.
Chapter 7	Discusses key areas of cooperation between the City of Ottawa and its governmental partners in the National Capital Region.

1.4 Cycling Vision

The OCP2013 is an action plan. It builds on the objectives and achievements of past transportation and cycling plans and emphasizes growth in all forms of sustainable mobility as its goal. It moves forward by being realistic (commensurate with the City's financial affordability envelope), providing a functional, interconnected and safe network that will meet the needs of a wide variety of users and the intensification goals of the City's Official Plan. To succeed in significantly growing the number of trips by bike, cycling facilities must be designed to be comfortable for "interested but concerned" cyclists, who represents 33% of City residents who are potential cyclists.[8]

The initial vision developed for the OCP2008 has been revised in view of the consultation process that led to the OCP2013. The heart of the vision is the same, but the content has been updated to reflect a greater emphasis on multimodal synergies between cycling and transit, as well as acknowledging the need to select appropriate cycling facilities to match the needs of residents in urban, suburban and rural areas.

OCP2013 VISION:

Develop a city-wide, connected network of cycling facilities actively used by all types and ages of cyclists to meet their transportation needs. This network will be supported by policies and programs that establish Ottawa as having one of the best cycling networks in North America, while maximizing the synergy of transit and cycling. Cycling facilities will be selected to complement local land uses and matching the needs of all areas of the City.

Exhibit 1.3 – All Types of Cyclists, Many Trip Purposes

Source: City of Ottawa

1.5 Mobility Needs

1.5.1 Combining Cycling and Transit

Cycling will contribute to the attractiveness of Ottawa's future light rail transit (LRT) and existing bus rapid transit (BRT, or Transitway) systems for customers that have a long walk to a station that might be only a short bike ride away. These residents will be able to take a short bike trip to an LRT station, leave their bikes at a secure parking facility, board the train and walk to their final destination or take advantage of a bike rental system such as Bixi as part of their trip. Customers can also bring their bikes with them on some transit trips using Rack and Roll on buses and bringing their bicycle on trains in accordance with OC Transpo policies.

A short bike ride of 15 minutes or less allows for an expanded capture area for each station, and provides transit users with the benefits of the high-frequency service. This also allows a transit rider the flexibility to add a personal errand at the beginning or end of a trip, such as escorting a child to school or stopping for groceries before dinner. Using a bike, rather than a car, to reach a transit station frees up a family vehicle for other uses, and a park-and-ride spot for other customers.

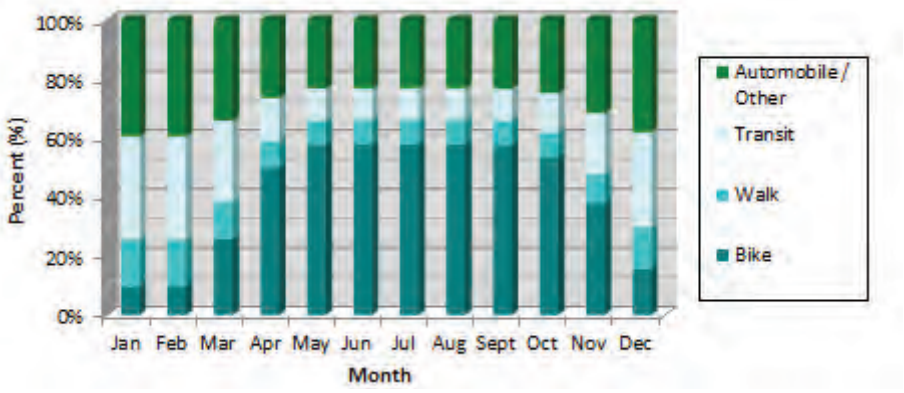
The OCP2013 will focus on building comfortable linkages to transit, establishing secure parking facilities at transit stations, and promoting multimodal travel.

1.5.2 Year-round Mobility Choices

By supporting a strong cycling option during the eight months of the year when Ottawa is largely snow-free, residents can and will make different choices about how they satisfy mobility needs for their families year-round. If residents can cycle for much of the year, they are more likely to choose other options (e.g. transit, walking, carpooling, carsharing) to bridge the winter-months, extending the full-year impacts of cycling well beyond winter cycling as shown in Exhibit 1.4.

A cycling-friendly city will enable many more residents to forgo purchasing a first, second or third car or a year-round parking pass at their place of employment. The impacts of such choices reduce the peak loads on City roads year-round.

Exhibit 1.4 – Ottawa Cyclists' Full-Year Modal Choices



Experience from other cold-weather cities shows that significant winter cycling levels can be supported where winter-maintained facilities exists (with separation from vehicular traffic). The first winter maintained network for Ottawa is identified in Section 5.4.1.

1.5.3 Suburban Mobility

Cycling has a role to play in all parts of the city. For suburbs, local cycling routes along Neighbourhood Bikeways can allow residents to take local trips by bike to the library,

community centre, or shopping. Neighbourhood Bikeways follow quiet on-road routes with pathway connections between meandering suburban road patterns creating a pleasant and relaxed cycling environment. Such trips turn chores by car into a pleasant experience by bike.

Because Ottawa's suburbs have relatively high transit mode shares, cycling can provide many suburban residents with a way to get to the rapid transit stop as well as reducing demand at park-and-ride lots.

Residents can also access numerous recreation trails provided by the City or the National Capital Commission (NCC), and access distant trails and city attractions by using the rack-and-roll option. As new subdivisions are developed, safe and child-friendly cycling links to school will be identified under guidance of the Official Plan.[9]

1.6 Benefits of Cycling

1.6.1 Health Benefits

The return on investment for cycling infrastructure is substantial from a health costs perspective. Research shows that for every investment dollar spent, five dollars are saved in health-related impacts.[10] Ottawa Public Health estimates that the population health impact of a 5% increase in cycling mode share can result in a maximum annual benefit of about $16 million. This dollar value represents lives saved due to improved health benefits from increased cycling rates.[11] Beyond cost savings to the health system, a healthier population will also enjoy a higher quality of life.

Physical Activity, Healthy Weights and Active Transportation

Building infrastructure to support cycling as a viable form of active transportation helps to create a city that promotes and protects health. Sedentary living and physical inactivity have contributed to a rise in obesity and chronic diseases such as Type II diabetes, heart disease, stroke, some cancers, as well as reduced psychological well-being.[12] About half of adults in Ottawa are overweight or obese, and only 30% of people were active during leisure time.[13] Being physically active is one of the most modifiable behaviours for reducing the likelihood of developing chronic diseases.[14]

Active transportation has vast potential to improve population health, as it is physical activity with a practical purpose. People who use active transportation to get to work are more fit and have healthier weights than those who rely on cars.[15] The cumulative benefits of regular walking and cycling can quickly add up to recommended physical activity guidelines of 150 minutes per week for adults, and can be more sustainable over the long term than structured, recreational activities.[16] [17] [18] Cycling is also a healthy leisure activity. Given low physical activity rates during leisure time, an enhanced

cycling infrastructure will increase opportunities for leisure cycling and its associated health benefits.

Like adults, children are becoming increasingly vulnerable to chronic diseases associated with physical inactivity and obesity. Fewer than 22% of children in grades 7 to 12 met daily physical activity requirements of 60 minutes per day.[19]

A key travel destination for children is school. Active transportation to and from school can make up a significant portion of the daily physical activity requirements. Children who use active transportation such as biking to get to school can accumulate up to 45 extra minutes of daily physical activity.[20] In addition to improving overall health, being physically active may also contribute to academic performance.[21]

Since 1985, there has been a 50% decline in the number of children who walk or bike to school.[22] [23] In Ottawa, students in grades 7 to 12 reported using active forms of transportation only for 20% of trips to school, and 28% of trips home from school.[24]

Incorporating health-promoting, child-friendly design, and integrating complete streets principles as found in the Official Plan, will encourage children to cycle.[25] [26] According to the Ontario Medical Association, "Cycling infrastructure of bike lanes and paths should be safe and seamless enough for parents to feel comfortable letting their children ride on the road in these lanes. It is especially important that bike lane networks are connected, and cyclists aren't left stranded in mixed traffic."[27]

Safety and Injury Reduction

A lack of safe cycling routes can be a significant barrier to active transportation.[28] [29] Street designs that support cycling, and thus help improve population health, most notably through purpose-built cycle facilities, lead to a reduction in injuries and collisions.[30] [31] Peoples' perceptions of safety can also influence the uptake of cycling, and modification to infrastructure can play an important role in encouraging new users.[32] [33]

Additionally, research suggests that increases in the number of cyclists can contribute to a reduction of injuries, with an effect called "safety in numbers." Collision rates typically decline as active transportation rates, including cycling, increase.[34] [35]

Cycling injuries result in about 1,500 visits to Ottawa emergency rooms each year out of about 16 million trips.[36] Reducing risks and promoting feelings of safety through the development of better and more ubiquitous cycling infrastructure is critical to ensuring cycling is perceived as a safe and attractive option; this, in turn, will contribute to a sustained shift in travel behaviour.

Improving Local Air Quality

Public health and environmental goals around active transportation are mutually reinforcing. Traffic pollution through vehicle emissions is the largest source of local air pollution in Ottawa. There are a number of health risks associated with poor local air quality, including impaired lung function, cardiovascular mortality, and asthma.[37] [38] The Canadian Medial Association estimates that 503 premature deaths in Ottawa each year can be attributed to ground level ozone and fine particulate matter air pollution.[39] An increase in cycling rates can help improve local air quality by helping reduce traffic congestion, carbon emissions and air pollution.[40]

1.6.2 Environmental Benefits

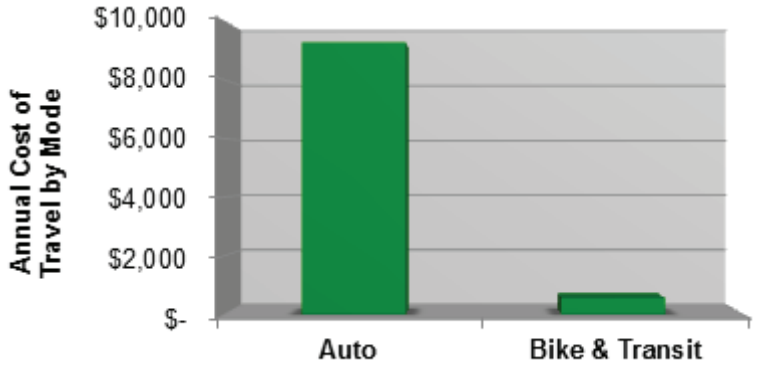
The average vehicle in Ottawa travels 10,000 km/year.[41] Residents who choose to forgo car ownership altogether, or reduce the 'fleet' of cars at home, will reduce the total household vehicle-kilometres travelled (VKT), and therefore the greenhouse gas (GHG) emissions, by a much higher figure than a simple substitution of bike for vehicle kilometres on a per trip basis. Habits also change, and residents using a bike for utilitarian purposes are more likely to shop and do other chores closer to home or along their commuting routes.

1.6.3 Social Benefits

Affordable Transportation

A well-developed network of cycling facilities can provide many residents with an affordable personal mobility option that is low in cost and easily accessible. Exhibit 1.5 provides a comparison of mobility costs to residents.

Exhibit 1.5 – Estimated User Cost of Travel in Ottawa[42]



Liveable Public Spaces

The presence of pedestrians adds a sense of safety and increases the desirability of our public spaces. Similarly, cyclists also interact with their surroundings and can easily

stop at a point of interest, a business along their route, or to chat with a friend. Increased cycling can also help animate and transform many currently underused city spaces (for example: the lands adjacent to the O-Train corridor, as illustrated in Exhibit 1.6).

Streets with more space dedicated to green buffers, boulevards, sidewalks and cycle tracks reduce noise and other negative effects associated with traffic. This makes the public spaces more inviting for local residents and visitors alike. In key destinations, such as the ByWard Market, and throughout the wider Ottawa street network, steps can be taken to improve the streetscape.

Many residents value the character of a lively “main street” commercial area such as Beechwood, Bank Street South, and Westboro. The success of these commercial areas leads to increased development, intensification, and increases the variety of local services available, which benefits all residents (cyclists included).

A recent survey of shoppers along the Wellington West commercial strip (a traditional main street), shows that the majority of customers arrive by means other than a personal vehicle (see Exhibit 1.8). This modal distribution of customers is largely due to the supportive land-use policies that bring many customers within walking or cycling range, and offer still more customers an attractive transit option.

Exhibit 1.6 – O-Train Pathway: Before and After Construction

(North of Bayview Station and at Gladstone Avenue)

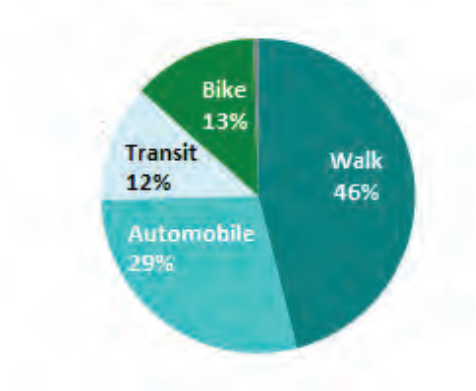
Before Construction **After Construction**

Exhibit 1.7 – Cyclists in the ByWard Market

Source: H. Moor

Residents who use a bike for many of their utilitarian or recreational trips will spend more money locally[43], and are far less likely to travel to a large shopping mall. As it is a key goal of the City to keep these vibrant areas economically healthy, cycling as a means of access to these areas will support and further these success stories.

Exhibit 1.8 – Modes of Transportation for Shoppers in Wellington West [44]



1.6.4 Economic Benefits

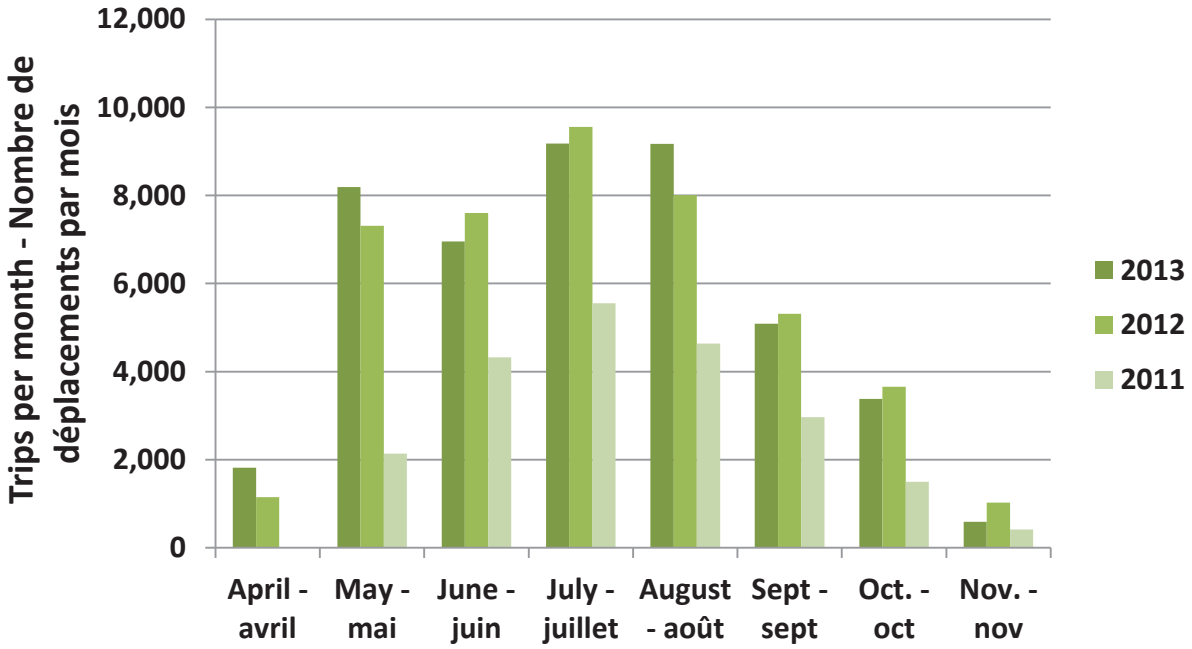
The tourism industry is the third largest employer in Canada's Capital Region.[45] Ottawa falls within the provincially-designated "Tourism Region 10" that enjoyed $1.3 billion[46] in visitor spending in 2010. The Ontario Ministry of Tourism developed the Premier-Ranked Tourist Destination (PRTD) project to help destinations define their competitive position within a tourism market. One of the future opportunities identified in Ottawa's PRTD project[47] was to further develop outdoor recreation especially related to cycling and water access. Ottawa Tourism has acknowledged this strength by releasing a new promotional video in 2012.[48]

Today's tourists desire a more active experience during their visits. Recognizing this, the City continues to make improvements to the cycling network to help meet this demand by connecting tourist destinations (already well served by the NCC and City pathway networks) with dining and accommodations. The East-West Bikeway linking Vanier to Westboro, including the Laurier Avenue Segregated Bike Lanes through the core, is a great example of these enhanced linkages to key destinations through the downtown.

In addition to a continuously improving network, initiatives such as the introduction of an expanded Capital BIXI bike system in 2011 help support cycling for tourists in the Capital. The NCC Capital BIXI bicycle rental system currently includes 25 stations, 250 bicycles, and 300 subscribers. The Capital BIXI service runs from mid-April to mid-November (seven months). From 2011 to 2012, usage of the Capital BIXI service

doubled. During this period, statistics revealed that 60% of trips were made by daily users, most likely visitors to the region.[49]

Exhibit 1.9 – Capital BIXI Usage: Number of Trips by Month



Source: NCC

The marketing of cycling as the preferred means to access major events in Ottawa (e.g. Bluesfest) and tourist destinations (e.g. the Canadian Museum of Civilization) also reinforces the theme of touring Ottawa "best by bike."

2.0 Cycling Context

2.1 Cycling Trip Data

In recent years, there has been additional investment in cycling infrastructure and services to encourage more cycling in the urban area. It is important to undertake timely data collection efforts to understand the choices people make for daily transportation.

On-going data collection efforts related to cycling rates in Ottawa are summarized in Exhibit 2.1.

Exhibit 2.1 – Sources of Cycling Data

Survey Type	Description
Origin-destination surveys	Telephone surveys to Ottawa residents to capture their trip origins, destinations, purposes, mode of travel, time of travel and household demographics. The two most recent origin-destination surveys (OD Surveys) for the National Capital Region were undertaken in 2005 and 2011.
National Household Survey	Starting in 2011, the National Household Survey data are available every five years and includes primary mode of transportation to work.[50] In prior years, this data was collected through the Canadian Census.
Cycling Index	The intent of the Cycling Index is to monitor relative changes in cycling activity over time. It is calculated using single-day manual intersection traffic count data at many locations across the city and captures cycling trips that take place during an eight-hour period during typical workdays in the spring and summer months. The Cycling Index is updated on a yearly basis.
Automated bike counters	Automated counting equipment has been installed at several locations in Ottawa along major cycling routes. This equipment records cycling volumes every hour throughout the year. The data provides a complete seasonal view of yearly cycling at specific locations, and can be used to establish temporal expansion factors, and weather correction factors.
Screenline surveys	Manual screenline traffic surveys are undertaken bi-annually in May and June for specific boundaries across the city. The data includes mode share information and includes passenger counts in both private and transit vehicles.
BIXI usage	BIXI usage for each station across the National Capital Region is tracked on a daily basis over the entire bike-share season, including information on the split between program subscribers and casual (one-time) users.

2.1.1 Overall Cycling Activity

The 2011 OD Survey reported about 2.26 million daily trips (all modes) on a typical fall workday that originated from within the City of Ottawa. This is an increase of 3% over the previous 2005 Survey. While the overall travel demand increased by 3%, the daily cycling trips showed an increase of 40% (from 31,100 trips in 2005 to 43,600 trips in 2011) over the same period, as shown in Exhibit 2.2.

Travel behaviour varies depending on the time of day. The 2.5-hour morning and afternoon peak periods (6:30-9:00 AM and 3:30-6:00 PM) account for about 43% of the daily trips. These periods experience the highest cycling mode shares, a characteristic that has become even more pronounced when comparing 2011 with 2005 results, as shown in Exhibit 2.4.

Changes in mode share during the AM peak period include an increase in cycling from 1.7% to 2.5% of all trips (an additional 3,300 trips by bike). During the PM peak period, cycling has increased from 1.6% to 2.4% of all trips (an additional 4,200 trips by bike).

Exhibit 2.2 – Total **Daily (24-hour) Trips by Mode**

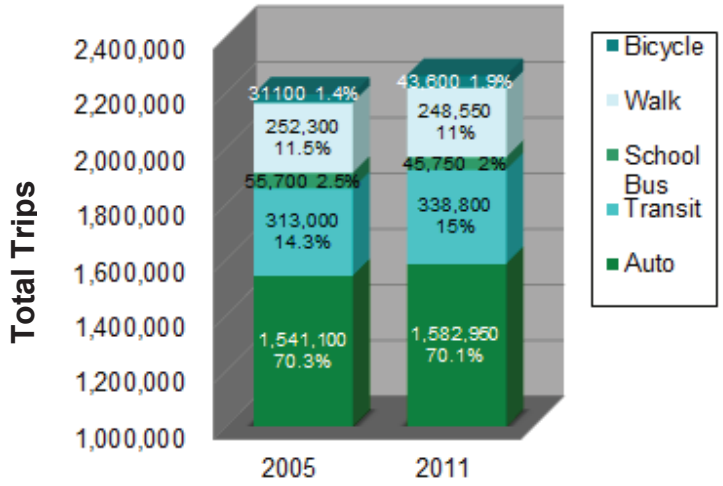
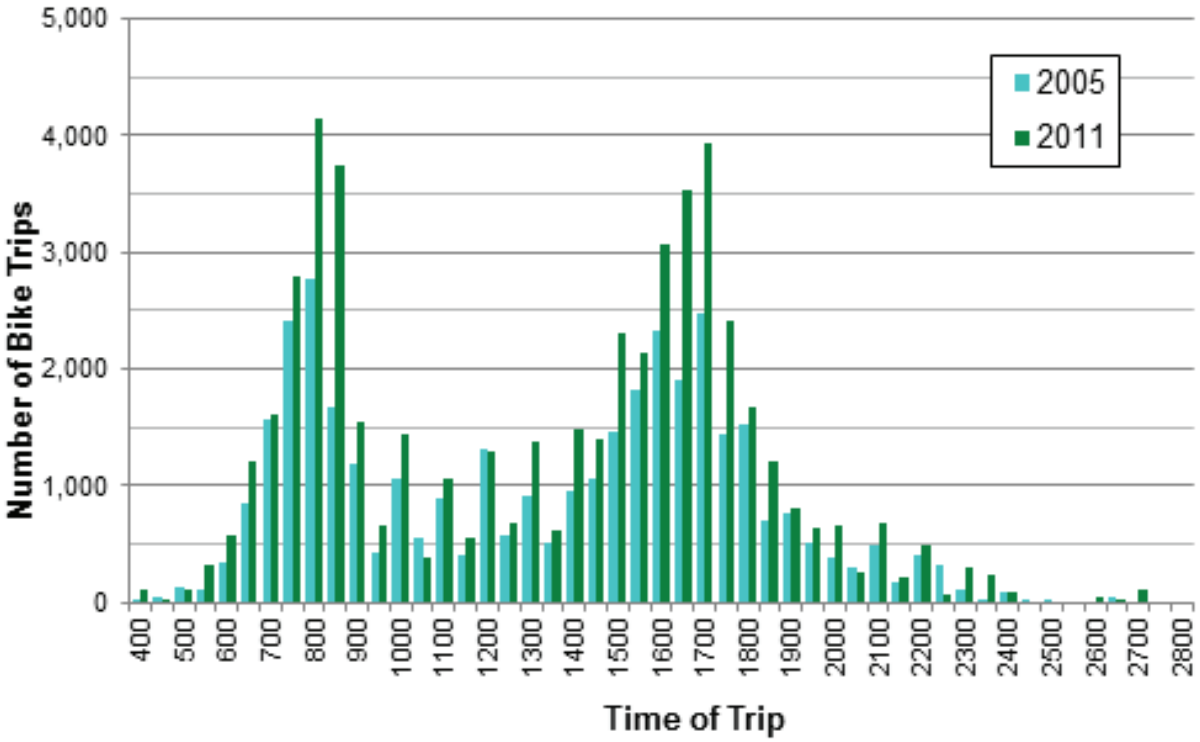


Exhibit 2.3 – Bicycle Travel by Time of Day



2.1.2 Cycling Activity by Trip Origin

The city may be sub-divided into four distinct areas (excluding the Greenbelt): Inner Area, Inner Suburbs, Outer Suburbs, and Rural, as shown in Exhibit 2.4. Trips that originate in the Inner Area, where there are mixed land uses and a higher density of origins and destinations, have a higher cycling mode share than in suburban residential areas or rural areas where there is more dependency on cars. Land use and built form strongly affect relative rates of cycling between each of these areas, since an interesting, active built environment along routes enhances the cycling experience, and therefore contributes to increasing the cycling mode share.

Considering trips originating inside the Greenbelt during the AM peak period in 2011, 3.8% of the trips have a primary mode of cycling (an increase from 2.4% in 2005). Trips outside the Greenbelt have remained at about a 0.7% share of cycling between 2005 and 2011 during the AM peak period. Exhibit 2.5 shows the change in mode share across the region during the AM peak period.

Exhibit 2.4 – Map of Ottawa by Geographic Area

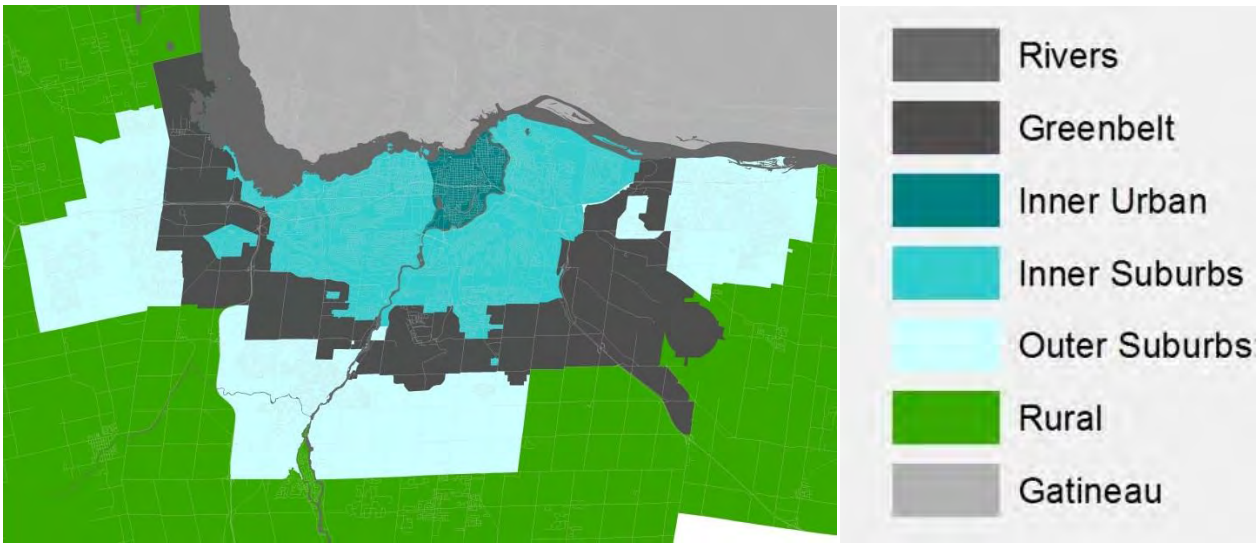
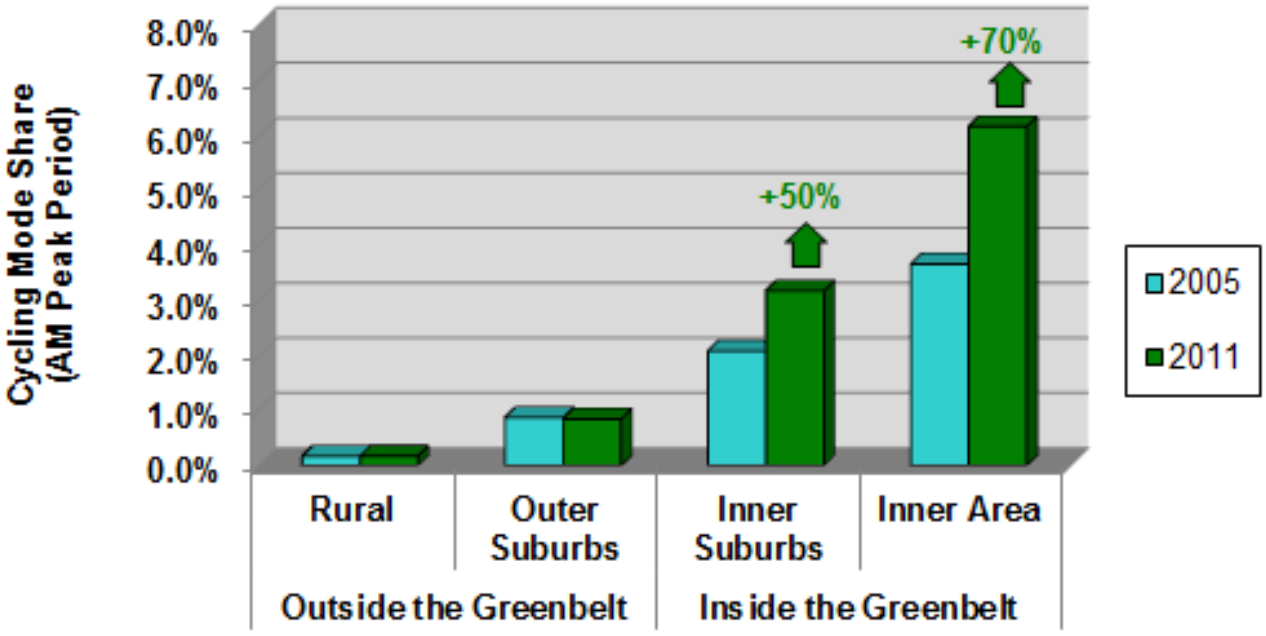


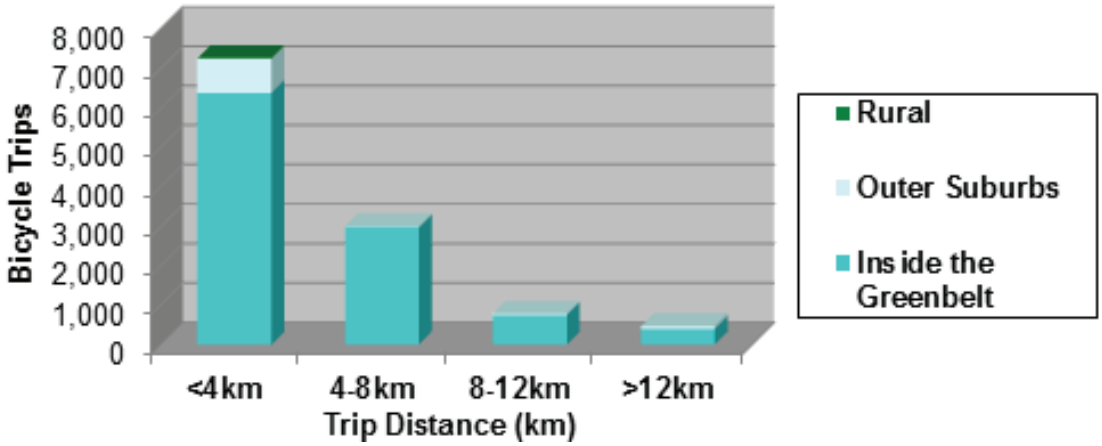
Exhibit 2.5 – AM Peak Period Cycling Mode Share



2.1.3 Cycling Trip Distances

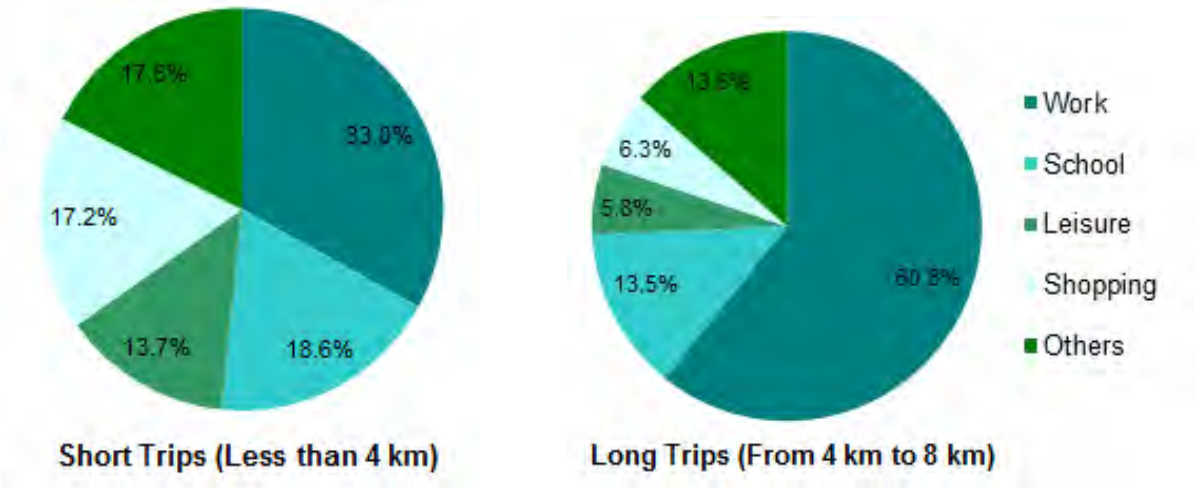
From a review of bike trips by distance (shown in Exhibit 2.6), it is apparent that over two-thirds of all bike trips are shorter than 4 km, and over 90% are shorter than 8 km. Also shown in Exhibit 2.6, most cycling trips originating outside of the Greenbelt are either less than 4 km (about 70%) or greater than 8 km, likely as a result of the Greenbelt that spans about three to five kilometres in width.

