

REPORT



Windsor Bike Share Feasibility Study

Final Project Report



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Executive Summary

Bike sharing provides members with temporary access to a bicycle, through payment for short-term rental periods. Modern bike share systems are generally operated as either *docked* or *dockless* systems.

- *Docked bike share* systems provide users with access to bikes that are located throughout a sophisticated network of stations within a specified service area.
- *Dockless bike share* systems eliminate the need for docking stations by integrating GPS units and locking mechanism on bicycles, enabling bikes to be parked anywhere within a designated service area.

A significant evolution in the bike share industry has occurred recently that has redefined the equation for municipalities. As recent as two years ago, bike share systems were funded in large part by municipalities who often coordinated (with or without the aid of non-profit agencies or corporate sponsors) the acquisition of stations and bicycles as well as the planning and operation of services. By contrast, emerging bike share systems are generally 100% funded and operated by private actors, with minimal to no cost to cities, shifting municipalities into the role of a partner and regulator as opposed to a service provider. Much of this recent shift has been the result of a technological evolution that has allowed for a transition away from the more space and cost intensive docked model to a dockless model or a hybrid of the two. This evolution has also allowed for greater fleet diversity, with electric bicycles (e-bikes) and electric kick scooters (e-scooters) now available for short term rentals in some jurisdictions.

As a result of these changes to the industry, Canada has seen a growth in bike share systems from four systems in 2016 to almost 20 today. All but the original four systems are operating as private dockless (or hybrid) systems with little to no cost to the municipalities or universities they operate within. These shifts in the industry have created a significant opportunity for Windsor to host a bike share at minimal to no-cost to the City and likely have it operating within the next 8 to 24 months.

Windsor is in the midst of re-envisioning both transportation and recreational opportunities for its residents. The City is engaged in several concurrent studies and long-range plans, including *Walk Wheel Windsor*, a 20-year plan to improve access and connections to walking, cycling, and transit for residents and visitors. *Walk Wheel Windsor* targets 20% of all commute trips to be made by walking, cycling, and transit by 2031 (25% by 2041), up from 10% currently.

Bike sharing can play a significant role in achieving these targets and is directly aligned with the following *Walk Wheel Windsor* strategies:

- Goal 1: Connecting Communities
- Goal 3: Innovation and Integration
- Goal 4: Culture Shift
- Goal 5: Quality of Life

The following factors render Windsor well suited to bike sharing:

- **Layout:** The location of the University of Windsor within 2-3 km of Downtown, proximity of major employers to Downtown, and commercial corridors near the core including University Avenue,

Wyandotte Street, Sandwich Street, and Erie Street, result in origin-destination pairs that are well aligned with typical bike share trip lengths (1 to 3 km);

- **Riverfront Trail:** The riverfront pathway system is a well-developed cycling corridor in Windsor;
- **Topography:** Windsor's absence of large hills and barriers provides an ideal cycling environment for bike share users;
- **Grid Roadway System:** The City's roadway network is well defined and logical to navigate on foot or by bike;
- **Mild Climate:** Windsor has one of the mildest climates in Canada, allowing for a longer cycling season.

The proposed vision for bike sharing in the City of Windsor is as follows:

"Bike share in Windsor serves as an important and affordable connection to the transportation network, improving access to transit, and to key local destinations. The bike share system contributes to quality of life in the city, engaging both residents and visitors to enjoy what the city has to offer in a way that is healthy, sustainable, and convenient."

Implementation of bike sharing is recommended in two phases. **Phase 1** would establish a bike share in central Windsor, generally between the Riverfront Pathway (N), Prince Road (W), Tecumseh Road (S), and Drouillard Road (E). At 22.6 km², the recommended service area covers 15% of the City and includes approximately 65,000 residents (30% of Windsor's population).

Approximately **450 bikes** are recommended for Phase 1 of Windsor's bike share system. This results in a service concentration of 20 bikes per square km, on par with peer cities such as Hamilton, Madison, WI, and Boulder, CO. Assuming a conservative trip uptake rate of 1.5 trips per bike per day, at a system size of 450 bikes, an average of 675 trips per day is projected.

The City of Windsor could pursue one of three models to implement bike sharing, as described below.

ES 1 - Bike Share Ownership and Operation Models

Model	Description	Example
1. Traditional – Public Sector Owned	Municipality (or a non-profit) owns fleet, manages and operates the system. Municipality generally assumes responsibility for cost overruns.	Montreal, Toronto, Vancouver, Hamilton, Detroit
2. Private – RFP (Exclusive Operator)	Municipality issues an RFP to operate and manage a bike share system based on a set of service standards. A successful proponent delivers the service at no-cost to the municipality but has the right (typically exclusive) of operation on City infrastructure.	Victoria, Kelowna, UBC, Kingston, etc.
3. Private – Permit (Multiple Operators)	Municipality allows multiple companies to operate within city boundaries.	Calgary

A multiple account evaluation was conducted to assess the advantages and disadvantages of each model. In general, choosing to pursue a traditional – public ownership and operation model provides the City with strong control and oversight of the system, which may allow the City to more easily direct the system toward key equity and transit system integration imperatives. However, public ownership and control comes at a financial cost to the City and leaves the City ultimately responsible for upkeep and maintenance.

A traditional – public ownership model renders the city responsible for fleet acquisition, fleet replacement, insurance, and potential theft and damage to property, as well as liability for bike share use – all of which are additional to the operating cost estimate. A traditional – public ownership model would additionally leave the City responsible for cost overruns while either of the private ownership models would place the commercial viability, fleet maintenance, and liability of the bike share system onto a third party operator.

In lieu of a traditional – public sector operated system, the City of Windsor could enact clear policies and direction relating to bike share through the context of a service agreement with one or many private sector operator(s). A thorough service agreement, common throughout the industry, could regulate private bike share services in Windsor in relation to (but not limited to) the following:

- Fleet size;
- Fleet type;
- Service area;
- Service period;
- License duration;
- Parking management;
- Upkeep and maintenance;

- Data reporting;
- Repair;
- User information;
- Transit integration;
- Cost structure;
- Insurance requirements; and
- Equity considerations (including redistribution requirements to lower income neighbourhoods, and alternatives to smart phones / credit cards for accessing bikes)

In order to serve the best interests of the City of Windsor, and in light of current market trends in the bike share industry, **the findings of this report recommend that the City pursue a partnership with one or multiple private operators to provide bike share and/or e-bike share services to Windsor for little to no cost to the municipality.** To balance trip directness, fleet availability, and mitigate bicycle clutter at high use locations, **a hybrid-dockless model is recommended.**

Under this approach, the bike share fleet would be fully owned and operated by the private sector but regulated by the City. In general, the private bike share provider would be responsible for provisioning bikes and e-bikes, bike upkeep and maintenance, system operations, and customer interface (including providing a public website or phone app that provides access to bicycles) in exchange for the right to operate their business on City property. This approach is most likely to satisfy the objective of providing bike sharing and e-bike sharing services to Windsor, while minimizing financial risk to the City. Under the recommended approach, capital and operating costs (including any potential cost overruns) are borne by the private sector. In the event that the initiative is unsuccessful, the City would not be responsible for defunct rolling stock, stations, or other infrastructure tied to the program.

To ensure the City of Windsor is able to achieve its vision and objectives for bike sharing under a private ownership and operation model, it is recommended that the City establish clear requirements in the context of a *PILOT* service agreement with one or many operators.

No changes to City bylaws are required to establish bike sharing and e-bike sharing in Windsor.

The incorporation of blanket e-scooter sharing into Windsor's micro-mobility service offering is not recommended at this time as legally, e-scooters cannot be operated within the public right-of-way, according to the *Ontario Highway Traffic Act*. This recommendation does not preclude the establishment of a closed e-scooter pilot course off of public roadways. If there is desire to pursue a closed course, careful consideration would be required as to what trip origin and destination pairs are targeted and which corridors are appropriate for e-scooter travel.

While this report does not recommend whether to pursue an exclusive operator agreement via an RFP or a permit license structure, a recommended Framework for bike share is provided below.

ES 2 - Recommended Bike Share Framework

Item	Recommendation
Fleet Size	At least 450 bicycles
Fleet Composition	Combination of standard bicycles and e-bikes
Service Area	See <i>Figure 12 (Phase 1)</i>
Service Period	Year-round operation
Term of License	One or two year pilot license
Parking Management	Hybrid dockless model; bike share system to be generally free floating / dockless EXCEPT near high activity areas, where designated geo-fenced drop-zones will regulate pick-up / drop-off locations and mitigate clutter.
Financial Contributions from City of Windsor	None Staff time anticipated to work with and regulate operator(s)
Financial Contributions Required of Private Operators	All capital and operations costs. Annual Licensing Fee OR application fee, Annual Program Administrative Fee per Bike. Licensee shall reimburse for any costs (plus penalty) incurred by the City for violations of the agreement, or for repair/maintenance of public property.
Cost Overruns	Operator(s) responsible for any cost overruns
Upkeep and Maintenance	Operator(s) responsible for fleet upkeep and maintenance
Operations Plan	Operator(s) must provide operations and maintenance plan, staffing plan. Must have 24-hour customer service phone number and email, as well as direct contact for City staff.
User Interface and Payment Systems	Operator(s) to be responsible for providing a simple to use access portal that protects personal information and the privacy of the user. To ensure access for all, the operator(s) must provide a proposed payment plan outlining how the operator(s) will provide service to those without smartphones and those without a credit card.
Costs	Operator(s) retains the right to set pricing and user fees, but will consult with the City in doing so. Must submit costs in proposal as well as package options for memberships/pay per use, and surcharges and extra fees.
Data Reporting Standards	Operator(s) must protect users personal and financial information. The City of Windsor will be given access to the fleet management portal and have access to real-time data feeds (GBFS). Monthly reports of number of bikes, km travelled, breakdown by age/gender. Also, monthly trip records for each trip should be provided (including route) including GIS data.