Exhibit 2.6 – Cycling Trips by Distance



When reviewing trip purpose compared to distance travelled, it is apparent that cyclists are willing to bike longer distances for work purposes than for other purposes, as shown in Exhibit 2.7. When considering non-work trips, over 90% of cycling trips are less than five kilometres.

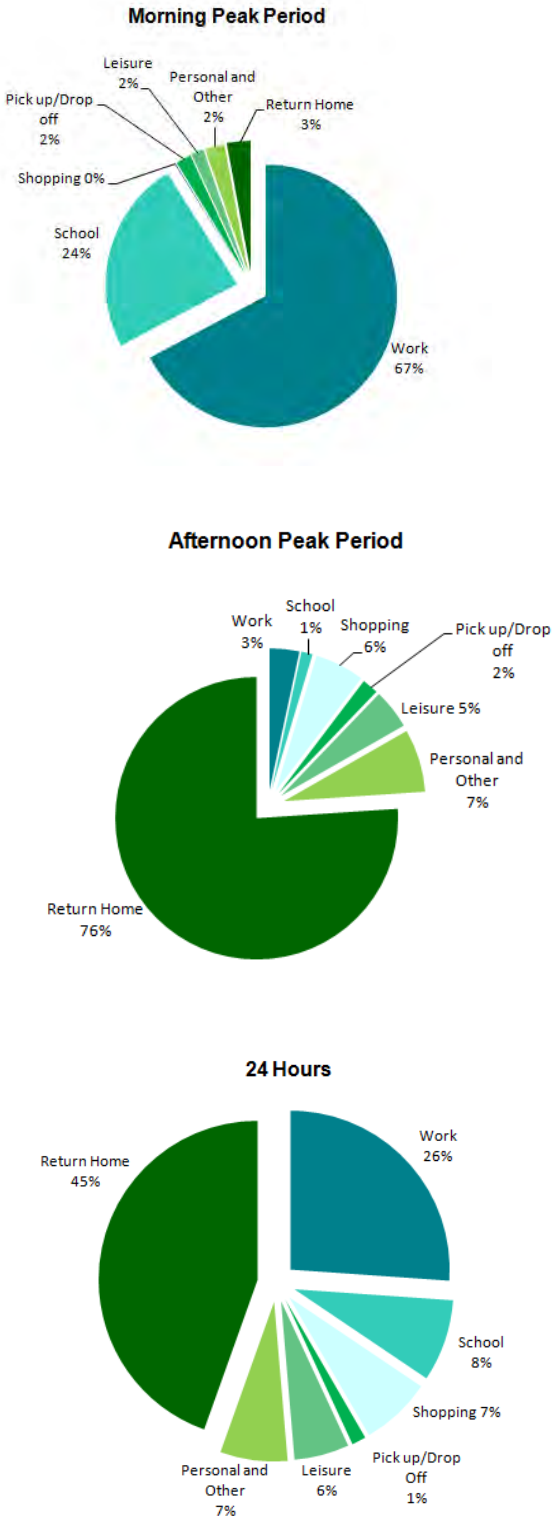
Exhibit 2.7 – Daily Bicycle Trips by Distance and Purpose[51]



2.1.4 Cycling Trip Purposes

Understanding the purpose of trips provides further insight into the choices residents make about when and how to travel. Some trips, such as work and school commutes, must take place within specific windows of time, while more discretionary trip purposes, such as shopping trips, can be scheduled with more flexibility. Many factors determine the range of and relative attractiveness of transportation options for any given trip. These factors include time of day, weather, number of passengers, if there are any trips being linked, and transportation amenities available (vehicles, transit service, parking). During the AM and PM peak periods, cycling trips are predominantly to/from work and school, while over a 24-hour period about 30% of trips are made for other purposes such as shopping, leisure, and personal activities, as shown in Exhibit 2.8.

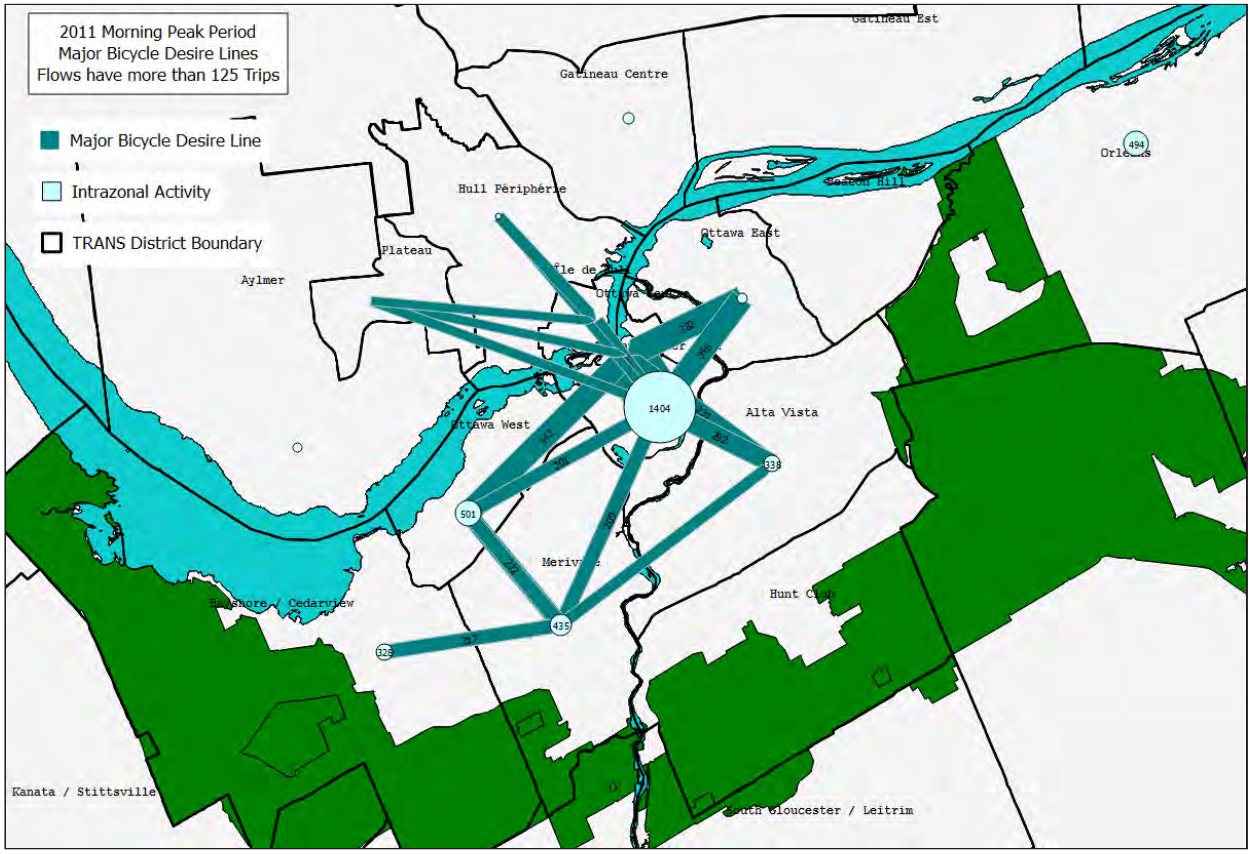
Exhibit 2.8 – Cycling Trip Purpose by Time of Day



2.1.5 Cycling Desire Lines

Major cycling desire lines (defined as those with greater than 125 bicycle trips) for the AM peak period are shown in Exhibit 2.9. Over 35% of bicycle trips occur within a single zone and nearly all bicycle trips occur in the urban area.

Exhibit 2.9 – Major Bicycle Desire Lines (2011 AM Peak Period)

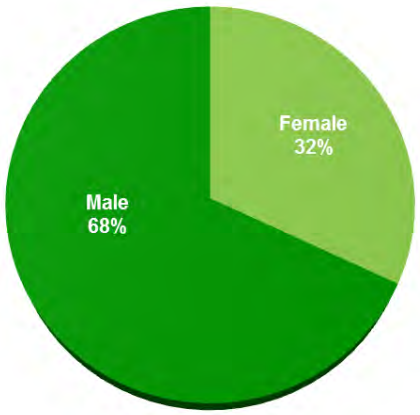


2.1.6 Cyclist Gender Balance

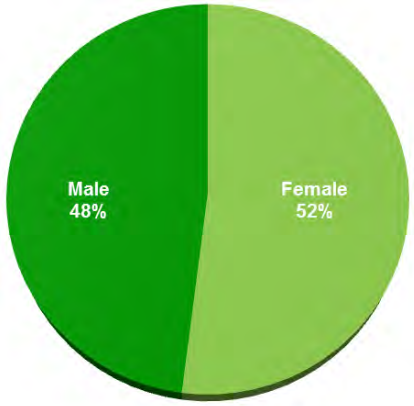
The 2011 OD Survey shows that in Ottawa, the majority of cycling trips are made by males, with only 30% of cycling trips undertaken by females. By comparison, females make 52% of trips by all modes, as shown in Exhibit 2.10.

Exhibit 2.10 – 2011 Daily Trips by Gender

Bicycle Trips by Gender



All Trips by Gender



2.2 Monitoring the OCP2008

One of the goals of the OCP2008 was to achieve a city-wide cycling mode share of 3% by 2021 (for the PM peak hour). To identify Ottawa's progress since 2008 and identify areas for improvement in future years, a review has been undertaken comparing the OCP2008 plan to the existing conditions in terms of both policy changes and infrastructure constructed.

2.2.1 Cycling Policies

Making Ottawa More Cycling-friendly

Specific achievements include:

- Consideration of cyclists' needs in roadway designs and intersection improvements
- Incorporating cycling safety measures
- Incorporating cycling infrastructure into road reconstruction and resurfacing projects as well as bridge and underpass projects
- Providing measures to reduce risks to cyclists in construction zones
- Adding ring-and-post bicycle parking at locations with high parking demand
- Providing and planning for comfortable cycling facilities parallel to rapid transit corridors

Areas where improvements have been limited include:

- Exempting cyclists' from turn restrictions – being addressed on a project-by-project basis in the OCP2013 implementation plan
- Improvements to the cycling environment on arterials and major collectors – addressed in OCP2013 through the Cross-Town Bikeways implementation plan
- Providing contraflow bike lanes along local one-way streets – example projects identified in OCP2013 (i.e. Glebe Avenue), and enabling legislation expected through the provincially-led Ontario Traffic Manual Book 18 and *Highway Traffic Act* update process
- Considering cyclists' needs in roadway maintenance operations – OCP2013 identifies specific improvements for winter maintenance, spring sweeping, life-cycle management and road-cut criteria
- Improving bicycle parking as part of new developments – OCP2013 includes new site plan requirements for short-term bicycle parking

Outreach

The OCP2008 included a plan on how to improve communications and promotion for increasing cycling in the City. Key achievements in cycling promotion include:

- A Cycling Safety Improvement Program was established to identify and improve cycling conditions at approximately 10 targeted sites/year (typically intersections).
- Events and programs to encourage cycling were implemented (such as Bike to Work Month and Sustainable Transportation Week). The OCP2013 sets out new goals for the Transportation Demand Management (TDM) Strategy in Section 6.2.

Design Guidelines

- The OCP2008 included a Technical Annex with design guidelines. In response to the rapid evolution in cycling facility design since the OCP2008 document was developed, City staff have collaborated with Ontario's Ministry of Transportation to develop improved bicycle safety and design initiatives. This collaboration resulted in the development of draft technical design guidelines as captured within OTM Book18 and OTM Book12 (signals) documents.
- Staff will continue collaboration with the MTO and other municipalities to further advance and adopt measures that will improve safety for cyclists through design. The OCP2013 suggests further joint initiatives with the MTO in support of cycling within Section 7.3.

Implementation

The City has implemented a number of the recommendations in the OCP2008, including over 250 km of cycling facilities (excluding signed-only or wide curb lane routes). The most significant increase has been within the pathway system with an increase of over 100 km. Regular data collection on cycling volumes has been initiated, and a number of cyclist surveys were undertaken as recommended in the OCP2008.

2.2.2 Cycling Infrastructure

The cycling network expansion that has occurred between 2007 and 2013 is summarized in the table below. A map showing existing cycling facilities is available online on GeoOttawa.[52]

Exhibit 2.11 – Cycling Facilities Built from 2007 to 2013 (km)

Cycling Facility Types	2007	2013	Achievement (Actual as % of Projected[53])
Bike lanes	119	161	93%
Paved shoulders	123	167	50%
Multi-use pathway (City)[54]	151	258	238%
Total	**393**	**586**	**108%**

2.2.3 The Need for an Updated Plan

Through consideration of recent industry reports and practices as well as a review of Ottawa's current cycling travel patterns, several significant changes in direction are proposed within this plan as compared with the OCP2008. These changes are required to achieve the growth in cycling mode share identified within the Transportation Master Plan.

Cycling Targets by Geography

With short-term progress in cycling mode share exceeding projections made in 2008, and requests by Council[53] to re-consider targets for cycling growth, the OCP2013 has established new, more aggressive targets for cycling mode share. To account for the wide disparity in urban built form and growth rates across the city, independent targets were set by geographic area.

Network Continuity

The bulk of past investments in cycling facilities have been incorporated within various road projects scattered across the city. The value of these previous investments now

can be fully realized by directing OCP2013 investment towards filling in missing links, as well as in developing continuous Cross-Town Bikeways.

The OCP2013 prioritizes projects supporting route continuity objectives within the first five years of the implementation timeframe. The importance of route connectivity will be reinforced as part of the project prioritization criteria described in Section 5.3.1 and the Cross-Town Bikeway route concept in Section 5.3.1.2.

In addition to providing improved route continuity for the cycling network as a whole, a recommended winter-maintained cycling network has been identified within the urban area.

Comfortable Cycling Facility Design

The mode share goals within the TMP 2013 cannot be met without attracting cyclists who are interested in cycling but prefer to be separated from traffic. An update to the OCP was necessary to incorporate new cycling facility types that buffer cyclists from traffic using physical barriers (e.g. cycle tracks).

Several industry guideline documents recently have been developed to address emerging cycling designs in North America and the concepts presented in these manuals will be highlighted. These new facility types are described in this Plan as part of Section 4.3.1.

3.0 Setting and Tracking Objectives

3.1 Cycling Mode Shares

Since the 2005 OD Survey, progress has been made in expanding the cycling mode share in the urban areas. The TMP2008 target for a city-wide cycling mode share of 3% has therefore been increased in this Plan.

3.1.1 Key Influences

While development of the cycling network is a critical component to increasing cycling, the most substantial increases in cycling rates occur in cities that have also implemented a range of supporting programs and policies. These supporting programs and policies include land use and road network layout, cycling safety, bike parking and end-of-trip facilities, transit integration, bike share programs, cycling promotion and training programs.

As part of the Building a Liveable Ottawa Survey, respondents were asked what measures would help them to cycle more often for any purpose. Participants were able to select up to three responses to this question. The most common responses to this question are shown in Exhibit 3.1. The survey results confirm that most residents are focused on facility or parking improvements, as well as cycling safety and road safety programs.

Exhibit 3.1 – Public Input on Measures that Would Encourage More Cycling

Response	Percentage*
Additional facilities (e.g. bike lanes, bike parking)	40%
Better pathway and /or road connections	36%
Improved traffic safety	33%
Better pathway and / or road conditions (including winter maintenance)	32%
I would not cycle more often	25%
More compact neighbourhoods, so everything is closer	20%
Other, please specify...	13%
Total responses	**4,238**

* Residents could choose more than one answer, so feedback totals exceed 100%.

3.1.2 Mode Share Targets

Future growth in cycling is expected to occur in proportion to existing cycling demand (by area), and to be dominated by short trips.

City-wide

When considering all person-trips (during a typical fall work-day morning peak period), the city-wide cycling mode share target for 2031 is 8% for trips originating within the Greenbelt and 5% city-wide. Further details are provided in Exhibit 3.2 for various areas of the city, expressed as a percentage of internal trips only within each area.

Exhibit 3.2 – Actual (2011) and Target (2031) Cycling Mode Shares for Internal Trips by Area (morning peak period)

Area	2011	2031
Inner Area	8%	12%
Inner Suburbs	3%	6%
Orléans	2%	3%
Riverside South/Leitrim	0%	3%
South Nepean	2%	4%
Kanata/Stittsville	1%	4%

Inside the Greenbelt

Mode share targets for the inner area and inner suburban area are set at 12% and 6% of internal trips respectively. The inner area is located within a reasonable cycling distance from downtown, has a higher density of population and employment and 49% of all trips were less than 4 km. The shorter trip distances in this area provide the greatest opportunity to significantly expand the number of cycling trips. The cycling network has been prioritized to improve key missing connections to the neighbourhoods that are currently not well connected and as a result under-achieving in relation to their potential cycling mode shares.

The inner suburban areas are further from downtown with a 3% cycling mode share for internal trips in 2011. The cycling network will seek to improve connectivity within these areas and support a doubled target cycling mode share of 6% for 2031.

Suburban Areas Outside of the Greenbelt

In 2011, about 40% of all trips starting in the outer suburbs during the morning peak period remained in the same suburban area. Nearly all of these internal trips are reasonable cycling distances, but only 1% to 2% were made by bicycle. A focus will be placed upon increasing the internal suburban trips by improving cycling route connections to schools, community centres, employment areas, and other local destinations. The cycling trip target for the outer suburban area is for 3% to 4% of all internal trips to be made by bicycle.

The trips originating in the outer suburbs and destined for inside the greenbelt are nearly all longer-distance trips with limited cycling potential. The role of cycling in supporting these longer-distance trips will be as a secondary mode by encouraging cycling to major rapid transit stations. A focus upon improving cycling connections to the rapid transit stations will seek to support the existing rapid transit network and expand cycling as a secondary mode to transit for longer-distance trips.

Rural Areas

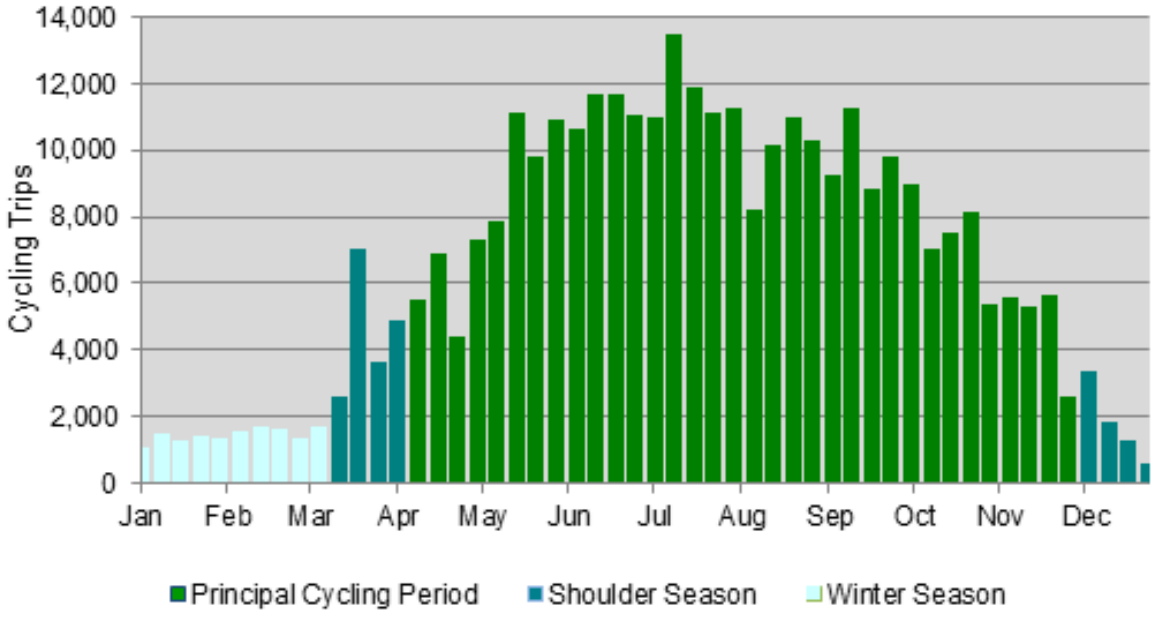
Most trips to/from rural areas involve distances beyond cycling range (for the majority residents). There is limited scope for cycling as either a primary or secondary mode of transportation for commuting purposes, but there are internal trips within villages that will be feasible by bike (e.g. school, local shopping). Investment in the rural areas will be focused on recreational pathways and paved shoulders for recreational cyclists, and will take guidance from Village CDPs (Community Design Plans) to improve linkages within rural villages.

Seasonal Variation in Cycling Rates

When comparing annual cycling data, it is important to understand the monthly variations to identify a baseline volume. The weekly cycling data presented in Exhibit 3.3 is based on data collected on Laurier Avenue in 2012 as a sample of the annual variation in cycling volumes. The principal cycling period is typically from April to November and is defined when most of the cycling activity occurs. The shoulder season is defined as the two months of the year where large variations in cycling rates can occur due to annual variations in temperature and snow accumulation. The winter season is defined as a two-month period when cyclists can expect to deal with snow and ice, often using specially-equipped bicycles.

The city-wide OD Survey is conducted during the fall season (October and November) and reflects average annual travel patterns. In keeping with this pattern, the mode share targets for 2031 are for the fall season. Cycling levels in the summer are expected to be significantly greater.

Exhibit 3.3 – Cycling Volumes by Season



3.1.3 Monitoring Progress

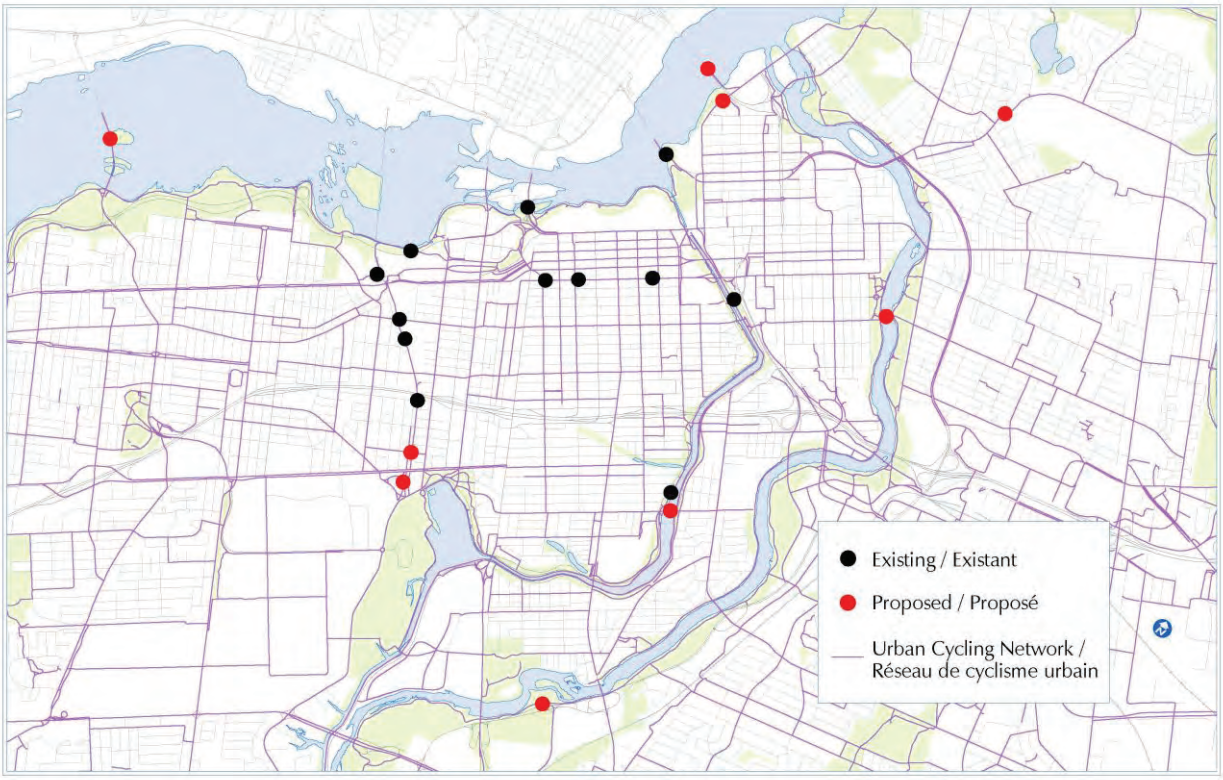
Three data sources can help the City assess how cycling mode shares and volumes are changing over time. All three data sources will be used to provide the most accurate representation of year-over-year cycling trends.

- **OD Survey:** A city-wide telephone survey with a sample rate of 5% is held once every five years (2005 and 2011 most recently) with sampling occurring between October and November.
- **Manual Traffic Counts:** Manual traffic counts (that cover all modes) are collected throughout the City of Ottawa at 203 locations. About one-quarter of locations are counted annually, with the others counted every two years. The counts are carried out between May and June.
- **Automated Bike Counter Data:** Automated bicycle counters collect cycling volumes around the clock between April and November (or all-year for winter-maintained cycling routes).

The first local automated bike counter was installed in June 2009 on the southern approach to the Alexandra Bridge. The network of bike counters has since been expanded to a current total of 16 operational counters, as shown in Exhibit 3.4.[54] This network will capture over 3 million passing cyclists per year. The counter network will

evolve to provide wider geographic coverage across the city, including all new bike/pedestrian bridges.

Exhibit 3.4 – Map of Current and Proposed Automated Counter Sites



Between years when OD surveys are undertaken, changes in annual cycling rates will be based upon yearly data collected from the automated bike counters (corrected for weather effects), and selected manual bike count locations. Owing to the variability of cycling data, there is a need to normalize data collected each year to determine the underlying changes in cycling rates.

The City has partnered with McGill University to create the capability to adjust counter data to take weather into account.[55] [56] This capability will be developed in stages over the next five-year planning period, and will result in the following:

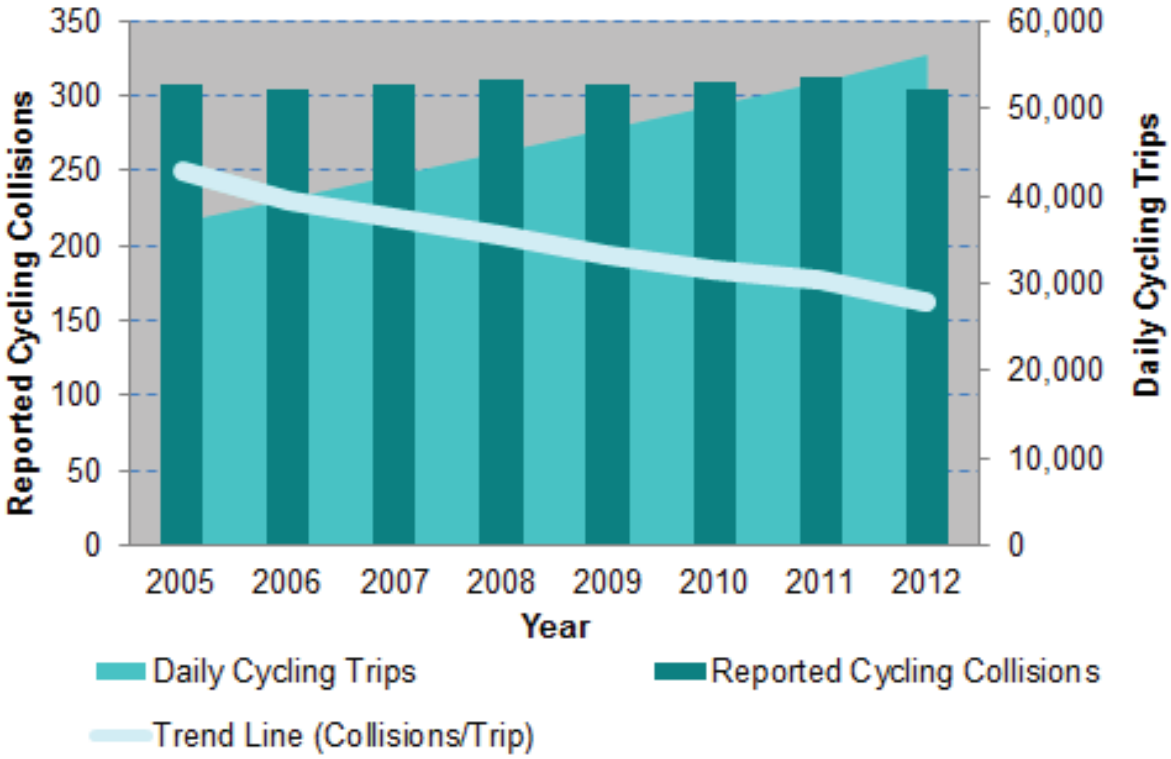
- Adjustment of annual automated counter data to approximate a normal weather year (based on a historical weather reference model). This allows annual cycling trends to be determined independently of yearly changes in weather.
- Adjustment factors to convert any single-day historical count to an average weather day, shifted to any other day of year, or extrapolated to a yearly total trip figure. This allows manual counts to be more easily compared, to a much higher level of accuracy.

- Expansion factors for OD survey data, to extrapolate the number of bike-trips made over the full year of the OD survey.

3.2 Cycling Safety

Exhibit 3.5 illustrates the OCP2013's principal measure of cycling safety, namely the rate of reported collisions to cycling levels on an annual basis. This rate has improved (i.e. reduced) since 2005, a trend that has also been observed in other cities where cycling volumes have increased. This indicator will be monitored over time.

Exhibit 3.5 – Collision Rate for Daily Cycling Trips (2005 to 2012)



3.3 Monitoring the Quality of Cycling Facilities

In conjunction with measurements such as the combined length of Ottawa's bike lanes, and the number of collisions involving cyclists, a measure of the level of service can be used to indicate progress towards a better cycling environment for residents. The "level of traffic stress" measurement methodology (LTS) has been defined for use within the City, with methodology and tables further detailed within Section 4.3.4 and Annex B.

Level of Traffic Stress measures related to cyclists will be calculated and used to inform design tradeoffs related to the addition or improvement cycling facilities in areas where high cycling rates are anticipated. Areas where LTS calculations should be made are:

- Within the urban core
- Along Traditional Main Streets
- Along Cross-Town Bikeways
- In TOD areas

The LTS calculations are used for guidance only, and do not represent minimum design standards. In the future, staff will work to establish 'multi-modal level of service (LOS)' methodologies, which allow for a quantitative assessment of LOS between all modes. There is no widely accepted multi-modal LOS available at the present time.

Creating a map showing the quality of cycling facilities will allow for progress to be monitored over time, as well as being a useful planning tool. Similar maps from other jurisdictions (e.g. San Jose, CA) show a pattern of low-stress cycling routes separated from each other by high-stress barriers, such as arterial roads. This type of map will assist planners in determining where best to implement network improvements, as well as providing useful route guidance for residents.

OCP Recommendation 3.1:
The City shall explore the option of creating a map showing the quality of cycling facilities using the Level of Traffic Stress (LTS) methodology. Regular updates shall track the City's progress towards improving the network-wide quality of facilities.