Item	Recommendation
Repair	<p>The operator(s) is/are to maintain all bikes in a safe and functional state, and promptly remove any damaged, unsafe or non-functional bikes from public property.</p> <p>Once notified of an issue, the operator(s) must lock down the bicycle to ensure it cannot be used.</p> <p>Maintenance data must be updated and submitted monthly.</p>
Rebalancing	<p>Bicycles must be rebalanced every 24 hours. Operator(s) must respond to pedestrian obstructions and safety concerns within several hours.</p> <p>Operator(s) must inspect any hubs or stations (if applicable) at least once per day to ensure they are kept in safe, tidy, and sanitary conditions.</p> <p>The City may remove or re-park bicycles in violation with the permit and deduct from the security deposit for fees, resources, and staff time.</p>
Equipment Standards	<p>Bikes must meet Provincial safety requirements and include adjustable seat posts, all-weather tires, front/rear fenders, GPS location tracking, unique identification number and permit number. E-bikes must conform to Provincial requirements.</p>
Storage	<p>Bikes to be parked at:</p> <ul style="list-style-type: none"> (1) Bike racks (i.e. post and ring) (2) Designated areas in geo-fenced hubs or stations (where applicable); (3) Bikes shall not block a 2 metre pedestrian zone, driveways, or street furniture. No parking within 0.5m of trees or shrubs. Bicycles must not be parked where these minimum distance requirements cannot be met. <p>Operator(s) should have in-app ability to communicate by text or alert to let the customer know if a bicycle is parked in a non-permitted area.</p> <p>All bicycles must remain in an upright position with both wheels in contact with the ground.</p>
User Education	<p>Operator(s) must educate customers on how to use services, proper riding behaviour, how to operate and park bicycles, helmet laws. An education plan must be provided and show how education plan will be delivered, including attendance at public meetings and community events to provide education and support to users.</p>
Transit Integration	<p>Operator(s) is/are encouraged to incorporate the capability to integrate payment and access systems with Transit Windsor.</p>

Item	Recommendation
	Special parking arrangements are to be considered in collaboration with the Transit Windsor and the City of Windsor in transportation hubs.
Insurance Requirements	Proof of Commercial General Liability Insurance in Province of Ontario – no less than \$5 million. Motor vehicle liability insurance in the amount of no less than \$2 million. WSIB coverage.

Contents

- Executive Summary..... i
- 1.0 Introduction..... 1
- 2.0 Current Bike Share Context..... 3
 - 2.1 What is Bike Sharing? 3
 - 2.2 Typical Bike Share Usage 3
 - 2.3 Bike Share Evolution 4
 - 2.4 Comparison of Contemporary System Types..... 5
 - 2.5 Bike Sharing in Canada..... 8
- 3.0 Peer Systems Research..... 14
 - 3.1 Inter-departmental Collaboration..... 15
- 4.0 Opportunity Assessment for Windsor..... 16
 - 4.1 Public Input on Bike Sharing..... 17
 - 4.2 Visioning 18
 - 4.3 Service Area Analysis..... 21
 - 4.4 Phase 1: Service Area Recommendation..... 28
 - 4.5 Fleet Size Recommendation (Phase 1)..... 30
 - 4.6 Estimated Trip Generation (Phase 1)..... 31
- 5.0 Implementation and Operations..... 32
 - 5.1 Public versus Private Ownership and Operation Models 32
 - 5.2 Funding Opportunities 37
 - 5.3 Tools to Regulate Third-Party Operators..... 37
 - 5.4 E-Bikes and E-Scooters 44
- 6.0 Recommendation..... 46

Appendices

Appendix A - Current Regulations Related to E-Bikes and E-Scooters

1.0 Introduction

The growing trend towards shared mobility, and multi-modal transportation has dramatically changed the way people are traveling and will travel in cities over the next several decades. Increasingly, municipalities are working with various levels of government, community and corporate partners to ensure new transportation options thrive and support individuals with more mobility choices. This can support other city-wide goals including improved accessibility, equity, safety, health, sustainability, and convenience.