4.0 Policies to Make Ottawa Cycling-Friendly

4.1 Cycling-supportive Planning

As a growing city, Ottawa is continually evolving with new developments changing the built form through expansion, intensification and regeneration. This evolution is guided by the City's Official Plan, which by supporting intensification, mixed development, and transit-oriented developments will also make cycling an increasingly viable option for many residents.[57]

The City's Transportation Master Plan incorporates a section on complete streets[58] that directs all roadways to be developed to consider the needs of all users, including cyclists. The type of cycling facilities implemented along any roadway will however take into consideration the different characteristics of each part of the city, as well as the land use characteristics of each roadway segment.

4.1.1 Urban Areas

Cycling is an established mode of transport for travelling in the urban area, particularly for commuting, and its importance has been growing as evidenced by the latest OD Survey that shows a 58% increase in cycling mode share inside the Greenbelt.[59] Cycling issues are often raised by residents in great detail during Community Design Planning efforts and roadway reconstruction projects. This, together with the planning guidance provided by the Ottawa Cycling Plan and Transportation Master Plan, means that there is a greater focus on ensuring that cycling facilities are provided for or improved as the opportunity arises through road reconstructions, private development or other infrastructure projects. It is through these processes and the additional infrastructure projects identified in this document that the vision of a connected and safe cycling network can be achieved in urban areas.

4.1.2 Suburban Areas

It is acknowledged that relatively few residents living outside of the Greenbelt will choose cycling as their main commuting option to downtown because of the distance. However, recent data[60] show that 40% of trips originating in these areas during the AM peak hour do not cross the Greenbelt, but remain within their suburban community. In recognizing these differences, this plan will focus on making cycling a convenient choice of transport for internal community trips in suburban areas. This includes trips to transit stations, or park-and-ride lots, recreation centres, town centres, schools, and travel to internal employment destinations (i.e. commuter flows between Kanata South and the Kanata North employment area).

New suburban roads, whether they be local, collector or arterial, should be developed in such a way that active modes of transportation are taken into consideration. As further outlined in Section 4.3, providing comfortable and safe cycling facilities is a key objective to factor in increasing the percentage of people choosing to cycle. Suburban residents (38% in inner suburbs and 31% in outer suburbs) have indicated that they are interested in cycling but are waiting for more bike lanes and pathways.[61]

Inclusion of a network of off-road multi-use paths or suitable family-friendly cycling facilities within the right-of-way during the planning stage for new subdivisions is very important in establishing cycling as a viable option for residents and providing mobility choice. Grid patterns, with appropriate traffic calming measures, are more bicycle-friendly than curvilinear street patterns due to their more direct routes. Cul-de-sacs can be popular for the quiet street environment that they provide, but this can also contribute to a car-dependent culture since pedestrian and cycling connections are often not present and what may be a short linear distance can be much longer via the curvilinear road network. Therefore, it is important to ensure that direct multi-use pathway connections are included where new cul-de-sac streets are used to ensure walking and cycling remain viable choices.

The City currently has a number of greenfield or brownfield developments underway where new street grids are being established. The following key objectives should be included when providing planning guidance to the development process:

- Multi-use pathway routes should be as contiguous as possible, with road crossings minimized.
- Mid-block roadway crossings for multi-use pathways should include signage, road narrowings and raised crossing areas on local roads, following guidance provided in the most current version of Ontario Traffic Manual Book 15.
- Arterials should be designed with appropriate cycling facilities to separate cyclists from traffic. Where such facilities parallel arterial roads for long stretches with minimal access points and relatively low pedestrian density, multi-use pathways may prove the most cost-effective solution for both cycling and pedestrian needs, and so avoid the provision of multiple facilities that serve a similar purpose.
- Schools and community centres should be sited to encourage active transportation modes, with good connections to cycling facilities and secure and convenient bicycle parking areas.

- Major pathway links through parks and natural areas should be identified and designed to appropriate standards for a multi-use transportation link. Public access provisions should be included on title where necessary.

OCP Recommendation 4.1:
The Subdivision Development Guidelines document update process will incorporate the OCP2013 goals for Greenfield/Brownfield developments, as well as the "Cycling Friendly City" Council directives to provide pathway connections between cul-de-sac be updated to reflect applicable aspects of recent cycling design guidelines for Ontario and Canada.

4.2 Improving Multimodal Travel Options

The Transportation Master Plan aims to have 50% of all peak period trips taken by sustainable modes by 2031. This sustainable mode share is made up of walking, cycling, public transit and carpooling trips. To provide a viable alternative to single occupant vehicle use, a mix of complementary alternative modes of transportation will offer the greatest opportunity for a strong shift in peak period travel mode.

Cycling as an individual mode of transportation often does not serve the needs of residents for all types of trips and during all seasons of the year. However, improvements to cycling facilities in combination with improvements to other sustainable modes of transportation can provide an attractive multimodal sustainable mobility option that shifts residents' mobility choices to support the TMP goals.

4.2.1 Cycling and Transit

Cycling coupled with transit provides a solution that enhances the viability of both the cycling and transit modes of transportation. Transit is a winter-season/inclement weather alternative for many cyclists, as well as a "range extender" where bikes can be brought along with a transit trip. Cycling can also make a transit trip more attractive by providing efficient access to a transit facility for the first or last leg of a trip.

The following measures have been implemented to promote the synergies that exist between cycling and transit in Ottawa:

- Rack-and-Roll – Over 540 (58%) of OC Transpo buses, including all articulated and double-decker buses are equipped with bicycle racks from about April to the end of October
- Bicycles are permitted on the O-Train (year-round, during designated time periods)

- There are co-located corridors for cycling and transit (i.e. O-train corridor from the Ottawa River to Dows Lake and the East/West route along Scott and Albert streets)
- Bike storage facilities have been provided at rapid transit stations

A sustainable transportation network that provides for seamless transition between modes (primarily cycling, walking and transit) will lead to increased use of these modes, and reduced reliance on the automobile. The OCP2013 targets the development of infrastructure and policies to improve the viability and acceptance of the Bike-Ride-Walk (BRW) mixed-mode model that was identified as a mode-shift policy concept with significant untapped potential.

As Ottawa's downtown transit service is changed from BRT to LRT, the supporting transit network will adjust towards a local service feeder model to bring customers beyond walking range to the LRT stations.

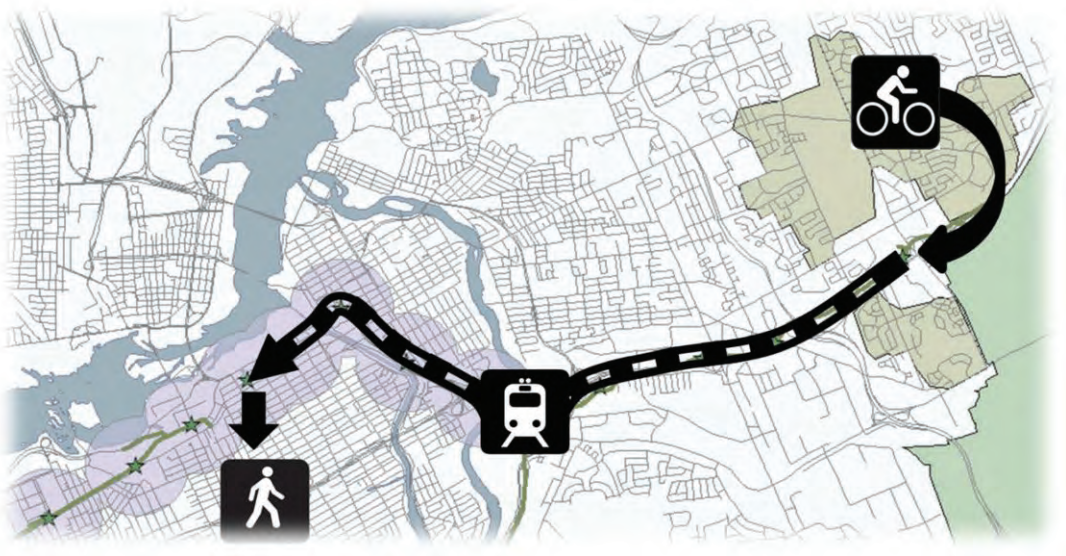
A key transit-supportive policy within the Official Plan is to increase mixed-use density in the immediate vicinity of many LRT stations, referred to as Transit-Oriented Development (TOD).[62] The density goals within the TOD plans will take many years to implement, and in the near-term most LRT users who live out of walking range will either drive, bike or take a feeder bus when travelling between home and their nearest LRT station.

The transition to the Confederation Line will require some existing transit users to make an additional transfer between a local bus and the Confederation Line. A more attractive alternative for some may be to travel by bike directly to the Confederation Line stations, leave their bikes at the station and continue the trip by the Confederation Line. This would eliminate the scheduling and travel delays that some passengers may associate with the feeder bus routes and enable customers to enjoy the full benefit of the high-frequency LRT service. In support of the BRW strategy, a total of 300 bicycle racks will be deployed at the 13 Confederation Line (LRT) stations to allow 600 bicycles to be parked at the stations. At least 40% of the bike racks will be sheltered by station roofs and will include well-lit racks located close to station entrances. Stairway bicycle runnels and elevators will help riders to bring bikes on board during specified time periods. New and existing cycling pathways will be included within the overall station design.

TOD plans around the Confederation Line stations include plans for enhanced cycling connectivity from nearby residential communities, typically located within a short 10-15 minute bike ride, defined as the "bike-shed". Areas deemed to be within the bike-shed must be close enough to allow for a short leisurely paced bicycle ride, and avoid all high-stress cycling routes. Taking one's bike to the station and leaving it there for the trip home should at least be as safe and convenient as walking or taking a bus to the

Confederation Line. An example of such a mixed mode trip from Beacon Hill to Downtown via Blair Station on the Confederation Line is illustrated in Exhibit 4.1.

Exhibit 4.1 – Example of a Bike-Ride-Walk Trip



The OCP2013 network implementation plan supports the bike-ride-walk model by funding the implementation of convenient cycling routes to LRT and BRT stations, and by providing funding for deployment and maintenance of a secure parking (bike locker) pilot project at transit stations. Further support for this multimodal model will be provided through the following recommendations.

OCP Recommendation 4.2:
Assessment of the Bike-Ride-Walk secondary mode share shall be included in surveys and manual counts where practical, to allow multi-year trends to be tracked using parked bike counts.

OCP Recommendation 4.3:
The Bike-Ride-Walk option shall be promoted as part of the TDM programming and be included in further updates to the TDM Plan implementation.

4.2.2 Bikesharing

Short-term bikesharing services provide residents and visitors with access to a bike at low cost for short periods of time, typically on a subscription basis. For the Capital BIXI service, one-time (single-day) usage is also supported.

There are four short-term bikesharing services offered in Ottawa: the NCC Capital BIXI system (downtown core), the privately-operated Causeway-led Right Bike[63] service (Westboro and Glebe neighbourhoods), Vélo Vanier, and the Bells Corners bikeshare.

Exhibit 4.2 – Capital BIXI Station

Source: NCC

Exhibit 4.3 – Right Bike Bikeshare

Source: RightBike.ca

The availability of bikeshare services provides yet another option for local mobility. This supports the option of taking transit or carpooling for the daily commute, complemented by bikeshare usage during the day as required. The City will encourage the further expansion of such services.

OCP Recommendation 4.4:
The City of Ottawa will encourage the Capital BIXI and other bikeshare systems by: facilitating new desirable locations for rental stations on City rights of way (where feasible); promoting bike share use in conjunction with transit services and as part of cycling tourism promotion; investigating the feasibility of Presto Card use for bike share usage; and facilitating new, desirable locations for bike-share stations as part of development site plan agreements on private lands (where feasible).

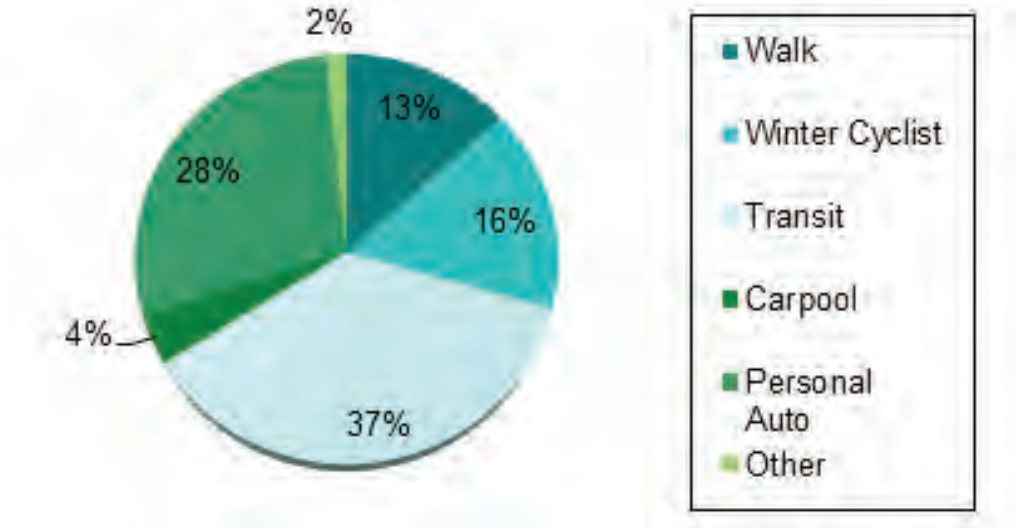
4.2.3 Carsharing

For those relying primarily upon sustainable modes of transportation but who may require the occasional use of a car, the City promotes the use of carshare services by including requirements to provide carshare parking within new developments. Carshare programs are being offered across North America, and are gaining in popularity. In Ottawa, Vrtucar offers a service for residents on a subscription basis.

4.2.4 Full-year Impacts of Cycling

Cycling rates decrease significantly over the winter season, with most cyclists switching to either walking or transit. A survey of more than 2,000 cyclists[64] in Ottawa found that 61% of cyclists who did not continue to cycle through the winter reported switching to a non-car mode of transportation, as shown below. When compared to the city-wide automobile driver share of 70% shown in Exhibit 2.2, it is apparent that cycling improves progress towards over-all mode shift objectives by encouraging sustainable modes of transportation even if winter cycling remains marginal in the near-term.

Exhibit 4.4 – Mode of Transportation in Winter Season for Cyclists

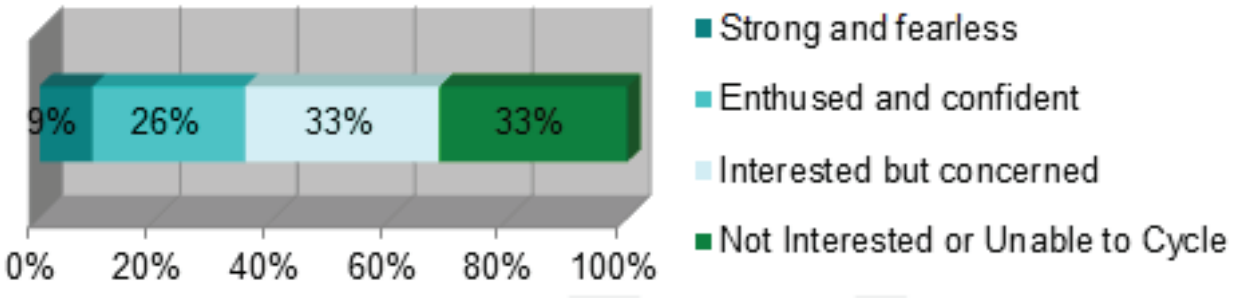


4.3 Quality of Facilities

The Transportation Master Plan establishes the target mode share for cycling in Ottawa at 5.0% city-wide for 2031. To achieve this mode share will require cycling to become attractive to a wider range of residents. To appeal to a wider range of people, the cycling facilities need to be comfortable enough for interested residents to feel safe. The City undertook a commuter survey[65] that categorized residents' attitudes towards cycling into four groups as shown in Exhibit 4.5.

The groupings range from those people who will choose to cycle on roads regardless of road conditions (9%) to those who have no interest in choosing to travel by bike or are unable to do so (33%). The majority of residents (59%) are interested in cycling but prefer bike lanes and separated cycling facilities for safety purposes.

Exhibit 4.5 – Categories of Cyclists in Ottawa



There are a variety of factors that may influence a cyclist's perception of safety, including the speed and volume of adjacent motor vehicles, cyclist volumes, transit operations, the presence and relative location of on-street parking, surface quality and maintenance, and sightlines. These concerns can often be addressed through appropriate roadway design and operation practices.

4.3.1 Facility Types

Ottawa's cycling network largely consists of four different types of facilities: on-street bike lanes, shared lanes with mixed traffic, multi-use pathways and cycle tracks (separated bike lanes). Depending on the circumstances, these facilities have differing characteristics in terms of the level of comfort for residents.

Bike Lanes

Painted bike lanes are on-road facilities that provide reserved space for cyclists, but are not physically separated from vehicle traffic. Bike lanes are appropriate to use where physical separation is not required, but a dedicated lane is still needed for the safety of cyclists. Typically, collector roads and minor arterial roads are appropriate applications for bike lanes. While not as comfortable as a cycle track, providing dedicated road space for cyclists may be sufficient to increase the attractiveness of a route when vehicle volumes and speeds are appropriately low. Bike lanes may also be enhanced with painted buffer strips and seasonal "whip post bollards" that can reduce the likelihood of illegal parking or stopping in bike lanes.

Shared Lanes (Mixed Traffic)

Shared lanes provide no reserved or separated space for bicycles. Where vehicle volumes and speed are low (e.g. on local streets), cyclists can be comfortable riding in mixed-traffic lanes. In some traffic conditions, cycling design treatments (e.g. sharrows, as shown in Exhibit 4.6 below) may improve the visibility of cyclists in shared lanes.

Exhibit 4.6 – Cyclist in Mixed Traffic with Sharrow in Ottawa

Multi-use Pathways

Multi-use pathways are facilities that are physically separated from the road and shared with pedestrians. These facilities may be either adjacent to a road or away from the roadway corridor. As physically separated facilities, multi-use pathways provide a high level of comfort for cyclists.

Multi-use pathways may also be used in place of sidewalks and on-road cycling facilities, where long continuous corridors exist without an active land use pattern (e.g. through the Greenbelt). Such parallel facilities can also be more cost effective to maintain and may be the preferred option along suburban arterials. In areas with a more urban street environment and where intensification is the long-term goal, a phased approach to cycling and walking facilities can be envisaged. Multi-use pathways can be initially deployed, then as land-use evolves a more urban cross-section with cycle tracks and sidewalks could be added without impacting the curb-to-curb portion of the roadway.

Multi-use pathways paralleling arterial roads are often a preferred alternative to cycle tracks in suburban areas where long stretches of unimpeded roadway may occur.

Cycle Tracks (Separated Bike Lanes)

Cycle tracks are an emerging design in North America, although they can be found in many cycling-friendly European cities. They consist of a bike lane within a road corridor that is physically separated from motor vehicle traffic and distinct from the sidewalk. Separation between motor vehicles and cyclists is recommended to ensure safety where vehicle volumes and speeds on roads are high. There are several forms of separation, including concrete curbs, bollards, planter boxes, and on-street parking.

Separated facilities can be provided as either unidirectional or bidirectional. Bidirectional bicycle lanes provide a bicycle lane travelling in both directions on one side of the road. As described in OTM Book 18, bidirectional facilities may provide some benefits in terms of maintenance operations and capital costs, but are more challenging with respect to cycling connections and managing conflicts between bicycles and motor vehicles at intersections. As a result, unidirectional facilities are recommended but bidirectional facilities may be provided at specific locations with careful consideration towards mitigating conflicts at intersections and driveways.

Cycle tracks are especially recommended in urban areas as they provide attractive and safe cycling facilities that meet the needs of all spectrums of cyclists while limiting the right-of-way requirements and minimizing accessibility concerns. Preliminary work has been undertaken to develop a design guideline. This guideline will be further refined and updated to reflect best practices.

4.3.2 Guidance on Designing Cycling Facilities

The following design guidelines have been updated or created recently to reflect some of the new treatments used in bicycle facility design:

- Ontario Traffic Manual (OTM) Book 12 – Bicycle Traffic Signals (in progress)
- Ontario Traffic Manual (OTM) Book 18 – Bicycle Facilities (May 2013 draft)[66]
- Bikeway Traffic Control Guidelines for Canada (Transportation Association of Canada, 2012)[67]
- National Association of City Transportation Officials Urban Bikeway Design Guide (2012) [68]
- American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities (2012)
- OCP2008 Technical Annex (approved in 2008)

The City has numerous detailed technical design references that address roadway cross-sections, detailed designs, roadway planning policy and parks pathway design guidelines. These reference documents will need to be updated to accommodate the cycling facility recommendations within the OCP2013, newly issued design guidelines such as OTM Book18 (along with relevant changes to the *Highway Traffic Act*) as well as to ensure consistency across design guidelines. Preliminary work has been undertaken by City staff related to these guideline updates however, implementation of some new design measures may be limited until such time as there is legal authority to proceed, through updates to Ontario's *Highway Traffic Act*.

OCP Recommendation 4.5:
All relevant City design documents shall be updated to reflect applicable aspects of recent cycling design guidelines for Ontario and Canada. The Accessibility Advisory Committee shall be provided with an opportunity to comment on technical design standards for roadway cross-sections involving cycling facilities as these documents are updated.

There is a wide spectrum of potential cyclists in Ottawa - ranging from those who are comfortable in traffic and do not prefer separated facilities (representing only a small minority of the population) to those who are interested but concerned about traffic and highly reluctant to use a bicycle without separated cycling facilities (representing the majority of the population).

To meet the OCP2013 modal share targets, cycling facilities must be made attractive to the 59% of residents who are interested in cycling but prefer bicycle lanes and separated cycling facilities for safety purposes.[69] The facility design guidance has therefore been targeted to deliver facilities for this segment of the population, which is referred to as the 'design cyclist'.

In most cases, roadway facility designs allow cyclists to mix with traffic if they feel comfortable in doing so. There is no implied limitation within the OCP2013, in relation to a cyclist's use of the roadway where they are permitted under the *Highway Traffic Act*.

Road Narrowings

Roadway narrowings have been used as traffic calming devices and in recent community street designs. They are one of the key tools used by the City's Area Traffic Management (ATM) program to mitigate negative traffic impacts (e.g. speeding and cut-through traffic on local roads) in neighbourhoods. Narrowings can reduce vehicle

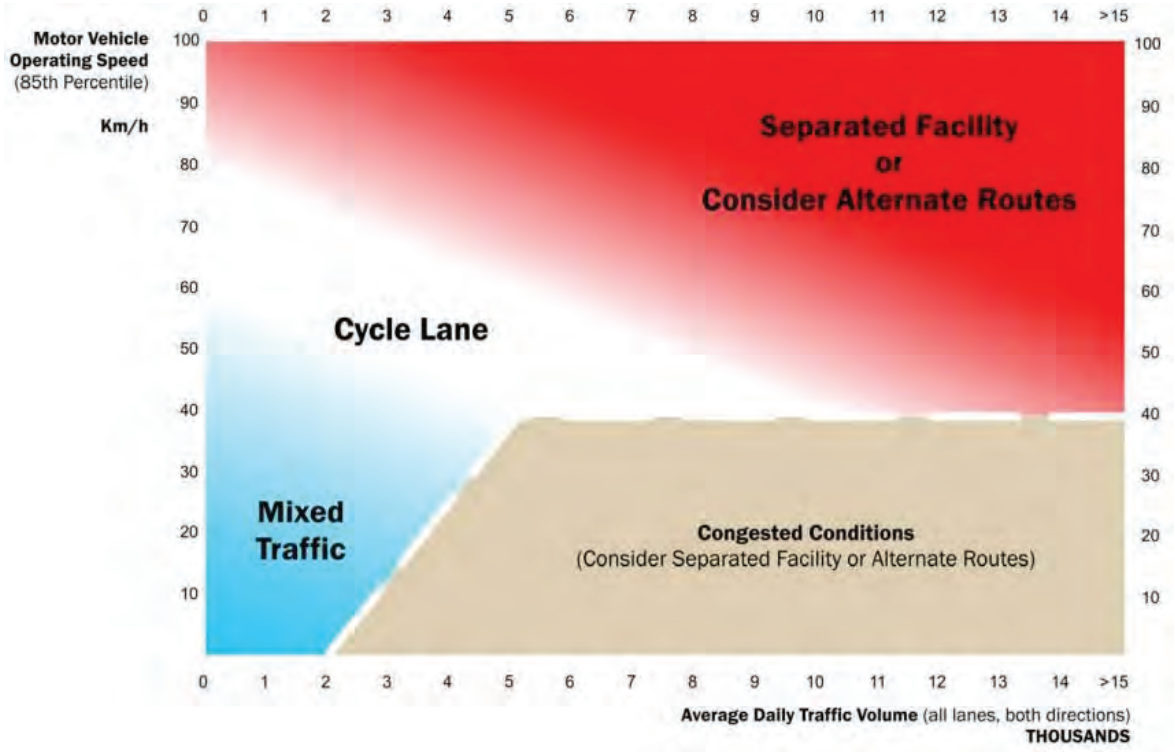
speeds and ensure a more orderly progression of traffic. Especially at intersections or where significant numbers of pedestrians cross the street, they can benefit pedestrians by reducing crossing distances and pedestrian delay, and by preserving clear sightlines between pedestrians and vehicles. Road narrowings can also be a valuable streetscaping or urban design feature, and provide space for amenities such as plantings, benches or bicycle parking. However, road narrowings must be carefully designed to provide shared lanes of adequate width, and they should never interrupt the continuity of an on-road bicycle lane.

4.3.3 Facility Selection Decision Support Tool

In 2011 the City undertook a study that developed criteria to aid practitioners in selecting an appropriate cycling facility for a particular corridor (*Cycling Facility Selection Decision Support Tool)*. The study and the materials developed drew upon research into the current state of practice for segregating cycling facilities from around the world. Alongside the tool, a set of rules was produced to help ensure that the most appropriate facility type would be applied, based on the unique characteristics of each site and the facility selection tool. The facility selection tool, also known as a nomograph, is shown in Exhibit 4.7. This nomograph (with minor adaptations) has also been incorporated in OTM Book 18 (Draft).

For a road corridor where a cycling facility is being contemplated, the nomograph identifies three different types of facilities: mixed-traffic lanes, painted bike lanes, and separated facilities. The daily volume and operating speed of motor vehicles within the road corridor are used to determine which type of facility is appropriate. After the facility type has been identified, a more detailed review of the unique characteristics of the location is required.

Exhibit 4.7 – Facility Pre-Selection Nomograph



4.3.4 Measuring the Quality of Cycling Facilities

In order to achieve the cycling mode share targets identified in this plan, cycling facilities need to appeal to a broader range of the population. To help with this, a level of service for cycling will be introduced to assess the quality of different cycling facilities. The City will use a Level of Traffic Stress (LTS) methodology, based on a recent paper from the Mineta Transportation Institute.[70]

LTS is connected to the safety (actual and perceived) of cycling facilities. It uses road characteristics such as vehicle speed, number of vehicle lanes, and the presence of parking to determine the quality for a particular segment. If the perceived level of safety is low (e.g. cycling next to fast traffic), then the corresponding level of traffic stress for cyclists is high. If the perceived level of safety is high (e.g. cycling on a segregated bicycle facility or multi-use pathway) then the level of traffic stress is low. Provision of cycling facilities with a lower level of traffic stress will appeal to a wider range of Ottawa residents.

Four levels of traffic stress are identified (Levels 1 to 4), with Level 1 reserved for the highest quality of cycling facilities (i.e. being the most comfortable for users). Exhibit 4.8 explains the typical characteristics associated with each level.

LTS measures related to cyclists will be calculated and used to inform design trade-offs related to the addition or improvement of cycling facilities in areas where high cycling rates are anticipated. Areas where LTS calculations should be made are:

- Within the urban core
- Along Traditional Main Streets
- Along Cross-Town Bikeways
- In TOD areas

The LTS calculations are used for guidance only, and do not represent minimum design standards. A description of how to apply the LTS methodology and metric reference tables are included in Annex B. As a new performance measure, the City will continue to assess and refine this methodology as required.

OCP Recommendation 4.6:
The City shall apply the Level of Traffic Stress methodology to assess the quality of cycling facilities. The City will evaluate and refine the methodology as required.

Exhibit 4.8 – Four Levels of Traffic Stress

Level	Description	Example
1	Presenting little traffic stress and demanding little attention from cyclists, and attractive enough for a relaxing bike ride.	
2	Presenting little traffic stress and therefore suitable for most adult cyclists but demanding more attention than might be expected from children.	
3	A moderate traffic stress environment that would typically be considered acceptable by many current cyclists. Cyclists' full attention is required and they may have to integrate with motor vehicle traffic.	
4	High traffic stress environment. Requires integrating with multilane traffic for turning movements. Avoided by most current cyclists; would not be considered by new cyclists.	

(Adapted from MTI Report 11-19[i])

4.4 Bicycle Parking

Easily accessible, secure bicycle parking must be provided at cycling destinations to increase utilitarian cycling. Bicycle parking facilities are provided by both public and private land owners.

Bike parking can further be subdivided into either short-term or long-term parking categories, each having its own unique characteristics. Short-term bicycle parking is generally defined as convenient outdoor bicycle parking (at street level) with weather protection provided (if possible); and security provided by locating bicycle racks in a highly visible area. Short-term bicycle parking is typically used by customers or visitors. Long-term parking is meant to serve those who stay at a particular site for several hours, such as residents of condominiums or employees. Long-term parking should be in a location that is both weather-protected and secured using access control.

4.4.1 Public Bicycle Parking

Short-term Parking

A number of initiatives have encouraged the use of cycling by providing conveniently located bicycle parking. These programs will be maintained and new initiatives will also be introduced to further expand the short-term bicycle parking facilities in Ottawa.

Exhibit 4.9 – Ring-and-Post Bike Parking

Advertising-based bicycle parking program – Through a partnership with Velocity Communications 1,600 parking spaces were provided within the public right-of-way in the central area in exchange for the ability to provide advertisements on the racks. The contract with Velocity has recently been renewed and will be in place between 2013 and 2018. The bike parking capacity will be increased by an additional 100 parking spaces each year so that by 2018, the total number of spaces will exceed 2,000.

Parking meter conversion program – The City of Ottawa recently converted all on-street parking meters to pay-and-display machines. To ensure this program did not inadvertently reduce bike parking capacity, a companion program was initiated to convert some of the former parking meter posts into ring-and-post bike parking. In addition, other new ring-and-post parking racks were relocated or installed in areas not previously covered by the former meters. The City has converted just over 1,150 parking meters to ring-and-post bicycle racks as of September 2013.

OCP Recommendation 4.7:
An additional 150 ring-and-post bicycle racks shall be installed each year or as demand warrants.

Bicycle parking corrals – Where sidewalk space limitations make it impossible to accommodate sufficient bicycle parking, a single on-street parking space for one motor vehicle can be converted to a bicycle parking corral to serve many bicycles. These on-street bicycle parking corrals can be added as temporary facilities during the main cycling season allowing the road space to be used by motor vehicles during the winter when cycling parking demand is low.

OCP Recommendation 4.8:
A Bike Corral Pilot Program will commence in 2014. If it is successful, it is recommended that the City institute an on-going bicycle parking corrals program to complement the ring and post program.

Exhibit 4.10 – On-Street Bicycle Parking Corral

Source: Graber Manufacturing Inc.

Long-term Parking

Long-term bicycle parking should be weather-protected with a higher degree of security as bicycles are left unattended for longer periods of time. Long-term bicycle parking facilities should continue to be provided at transit stations, community facilities, and in dense employment areas with high cycling parking demand.

Covered bike parking at rapid transit stations – As of 2012, the City had 20 bike shelters hosting 25 bike racks at transit stations.

Exhibit 4.11 – Covered Bicycle Parking at the Westboro Transitway Station

OCP Recommendation 4.9:
OC Transpo shall expand covered bike parking at transit stations where high demand warrants and where space and budgets permit.

4.4.2 Bicycle Parking on Private Property

The City currently requires all new commercial and residential buildings to provide bicycle parking on-site according to requirements set out in Section 111, Bicycle Parking Space Rates and Provisions of the Zoning By-law. This requires developers to provide a certain number of parking spaces based on the size of the development and the type of land use. However, the City does not differentiate between short-term and long-term bicycle parking and provides limited direction on rack placement and design compared to other municipalities in North America.