Bike Shares provide members with temporary access to a bicycle, through payment for short-term rental periods. Bike Shares around the world each have their own blend of unique characteristics which range from a variety of ownership and operation models, user experiences, distribution and integration with other modes and systems, among other factors. Bike Share systems can make it more convenient and enjoyable for those that walk or use transit daily and can also provide an important service for tourists.



Figure 1 - Bike Share Pilot at University of Windsor

Windsor has already begun its journey into shared mobility services. Beginning in September 2016, an initial Bike Share pilot project was led by the University of Windsor Students Association. This pilot provided students with access to 40 *Zagster* bicycles, which were housed at several docking stations located around the campus (**Figure 1**). While the initial intent was for the bicycles to remain on campus, an error with the GPS unit resulted in bicycles being removed, resulting in 33/40 going missing in the project's first year. The GPS units were adjusted, and bicycles were replaced. However due to high costs, the program was terminated in August 2018.

As part of a capstone project, a group of students (Shareways Design Solutions) from the University of Windsor prepared a report which analyzes and evaluates potential costs, locations, and overall feasibility of a bike share program throughout Windsor. This report recommends a 33 station bike share system be expanded throughout the city, with 265 bicycles.

In Fall 2018, the City of Windsor retained Urban Systems to conduct a Bike Share Feasibility Study to review and report on potential options available for the development of a city-wide bike share system. Through research and extensive conversations with peer municipalities and operators, the consultant team identified a significant evolution in the state of the bike share market. As recent as two years ago, bike share systems were funded in large part by municipalities who often coordinated (with or without the aid of non-profit agencies or corporate sponsors) the acquisition of stations and bicycles as well as the planning and operation of services. Today's recent bike share systems are generally 100% funded and operated by private actors, with minimal to no cost to cities, shifting municipalities into a role of a partner and regulator as opposed to a service provider. Much of this recent shift has been the result of a technological evolution

that has allowed for a transition away from the cost and space intensive station-based model, to a stationless (dockless) model or a hybrid of the two. This model tends to be more flexible, and significantly reduces both capital and operational costs.

As a result of these changes in the industry, Canada has seen a growth in bike share systems from four systems in 2016 to almost 20 today. All but the original four systems are operating as a private dockless (or hybrid) business model with little to no cost to the municipalities or institutions (mainly university campuses) they operate within. These shifts in the industry have created a significant opportunity for Windsor to host a municipal bike share at minimal to no-cost to the City and likely have it operating within the next 8 to 24 months.

However, these rapid changes in bike share ownership and operation models over such a short period has resulted in some key lessons and cautionary experiences from other municipalities. The regulation of, and license agreements with, bike share operators are critical to maintaining order, accessibility, equity, and ensuring successful implementation of a system that best serves the city. This is critical to ensure the bike share contributes to the public interest and works in tandem with existing transportation networks and plans. It is also critical to ensure that the city benefit from user data that can be integral to planning and monitoring the operation of the bike share, as well as planning for active transportation improvements, more broadly.

This report will support the City of Windsor in taking important steps toward implementing a made-in-Windsor bike share system. The report includes the following components:

- A backgrounder on current trends in bike sharing, including key recent innovations in the industry;
- A comparison of various bike share service models across Canada, and how these models might work in Windsor;
- A nation-wide scan of municipalities where bike sharing is part of the transportation ecosystem;
- A framework for bike share in Windsor, alongside a proposed approach, system area, and system size;
- Capital and operations cost estimate for a publicly-funded bike share system in Windsor;
- A multiple account evaluation examining three prevalent bike share service models to support the City in selecting a bike share service model that best suits the community;

2.0 Current Bike Share Context

2.1 What is Bike Sharing?

Bike shares provide members with temporary access to a bicycle, through payment for short-term rental periods. Bike shares around the world each have their own blend of unique characteristics which range from a variety of ownership and operation models, user experiences, distribution and integration with other modes and systems, among other factors. Bike share systems can make active transportation more convenient and enjoyable for those that walk or use transit daily and can also provide an important service for tourists.