OCP Recommendation 4.10:

The City shall update its Zoning By-law to:

1. Identify separate requirements for both short-term and long-term bicycle parking.
2. Provide further direction within the Zoning By-law to ensure proper rack placement and design of all bicycle parking facilities.
3. Identify all short-term and long-term bicycle parking requirements for each new development on a public website (such as GeoOttawa) to ensure residents, employees and visitors are aware of the parking availability.

4.5 eBike Usage

Province of Ontario

The Province of Ontario determines the rules for vehicles designated as power-assisted bicycles (eBikes) when they are used on public roadways. The City, however, may set its own policy (enforced through by-laws), to regulate the use of eBikes on its pathways, cycle tracks, and designated bike lanes.

A power-assisted bicycle may resemble a traditional bicycle or a motorized scooter. The larger power-assisted bicycles are often heavier, faster and wider than a traditional bicycle, and this has the potential to interfere with other users of the bicycle facilities or multi-use pathways. The current generation of eBikes can be separated into two categories, both of which fall under the current definition of an eBike under Ontario regulation:

- Pedelecs – eBikes with an electric motor that is only engaged while pedaling. This type of eBike can be used without the electric motor. They are visually difficult to distinguish from a regular bicycle.
- eScooters – eBikes with a “scooter” frame, and pedals. The user does not have to pedal while riding this type of eBike.

City of Ottawa

All forms of eBikes have the potential to advance sustainable transportation goals by reducing roadway and parking congestion and eliminating emissions and noise. Pedelecs can provide extended cycling range for many users (up to 17 km is considered feasible), as compared with unpowered bicycles, while still offering health benefits. The policy for Pedelecs and eScooters, therefore, will be as permissive as

possible, with limitations imposed only where adverse impacts with other users (cyclists and pedestrians) are likely. Since the policy differs depending on the eBike type, the City encourages senior levels of Government to formalize this distinction through appropriate regulation or legislation.

The City of Ottawa held public consultations on the type of eBikes that can use rural pathways, and determined that all eBikes (Pedelecs and eScooters) could be used on these rural links. The policy was applied on a trial basis, and subsequently approved by Council on 10 March 2011[71].

The City of Ottawa's approved eBike Usage Policy, which applies to City roads and pathways, follows:

- Pedelecs will be allowed wherever bicycles are allowed.
- eScooters will be permitted on all designated bike lanes where it is possible for cyclists to pass using a travel lane, and where the bike lane is separated from the pedestrian area by a physical barrier.
- eScooters will be allowed on rural pathways. eBike riders should limit speeds to 20 km/h, less when passing pedestrians.
- eScooters will be allowed on select multi-use pathways on a case-by-case basis (i.e. where long sections of a multi-use pathway run alongside high speed roads without bike lanes).
- eScooters will not be permitted on cycle tracks. Cycle tracks may provide less separation between pedestrians and cyclists, and have some characteristics in common with multi-use pathways, making use by eScooters less desirable.

National Capital Commission

The NCC recently held public consultations[72] on this subject, and decided to allow Pedelecs along their multi-use pathways, but not eScooters.

The rules for eBikes on NCC multi-use recreational pathways[73] are:

- Electric bikes that physically resemble conventional bikes are permitted on the NCC's Capital Pathway Network.
- All electric bikes, including scooter-type, are permitted on dedicated NCC bike lanes (as opposed to the multi-use recreational pathways, and the Capital Pathway Network).

- Scooter-type power-assisted bikes are prohibited on the NCC's Capital Pathway Network, during Sunday Bikedays and Saturday Short Loops programs. Very often, the electric bike with a non-conventional appearance is much heavier than a conventional-type electric bicycle and therefore poses greater risks to safety in the event of a collision.
- In Gatineau Park, all electric bikes are prohibited on the 90 kilometres of natural surface trails intended for hiking and mountain biking.
- Rules for electric bikes do not apply to motorized mobility aids such as wheelchairs, three-wheel electric scooters and four-wheel electric scooters.

The NCC pathways now have signs banning eScooters, as shown in Exhibit 4.12.

Exhibit 4.12 – NCC's No eScooter Sign

OCP Recommendation 4.11:
The City will request through the provincial government that the current eBike category be split, to establish standards for a Pedelec category.

OCP Recommendation 4.12:
City traffic and parking by-law and signage policies will be modified, and signs posted as needed, to support implementation of the above policy, consistent with the provincial legislative framework.

5.0 Cycling Infrastructure

Cyclists are permitted on all City roadways with the exception of major divided highways. However, as previously established, most cyclists require comfortable dedicated cycling facilities in order to choose to travel along roads with high motor vehicle volumes or speeds. It is currently not feasible to retrofit all City roadways with comfortable cycling facilities within the planning horizon. Therefore, a cycling network has been developed that identifies priority routes for cycling facilities. The cycling network should be considered an evolving plan with updated versions posted to GeoOttawa on an as-needed basis. For more information about the cycling network maps on GeoOttawa, refer to Annex C.

5.1 Ultimate Network Concept

The OCP2013 has proposed a complete network of cycling routes covering the entire City. This Ultimate Network Concept (UNC) has no targeted completion date, but serves as a framework for projects prioritized within the OCP2013's 2014-2031 implementation plan. The second important role of the UNC map is to allow for coordination when road-works or developments are being reviewed, so that future needs of the cycling network can be taken into account wherever possible, facilitating and lowering costs for eventual implementation. There is no attempt to project a facility type along any route segment within the UNC, since this decision will follow guidance provided elsewhere in this document, and facility design will also likely evolve over time. Multi-use pathways are identified within this plan, and they serve both cycling and pedestrian needs. The UNC map can be found online on GeoOttawa, under the Cycling Plan tab.[74]

Ottawa's ultimate cycling network features continuous, higher capacity spine routes for direct, longer distance travel, supported by smaller scale local routes for local access. These routes will be interconnected with the City's and NCC's off-road pathway network. The UNC map includes the following route categories:

- Spine Routes
- Local Routes
- Pathways

When completed, the Ultimate Network will include 2,529 km of cycling facilities as shown in Exhibit 5.1.

OCP Recommendation 5.1:
When initiating a roadway design for new road construction, road reconstruction or road resurfacing (regardless of whether it is identified as part of the cycling network), staff shall consult with PGM to identify whether cycling facilities should be included. Cycling needs should be considered during Environmental Assessments and Community Design Plans and included in the City's road design standards.

Exhibit 5.1 – Length of Route Types in Ultimate Network Concept

Route Category	Proposed Length (km)		
	Existing	Proposed	Total
City-Owned			
Spine Route	311	535	846
Local Route	467	332	799
Major Pathway	263	203	466
Minor Pathway	192	25	217
NCC			
Spine Route	7	0	7
Major Pathway	138	32	169
Minor Pathway	25	0	25
Total	**1,403**	**1,126**	**2,529**

5.1.1 Spine Routes

Spine routes follow major roadways (typically arterials) and may provide a reserved space for cyclists, ideally either a cycle track or a buffered bike lane. Spine routes will provide access along major corridors, connecting the Cross-Town Bikeways and major off-road bike paths to local neighbourhood local routes and Neighbourhood Bikeways.

5.1.2 Local Routes

Local routes will typically be used at the neighbourhood level, providing access from residential streets and shopping areas to the more major spine and bikeway routes that will allow travel for longer distances through the city. Local routes will typically be on-road facilities, and could be painted bike lanes, or shared lanes with mixed traffic depending on the configuration of the road.

5.1.3 Pathways

Multi-use pathways are ideal along continuous corridors without many intersections. Occasionally, multi-use pathways can be found in urban settings as linkages or cut-throughs between roadways. Multi-use pathways may also provide both cycling and pedestrian linkages along major arterials.

Major pathways provide long, continuous routes while minor pathways would include short connections, or provide an alternate, indirect path that is not being used as a through-route.

5.2 Cycling Network Development

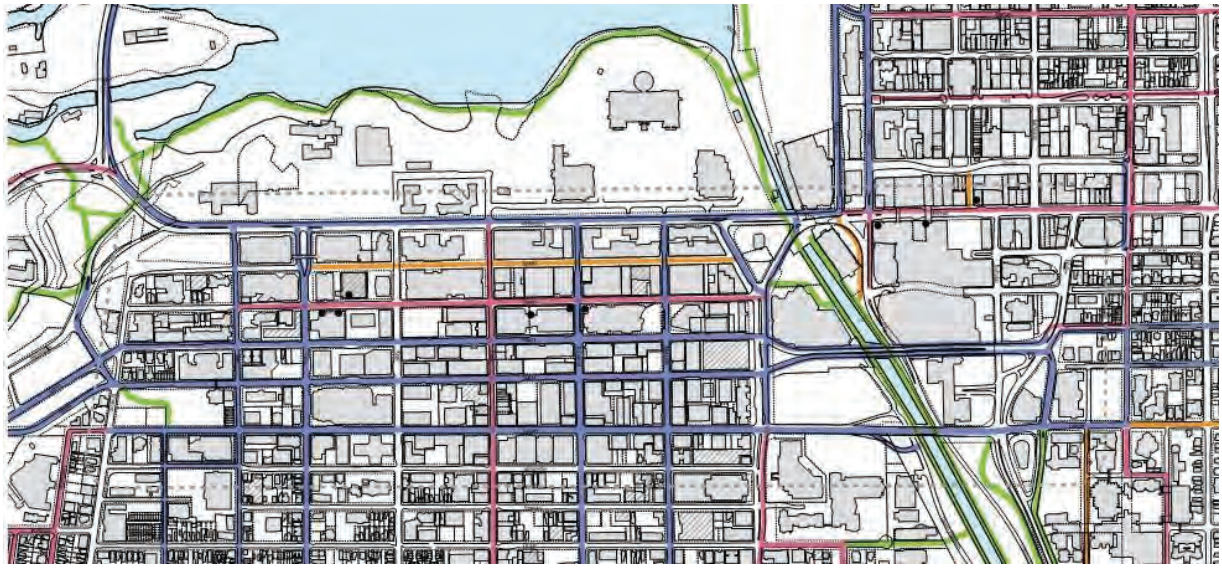
The OCP2008 was used as a basis for the development of the OCP2013 network. The updated network map incorporates a number of route elements that have been identified through supporting planning documents, as further elaborated below.

5.2.1 Downtown Moves

The City initiated the Downtown Moves project, which was approved by Ottawa City Council on March 27, 2013 (Report 02-ACS2013-PAI-PGM-0064), to provide urban design and transportation guidance that capitalized upon roadway re-purposing opportunities presented by the introduction of the Confederation Line. Downtown Moves was developed to create safe, vibrant and accessible streets for all users. The vision for cycling within the plan was to develop a comprehensive network of comfortable and convenient bicycle routes in the downtown.

The cycling network defined within Downtown Moves is shown in Exhibit 5.2 and recommends a number of facilities be implemented as cycle tracks. The relevant Downtown Moves recommendations have been included in the cycling plan network, as part of the spine or local network, as appropriate.

Exhibit 5.2 – Recommended Cycling Routes for Downtown



Source: Downtown Moves Study (2013)

5.2.2 Confederation Line and Transit-Oriented Development (TOD)

The Confederation Line LRT follows the existing alignment of the Transitway between uOttawa and Blair Stations, passing through an underground tunnel below the downtown core. The Confederation Line will include new multi-use pathway segments parallel to the alignment between uOttawa and Lees Stations as part of the construction budget. The Confederation Line design also contains provision for a pedestrian pathway extending north from uOttawa Station to meet with Laurier Avenue. The current design of this facility calls for a pedestrian facility only.

OCP Recommendation 5.2:

The City shall review the feasibility of a cycling link between Laurier Avenue and the Rideau Canal Eastern Pathway, which allows for a direct 'cycle through' option connecting through uOttawa Station. The Rail Implementation Office shall work with PGM to explore the feasibility of such a link.

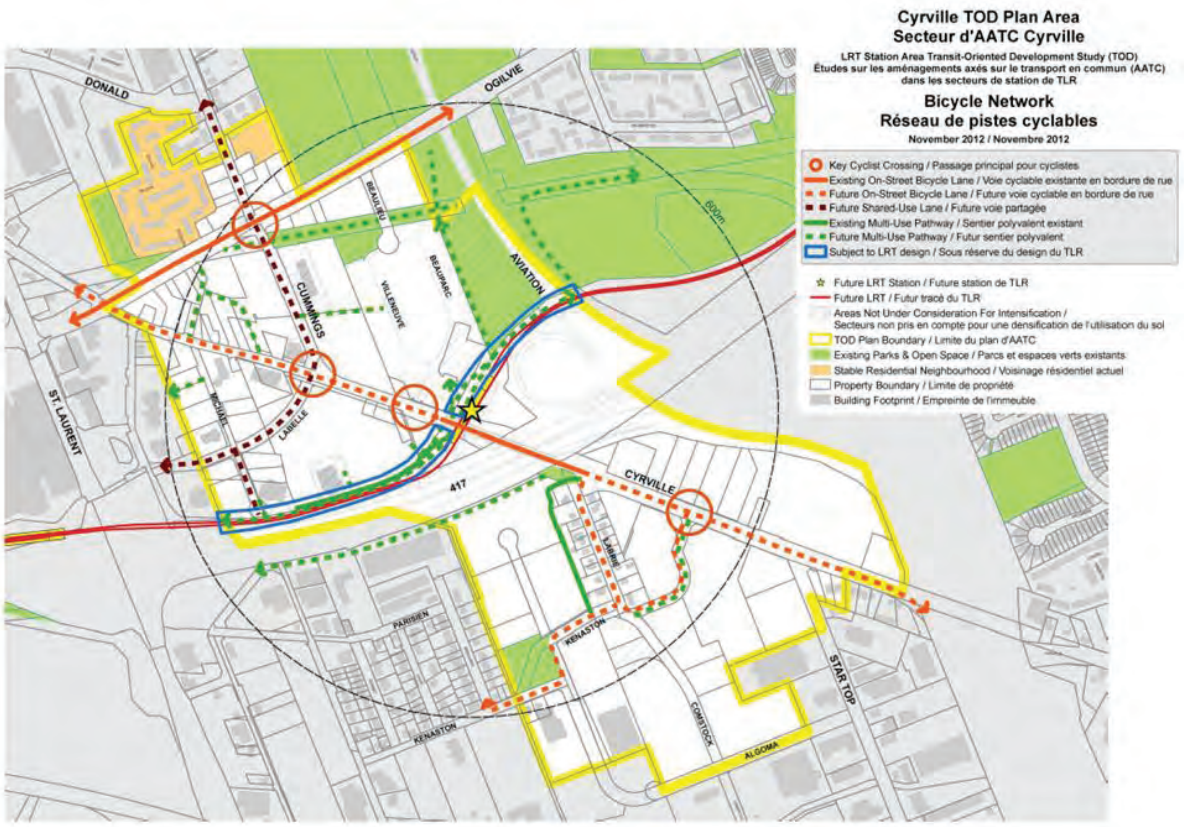
To support the Confederation Line, City Council selected six LRT stations with a high potential for urban re-development intended to increase densities adjacent to the new LRT stations (TOD). Each of these six TOD stations were evaluated to identify needed cycling links that could be used by customers living in neighbourhoods near the station (but outside of easy walking distance) to access the station and its environs.

This analysis identified cycling routes within a seven-minute to 15-minute cycling distance from a Confederation Line station assuming the provision of very low stress cycling facilities. Listed below are six LRT stations for which TOD area linkages have been defined:

- Lees
- Hurdman
- Tremblay
- St. Laurent
- Cyrville
- Blair

The plans developed for the TOD area include many linkages that could not be accommodated within the affordability envelope, but are nonetheless included in the OCP2013 Ultimate Network Concept map. Some of the identified linkages are expected to be provided as a condition on site redevelopment, and so will be provided outside of the OCP2013 budget; although no specific timeframe can be projected for completion. An example of TOD cycling linkages is provided in Exhibit 5.3 for the Cyrville LRT Station on the Confederation Line.

Exhibit 5.3 – Cyrville Station Bicycle Network (TOD Study)



5.2.3 Routes to Key Employment and Education Areas

A review of 2011 OD Survey data identified employment areas outside the central core with the highest number of short-distance trips (using all modes). A total of ten employment areas were evaluated with five selected for a detailed review of cycling infrastructure gaps.

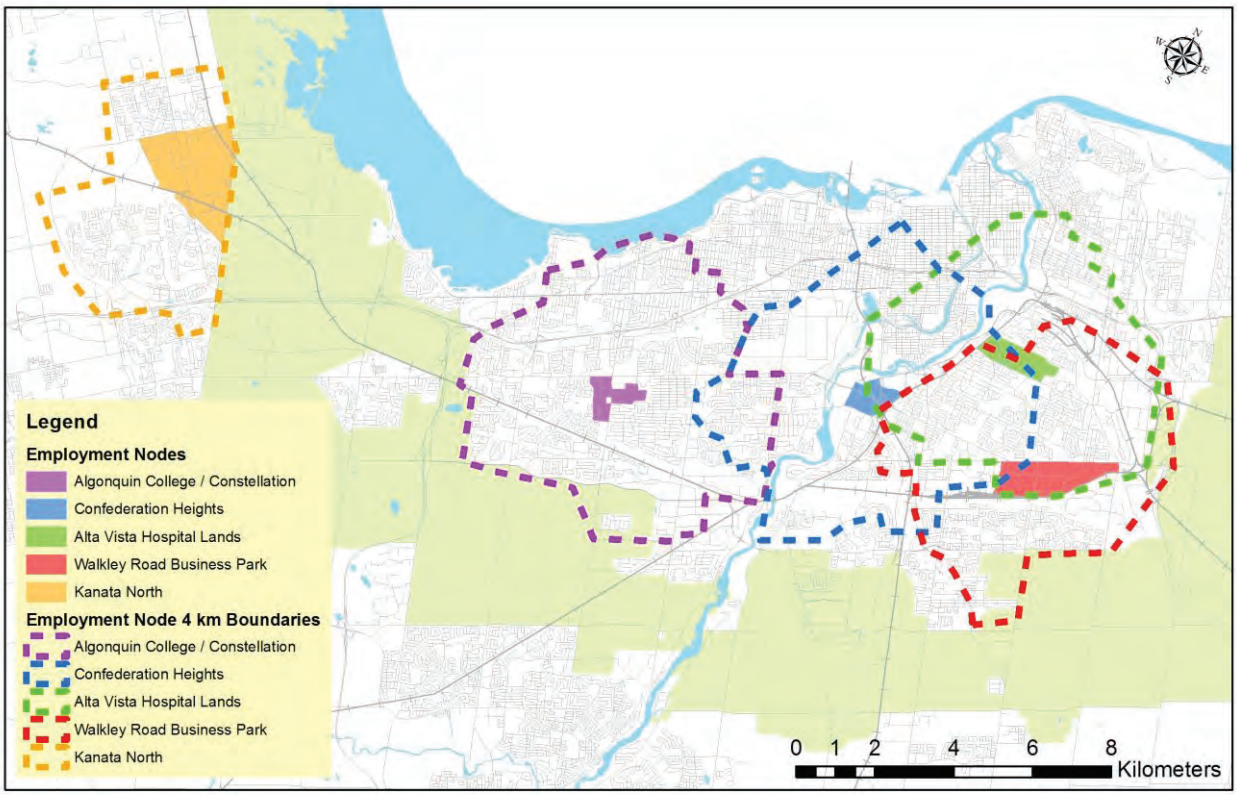
The five nodes were selected based on potential to improve the cycling mode share for residents travelling to/from these nodes in the AM/PM peak periods. Criteria included ratio of short-distance trips and current volumes and mode share of auto drivers and cyclists to the node. The five nodes that were selected are listed in Exhibit 5.4 and shown in Exhibit 5.5 along with a four-kilometre study area boundary where gaps were evaluated.

For each of the five nodes, cycling routes of up to four kilometres were identified and recommended improvements to these routes were prioritized with consideration to overall cycling network improvements. The identified desire-line routes to these employment areas can be found in Annex D.

Exhibit 5.4 – Priority Employment and Education Areas

Destination	<4 km			<8 km			All Distances
	% Auto Driver	% Bike	Trips	% Auto Driver	% Bike	Trips	Trips
Kanata North	84%	1%	1,240	85%	1%	2,740	8,540
General Hospital/ CHEO	67%	5%	1,590	68%	4%	2,830	5,500
Algonquin College/ Centrepointe Dr.	28%	4%	1,790	35%	2%	3,740	9,190
Canada Post/ Confederation Heights	61%	13%	1,180	60%	7%	2,330	4,730
Walkley Business Park	59%	2%	640	64%	1%	1,970	4,060

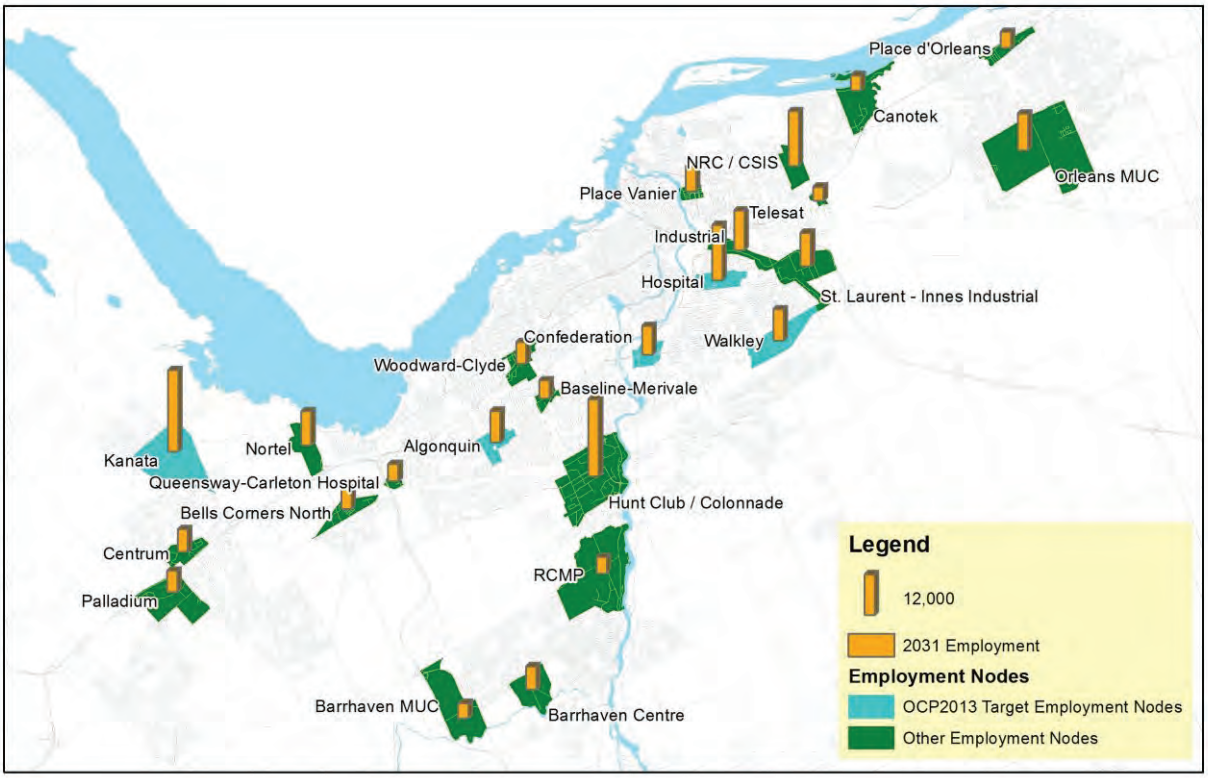
Exhibit 5.5 – Selected Major Employment Nodes



A review of projected employment levels for 2031 identified future high employment nodes outside of the core area, shown in Exhibit 5.6.

OCP Recommendation 5.3:
An additional five employment areas shall be evaluated using the same process as part of the next update to the OCP or as additional funding becomes available in the medium- and long-term horizons.

Exhibit 5.6 – Future Employment Nodes Outside the Core Area



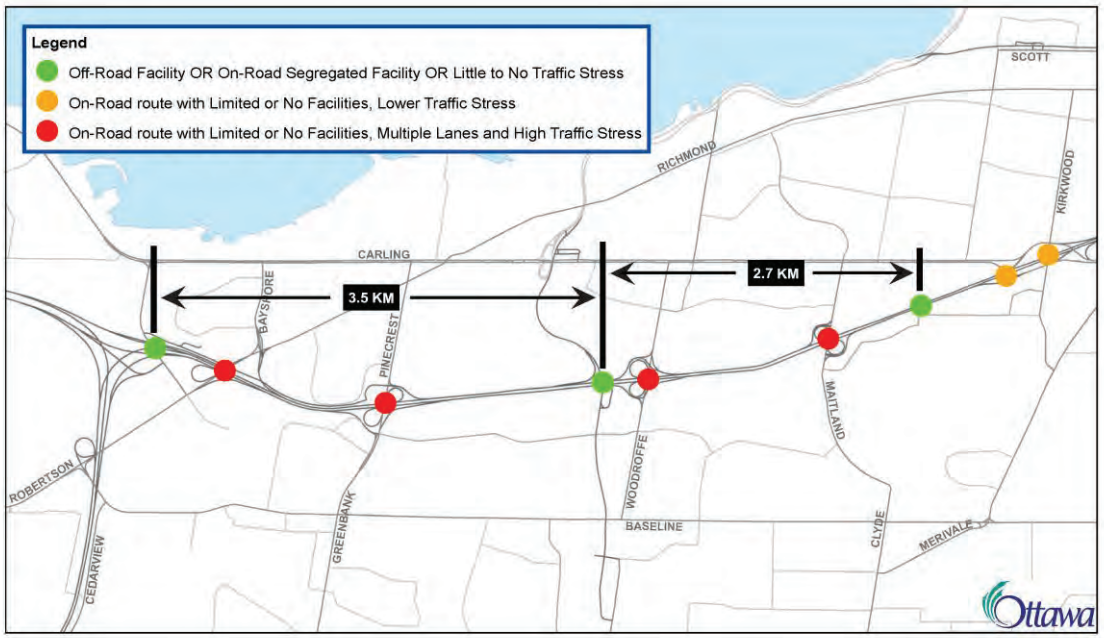
5.2.4 Multi-use Bridges and Structures

To achieve a comfortable and convenient cycling network, connections for cyclists and pedestrians across major natural and manmade barriers have been considered. These structures have been considered separately from other cycling capital infrastructure projects because they benefit both the pedestrian and cycling networks and often have significant capital costs.

Some of the most significant barriers in Ottawa include the Rideau and Ottawa Rivers, the Rideau Canal, Highways 416 and 417, the O-Train, the Transitway (and future Confederation Line) and the numerous other rail corridors passing through the city. Although several crossings of these barriers already exist, they naturally attract high levels of vehicular traffic, are often severely constrained in terms of width or right-of-way and therefore provide low levels of service for cyclists and pedestrians. On the other hand, where a bicycle- and pedestrian-only crossing can be provided, the level of service for these users becomes very high, as well as providing more direct routes. A key bicycle and pedestrian crossing can quickly transform travel behaviours in favour of sustainable transportation for communities otherwise cut-off from natural desire lines. Such crossings also allow the establishment of longer Neighbourhood Bikeway routes.

Through numerous planning initiatives (e.g. CDPs, environmental assessments) and through public engagement including the on-line feedback tool, a number of potential locations for multi-use crossings have been identified. These locations are posted on GeoOttawa[75]. Bicycle and pedestrian bridges that have been funded within the planning period have been identified in Section 5.3.7.

Exhibit 5.7 – Example of Cycling Barrier: Highway 417 in West Ottawa



5.2.5 Rural Cycling Network

The largest portion of the city is composed of rural lands including several rural villages. The OCP2008 proposed multiple parallel cycling routes through the rural areas. As identified in Section 2.1.2, only 0.2% of rural trips are currently travelled by bicycle. Owing to the very low proportion of short-distance trips in the rural area, it is not expected that the cycling mode share will increase within the planning horizon. The OCP2013 has reduced the number of rural road kilometres designated for cycling, as compared with the OCP2008. This change was implemented to:

- Focus on the key routes that are required to connect rural communities
- Target lifecycle investments on those routes that are deemed to provide the most benefit in a manner that is consistent with the City's Comprehensive Asset Management Program

A simplified rural network of linkages (typically implemented as paved shoulders or multi-use pathways) has been added to the OCP2013 Ultimate Network Concept to meet the needs of recreational cyclists and rural residents.

5.3 Cycling Network Implementation

The OCP2013 has established targets and budget requirements for the 2031 planning horizon, with implementation over three time frames:

- Phase 1 projects to be implemented between 2014 and 2019
- Phase 2 projects to be implemented between 2020 and 2025
- Phase 3 projects to be implemented between 2026 and 2031

The first six-year planning horizon (2014-2019 inclusive) is intended to support the Comprehensive Asset Management Program, and the Official Plan. It also captures the changes expected to occur after the Confederation Line is in operation and the short-term recommendations of the Downtown Moves and TOD studies.

The phasing of the identified projects is critical to the development of the network. Projects proposed in the first phase have been identified, to guide the logical and continuous growth of cycling connectivity in this early stage and encourage increased cycling.

Projects already implemented, or approved and funded prior to 2014, represent the starting point for future network implementation plans described within the OCP2013. A map of the existing (2013) cycling network is available via the GeoOttawa online mapping tool[76] and includes a description of the type of facility built.

Any major cycling projects that were approved and funded prior to 2014 but are not yet completed (i.e. Ottawa on the Move projects) are shown in the OCP2013 project maps as “work in progress” (WIP). They are not included in the OCP2013 project implementation plan.

Circumstances in budgeting, infrastructure development and political direction over the implementation of this Plan could result in changes to priorities, adjustments or additional opportunities that have not been foreseen. Therefore, changes to the cycling network are a possibility. Priorities are addressed during the annual budget deliberations. GeoOttawa[77] should be consulted for the most up-to-date information on the cycling network.

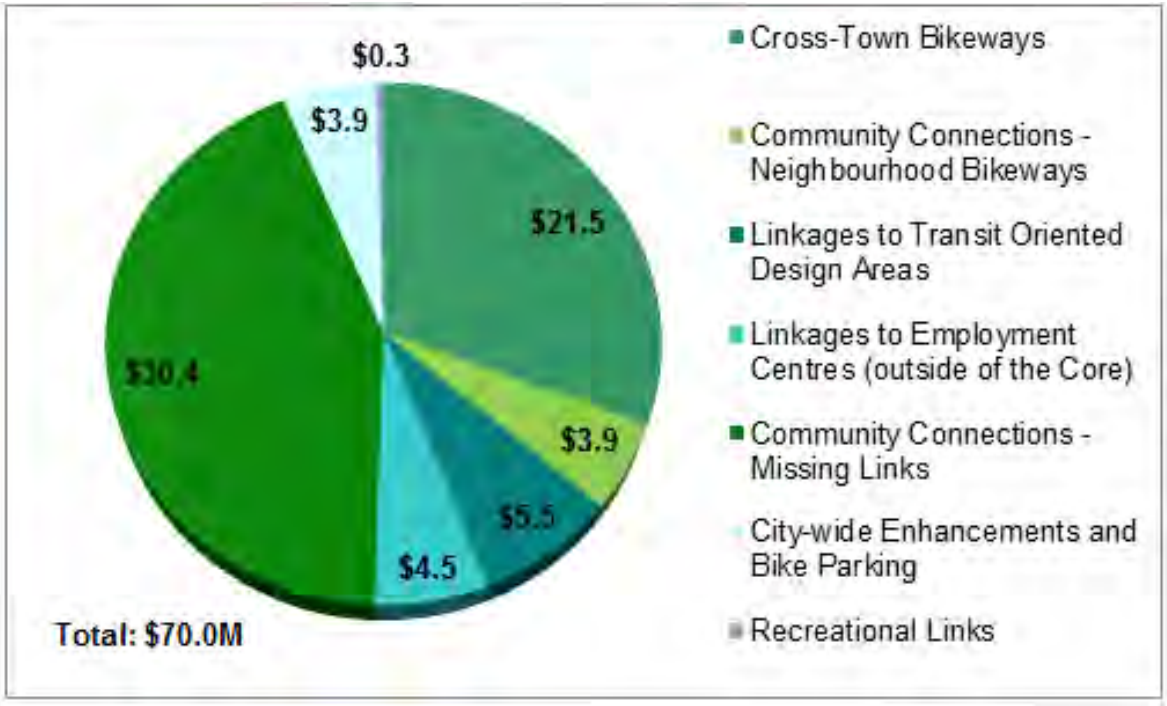
5.3.1 Cycling Program Investment Categories

Direct funding for cycling facilities has been established as a cycling capital budget that is subject to annual approval. The direct funding required for cycling infrastructure totals $70 million over the term of this Plan. This has been allocated to several different categories of cycling-supportive infrastructure and programs further elaborated within this section.

The allocation of the cycling capital budget for each major capital investment category is summarized in Exhibit 5.8. The maintenance and renewal costs for these cycling facilities will be reflected in Public Works and Infrastructure Services financial plans. The list of projects is described in the OCP2013 Project Table in Annex E.

New or enhanced cycling facilities add to the City's overall asset base and will therefore require additional funding for both ongoing maintenance and life-cycle replacement costs. The affordability exercise undertaken within this planning cycle recognizes and evaluates these costs. Maintenance costs for new and enhanced cycling facilities have been included within the funding plan. Life-cycle costs for all cycling facilities have been captured within the City's Comprehensive Asset Management Plan, and are also considered in establishing the funding plan.

Exhibit 5.8 – OCP2013 Funded Investments by Category



5.3.1.1 Process for Selection of Priority Cycling Projects

An initial screening of the proposed cycling network was undertaken to identify cycling links that would most effectively fulfill the objectives of each investment category. The criteria considered as part of for this screening is summarized in Exhibit 5.9.

The segments that contributed to multiple objectives were reviewed and grouped with relevant adjoining segments to identify projects. This list of cycling projects was supplemented with other key projects identified separately, including Neighbourhood Bikeways, employment node projects, high priority TOD projects and key missing links, to generate a comprehensive list of projects that could be accommodated in the $70-million budget allocated to the OCP2013.

Exhibit 5.9 – Elements Considered in the Identification of Priority Links

Element	Rationale
Develop a city-wide connected network	
Cross-Town Bikeways	Segments of the cycling network that will make up sections of the proposed Cross-Town Bikeway network were reviewed to reflect the priority of the Cross-Town Bikeways as a key network element.
Missing links	Missing links were identified as facilities that would bridge gaps between existing cycling facilities and increase the connectivity of the network as a whole.
Community requests	Cycling links that were identified as priorities by members of the public through consultation exercises were considered.
Increase the cycling mode share (with a focus upon peak period travel)	
Employment node links	All cycling links within a 4-km radius of the five employment nodes identified for consideration in Section 5.2.3 were reviewed.
Cycling potential	Over 70% of all cycling trips reported by the 2011 OD Survey were less than 4 km. The cycling potential of each link was estimated based on the number of trips of 4 km or less (by all modes) that originate or are destined to their area of the city.
Improve the integration of cycling and transit	
Proximity to rapid transit	Cycling links that provide access to facilities along the Transitway and O-Train Stations were reviewed.

The selection of facility types for the projects identified for the OCP2013 was based on the City of Ottawa's Cycling Facility Selection Decision Support Tool identified in Section 4.3.3. The list of projects is provided in the OCP2013 Project Table in Annex E.

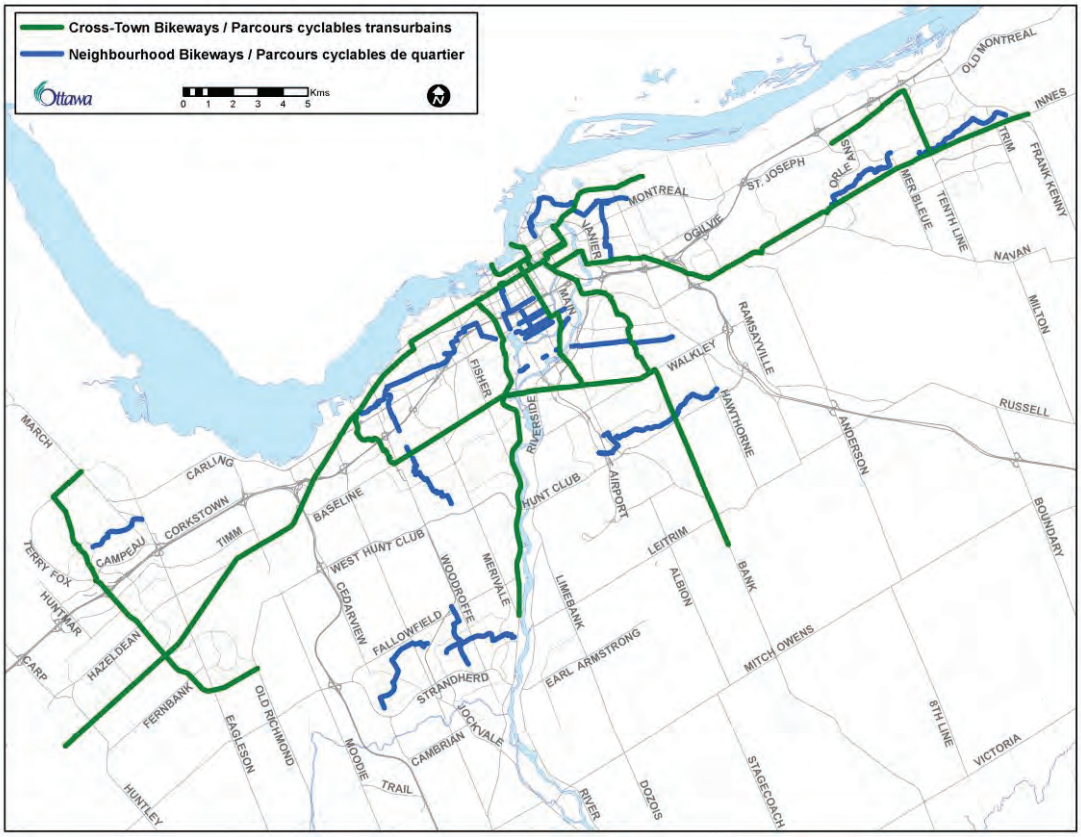
5.3.1.2 Cross-Town Bikeways

The Cross-Town Bikeway network will provide continuous connectivity over long distances for cycling across the city, as shown in Exhibit 5.10. Each Cross-Town Bikeway has been phased, with the sections nearest to the urban core built first, followed by connectivity to the suburban areas in the long term.

The Cross-Town Bikeways identified in the OCP2013 represent one of the highest priority targets for funding, and have been selected for feasibility of implementation.

Cross-Town Bikeways will include both on-road and off-road facilities that will provide a consistently high level of comfort for their entire length and be the main priority of the cycling network for maintenance. Cross-Town Bikeways will maximize the use of cycling-friendly designs such as bike boxes, coloured intersection crossings, route signage, and signal timing adjustments.

Exhibit 5.10 – Map of Bikeways Network



5.3.1.3 Neighbourhood Bikeways

Neighbourhood Bikeways are intended to provide comfortable cycling routes for residents within their local communities by linking residential areas to local institutions, parks, natural areas, historic sites, transit, amenities, and commercial land uses. They are routes generally located on quiet, low traffic volume local roads and may take advantage of neighbourhood multi-use pathway connections. These Neighbourhood Bikeways will be designed to limit vehicle speeds, reduce cut-through vehicle traffic and prioritize cyclists and pedestrians. Examples of potential treatments along a Neighbourhood Bikeway include:

- Information/regulatory signage
- Traffic diverters at intersections that are permeable for bikes but not vehicles
- Intersection traffic controls with cycling provisions/priority
- Curb modifications (e.g. road narrowings, ramps)
- Bicycle-friendly traffic calming measures

Exhibit 5.11 – Bicycle Priority Measure at the Intersection of Fifth Avenue and O'Connor Street

The above treatments are intended as relatively inexpensive retrofits of existing facilities. Since Ottawa does not possess a highly regular street grid, some

Neighbourhood Bikeways will rely in part upon bicycle/pedestrian-only links for a continuous cycling route. The OCP2013 Network Implementation budget will fund several Neighbourhood Bikeway projects through established neighbourhoods. Preliminary routings have been developed and shown in the OCP2013 network maps. However, the routings are preliminary and will be further assessed based on the following criteria:

- Cycling as an alternative to driving
- Facilitate existing cycling demand
- Better connectivity
- Appropriateness of Neighbourhood Bikeway

5.3.1.4 Transit-Oriented Development Links

Section 5.2.2 of this report introduced the six TOD areas that have been identified through studies by the City. The cycling capital budget includes provision for the implementation of key cycling links identified within all six TOD study areas.

The phasing was developed to incorporate TOD cycling projects in Phase 1 or 2 to closely align with the opening of the Confederation Line. Timing also takes into account the timing of the development of other proposed cycling facilities.

5.3.1.5 Employment Centre Links

Section 5.2.3 of this report identified five employment areas that are considered candidates for implementing improved cycling access via key links. The cycling capital budget contains provision for the implementation of the proposed improvements in one of the identified employment areas per year between 2015 and 2019. The nodes were prioritized based on both their estimated relative cycling potential and the timing of other complementary road works. The order of implementation is shown below:

- Algonquin College / Centrepoint Dr.
- General Hospital / CHEO
- Canada Post / Confederation Heights
- Kanata North
- Walkley Business Park

5.3.1.6 Missing Links

Although there has been significant growth in the total length of facilities in recent years, Ottawa's cycling network remains fragmented. The "missing links" projects identified within the OCP2013 Network Implementation Plan will enhance the utility of past investments by interconnecting existing cycling facility fragments.

5.3.1.7 Bike Parking

Section 4.4 of this report outlines several initiatives undertaken by the City to develop options for secure bike parking in key areas of demand. The cycling capital budget contains provision for the initiation of related key pilot projects.

The on-going expansion of ring-and-post bike parking within City rights-of-way is managed by Parking Operations through its mandate to support and encourage sustainable modes of transportation.

5.3.2 New and Reconstructed Roads

It is much less expensive to add new on-street bicycle lanes as part of a major road reconstruction project or a new roadway project vs. a retro-fit of cycling facilities to an existing roadway. Costs related to cycling enhancements which are included as part of a new or rebuilt road project will be incorporated within that project's budget. This funding scenario also applies to major bridge structure rehabilitation projects.

For pilot projects related to cycling facilities, OCP2013 program budgets shall cover any incremental maintenance costs during the term of the pilot, as well as the estimated cost of de-commissioning the project after the pilot phase (if necessary).

Annual maintenance and life-cycle renewal costs for new or upgraded cycling facilities will be considered under the affordability and Comprehensive Asset Management financial projections process.[78]

Upgrades to cycling facilities are sometimes implemented as part of other projects such as road resurfacing, water and sewer line replacements/upgrades or transit priority measures. In these cases, cycling program funds will cover the incremental costs for the addition of cycling facilities.

5.3.3 Paved Shoulders in Rural Areas

Some older rural roads have sub-standard pavement widths. When any rural road is re-habilitated, it will be brought up to the new standard pavement width if feasible. Such upgrades will provide some limited improvement to cycling conditions along these routes.

For roads inside of the Urban Boundary with rural cross-sections, the addition of paved shoulders will be considered on a case by case basis according to demand and affordability. In such cases, the nomograph found in OCP Exhibit 4.7 will be consulted to determine if paved shoulders are warranted. In the rural area (outside of the Urban Boundary), paved shoulders will be added or restored as part of the repaving budget on spine routes identified in the Ottawa Cycling Plan. The paved shoulder width in these cases will be 1.5 to 2.0 m, depending on roadway characteristics. In isolated cases

adverse conditions (such as constrained road corridors or the need to reconstruct part of the road to expand the road base, relocated ditches and hydro poles) may make it cost-prohibitive to increase shoulder width to add paved shoulders. In such cases, Infrastructure Services will work with Planning & Growth Management to identify alternate routes.

5.3.4 New Development

New cycling facilities such as bike parking, pathways and enhanced facilities along roadways to new developments can be incorporated into site plan and subdivision agreements as special conditions with costs covered by the developer. In areas of intensification, contribution to the expansion of the cycling network is one way individual developers can mitigate the traffic impacts of their developments.[79]

A number of commercial developments proposed in the vicinity of the TOD areas include cycling infrastructure as part of the development plan (to be funded by the developer) that have been included as part of the Cycling Plan network. The requirement for cycling infrastructure will be included as special conditions within site plan agreements.

5.3.5 Rapid Transit Projects

Major transit projects will include funding for parallel cycling linkages identified within the OCP2013 Network Implementation, or Ultimate Network Concept plans. The cycling facilities will be constructed at the same time as the transit facility. Examples of major projects include the western LRT extension and the proposed Baseline BRT corridor.

OCP Recommendation 5.4:
Major transit projects will include funding for cycling linkages identified within the OCP2013 Network Implementation or Ultimate Network Concept plans.

5.3.6 Recreational or Tourism Links

To fund extensions to the cycling network that are mainly recreational, funding sources outside of the OCP2013 will be utilized where possible. One such funding source is the Cash-in-lieu of Parkland reserves that have been identified on a ward-by ward basis. With the approval and support of one or more councillors, reserve funds could be used to build new recreational links on City-owned land, or on land leased by the City on a long-term basis.[80]

OCP Recommendation 5.5:
Where possible, the City will fund extensions to the cycling network that are largely recreational through Cash-in-lieu of Parkland reserves.

5.3.7 Multi-use Bridges and Structures

Dedicated cycling/pedestrian bridges or tunnels will be funded by a Structures budget highlighted within the TMP affordable network budget, totalling $40 million during the 2014-2031 planning period.

Previous planning exercises undertaken by the City identified a number of locations with potential for supporting new bridges or tunnels along cycling routes. These potential structure locations were evaluated and three projects were selected for Phase 1 and Phase 2 of the 2031 Multi-use Pathway Structures plan, as shown in Exhibit 5.12. Further evaluation in subsequent cycling plans will identify any additional structures to be included within the Phase 3 planning window (2026- 2031).

The financial feasibility of adapting the Prince of Wales bridge for use by pedestrians and cyclists will rely on joint funding arrangements which are not currently secured. Technical and regulatory assessments must also be successfully completed before the feasibility of this project can be fully determined.

Bridges and tunnels may also be required as a condition of development (for example the Hickory O-Train Bike/Pedestrian bridge), funded under Section 37 agreements, or provided as part of another major capital project such as an LRT or BRT expansion.

The provincial government has an important role in helping to make crossings of its urban highway system (Highways 416 and 417) safe and comfortable for cyclists and pedestrians. Provincial funding for crossing improvements/alternatives is being suggested for inclusion into the Ontario Cycling Strategy policy as detailed in Section 7.3.

Exhibit 5.12 – 2031 Affordable Multi-use Pathway Structures

Project	Description	Rationale
Phase 1 (2014 – 2019)		
Rideau River Bridge	New pedestrian and cycling bridge over the Rideau River between Donald Street and Somerset Street East	• Major connection to University of Ottawa • Allows for direct connection between Vanier and Rideau Canal Pathways
Prince of Wales Bridge	Improvements to the existing Prince of Wales Bridge over the Ottawa River, connecting the Ottawa River Pathway to the Voyageurs Pathway (Gatineau)	• Adapts the existing Prince of Wales Bridge to accommodate a multi-use pathway • Provides a comfortable connection between the NCC Pathways on both sides of the Ottawa river as well as to the O-Train multi-use pathway (opened in 2013) • Provides a connection between Gatineau and the Rapid Transit hub at Bayview Station
Phase 2 (2020 – 2025)		
Rideau Canal Bridge	New pedestrian and cycling bridge over the Rideau Canal from Clegg Street to Fifth Avenue	• Connects Glebe to Old Ottawa South, connecting NCC paths on either side of the canal • Connection between proposed Glebe Neighbourhood Bikeway and proposed cycling facilities along Main Street • Major connection to Lansdowne Park

Exhibit 5.13 – Artist's Conception of Donald-Somerset Bridge Over the Rideau River

5.4 Cycling-friendly Pavement

Proper maintenance is imperative to providing cyclists with an appropriate level of service. Bicycles are more susceptible to irregularities in roadway conditions than motor vehicles, and deterioration of the roadway surface such as potholes, road-cuts, cracking and debris near the curb increases the risk of injuries to cyclists.

While it may represent additional time and operating costs, reorganizing existing maintenance priorities can contribute to the success of delivering an effective and well-used cycling network. This includes snow and ice clearing in the winter from designated cycling facilities, sweeping of debris in the spring, summer and fall, and special precautions for road cuts along cycling facilities. It is important to note that reorganizing existing priorities to better support the cycling network would require additional funds or alternately will require, in some cases, delayed roadway and sidewalk maintenance.

5.4.1 Winter Maintenance

In snowy cities like Ottawa, cycling volumes drastically decrease in the winter months. Although data on local winter cycling rates is limited, an analysis of Laurier Bike Counters indicates that 17%[81] of bike trip volumes along this route occur during December through mid-March.

As part of the consultation process, residents were asked about the likelihood of themselves cycling more if the City began to clear its existing pathways in the wintertime. Half of respondents (50%), as shown in Exhibit 5.14, indicated they would not use existing pathways to cycle in the wintertime. Almost one in five (19%)

respondents said they would cycle on existing pathways in the wintertime, while another one in five (17%) indicated they would use these pathways sometimes.

Exhibit 5.14 – Interest in Winter Cycling with Improved Maintenance

Response	Percentage
Yes	19%
Sometimes	17%
Unsure	14%
No	50%
Total responses	**4,257**

Currently the City maintains the Laurier Avenue Segregated Bicycle Facilities as well as some of the NCC multi-use pathways during the winter. The current Maintenance Quality Standards (MQS) (2003) Table 103.01.01 states that:

> "This standard applies to winter snow and ice control operations on all City roads, including adjacent shoulders and bicycle lanes where designated as City Cycling Routes. In accordance with the MQS any road Class of 1, 2, 3 and up to 4A would be maintained to bare pavement. Bare Pavement is defined as "requires that snow and ice be controlled, cleared and/or prevented for the full travelled road pavement width, including flush medians of 2 m width or less, paved shoulders and/or adjacent cycling lanes. It does not include parking lanes."

As part of the Transportation Master Plan and OCP2013, a winter-maintained cycling network has been proposed.

OCP Recommendation 5.6:
That the proposed winter-maintained cycling network, along with estimated incremental maintenance costs, be considered as a term-of council priority for implementation starting in winter 2015/16. Standards to clarify the winter clearing standards that apply to the routes identified within an approved winter cycling network will subsequently be identified by Public Works.

The network has been focused within a 5-km radius of Ottawa's core area where cycling rates are highest, using the proposed east-west Cross-town Bikeway as the primary route into and out of the downtown core. This network builds on ideas presented by the former Road and Cycling Advisory Committee at a previous City Transportation Committee. Based on public feedback, a connection has been added to the proposed winter network along the Rideau River Eastern Pathway route, connecting via Lees

Avenue to the Rideau Canal Pathways and the downtown core. The use of this segment will necessitate an agreement with the NCC to maintain a small section linking North River Road to Lees Avenue via the Lees Avenue Bridge. Pending approval, the winter network will be posted on GeoOttawa[82] (under the Cycling Plan tab) for public reference.

The proposed winter network consists of a mixture of road types, cycling facilities and pathways chosen to provide connectivity throughout the central focus area, and which were reviewed for their current road classification to identify the additional operational costs required for winter maintenance. The feasibility of maintaining these routes during winter considered difficulties such as lack of snow storage and ability to maintain a clear and dry condition.

There are about 40 planned kilometers of Ottawa's proposed "winter network", of which about 21 kilometers were already winter maintained as either shared use lanes or as part of the separated cycling facilities along Scott Street, Albert Street and Laurier Avenue. The designation of these parts of the winter network will result in upgrades and changes to current maintenance practices. The incremental cost of maintaining the proposed winter cycling network is estimated at $200,000 per winter season.

Additional costs may be incurred to maintain the winter network depending on the severity of snow and freezing rain events during a given winter season. Severe weather events may require additional snow removal, a greater number of network inspections and additional resources and materials to keep the network treatment standard as bare surface.[83]

5.4.2 Spring, Summer and Fall Maintenance

Spring and Summer Clean-up

Vehicles on the roadway tend to push debris from the travel lanes to the edge of the pavement, including grit and sand used for winter maintenance. Since cyclists typically use the edge of the pavement, they are most likely to encounter and be affected by the deposited debris that creates hazards such as road narrowing (requiring incursions into the travel lanes), windblown grit, stones projected from passing tires, loss of control on loose material, and increased risk of tire punctures.

The City carries out a spring clean-up from the end of winter until May 31 and then continues to sweep the roadways in a scheduled format throughout the summer based on the classification of the roadway. In accordance to MQS 106.02, subsequent sweeping can be completed at various frequencies between daily to only as required.

While no change to the classification of facility (priority level) or increase in frequency of sweeping is proposed, it is recommended that the *order* of the first Spring-sweeping be

set such that high priority routes on the City's Cycling Network be carried out after the existing priority areas. The priority for the spring and summer clean-up is:

- The ByWard Market, downtown core and BIA areas
- The Cross-Town Bikeways
- Attention to Spine Routes on a best-effort basis

The remainder of the Cycling Network would be swept in the sequence set by Public Works.

OCP Recommendation 5.7:
The General Manager of Public Works shall be given delegated authority to clarify the Maintenance Quality Standards such that the order of Spring Sweeping be defined that Bikeways are given priority followed by cycling spine routes as defined on the Ottawa Cycling Network. These roadways shall be given priority over roadways and pathways not identified as part of the Ottawa Cycling Network. The Spring Cleanup on the Bikeways and Spine Routes shall be initiated at the earliest opportunity each spring.

Fall Clean-up

Sweeping continues through the fall season depending on a roadway's classification. As it is difficult to narrow in on particular areas where leaves and debris are issues in the Ottawa Cycling Network, a dedicated fall clean-up is not recommended as part of the Cycling Plan. Residents are encouraged to submit a service request for clearing any debris or leaves in bike facilities.

Public Requests

Service Ottawa allows the public to create a service request and report a number of issues on public roadways through the City's website. These include roads not plowed or sanded, roads in disrepair, blocked or flooded areas and litter or debris on roadways, among others.

Pavement Markings for Cycling Facilities

Cycling facilities are frequently designated by pavement markings, either as a striped line and bicycle stencil or with sharrows in mixed-traffic conditions. Pavement markings wear off the roadway over time and must be re-applied as a maintenance activity. Cycling markings that are safety related (e.g. sharrows) shall be applied based on available resources to achieve the desirable quality of facilities. Their maintenance and

renewal costs will be reflected in Public Works and Infrastructure Services financial plans.

5.4.3 Designing for Maintenance

Pavement Markings for Cycling Facilities

Depending on wear conditions (i.e. location of markings), in some locations thermoplastic markings may be more cost-effective when markings are applied in high-traffic areas within the tire track zone.

Ironwork Obstructions

Standard catch basins have a metal grate next to the curb that is located within the path of cyclists. Over time, the pavement surface may shift above or below the catch basins, creating significant bumps that can make a cycling lane uncomfortable, particularly when cycling in high traffic conditions where cyclists cannot avoid travelling next to the curb. In addition, the metal works can be slippery when wet and water/debris accumulation is common. The preferred design for drainage along cycling routes is the curb inlet catch basin, which can alleviate many of the issues described above.

The City's current Sewer Design Guidelines indicate that the preferred catch basin is the curb inlet type and that surface inlet grates may be used only where it is not possible to place a curb inlet catch basin.[84] These guidelines apply to new road construction and full reconstruction projects. When rebuilding roads, the current approach provides for removal of some surface storm sewer grates in favour of curb inlet designs.

Consideration to convert other ironwork such as water valves, manholes and accesses that cannot be moved off the bikeway to "floating designs" (or "self-levelling frame and cover") should be done at the time of construction/reconstruction. This technology remains flush to the surface of the pavement even through a certain amount of road surface settlement occurs.

Road Cuts

Road cuts are carried out for access within the right-of-way (i.e. maintenance work on utilities) and then re-asphalted leaving a seam where the cut was made. When these are within the bike lanes, at the curb and along the direction of travel they can be dangerous and can cause cyclists to become de-stabilized. The preferable method for carrying out road cuts would be to make them perpendicular across the bike lane and where required in the direction of travel place them at the curb or within the vehicle driving lane out of the path of cyclists.

Curb-cuts and Depressed Curbs

Curb-cuts at entrances and driveways can be constructed at a height that is difficult for cyclists to mount the curb from the curb-side of the lane. This is typically a construction issue and when addressed or corrected it will aid cyclists as well as other users from an accessibility point of view.

The current City standard suggests a desired height of 15 mm, with a minimum of 0 mm and a maximum of 25 mm, and this is shown on all applicable SC series City Standard Drawings.

Multi-use Pathways and Cycle Tracks

Both multi-use pathways and cycle tracks are constructed over a road base that is less extensive, and therefore less expensive than on-street roadway bases. They are therefore more subject to root damage from nearby vegetation and root-barriers are recommended where needed during design to reduce life cycle costs.

Designing for Winter Maintenance of Cycle Tracks

Cycle tracks may be designed to have the cycling facility at the same elevation as the sidewalk. Winter maintenance is simpler when the sidewalk and cycle track are immediately adjacent to one-another and maintained at the same elevation. Where cycle tracks are less than 1.5 m wide and where winter maintenance is desired, they should be at the same elevation as the adjacent sidewalk (without street furniture demarking the boundary) in order to allow for single-pass plowing.

5.4.4 Life-cycle Management of Cycling Facilities

On-road Facilities

In 2012 Council approved a Comprehensive Asset Management (CAM) Program. The intent of the CAM Program is to ensure that City assets are maintained in a state of good repair and managed in the most effective manner, in order to support the delivery of services to the community (including cycling facilities). CAM identifies the need to document levels of service from a customer perspective. The intent is to develop the customer level for cycling as a separate service. This will then inform how the assets supporting that service should be managed in a manner that is affordable and sustainable.

The City uses road condition assessments to determine the overall condition of their roadway infrastructure and estimate annual budgets and implementation schedules for roadway resurfacing and reconstruction. As indicated above, roadway deterioration can occur closer to the curb where cyclists travel, and is an important consideration given that cyclists are more susceptible to roadway cracking, potholes and asphalt

irregularities than a motorized vehicle. A review of cycling facilities in the overall road condition assessment as a separate item will be considered, both to identify the cycling surface conditions as well as to consider cycling facilities when selecting planned roadway works. The separation of these areas will also be considered whereby on-road cycling facilities could be rehabilitated independently in advance of the driving lanes due to their condition for the end user. Changes to on-road facilities, including the installation of segregated lanes, represent a higher maintenance cost to the Public Works Department and in renewal costs to Infrastructure Services. These costs will be identified within the Comprehensive Asset Management Plan.

Multi-use Pathways and Cycle Tracks

Condition ratings and life-cycle management of multi-use pathways that are part of the cycling network (i.e. designated as major pathways) should be maintained to standards appropriate for use by cyclists, meeting the standard level of service while respecting affordability.

Cycle tracks are outside of the curb-to-curb roadway section, and therefore need to be included in asset management improvements as required.

OCP Recommendation 5.8:

That the General Manager, Public Works be given delegated authority to clarify the Maintenance Quality Standards such that the surface condition for the bike lane section of the traveled roadway, multi-use pathways and cycle tracks shall be maintained in a state of good repair for the intended use.

As part of the City's Comprehensive Asset Management Program, the level of service for cycling infrastructure shall be defined to achieve customer outcomes and inform how these assets should be managed in a sustainable manner.

6.0 Cycling Safety and Promotion

Education and awareness programs are needed to complement and obtain the maximum benefit from capital investments in cycling facilities, and ensure they are used safely. There is also a need to improve information gathering and analysis related to cycling trends so that progress can be reported, relative safety levels monitored, and best practices adopted within the appropriate departments .

Cycling promotion is included as part of the City's transportation demand management (TDM) program. Funding requests are captured within the TDM report to Council approved in 2012[85]; therefore no further promotional funding (beyond what has already been identified) will be requested as part of this plan. Funding levels will be confirmed on an annual basis through the budget process.

A need for funding has been identified for ongoing cycling safety awareness and training (Exhibit 6.2 – Funding Requirements for Cycling Safety Programs) including training cyclists on safe cycling habits (with a focus on school children), explaining new cycling road markings to all road users (e.g. the yellow dot program as shown below in Exhibit 6.1, sharrows, bike boxes), and promoting safety messages related to sharing the road.

Exhibit 6.1 – Yellow Dot Campaign

Source: City of Ottawa

The Safety Pilot/Research and Data Collection operational program will fund maintenance of the bike counter data collection network. This program will also fund data analysis, support research related to cycling safety[86], support participation in MTO guidelines, and support pilot projects.

Ottawa Public Health is a key partner in promoting cycling safety, and is committed to working with other departments, community partners (e.g. school boards), and the public to advance the uptake of cycling.

Exhibit 6.2 – Funding Requirements for Cycling Safety Programs

Program	Department	Annual Funding*
Cycling Safety Improvement Program	Public Works	$80,000 - $120,000
Cycling Safety Awareness Program	PGM	$100,000
Cycling Safety Pilots, Data Collection	PGM	$30,000

*Operational budgets are subject to review and confirmation on an annual basis.

OCP Recommendation 6.1:

The Cycling Safely Awareness program will be incorporated within the Transportation Demand Management program funding envelope, subject to annual budget authorization by Council.

OCP Recommendation 6.2:

Staff shall identify opportunities to share expertise in order to continue building an appreciation of the health benefits associated with improvements in active transportation.

OCP Recommendation 6.3:

Staff shall support the development of school active transportation plans in Ottawa elementary schools, which includes the promotion of cycling.

Exhibit 6.3 – Children and Teens Cycling to School

6.1 Road Safety Programs

The City's Road Safety initiative incorporates a number of programs aimed at making the roads safer for all users. It sets out a bold vision and a new action plan that is comprehensive and responsive to road safety priorities that will help make the "City of Ottawa the safest traffic environment for all."

One of the programs initiated was the Share the Road awareness and outreach program in 2011. The program leverages external partnerships (Canadian Automobile Association, MTO Road Safety Branch) as well as being fully integrated within Safer Roads Ottawa, the overarching program for Road Safety, which brings together various City departments such as Public Works, Planning, Police Services, Fire Services, Paramedic Services and Public Health. CAN-Bike training programs are delivered by the City to educate children and adults about safe cycling.

Exhibit 6.4 – Children Participating in CAN-Bike Training

6.1.1 Cycling Safety Improvement Program (CSIP)

The Cycling Safety Improvement Program (CSIP) was developed to address existing problem areas for cyclists. It provides a toolkit for assessing the relative degree of danger and discomfort of a cycling problem location, and identifies appropriate remediation options when possible.

Cyclist and motor vehicle collision analysis alone cannot provide an accurate account of problem locations due to the limited nature of the data. Therefore, to help identify problem areas, the City considers other sources of input from stakeholders, including Councillors, residents and various cycling groups.

With the feedback and data collected through the above process, ten sites are then identified and selected to be addressed within the CSIP annually. Each site is investigated through a combination of data analysis (e.g. cycling flows, traffic volumes, vehicle speeds, cycling collisions) and in-field study through the perspective of both drivers and cyclists. As part of the in-field study, input is also gathered from the community.

With all the data in hand, each site is evaluated and appropriate countermeasures are identified. Typical treatments are generally restricted to signs and pavement markings. Exhibit 6.5 is a photo of a typical treatment that was introduced under the 2012 CSIP.

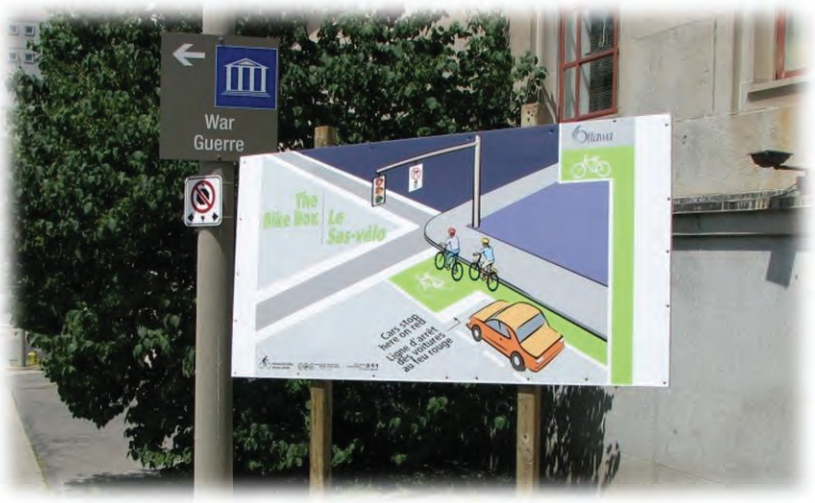
Exhibit 6.5 – CSIP Treatment on Prince of Wales Road South of Preston Street

6.1.2 Cycling Safety Awareness Program (CSAP)

The Cycling Safety Awareness Program (CSAP) is an educational outreach program about cycling safety. The program was created based on a recommendation of the Council-approved Cycling Safety Improvement Program, and includes initial key messages on "dooring" (i.e. a collision caused by a car door opening into a cyclist's path), sharrows, sidewalk cycling and bike boxes. CSAP complements cycling infrastructure improvements being implemented through the City's Cycling Facilities Program, Ottawa on the Move program, and Cycling Safety Improvement Program.[87]

Over the next planning period, the City expects to introduce numerous new roadway markings and bike specific signals (pending approval of OTM Book 18 and Book 12 updates[88]). The use and meaning of these new roadway treatments will need to be explained to all affected roadway users, in conjunction with supporting efforts by MTO. For example, a driver and cyclist awareness campaign was launched in advance of the first bike box being deployed at Bay Street and Wellington Street in 2012.

Exhibit 6.6 – Bike Box Informational Sign on Bay Street



Source: City of Ottawa

Elements of the Cycling Safety Awareness program include:[89]

- Safety messaging materials
  - Posters and information slips for the bike box program, sharrows and dooring
  - Video promotion of CAN-Bike and video showing the safe navigation of local roadways by bike
- Bike safety training (led by Parks and Recreation – City-wide Sports)
  - CAN-Bike courses for residents
  - School bike safety outreach (primary schools)
  - Bike rodeos by CAN-Bike
- Public messaging
  - Radio ads
  - Back of bus posters
  - Curb-side posters
  - Internet video clips (under development for 2013)
- Workplace cycling safety outreach
  - 65,000 residents at 64 local employers reached in 2012
  - Leverages green team leaders, bicycle user groups and other interested stakeholders within these employers to internally distribute the cycling safety message
  - Opportunity to promote the CAN-Bike program, particularly a two-hour variant of the full program that can be easily provided at workplaces
  - Support from both MTO, NCC
- New driver outreach
  - In 2013, all local driving schools were contacted and information packages on sharrows, dooring and bike boxes were provided.
- Be Safe and be Seen

- o "Lights on Bikes" visibility message provided at public locations (for example Corktown Bridge, November 2012)
- o Led by Safer Roads Ottawa (SRO) with support from Citizens for Safe Cycling

6.2 Transportation Demand Management Strategy

In developing the TDM Strategy, which was adopted by City Council in 2012, it was recognized that significant and lasting change in how people travel in the future will arise if the competitiveness of transit, cycling and walking can be strengthened. The TDM Strategy outlines the complementary "soft" measures that support key capital improvements and maximize their benefits, and that encourage people to use them. These measures are primarily educational and promotional initiatives, incentives and disincentives, and other measures that change the social or economic factors that influence people's travel choices, including "work-shifting" outside of peak travel periods. When properly planned and implemented, capital infrastructure projects and TDM measures complement one another to yield a whole that is greater than the sum of its parts.[90]

Safety messages for cycling have been developed and embedded within TDM initiatives such as Bike to Work Month, to maximize exposure and provide a blended cycling safety and promotional message.

6.2.1 Leadership by Example

The City has about 17,000 employees at numerous building across the city, with the largest located at 110 Laurier Avenue West and 100 Constellation Drive. It is the second-largest employer in Ottawa after the federal government. With this large employee base, the City is well positioned to take on a leadership role in setting TDM goals within its own workforce that would be in line with the City's strategic planning goals as laid out in the TMP. These goals include developing programs to encourage the use of more sustainable modes of transportation by City employees for commuting purposes and business travel.

6.2.2 Cycling Maps

To help residents plan their bike trips, the City issues printed cycling maps every two to three years (most recently in 2011-2012), and posts maps online in a PDF format[91]. Future maps will also include information of interest to pedestrians using multi-use pathways.

The City's most recent map had two formats: first, a conventional map showing the entire area of the city; and second, a special wallet-sized foldout map, zeroing in on the core area. These maps are available for sale and online. In addition, the new GIS-

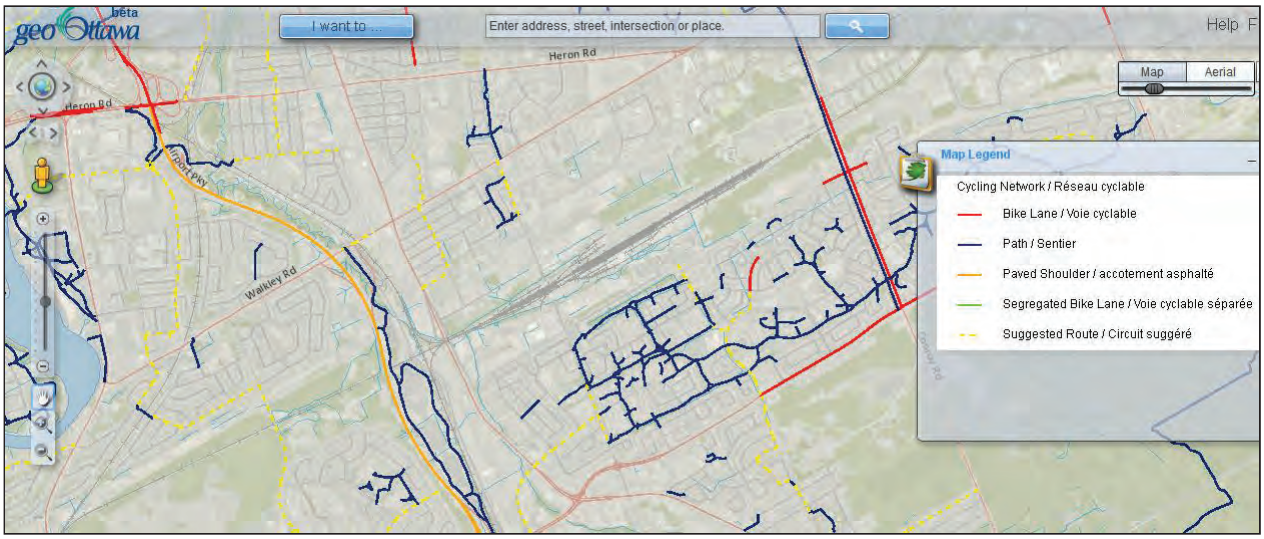
compatible database that underlies these maps can be more readily maintained, enabling more frequent updates.

In addition to the City's efforts in 2011, the NCC issued a new cycling map for the region, including Ottawa's and Gatineau's cycling facilities. Google's cycling route function enabled Ottawa to be one of the first Canadian cities where residents could search for and map appropriate cycling routes. Google's effort was initially supported by the transfer of Ottawa GIS cycling information. The cycling map in a GIS compatible format is also made available to residents through the Open Data project so that residents can use different tools and techniques to extract value out of the map and tie it to other kinds of software.

TDM program initiatives for individual route planning provide cycling route advice to residents and visitors, and target specific areas of the city with campaigns that offer personal contact and engagement.

The City will increasingly rely on posting cycling facilities information in its native GIS format (through Open-Data[92]), as well as allowing residents to view cycling facilities on the recently released GeoOttawa[93] mapping tool (released for public use in May 2013). By using the GeoOttawa platform, residents can display various cycling-related layers, as well as being able to zoom into areas of the City at a scale appropriate to their needs.

Exhibit 6.7 – Example of Geo-Ottawa with Cycling Facilities Layer Enabled



OCP Recommendation 6.4:
The City shall ensure that route updates are provided for the GeoOttawa database on a proactive basis, as new cycling facilities come online, to keep the data current.

6.3 Helmet Use

In general, cycling is a safe and healthy activity that can be enjoyed by people from a wide range of ages and abilities. However, many cycling routes in North America (including Ottawa) require cyclists to travel near motor vehicles that operate at relatively high speeds. As described in Section 4.3, this design is uncomfortable for most cyclists, and collisions may lead to severe injuries. As a result, helmet use is widely encouraged to mitigate safety risks while cycling.

Wearing a helmet will reduce the life-threatening impact of a head injury caused by a fall or a collision with a motor vehicle. The Ontario Highway Traffic Act states that anyone under the age of 18 must wear a helmet while riding a bicycle, or face a $60 fine. There is no equivalent rule that applies to City or NCC multi-use pathways, although helmet use by all residents, and children in particular, is encouraged.

The City will focus on improving cycling safety through improvements to cycling facilities and roadway design. The provision of safe cycling facilities is effective at reducing both the likelihood and severity of cycling collisions.[94] [95] While wearing a helmet is an appropriate personal choice to minimize personal injuries in the event of a collision, the

provision of safe cycling facilities is effective at reducing the likelihood of cycling collisions. In addition to improving the overall safety of cycling, the provision of comfortable cycling facilities encourages more people to travel by bicycle, which supports the goals of the Transportation Master Plan. In comparison, mandatory helmet laws may reduce the number and severity of some injuries, but have also been known to reduce the number of people travelling by bike.[96] Therefore, the City will focus upon improving cycling safety primarily through improvements to cycling facilities and roadway design, while it continues to promote helmet use.

Provincial surveys show that helmet use is lower among youth ages 13 to 18, and represents a target for improved and expanded youth outreach and safety education activities by the City. The City also supports programs to provide free helmets for children that may not otherwise have access to helmets, as well as information on proper helmet fitting.

Helmets for Youth Campaign

To promote cycling safety, Ottawa Public Health leads a mass media campaign focusing on helmet safety, helmet accessibility and public awareness. The “Adopt a Helmet” campaign includes a video that focuses on proper helmet fitting, helmet care, and encourages active transportation. The campaign is promoted through social media, cinemas and radio stations and has generated over 470,000 impressions between 2012 and 2013.

Ottawa Public Health is addressing financial barriers by collaborating with 37 retail stores to offer a weekend of discounts on helmets and protective gear at the beginning of the cycling season. In addition, an ongoing partnership between the City’s Cycling School (PRCS) and OPH has made it possible for 3,200 children and youth to receive cycling lessons.

6.4 Safe Routes to School

Safe Routes to School is a national program that promotes the safe and active journey to and from school through the promotion of safety, physical activity and environment-friendly modes of travel. Green Communities Canada has partnered with municipalities, school boards, public health and community organizations across the country to encourage children and their parents to use active modes for school travel. In Ottawa, City departments, local school boards, the Ottawa Student Transportation Authority, the Consortium du transport scolaire d’Ottawa, Heart and Stroke Foundation, Ottawa Police Services and the Ottawa Safety Council are working together through the Green

Communities Canada's Active and Safe Routes to School program to encourage more walking and cycling by children. Ottawa Public Health is the lead department on this initiative, which also includes the following programs.

School travel planning – School travel planning is intended to encourage local ownership of Active and Safe Routes to School. It solicits the participation of stakeholders such as school boards, municipal transportation planners and engineers, public health, police, parents, students and school staff. School travel planning conducts research to identify any obstacles to active transportation to school and implements solutions, with the support of local stakeholders. This initiative leads to better health for school children and reduced traffic congestion, amongst other benefits. It is currently being implemented at 17 Ottawa schools (12 elementary schools and five high schools).

Ottawa Public Health school-based active transportation – Ottawa Public Health has Public Health Nurses affiliated with all Ottawa schools, and works with educators, students, parents, and other partners to increase the number of children using active transportation to get to and from school. Public Health Nurses use a comprehensive approach to promote active transportation, including educating, advocating and assessing for supportive physical environments, promoting supportive social environments and partnering with key stakeholders. As one of the key deliverables on the Board of Health's priorities, OPH is focusing on supporting all elementary schools to have a school active travel plan. These and other OPH initiatives to promote cycling and walking are supported through the Healthy Eating, Active Living (HEAL) strategy that incorporates a focus on creating more supportive social and physical environments for making healthier choices.

Walk/Wheel on Wednesdays – Designates one day per month or one day per week as a Walk to School Day or a Wheel to School Day, starting right after International Walk to School Week in October. The event encourages families to commit to one day where they break their car habit and take part in active transportation to reach their destination, be it walking or cycling. Program benefits include less congestion near schools.

Spring into Spring – Participating schools walk (or jog, skip or bike) for a week between Earth Week and Clean Air Day. It can combine activities with Earth Week (April) or Environment Week (June). Program benefits include a healthier environment, safer streets and making friends.

6.5 Wayfinding

On-street signage for wayfinding purposes has in the past been largely limited to green bike route signs (shown in Exhibit 6.8). Use of these signs is no longer pursued on a systemic basis, rather only where specific needs arise such as to provide guidance

between discontinuous bike lane segments. The NCC has deployed a system of wayfinding on its pathway system.

Exhibit 6.8 – General Bike Route Signage

The recently completed O-Train pathway includes its own wayfinding signage (shown in Exhibit 6.9) and similar City of Ottawa wayfinding signs will be deployed along all the Cross-Town Bikeways, Neighbourhood Bikeways, and multi-use pathways when opportunities arise. Other signs to expect along bike routes include, but are not limited to, those related to bypass routes, regulatory signs, or rules regarding the use of eBikes.

Exhibit 6.9 – Standardized Wayfinding Signage

Example pathway sign (O-Train path)

Example Cross-Town Bikeway sign

6.6 Cycling Tourism

The City is looking to continue to support initiatives that promote cycling across the city for residents and tourists alike.

Looking forward, a cycling tourism initiative will be undertaken to leverage the continuously improving cycling ecosystem within the city. This initiative will include activities aimed at improving promotional efforts, including the introduction of necessary

tools to local organizations and businesses (e.g. BIA, hotels, restaurants, museums) to promote cycling friendly destinations. It will also provide guidance to identify and develop special route destinations in both the urban and rural areas. In all efforts to promote cycling tourism in Ottawa, the City will look to expand on existing resources, and work with the network of organizations involved and interested in cycling promotion such as Tourism Ottawa.

OCP Recommendation 6.5:
A cycling tourism initiative for Ottawa shall be launched within 2014 to increase visibility of Ottawa as a tourism destination for cyclists.

7.0 Inter-jurisdictional Cooperation

Ottawa relies on many other government departments to achieve the goal of a truly cycling-friendly city. These partners include the NCC, Public Works and Government Services Canada (PWGSC, for interprovincial issues and as a manager of federal buildings), Parks Canada (for the Rideau Canal), the Province of Ontario (for highway crossings and roadway design regulations), and City of Gatineau (for transit and cycling).

Cycling between Ottawa and Gatineau relies on crossings that are maintained by the federal government (PWGSC) as well as the NCC. The 2011 OD Survey found that 3.7% (1,410 trips) of all morning peak period trips from Gatineau to Ottawa are taken by bike, as are 3.9% (630 trips) of all trips from Ottawa to Gatineau during the same period.

Cyclists are well served by the existing Ottawa River crossings, with the notable exception of the Chaudière crossing. The Macdonald Cartier Bridge is currently undergoing an extensive rebuild that will provide for a bidirectional multi-use pathway on the east side of the span, and improved connectivity at both approaches. Exhibit 7.1 provides information on the interprovincial bridges.

Exhibit 7.1 – Interprovincial Bridges in the National Capital Region

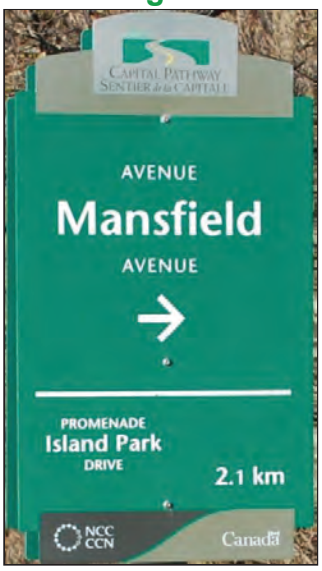
Existing Links	Share of Interprovincial Bike Trips	Cycling Level of Traffic Stress**	Owner	Cycling Facility
Alexandra Bridge	32%	1	PWGSC	Protected facility – cycle track
Portage Bridge	37%	1	NCC	Raised cycle track adjacent to traffic lanes
Champlain Bridge	11%	3	NCC	Bike lanes
Macdonald Cartier Bridge*	12%	1	PWGSC	Protected facility – mulit-use pathway
Chaudière crossing	8%	4	PWGSC	Shared lane

Note: * Post-reconstruction ** Based on posted speed limit

7.1 National Capital Commission

Canada's Capital Region is fortunate to be at the confluence of four major rivers and two canals. The NCC has developed an extensive set of pedestrian and cycling facilities along these natural corridors as well as within Gatineau Park and the Greenbelt. This network is largely completed and the NCC and City continue to improve these facilities. The City's rural pathways and the more than 250 km of NCC pathways, including 55 km of Greenbelt pathway, are good examples of such initiatives.

Exhibit 7.2 – Example of NCC Pathway Route Sign



Collaboration continues with the Inter-Agency Committee on Multi-Use Pathways, a forum for NCC, City of Ottawa, and City of Gatineau staff to meet regularly to review the regional pathway network to promote improved interconnection and continuity of facilities. The 2006 Integrated Multi-Use Pathways Network Plan serves as the context for consideration of numerous joint initiatives covering aspects such as regional planning and coordination, infrastructure development, safety, design standards, way-finding, signage, etc. Planned NCC pathways are not identified within the OCP2013 Project Maps.

The NCC also places importance on improving connectivity between Ottawa and Gatineau, and on providing visitors and residents with improved opportunities to explore the Capital's shorelines and attractions. The City's concept for a bike/pedestrian crossing on the Prince of Wales Bridge and the NCC concept of enhanced cycling and pedestrian facilities along the Chaudière Crossing are examples of potential measures toward improved interprovincial connectivity.

Exhibit 7.3 – NCC Ottawa River Pathway

Source: City of Ottawa

The NCC conducts its own safety campaigns on pathways, focusing on promotion of Share-the-Path code of conduct to reduce bike-pedestrian conflicts, and will cooperate with the City on wider safety initiatives. The NCC is working to develop way-finding and on-line mapping resources to help residents and visitors explore the Capital region by bike. The NCC is supportive of multimodal automated interprovincial data counting systems, and is evaluating the merits of a shared cycling/pedestrian winter facility over the Portage Bridge.

The City and NCC will strive to develop similar standards and usage policies to promote as seamless an environment for cyclists as possible.

7.2 City of Gatineau

The City of Ottawa and City of Gatineau will work together to integrate cycling networks and policies, and in particular to improve further the quality and interconnectedness of links over the Ottawa River. The following policies and joint initiatives will be considered by City of Gatineau as part of its 2013 Mobility Plan (*Plan de déplacements durable*) update, subject to the required review and approval process. Any investment will be subject to the City of Gatineau budget process, notwithstanding any previous policy agreements. In that respect, the Gatineau Mobility Plan includes the following recommendations:

- Give consideration to extending a winter maintained cycling network connection from the Portage Bridge to complement the Ottawa plan.

- Give consideration on developing complementary GIS mapping involving cycling facilities such as:
  - *Facility Planning*, using common attributes and naming conventions to facilitate better comprehension of cross-border cycling plans for residents and other stakeholders on both sides of the river, as well as for the NCC and PWGSC
  - *Route Planning*, using common attributes and naming conventions to allow a common region-wide map to be posted on public sites (such as GeoOttawa or Open Data). Such a regional map makes it easier for residents and visitors to plan bike trips within the National Capital Region.
- Give consideration to develop a joint policy for eBikes, including partnering with the NCC in that respect.
- Participate in a study involving improvements to the cycling facilities across the Chaudière crossing in 2014 (with the NCC, PWGSC and City of Ottawa).
- Give consideration to develop a multi-year proposal to a full-time monitoring of all traffic crossing the Ottawa River (all modes, year-round).
- Participate in cycling tourism and recreational promotion for Canada's Capital Region.

7.3 Province of Ontario

The Province exerts considerable influence over the future evolution of cycling facilities in Ottawa. Provincial influence extends to setting technical guidelines for roadway design (backed up by appropriate legislation and regulations), as well responsibility for Highway 417 and Highway 416 crossings, many of which are also key cycling routes.

7.3.1 Ontario Traffic Manual

The Ministry of Transportation has taken the lead (along with 15 other municipalities) in defining new technical guidelines for cycling-related roadway markings and signals.

This initiative will result in a new OTM Book 18 design guideline (pavement markings and cycling facility design), as well as an updated OTM Book 12 defining new cycling signals. The *Highway Traffic Act* will need to be updated in order to support and be consistent with all the recommendations within these new guidelines.

The City of Ottawa has been an active participant in both OTM Book 12 Bicycle Signals and Book 18 review processes, and encourages the province to finalize the documents and follow-up with any needed legislative or regulatory changes as quickly as possible.

7.3.2 Ontario Cycling Strategy

Under the guidance of the Minister of Transportation, a new Provincial Cycling Strategy was approved in the fall of 2013 (#CycleON: Ontario's Cycling Strategy).[97] This strategy will strengthen the Province's role in cycling promotion, safety awareness and cycling facilities design.

Exhibit 7.4 – #CycleON: Ontario's Cycling Strategy

Source: Ontario Ministry of Transportation

The City of Ottawa will encourage the province to incorporate the following elements within the #CycleON implementation plan:

Safety and Awareness

- A comprehensive evaluation of cycling safety education in primary schools, to identify best practices in other jurisdictions
- Removal of any barriers to offering "Share the Road Diversion" training programs targeted to both drivers and cyclists
- Coordinate the sharing of cycling safety education materials in their native format, (with permissions to use and modify) on behalf of all Ontario municipalities.

Laws and regulations

- A 40 km/h default speed limit for local residential streets
- Revisit (with the federal government) current technical specifications and legislation related to eBikes to further differentiate between eBike products available for sale in Ontario. Two categories should be considered, one for Pedelecs and the other for eScooters.

- Increasing the effectiveness of enforcement of the current laws against after-market window tinting; cyclists and pedestrians rely on visual communication between themselves and drivers, which is impossible when drivers cannot be seen through tinted glass.

Overcoming barriers and development of new design guidelines

- Updating technical guidelines related to urban highway overpasses to better accommodate cyclists on bridges and at ramp crossings when they are scheduled for refurbishment. Technical specifications such as minimum curb heights, buffer areas between roadway and curbs should be re-evaluated, and the inclusion of raised cycle tracks should be considered.
- The establishment of a funded pilot program (in conjunction with municipalities) to develop and evaluate new cycling facility and signal designs for inclusion in future OTM Book updates
- Assisting municipalities in overcoming cycling barriers presented by provincial facilities (such as 400 series highways)

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[73] Rules Pertaining to Electric-Powered Vehicles on Multi-Use Pathways and Parkways under NCC Responsibility (51.02 KB)

[74] GeoOttawa mapping tool: http://maps.ottawa.ca/geoottawa/ For more information about the Cycling Plan maps on GeoOttawa, refer to Annex C.

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[76] GeoOttawa mapping tool: http://maps.ottawa.ca/geoottawa/ For more information about the Cycling Plan maps on GeoOttawa, refer to Annex C.

[77] GeoOttawa mapping tool: http://maps.ottawa.ca/geoottawa/ For more information about the Cycling Plan maps on GeoOttawa, refer to Annex C.

[78] Comprehensive Asset Management Program ACS2012-PAI-INF-0007, !9 September 2012 (Finance and Economic Development Committee)

[79] A Transportation Impact Assessment is conducted to determine the need for mitigation measures to lessen the impact of new developments on the surrounding transportation network.

[80] To satisfy provisions of the Parks Cash-in-lieu program, land must be owned by the city or access rights secured under a 21yr or longer lease.

[81] Calculated using average daily weekday trips for December 2012 to March 15, 2013.

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[83] As per MQS 103.01 and 103.02, it is important to note the “Under extreme storm conditions (i.e. those that exceed normal conditions) snow and ice control operations will be carried out based on the capacity of resources in as continuous a manner as practicable, consistent with the classes of roads, sidewalks and pathways as detailed in tables 103.01.01 and 103.02.01.

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ANNEX A

LIST OF RECOMMENDATIONS

OCP 2013 – List of Recommendations

Number	Recommendation
3.1	The City shall explore the option of creating a map showing the quality of cycling facilities using the Level of Traffic Stress (LTS) methodology. Regular updates shall track the City's progress towards improving the network-wide quality of facilities. [Planning and Growth Management]
4.1	The Subdivision Development Guidelines document update process will incorporate the OCP2013 goals for Greenfield/Brownfield developments, as well as the "Cycling Friendly City" Council directives to provide pathway connections between cul-de sac be updated to reflect applicable aspects of recent cycling design guidelines for Ontario and Canada. [Planning and Growth Management]
4.2	Assessment of the Bike-Ride-Walk secondary mode share shall be included in surveys and manual counts where practical, to allow multi-year trends to be tracked using parked bike counts. [Planning and Growth Management, OC Transpo]
4.3	The Bike-Ride-Walk option shall be promoted as part of the TDM programming and be included in further updates to the TDM Plan implementation. [Planning and Growth Management]
4.4	The City of Ottawa will encourage the Capital BIXI and other bikeshare systems by: facilitating new desirable locations for rental stations on City rights of way (where feasible); promoting bike share use in conjunction with transit services and as part of cycling tourism promotion; investigating the feasibility of Presto Card use for bike share usage; and facilitating new, desirable locations for bike-share stations as part of development site plan agreements on private lands (where feasible). [Planning and Growth Management, OC Transpo]
4.5	All relevant City design documents shall be updated to reflect applicable aspects of recent cycling design guidelines for Ontario and Canada. The Accessibility Advisory Committee shall be provided with an opportunity to comment on technical design standards for roadway cross-sections involving cycling facilities as these documents are updated. [Planning and Growth Management, Infrastructure Services Department and Public Works Department]

4.6	The City shall apply the Level of Traffic Stress methodology to assess the quality of cycling facilities. The City will evaluate and refine the methodology as required. [Planning and Growth Management, Infrastructure Services Department and Public Works Department]
4.7	An additional 150 ring-and-post bicycle racks shall be installed each year or as demand warrants. [Public Works Department]
4.8	A Bike Corral Pilot Program will commence in 2014. If it is a proven success, it is recommended that Ottawa institute an on-going bicycle parking corrals program to complement the ring and post program. [Planning and Growth Management and Public Works Department]
4.9	OC Transpo shall expand covered bike parking at transit stations where high demand warrants and where space and budgets permit. [OC Transpo]
4.10	The City shall update its Zoning By-law to: 1. Identify separate requirements for both short-term and long-term bicycle parking. 2. Provide further direction within the Zoning By-law to ensure proper rack placement and design of all bicycle parking facilities. 3. Identify all short-term and long-term bicycle parking requirements for each new development on a public website (such as GeoOttawa) to ensure residents, employees and visitors are aware of the parking availability. [Planning and Growth Management]
4.11	The City will request through the provincial government that the current eBike category be split, to establish standards for a Pedelec category. [Planning and Growth Management]
4.12	City traffic and parking by-law and signage policies will be modified, and signs posted as needed, to support implementation of the above policy, consistent with the provincial legislative framework. [City Clerk and Solicitor Department, Public Works Department]
5.1	When initiating a roadway design for new road construction, road reconstruction or road resurfacing (regardless of whether it is identified as part of the cycling network), staff shall consult with PGM to identify whether cycling facilities should be included. Cycling needs should be considered during Environmental Assessments and Community Design Plans and included in the City's road design standards. [Planning and Growth Management and Infrastructure Services Department]
5.2	The City shall review the feasibility of a cycling link between Laurier Avenue and uOttawa Station, which allows for a direct 'cycle through' option to the

	Multi-Use Pathway south of the station. The Rail Implementation Office shall work with PGM to explore the feasibility of such a link. [Rail Implementation Office, Planning and Growth Management]
5.3	An additional five employment areas shall be evaluated using the same process as part of the next update to the OCP or as additional funding becomes available in the medium- and long-term horizons. [Planning and Growth Management]
5.4	Major transit projects will include funding for cycling linkages identified within the OCP2013 Network Implementation or Ultimate Network Concept plans. [Planning and Growth Management]
5.5	Where possible, the City will fund extensions to the cycling network that are largely recreational through Cash-in-lieu of Parkland reserves. [Planning and Growth Management]
5.6	That the proposed winter-maintained cycling network, along with estimated incremental maintenance costs, be considered as a term-of council priority for implementation starting in winter 2015/16. Standards to clarify the winter clearing standards that apply to the routes identified within an approved winter cycling network will subsequently be identified by Public Works. [Planning and Growth Management]
5.7	The General Manager of Public Works shall be given delegated authority to clarify the Maintenance Quality Standards such that the order of Spring Sweeping be defined that Bikeways are given priority followed by cycling spine routes as defined on the Ottawa Cycling Network. These roadways shall be given priority over roadways and pathways not identified as part of the Ottawa Cycling Network. The Spring Cleanup on the Bikeways and Spine Routes shall be initiated at the earliest opportunity each spring. [Public Works Department]
5.8	That the General Manager, Public Works be given delegated authority to clarify the Maintenance Quality Standards such that the surface condition for the bike lane section of the traveled roadway, multi-use pathways and cycle tracks shall be maintained in a state of good repair for the intended use. As part of the City's Comprehensive Asset Management Program, the level of service for cycling infrastructure shall be defined to achieve customer outcomes and inform how these assets should be managed in a sustainable manner. [Public Works Department and Infrastructure Services Department]
6.1	The Cycling Safely Awareness program will be incorporated within the Transportation Demand Management program funding envelope, subject to

	annual budget authorization by Council. [Planning and Growth Management]
6.2	Staff shall identify opportunities to share expertise in order to continue building an appreciation of the health benefits associated with improvements in active transportation. [Ottawa Public Health]
6.3	Staff shall support the development of school active transportation plans in Ottawa elementary schools, which includes the promotion of cycling. [Ottawa Public Health]
6.4	The City shall ensure that route updates are provided for the GeoOttawa database on a proactive basis, as new cycling facilities come online, to keep the data current. [Infrastructure Services Department]
6.5	A cycling tourism initiative for Ottawa shall be launched within 2014 to increase visibility of Ottawa as a tourism destination for cyclists. [Planning and Growth Management and Deputy City Manager's Office, in partnership with Tourism Ottawa]

ANNEX B

CYCLING LEVEL OF TRAFFIC STRESS

Cycling Level of Traffic Stress

For full details and explanatory text on the Level of Traffic Stress (LTS) concept and methodology refer to "Low Stress Bicycling and Network Connectivity" (MTI Report 11-19); the following text and tables are adapted from this Report. The methodology and tables will be further tested and modified if required.

Note: The higher value of the operating speed (85th percentile) or posted limit should be used throughout. Where operating speed data isn't available, the posted speed limit can be used.

1.0 Cycling Level of Traffic Stress Mid-Block

Cycling facilities that are physically separated from motor vehicle traffic have the lowest level of traffic stress; LTS 1.This includes cycle tracks, protected bike lanes and multi-use paths. Physical separation refers to, but is not limited to, curbs, raised medians, bollards and parking lanes.

1.1 Bike Lanes

Level of Traffic Stress (LTS) criteria for bike lanes are given in Table 1 and Table 2 below. The LTS methodology is based on a weakest-link principle. For bike lanes this means that the worst scoring criteria is used to determine the LTS for a particular segment.

Table 1 - Criteria for Bike Lanes Not Alongside a Parking Lane

	LTS ≥ 1	LTS ≥ 2	LTS ≥ 3	LTS ≥ 4
Street width (through lanes per direction)	1	2, if directions are separated by a raised median	more than 2, or 2 without a separating median	(no effect)
Bike lane width (includes marked buffer and paved gutter)	1.8m or more	1.7m or less	(no effect)	(no effect)
Operating speed or posted speed limit (use higher)	50km/hr or less	(no effect)	60km/hr	70km/hr or more)
Bike lane blockage (may apply in commercial areas)	rare	(no effect)	frequent	(no effect)

Note: (no effect) = factor does not trigger an increase to this level of traffic stress.

Example 1: referring to Table 1, mid-block Alpha Street has one lane per direction (LTS1), a 1.7m wide bike lane (LTS2), the bike lane is only blocked rarely (LTS1) and an operating speed of 70km/hr (LTS4). The LTS for this segment of Alpha Street is LTS4 (corresponding with the worst score from the criteria).

Table 2 - Criteria for Bike Lanes Alongside a Parking Lane

	LTS ≥ 1	LTS ≥ 2	LTS ≥ 3	LTS ≥ 4
Street width (through lanes per direction)	1	(no effect)	2 or more	(no effect)
Sum of bike lane and parking lane width (includes marked buffer and paved gutter)	4.5m	4.25m [a]	4.0m	(no effect)
Operating speed or posted speed limit (use higher)	40km/hr or less	50km/hr	60km/hr	70km/hr or more
Bike lane blockage (typically applies in commercial areas)	rare	(no effect)	frequent	(no effect)

Note: (no effect) = factor does not trigger an increase to this level of traffic stress.

[a] If speed limit < 40 km/h or Class = residential, then any width is acceptable for LTS 2.

Example 2: referring to Table 2, mid-block Bravo Street has one lane per direction (LTS1), a 1.5m wide bike lane adjacent to a 2.5m parking lane (LTS3), the bike lane is only blocked rarely (LTS1) and an operating speed of 40km/hr (LTS1). The LTS for this segment of Bravo Street is LTS3 (corresponding with the worst score from the criteria).

1.2 Mixed Traffic

In mixed traffic (where there is no separate bike facility) the Level of Traffic Stress is determined from the operating traffic speed and the number of motor-vehicle lanes.

Table 3 - Criteria for Level of Traffic Stress in Mixed Traffic

Operating speed or posted speed limit	Street Width		
	2-3 lanes	4-5 lanes	6+ lanes
Up to 40km/hr	LTS 1[a] or 2[a]	LTS 3	LTS 4
50km/hr	LTS 2[a] or 3[a]	LTS 4	LTS 4
60km/hr+	LTS 4	LTS 4	LTS 4

Note: [a] Use lower value for streets without marked centrelines or classified as residential and with fewer than 3 lanes; use higher value otherwise.

Example 3: referring to Table 3, Charlie Street has an operating speed of 50km/hr, one lane in each direction, and a marked centreline. The LTS for Charlie Street is LTS3.

Example 4: referring to Table 3, Delta Street has an operating speed limit of 50km/hr, one lane in each direction, but no marked centreline. The LTS for Delta Street is 2.

2.0 Cycling Level of Traffic Stress at Intersection Approaches

Where additional vehicle lanes are added to accommodate turning movements at intersections the LTS can increase for cyclists. Table 4 and Table 5 below show the LTS criteria for bike lanes and mixed-traffic conditions at intersections. Continuing the weakest-link concept, the LTS for a particular route is based on the worst score from the different street segments and intersections.

Table 4 - Level of Traffic Stress Criteria for Pocket Bike Lanes

Configuration	Level of Traffic Stress
Single right-turn lane up to 50m long, starting abruptly while the bike lane continues straight, and having an intersection angle and curb radius such that turning speed is ≤ 25km/hr	LTS ≥ 2
Single right-turn lane longer than 50m starting abruptly while the bike lane continues straight, and having an intersection angle and curb radius such that turning speed is ≤ 30km/hr	LTS ≥ 3
Single right-turn lane in which the bike lane shifts to the left but the intersection angle and curb radius are such that turning speed is ≤ 25km/hr	LTS ≥ 3
Single right-turn lane with any other configuration; dual right-turn lanes; or right-turn lane along with an option (through-right) lane.	LTS = 4

Example 5: As Echo Street (one lane in each direction, 1.8m bike lane, rarely blocked with an operating speed of 50km/hr – LTS1) approaches Foxtrot Street, a 40m right-turn lane begins abruptly to the right of the bike lane with a sharp turning radius so that the operating turning speed is 20km/hr. Referring to Table 4, the LTS for continuing in the Echo Street bike lane through the Foxtrot intersection is LTS2. The LTS for the Echo St route (Echo St midblock LTS1 and Foxtrot intersection LTS2) is LTS2, based on the worst score on the route.

Table 5 - Level of Traffic Stress Criteria for Mixed Traffic in the Presence of a Right-turn Lane

Configuration	Level of Traffic Stress
Single right-turn lane with length ≤ 25m and intersection angle and curb radius limit turning speed to 25km/hr	(no effect on LTS)
Single right-turn lane with length between 25 and 50m, and intersection angle and curb radius limit turning speed to 25km/hr	LTS ≥ 3
Otherwise	LTS = 4

Example 6: As Delta Street (one lane in each direction, operating speed of 50km/hr, no marked centreline – LTS2) approaches Foxtrot Street, a 45m right-turn lane begins with a radius such that the operating turning speed is 30km/hr. Referring to Table 5, the LTS for continuing on Delta Street in mixed traffic through the Foxtrot intersection is LTS4. The LTS for the Delta St route (Delta St midblock LTS2 and Foxtrot intersection LTS4) is LTS4, based on the worst route score.

3.0 Cycling Level of Traffic Stress at Unsignalized Crossings

The level of traffic stress at unsignalized crossings is determined through the number of motor-vehicle lanes, the operating speed of traffic and the absence (Table 6) or presence (Table 7) of a suitable median refuge.

Table 6 - Level of Traffic Stress Criteria for Unsignalized Crossings Without a Median Refuge

Speed Limit of Street Being Crossed	Width of Street Being Crossed		
	Up to 3 lanes	4 - 5 lanes	6+ lanes
Up to 40km/hr	LTS 1	LTS 2	LTS 4
50km/hr	LTS 1	LTS 2	LTS 4
60km/hr	LTS 2	LTS 3	LTS 4
70km/hr	LTS 3	LTS 4	LTS 4

Example 7: Golf Street (residential, no centreline, 40km/hr - LTS 1) is stop controlled where it intersects Hotel Street, a major road with the right of way (two lanes in each direction, operating speed of 40km/hr). Referring to Table 6, the LTS for continuing on Golf Street across Hotel

Street is LTS2. The LTS for the Golf Street route (residential street and Hotel Street crossing) is LTS2, based on the worst route score.

Table 7 - Level of Traffic Stress Criteria for Unsignalized Crossings With a Median Refuge at Least 1.8m wide

Speed Limit of Street Being Crossed	Width of Street Being Crossed		
	Up to 3 lanes	4 - 5 lanes	6+ lanes
Up to 40km/hr	LTS 1	LTS 1	LTS 2
50 km/hr	LTS 1	LTS 2	LTS 3
60km/hr	LTS 2	LTS 3	LTS 4
70km/hr)	LTS 3	LTS 4	LTS 4

Example 8: Golf Street (residential, no centreline, 40km/hr - LTS 1) is stop controlled where it intersects Juliet Street, a major road with the right of way (two lanes in each direction, operating speed of 40km/hr, 2m median refuge). Referring to Table 7, the LTS for continuing on Golf Street across Juliet Street is LTS1. The LTS for the Golf Street route (residential street and Juliet Street crossing) is LTS1, based on the worst route score.

ANNEX C

GEOOTTAWA ONLINE MAPPING TOOL

GeoOttawa Online Mapping Tool

The Ottawa Cycling Plan (OCP 2013) maps are available for public view online on the City's GeoOttawa website. This site allows users to choose which parts (or layers) of the cycling network map they wish to view, and to zoom in on different parts of the city. These interactive maps permit all users to view the details of the network anywhere in the city, in place of paper maps. To access this online mapping tool, visit: http://maps.ottawa.ca/

1.0 Cycling Plan Layers

Ultimate Cycling Network

This layer displays the Ultimate Network Concept. Facilities are categorized by the type of route:

- Spine Routes (dark red)
- Local Routes (pale yellow)
- Major Pathways (dark green)
- Pathway Links (bright green)

Refer to Section 5.1 of the OCP 2013 for more information on the Ultimate Network Concept.

Project Timing (Phase 1, Phase 2, Phase 3)

Phase 1 (2014-2019), Phase 2 (2020-2025), Phase 3 (2026-2031): These are the projects included in the affordable network planned between 2014 and 2031, wholly or partly funded through the $70M OCP2013 budget. The labels of each project correspond to a project description included in the project table in Annex E.

Proposed Winter Network

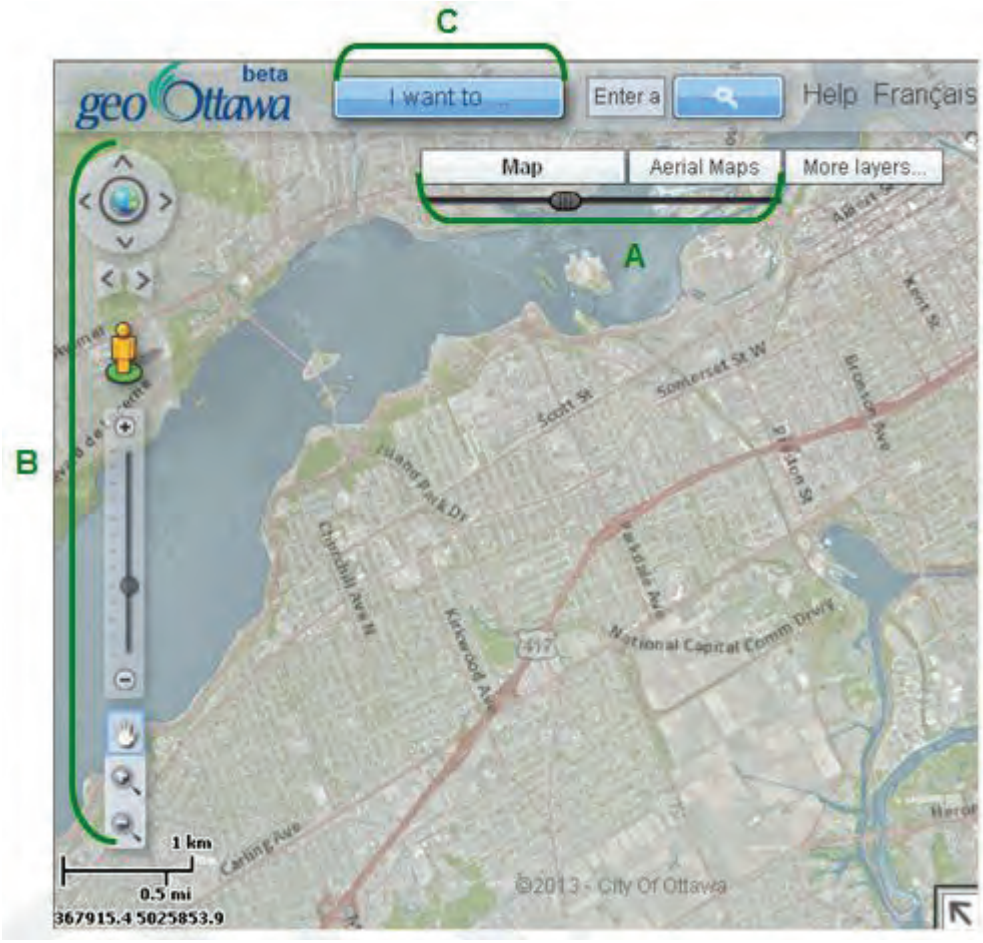
This layer displays the cycling routes in the inner urban area which are currently maintained throughout the winter (pale blue) and proposed extensions (dark blue). Refer to Section 5.4.1 of the OCP 2013 for more information on the Winter Network.

Neighbourhood Bikeways and Cross-Town Bikeways

These two layers show proposed *Neighbourhood Bikeways* (green) and *Cross-Town Bikeways* (orange). For more information on the bikeway concept, refer to Section 5.3.1 of the OCP 2013.

2.0 Basic Tools:

Figure 1: GeoOttawa window displaying a blend of coloured base map and 2011 aerial photo, with basic tools labeled



A - In the top right corner of the page, slide the bar between 'Map' and 'Aerial Maps' to view either a base map or an aerial photo. The base map can be viewed in greyscale or in colour.

B - Use the navigation controls on the left side of the page to zoom in and out and to pan to different parts of the city. Click the orange figure to open Google street view.

C – Click the 'I want to...' button for more options, such as: measuring a distance, drawing on the map, viewing the legend, printing the map, or saving the map to view it later.

3.0 How to View the Cycling Plan:

The different layers of the Cycling Plan maps are not automatically displayed on the GeoOttawa application; they need to be turned on. To view the layers pertaining to the OCP 2013, click on the button 'More layers...' in the top right corner of the page and select the layers which you would like to view. It is easier to understand the map if only a few layers are on at one time.

Step-by-Step Instructions:

1. Click on the button 'More layers...' in the top right corner of the page. A drop-down menu will appear with a variety of options. Scroll down until you find the label 'Cycling' and click on the green plus button next to the text (see Figure 2).

Figure 2: Finding the Cycling layers

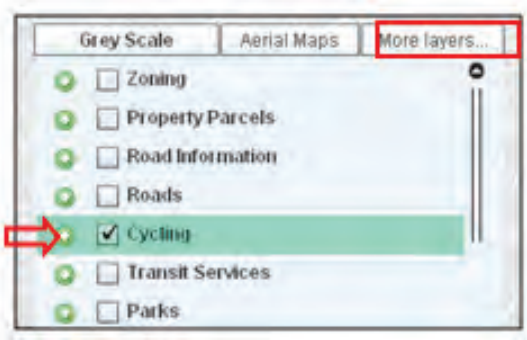
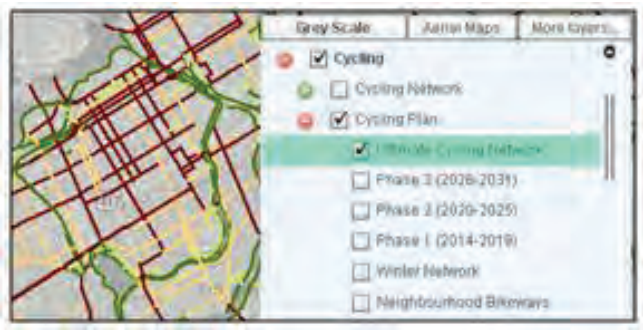


Figure 3: Ultimate Cycling Network Layer Turned On



2. When a user turns on the "Cycling" group, the Cycling Network layers are automatically turned on. Turn off the Cycling Network group in order to properly view the Plan layers.
3. Click the box beside each layer name to turn it on; when a layer is on, a check mark is shown in the box. For a layer to be displayed on the map, the layer and all the headings above it must all be turned on (see Figure 3).
4. 'Cycling Plan' can display the components of the OCP 2013, including the phases of the affordable network, the Ultimate Network, the proposed Winter Network and Neighbourhood and Cross-Town Bikeways. Click on the box next to each layer to display it on the map.

4.0 Displaying the Map Legend:

To view the map legend, click the 'I want to...' button at the top of the screen and select 'view the map legend', as illustrated in Figure 4.

A box will appear, with the title 'Map Legend', showing you the legend for the layers you have turned on, as illustrated in Figure 5.

There is no legend for the base map. If there are more layers turned on than will fit within the legend box, use the scroll bar in order to see the rest of the items in the legend. Each Cycling Plan layer is displayed using lines of a different colour.

Figure 4: Turning on the Legend

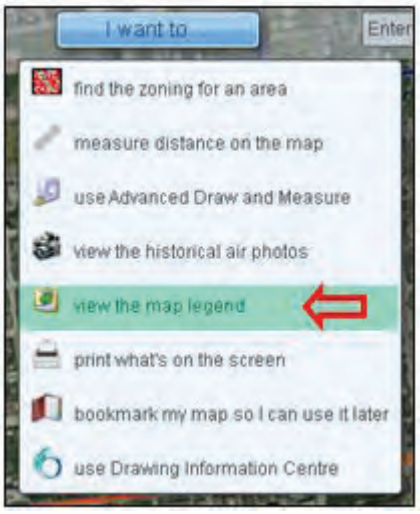
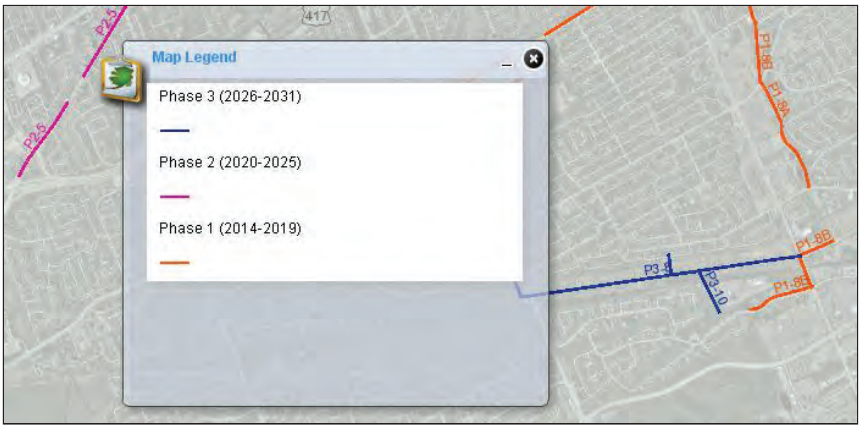


Figure 5: Map and legend showing Phases 1, 2, and 3



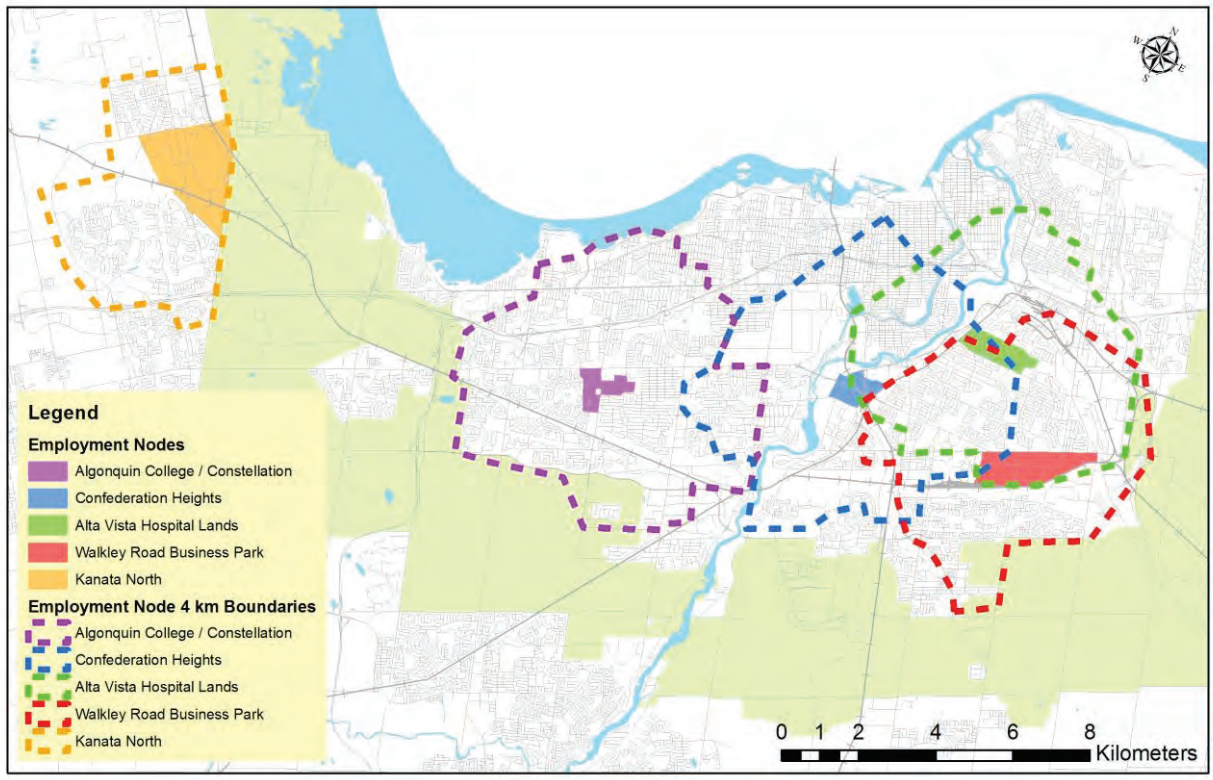
ANNEX D

CYCLING ROUTE DEVELOPMENT FOR EMPLOYMENT AREAS

Annex D: Cycling Route Development for Employment Nodes

Five major employment nodes were selected as part of the development of the OCP2013 network. Projects supporting each of these nodes were selected and phased as explained in the OCP2013 report. This appendix provides additional details on the characteristics of each of these areas as well as explanations of the key cycling connections that were examined during the development of the network. The five employment node areas chosen for this analysis are illustrated in Figure 6.

Figure 6: Employment Node Boundaries



The process undertaken for each of the five nodes was:

1. Identify a 4 km radius around each node to reflect the highest potential for cycling trips.
2. Within the 4 km radius, identify neighbourhoods with a common cycling route to the node.
3. Identify spine and feeder routes to reach the node from each neighbourhood.

4. Determine the appropriate facility type for segments of each route based on the methodology defined in the OCP2013 Section 3 (based on vehicle speed and volume) and a qualitative assessment of the existing conditions.
5. Identify required improvements to provide a comfortable cycling route to all neighbourhoods within a 4 km radius of the node.
6. Using the most recent OD Survey (2011) data highlight the number of trips to the node during the AM peak hour for work and school purposes.
7. Prioritize recommended improvements for the node with consideration to overall cycling network improvements.

1.1 Kanata North Employment Area

The Kanata North employment centre covers the entirety of the Kanata North Business Park neighborhood, as shown in orange in Figure 6. The existing employment numbers for the Kanata North employment node are as follows:

- 8,540 AM peak period work trips, of which
- 1,240 trips are made to the area from a departure point within 4km, and
- 1,500 trips are made to the area from a 4-8km distance.

The 2011 OD Survey shows a very strong link between this node and trips from Southern Kanata and Stittsville, with other heavier connections to South Nepean, Bayshore and Ottawa's inner area. Trip linkages for the node from the OD Survey are illustrated in Figure 7. In 2011 the OD Survey found that 85% of employees in this area drive to their workplace and only 1% bike and 4% by transit.

The nearest rapid transit station is Teron, located at a distance of 2.5km (30 minutes by foot) of the nearest point in the employment node, and 4.3km (53 minutes by foot) of the furthest. There would be potential for a 6 minute cycling trip from the rapid transit station along Teron Road to the nearest point in the employment node or potential for a 15 minute cycling trip from the rapid transit stations along Terry Fox Drive or the Kanata Town Centre to the furthest point in the employment node.

The spine and feeder routes identified for the Kanata employment area are shown in Figure 8. This map identifies spine and feeder routes for the purposes of illustrating the routing structure. However, when integrated into the Ultimate Cycling Network, route hierarchies were based upon network connectivity and not related to the individual employment area routes.

Figure 7: 2011 OD Survey Trips to/from Kanata Employment Node

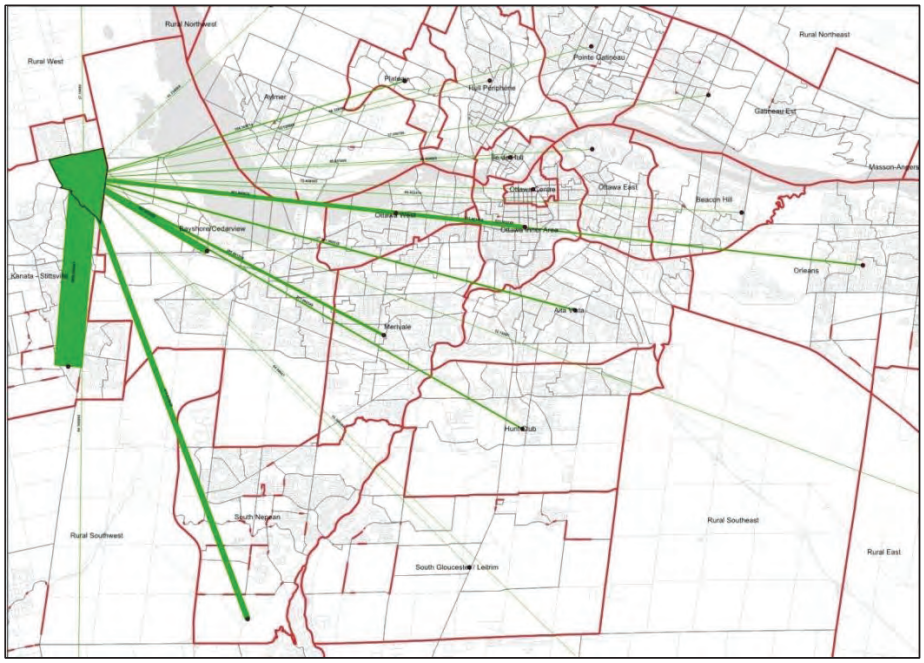
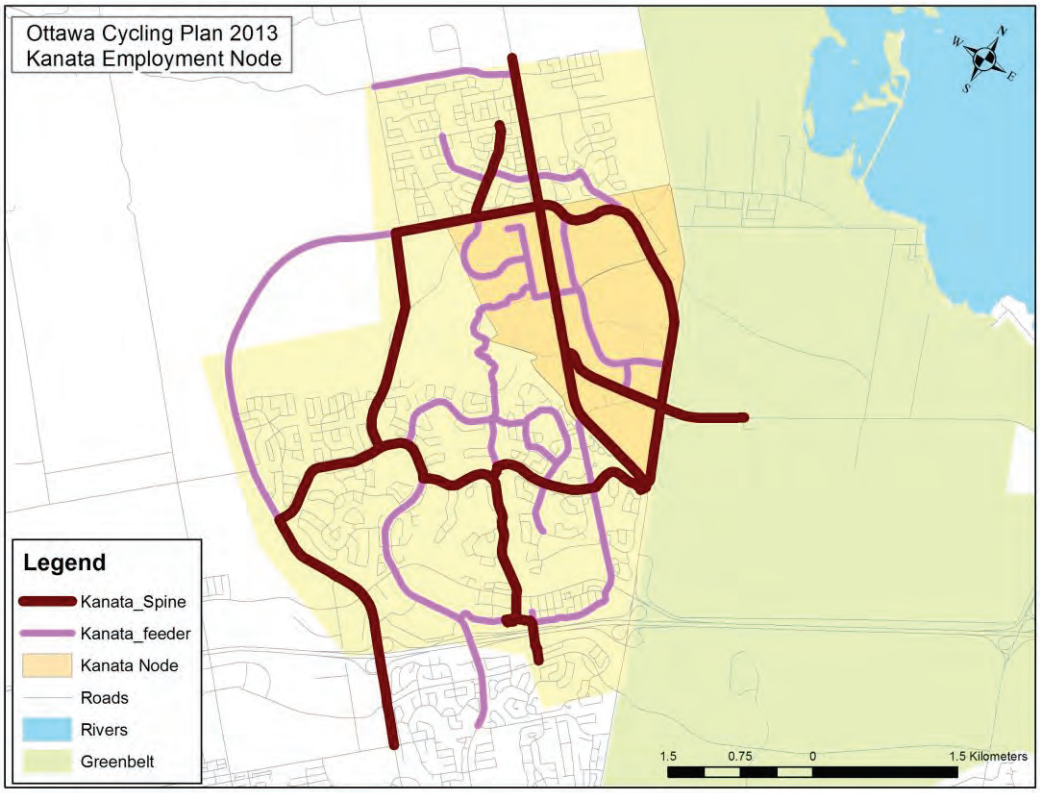


Figure 8: Kanata Employment Node Routes



1.2 General Hospital / CHEO

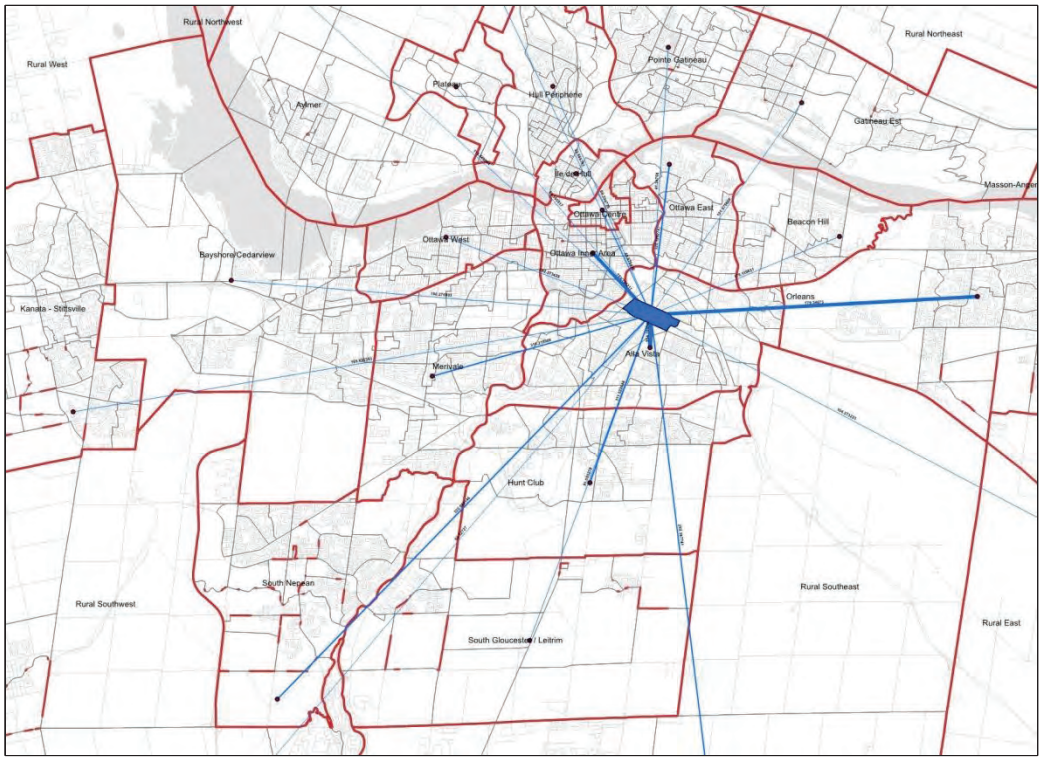
The General Hospital / CHEO employment centre is located in the Riverview neighborhood, on the east quadrant of Alta Vista Drive and Smyth Road. The study area for this employment area is shown in green in Figure 6. The existing employment numbers for the General Hospital / CHEO employment node are as follows:

- 5,500 AM peak period work trips, of which
- 1,590 trips are made to the area from a departure point within 4km, and
- 1,240 trips are made to the area from a 4-8km distance.

The OD survey data shows a fairly even trip distribution between the node and surrounding areas, with slightly heavier travel to the Alta Vista and Orleans areas; the OD survey node trips are illustrated in .

Figure 9.

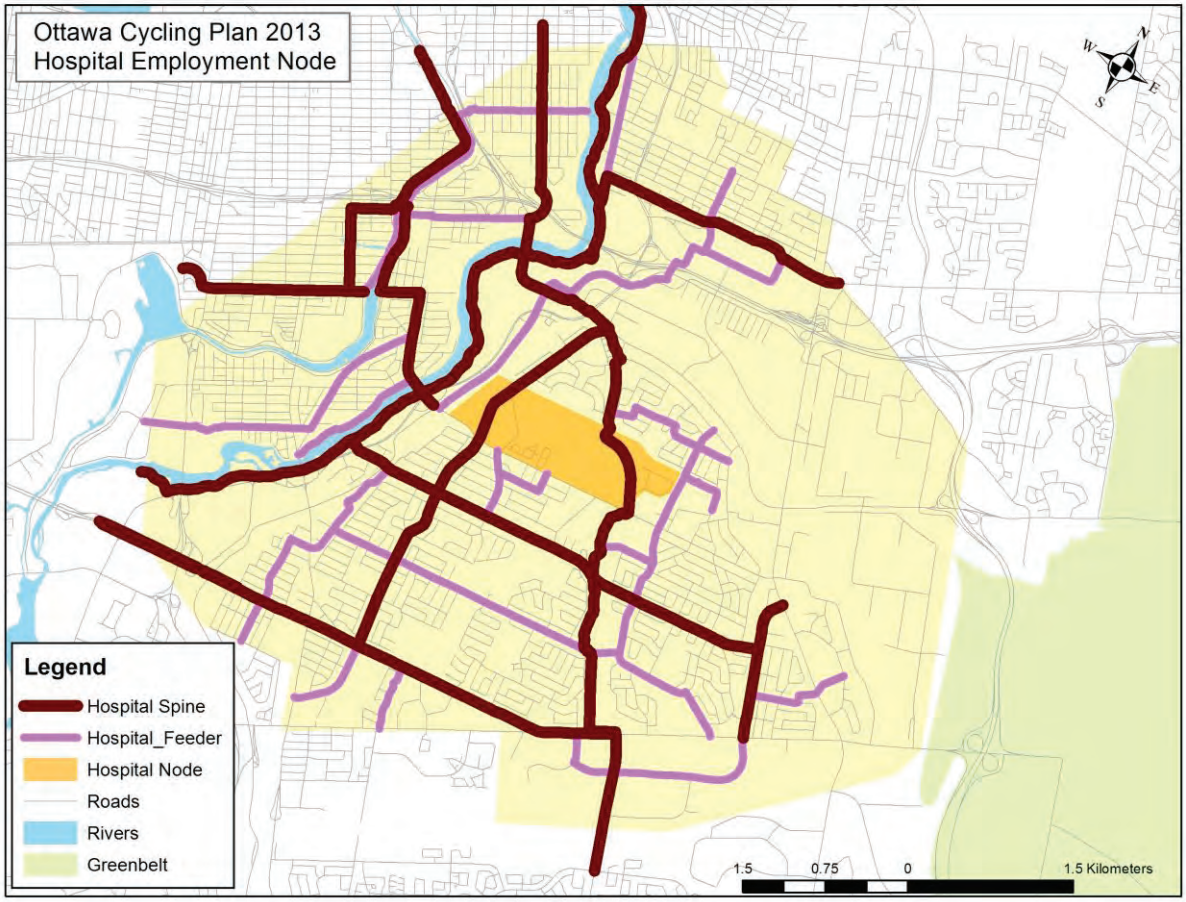
Figure 9: 2011 OD Survey Trips to/from Hospital Employment Node



The nearest rapid transit stations are Smyth or Hurdman, located at a distance of approximately 1.8km (23 minutes by foot). There would be potential for a 5-8 minute cycling trip from the rapid transit stations to the node, along the Pleasant Park Greenway or North-South Bikeway.

The spine and feeder routes identified for the Hospital employment area are shown in Figure 10.

Figure 10: Hospital Employment Node Routes



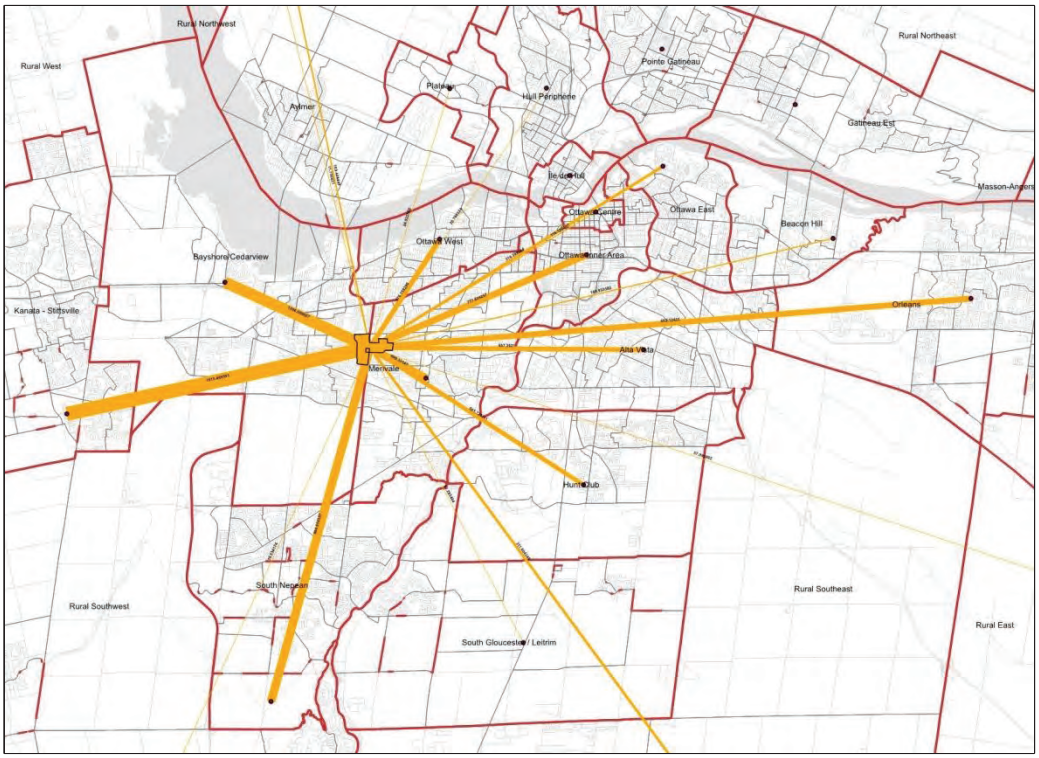
1.3 Algonquin College / Centrepointe Dr.

The Algonquin College/Centrepointe Dr. employment centre is located on the southwest/southeast quadrants of the Baseline Road and Woodroffe Avenue Intersection, as shown in Figure 6. The existing employment numbers for the Algonquin College / Centrepointe Dr. employment node are:

- 9,190 AM peak period work and school trips, of which
- 1,790 trips are made to the area from a departure point within 4km, and
- 1,950 trips are made to the area from a 4-8km distance.

The 2011 OD Survey shows strong trip linkages between this employment node and the adjacent Bayshore, Barrhaven and Merivale Areas, as well as a strong link to Kanata-Stittsville. OD trips for the Algonquin / Centrepoint Node are illustrated in Figure 11.

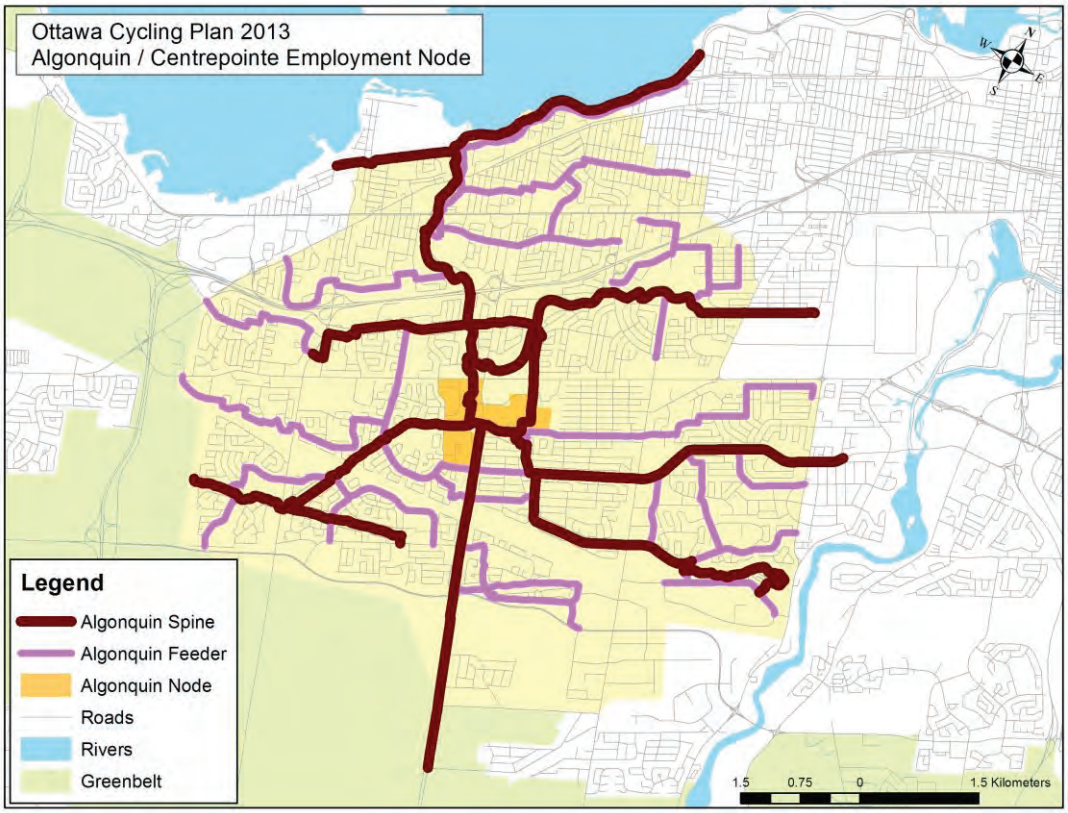
Figure 11: 2011 OD Survey Trips to/from Algonquin / Centrepointe Employment Node



The nearest rapid transit station is Baseline Station, located in the direct centre of the employment node. All boundaries of the node are within approximately 0.5km (5 minutes by foot) of Baseline Station, and therefore there are limited opportunities to encourage cycling trips from the transit stations.

Figure 12 shows the routes developed for the Algonquin / Centrepointe Employment Area.

Figure 12: Algonquin / Centrepointe Employment Node Routes



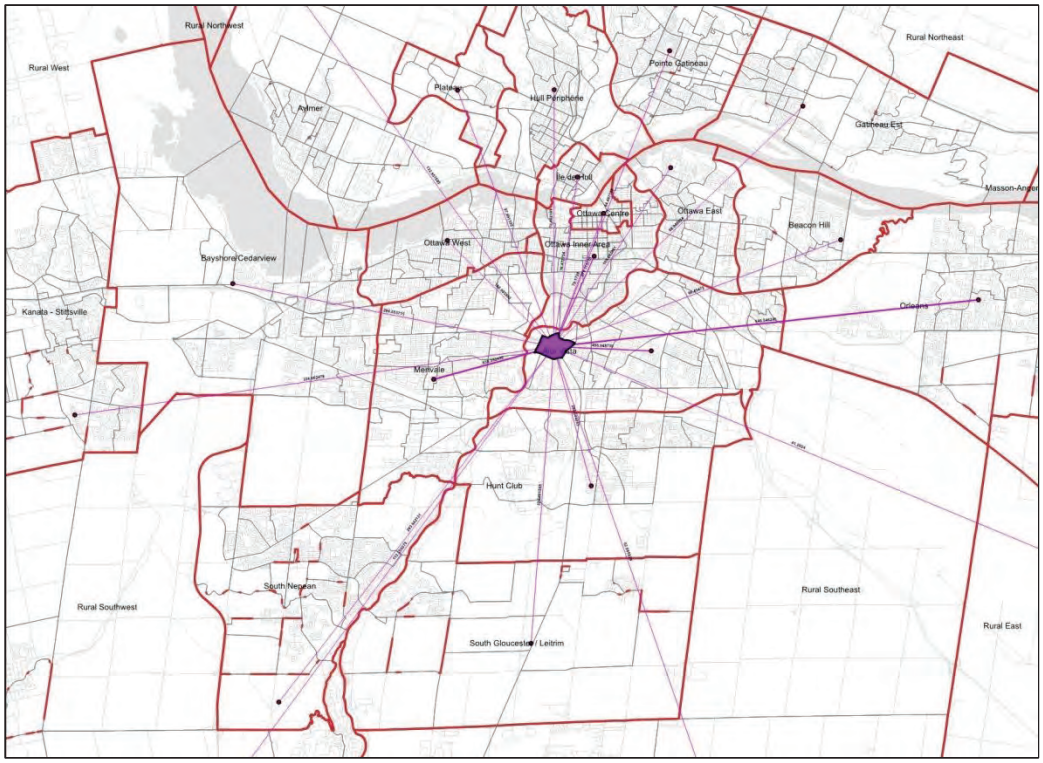
1.4 Canada Post / Confederation Heights

The Canada Post/Confederation Heights employment centre is located on all four quadrants of the Heron Road and Riverside Drive intersection. The study area is identified in blue in Figure 6. The existing employment numbers for the Canada Post / Confederation Heights employment node are as follows:

- 4,730 AM peak period work and school trips, of which
- 1,180 trips are made to the area from a departure point within 4km, and
- 1,150 trips are made to the area from a 4-8km distance

The OD survey indicates a fairly even distribution of trips to and from the Confederation employment node to all surrounding areas; this distribution is illustrated in Figure 13.

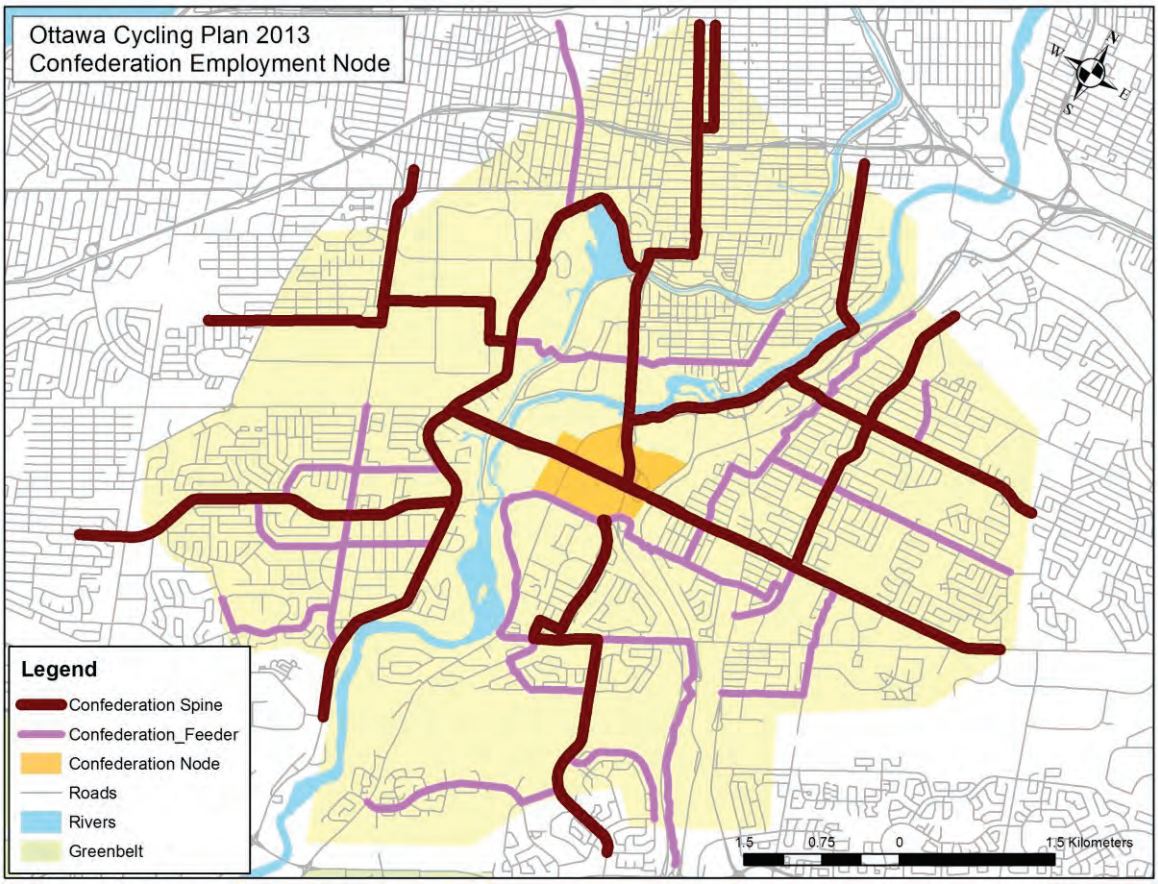
Figure 13: 2011 OD Survey Trips to/from Confederation Employment Node



The nearest rapid transit station is Heron Station and nearest O-Train station is Confederation; both located in the direct centre of the employment node. All boundaries of the node are within approximately 0.5km (5-10 minutes by foot) of both transit stations, and therefore limited opportunities exist to promote the integration of cycling and transit at this location.

Figure 14 shows the spine and feeder routes developed for this employment area.

Figure 14: Confederation Employment Node Routes



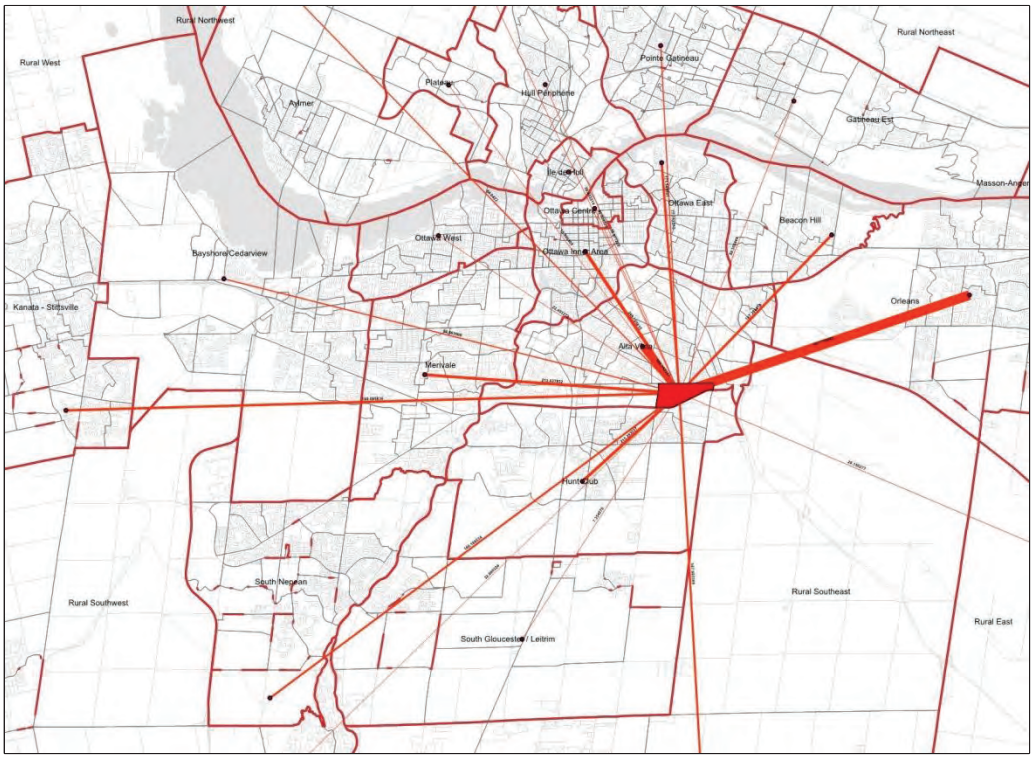
1.5 Walkley Business Park

The Walkley Business Park employment centre is located on the southwest and southeast quadrants of the Walkley Road and Conroy road Intersection, as shown in red in Figure 6. The existing employment numbers for the Walkley Business employment node are as follows:

- 3,220 AM peak period work trips, of which
- 510 trips are made to the area from a departure point within 4km, and
- 1,010 trips are made to the area from a 4-8km distance.

The 2011 OD Survey shows a strong proportion of trips to this node from Orleans, with another significant proportion from the Ottawa Inner Area. OD Survey Data for the Walkley employment node is summarized in Figure 15.

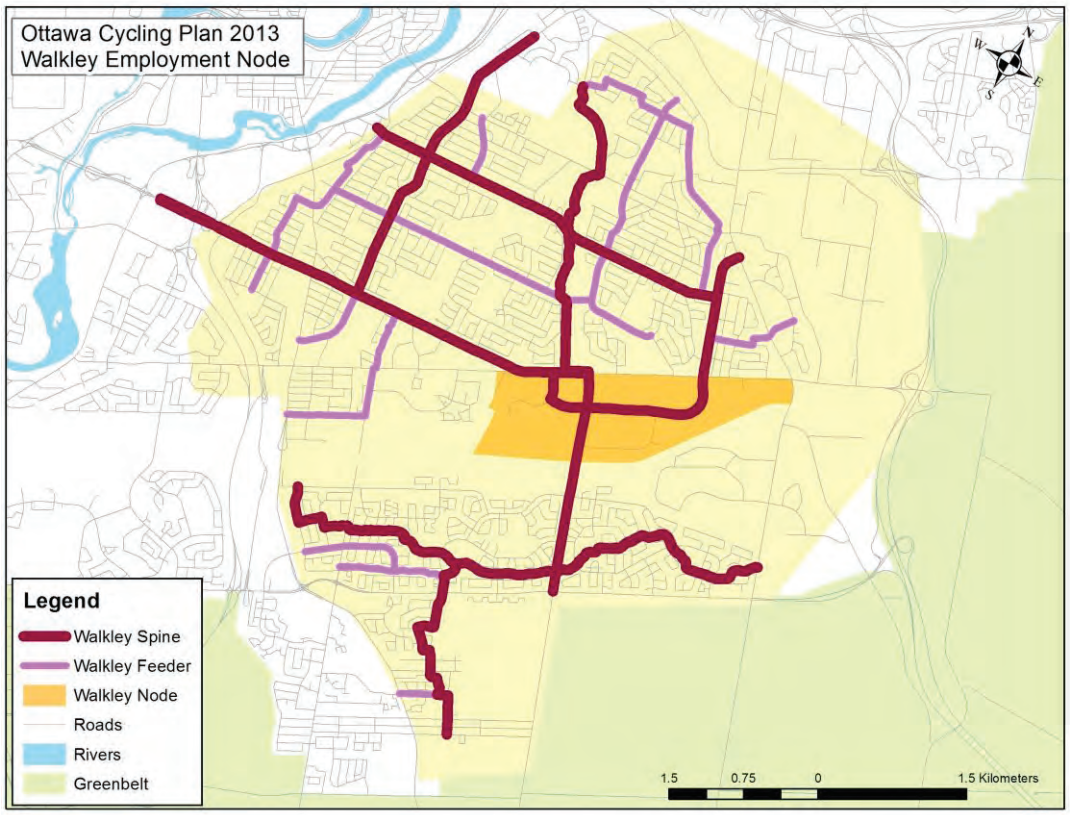
Figure 15: 2011 OD Survey Trips to/from Walkley Employment Node



The nearest rapid transit station is Walkley Station, located at a distance of 2.8km (35 minutes by foot) to the nearest point in the employment node, and 5.3km (63 minutes by foot) to the furthest. Since there is no existing cycling route along Walkley Road, Heron Station (at a distance of 4km and 50 minutes by foot) presents better cycling potential. Cycling trips from Heron Station would be approximately 15 minutes to the employment area and offers an opportunity to promote integration with transit for longer-distance trips.

Figure 16 shows the spine and feeder routes developed for the Walkley employment area.

Figure 16: Walkley Employment Node Routes



ANNEX E

2031 AFFORDABLE CYCLING PROJECT LIST

2031 Affordable Cycling Network

Phase	Project ID	Project Name	Facility	Project Category
Phase 1	P1-1	Hospital Link Pathway - Smyth Rd. to Station Blvd. and signed local routes along Station Blvd. and Coronation Ave.	Multi-Use Pathway and Shared Lanes	Cross-Town Bikeway
	P1-2	Coventry Rd. - North Shopping Mall Entrance to St.Laurent Blvd.	Bike Lanes	TOD
	P1-3	Barrhaven Railway MUP – Conway-Valiant Tunnel to Highbury Park Dr.	Multi-Use Pathway	Missing Links
	P1-5	Byron Ave. - Island Park Dr. to Holland Ave.	Improvements to Existing Multi-Use Pathway and Shared Lanes	Missing Links
	P1-6	Glebe Neighbourhood Bikeway	Shared Use Lanes and On-Street Bike Lanes	Neighbourhood Bikeways
	P1-7	Hunt Club Neighbourhood Bikeway	Bike Lanes, Shared Use Lanes and Multi-use Pathway	Neighbourhood Bikeways
	P1-8	Nepean Trail	Multi-Use Pathway and Shared Lanes	Missing Links
	P1-9	Rideau River Western Pathway - Belmont Ave. to the University of Ottawa	Multi-Use Pathway	Missing Links
	P1-10	Shefford Rd. Pathway - Montreal Rd. to Ottawa River Pathway	Multi-Use Pathway	Missing Links
	P1-11	Prescott-Russell Recreational Trail - Connection to Cyrville Rd.	Multi-Use Pathway	Recreational Link
	P1-12	Mackenzie Ave. - Alexandra Bridge to Wellington St.	Segregated Bike Facility	Cross-Town Bikeway
	P1-13	O'Connor St. - Wellington St. to Holmwood Ave.	Segregated Bike Facility, Shared Use Lane, and Multi-Use Pathway	Missing Links
	P1-14	Pathway - Industrial Ave./Trainyards Dr. to Coronation Ave.	Multi-Use Pathway	TOD
	P1-15	Woodroffe Pathway - Norice St. to College Ave.	Multi-Use Pathway	Employment Nodes

Phase	Project ID	Project Name	Facility	Project Category
Phase 1	P1-16	Navaho Dr. - Woodroffe Ave. to Baseline Rd.	Bike Lanes	Employment Nodes
	P1-17	Pathway - McBride St. to Edgecliffe Ave.	Multi-Use Pathway	Employment Nodes
	P1-18	Lees Ave.- Chestnut St. to Chapel Cres.	Bike Lanes	TOD
	P1-19	Heron Rd. - Data Centre Rd. to Alta Vista Dr.	Segregated Bike Facility	Cross-Town Bikeway
	P1-20	Pleasant Park Rd. Neighbourhood Bikeway	Shared Use Lane	Neighbourhood Bikeways
	P1-21	Hog's Back Rd. - Prince of Wales Dr. to Colonel By Dr. and Brookfield Rd. - Airport Pkwy. to Riverside Dr.	Multi-Use Pathway	Employment Nodes
	P1-22	Cyrville Rd. - Meadowbrook Rd. to Ogilvie Rd.	Bike Lanes or Paved Shoulders	Cross-Town Bikeway
	P1-23	Pathway and Signed Local Route - Riverside Dr. (local road) to Rodney Cres.	Multi-Use Pathway and Shared Lanes	Employment Nodes
	P1-24	Westboro Neighbourhood Bikeway	Shared Use Lane	Neighbourhood Bikeways
	P1-25	Lowertown - New Edinburgh Neighbourhood Bikeway	Shared Use Lane	Neighbourhood Bikeways
	P1-26	Terry Fox Dr.- Hwy.417 WB to south of Campeau Dr.	Bike Lanes	Missing Links
	P1-27	Carling Ave. - East of March Rd. to Herzberg Rd.	Bike Lanes	Employment Nodes
	P1-28	Gladstone Ave. - Preston St. to Parkdale Ave.	Shared Use Lane	Missing Links
	P1-29	Ackerson Rd. Subdivision Pathway Links - Connection to Trans Canada Trail, Superstore, and Eagleson Crossing	Multi-Use Pathway	Missing Links
	P1-30	Laurier Ave. - Nicholas St. to Cumberland St.	Bike Lanes	Cross-Town Bikeway
	P1-31	Scott St./Albert St. - Holland Ave. to Bronson Ave.	Bike Lanes	Cross-Town Bikeway
	P1-32	Enhanced Paved Shoulder Pilot Project	Paved Shoulder	Other
	P1-33	Phase 1 City-wide Enhancements and Bike Parking	Various	Other

Phase	Project ID	Project Name	Facility	Project Category
Phase 1	P1-34	Woodroffe Ave. Pathway – Longfields Dr. To Stoneway Dr.	Multi-Use Pathway	Missing Links
	P1-35	St. Patrick St. and Murray St. – King Edward Ave. To Sussex Dr.	Shared use Lanes	Missing Links
	P1-37	Beausoleil Dr. – York St. to Cobourg St.	Shared Use Lanes	Missing Links
	P1-38	Old St. Patrick St. – Beausoleil Dr. To Cobourg St.	Shared Use Lanes	Missing Links
	P1-39	Donald St. – North River Rd. To Cummings Ave. And Cummings Ave. – Donald St. to Ogilvie Rd.	Shared Use Lanes	Missing Links
	P1-40	Byward Market Square – Clarence St. to York St.	Contra-flow Bike Lanes	Missing Links
	P1-S1	Rideau River Crossing – Donald St. to Somerset St. East	Bridge	Multi-Use Pathway Structures
	P1-S2	Ottawa River Crossing – Prince of Wales Bridge	Bridge	Multi-Use Pathway Structures
PHASE 1 TOTAL COSTS*				**$ 22,000,000**

*Total costs exclude projects in the Multi-Use Pathway Structures category.

Phase	Project ID	Project Name	Facility	Project Category
Phase 2	P2-1	Walkley Rd. - Transitway to Riverside Dr.	Bike Lanes	Employment Nodes
	P2-2	Railway MUP – Jockvale Rd. To Conway-Valiant Tunnel	Multi-Use Pathway	Missing Links
	P2-3	St.Laurent Blvd.- Pleasant Park Rd. to Russell Rd.	Bike Lanes	Employment Nodes
	P2-4	Richmond Rd./Robertson Rd. - Moodie Dr. to Baseline Rd.	Segregated Bike Facility	Cross-Town Bikeway
	P2-5	Richmond Rd.- Highway 417 to Carling Ave.	On-Street Bike Lane or Paved Shoulder	Cross-Town Bikeway
	P2-6	Hunt Club Rd. - Bank St. to Lorry Greenburg Dr., and Riverside Dr. to Billy Bishop Private	Bike Lanes	Missing Links
	P2-7	Flamborough Way, Hines Rd., Innovation Dr.	Bike Lanes	Employment Nodes
	P2-8	Solandt Rd.- west of March Rd.	Bike Lanes	Employment Nodes
	P2-9	Leggett Dr. - south of Solandt Rd.	Bike Lanes	Employment Nodes
	P2-10	Belfast Rd. - Trainyards Dr. to Coventry Rd.	Multi-Use Pathway	TOD
	P2-11	Pathway - St.Laurent Station to Aviation Pkwy.	Multi-Use Pathway	TOD
	P2-12	City Park Dr. and access to Blair Station	Multi-Use Pathway	TOD
	P2-13	Booth St. - Lebreton Station to Ottawa River Pathway	Bike Lanes or Multi-Use Pathway	Missing Links
	P2-14	Herzberg Rd. immediately east of March Rd.	Bike Lanes	Employment Nodes
	P2-15	Terry Fox Dr. immediately west of March Rd.	Bike Lanes	Employment Nodes
	P2-16	Wellington St. - Mackenzie Ave. to the Portage Bridge	Segregated Bike Facility	Cross-Town Bikeway
	P2-17	Barrhaven EW Neighbourhood Bikeway	Shared Use Lane	Neighbourhood Bikeways
	P2-18	Phase 2 City-wide Enhancements and Bike Parking	Various	Other
	P2-19	Hunt Club Neighbourhood Bikeway Extension to Airport Parkway Bridge	Shared Use Lane	Neighbourhood Bikeways
	P2-20	Old Montreal Rd. – Trim Rd. To Dunning Rd.	Paved Shoulder	Cross-Town Bikeway
	P2-S1	Rideau Canal Crossing – Fifth Ave. To Clegg St.	Bridge	Multi-Use Pathway Structures
PHASE 2 TOTAL COSTS*				**$ 24,000,000**

*Total costs exclude projects in the Multi-Use Pathway Structures category.

Phase	Project ID	Project Name	Facility	Project Category
Phase 3	P3-1	Tenth Line Rd. - St.Joseph Blvd. to Innes Rd.	Multi-Use Pathway	Cross-Town Bikeway
	P3-2	Blair Rd. - Ogilvie Rd. to Meadowbrook Rd.	Bike Lanes	TOD
	P3-3	Baseline Rd. - Woodroffe Ave. to Greenbank Rd.	Segregated Bike Facility	Missing Links
	P3-4	Montreal Rd./Ogilvie Rd. - Blair Rd. to Hwy. 417	Segregated Bike Facility	Missing Links
	P3-6	Hazeldean Rd. - Terry Fox Dr. to Eagleson Rd.	Segregated Bike Facility	Missing Links
	P3-7	Innes Rd. - Connections to BBHBP and BBHBP to east of Orleans Blvd.	Segregated Bike Facility	Cross-Town Bikeway
	P3-8	Nepean Creek Pathway	Multi-Use Pathway	Missing Links
	P3-9	Pathway along Cumberland Transit ROW	Multi-Use Pathway	Missing Links
	P3-10	Nepean North-West Neighbourhood Bikeway (Pathway segments only)	Multi-Use Pathway	Neighbourhood Bikeways
	P3-11	Centretown Neighbourhood Bikeway - Arthur St./Arlington Ave.	Shared Use Lane	Neighbourhood Bikeways
	P3-12	Lindenlea - Vanier Neighbourhood Bikeway	Shared Use Lane	Neighbourhood Bikeways
	P3-13	Kanata North Neighbourhood Bikeway	Shared Use Lane	Neighbourhood Bikeways
	P3-14	Barrhaven North-South Neighbourhood Bikeway	Shared Use Lane	Neighbourhood Bikeways
	P3-15	Orleans East-West Neighbourhood Bikeway	Shared Use Lane	Neighbourhood Bikeways
	P3-16	Old Ottawa South Neighbourhood Bikeway	Shared Use Lane	Neighbourhood Bikeways
	P3-17	Victor St. - Hazeldean Rd. to Greer St.	Shared Use Lane	Missing Links
	P3-18	Phase 3 City-wide Enhancements and Bike Parking	Various	Other
PHASE 3 TOTAL COSTS				**$ 24,000,000**