Bike shares are part of current trends in transportation towards shared mobility (carshare, rideshare), and new mobility modes such as e-scooters, both of which are dramatically changing the way people are traveling and will travel in cities over the next several decades. Bike shares also make multi-modal transportation a more practical option, providing an important connection option for the first and last mile of trips. To create and plan for these systems, cities are working with various levels of government, community and corporate partners to ensure these new transportation options compliment and support individuals with more mobility choices. This can support other city-wide goals including:

- Improving Accessibility
- Reducing Congestion
- Improving Transportation Equity
- Improving Health
- Contributing to Community Environmental Sustainability
- Improving Convenience and Practicality of Multi-Modal Transportation
- Supporting Tourism

2.2 Typical Bike Share Usage

While there are variations amongst systems based on a combination of unique local factors, there are some common trends around system usage, and travel characteristics that have emerged. The Institute for Transportation & Development Policy (ITDP) has documented some of these common characteristics in its Bike Share Planning Guidebooks. ITDP notes that an effective bike share system sees between 4-8 uses of each bike per day, and approximately one daily trip for each twenty to forty residents. There can be variations amongst seasons, and the density and transportation networks that exist in various areas of the city. These two factors are integral to ensuring a system is financially viable, and able to cover the operations costs associated with the bike share.

USAGE

An effective bike share system sees between 4-8 uses of each bike per day, and one daily trip for each 20-40 residents.

ITDP, 2018

DISTANCE

The average trip distance is between 1-3 km. Dockless bicycles trend towards shorter trips, while docked bicycles trend towards longer trip distances.

NACTO, 2018

The US National Association of City Transport Officials (NACTO) has conducted research using bike share system data and compiled several case studies of user intercept surveys to learn about common trip characteristics. As of 2017, NACTO found that the average trip is between 1-3 kilometres with dockless bicycles trending towards the shorter end of the spectrum and docked bike share users trending towards longer trip distances. Based on data from Seattle and Washington DC, which have both dockless and docked systems in operation, trends show that docked bike share systems have a greater usage during peak weekday travel times (7-9am or 4-6pm), and weekends, whereas dockless systems show higher evening peaks, but not necessarily any correlation to commuting times. This suggests that docked stations in these cities are better integrated into the transportation network, creating enough reliability for daily commuters. Overall, these early findings provide some context in designing a bike share system that meets the needs of users, ensures for an effective and efficient system, and supports city-wide transportation goals.

2.3 Bike Share Evolution

Modern bike share systems have been evolving since their emergence in Europe in the early 1990s. ITDP has described this evolution as a series of generations, as shown in **Table 1**. Growing out of a free and unlocked system in its first iterations, bike share systems evolved with increasing need for security, accountability, dependable equipment, and integration within broader transportation networks. This resulted in the emergence of station-based or docked systems which release the bicycles from a main station once a user has rented it using coins, a membership card, or a credit card. Stations can be located throughout a city, enabling users to start and end their trips at different locations.

Table 1 - Evolution of Bike share

The Evolution of Bike share			
Free public bicycles/bicycle libraries	Amsterdam, France, England	1965-1993	1 st Generation Bike share
Coin operated bicycle shares with secure docking stations	Copenhagen	1995	2 nd Generation Bike share
Smart-card/credit card operated with secure docking stations	Began in France, expanding worldwide	1996	3 rd Generation Bike share
Modern technology operated with variations in access and storage. Modern technology in fleets such as solar cells, E-Bikes, E-Scooters; dockless, movable, or geo-fenced station types; accessed by smart card (mobility pass), credit card, cell phone, or key fob.	Began in China and expanding worldwide	2013	4 th Generation Bike share

More recently, between 2013-2015, the bike share industry began to evolve on a variety of fronts. Firstly, the emergence of dockless bikes has shifted the market compared to more traditional station based docked systems. Dockless bikes do not require a station, removing the need for widescale infrastructure throughout the network. This has led to a wide array of system make-ups. Secondly, the emergence of these systems started to drive a change in price structures, driving annual memberships and monthly passes towards a more trip-based pay-per-use fee structure which was intended to generate more trips. Thirdly, the emergence of other types of bikes including electric assist bikes (e-bikes) began to provide more options to users. E-bikes expanded the market and made bike sharing a more practical option for a wider variety of trips. E-bikes help make longer distance trips an option and make changes in elevation less of an issue. Lastly, as bike sharing has become a more viable transportation option in cities, there has been a recognition that bike shares play an integral role in the first/last mile of transit trips. As such, it has benefited both transit agencies and the bike share service providers to plan these systems together. In some systems, the bike share is owned by the municipality, making this a natural extension with public transit.

MetroBike LLC's [Bike-Sharing World Map](#) is a useful resource to visually see the spread of bike share around the world. A snapshot of bike share systems in North America can be seen in **Figure 2**.

2.4 Comparison of Contemporary System Types

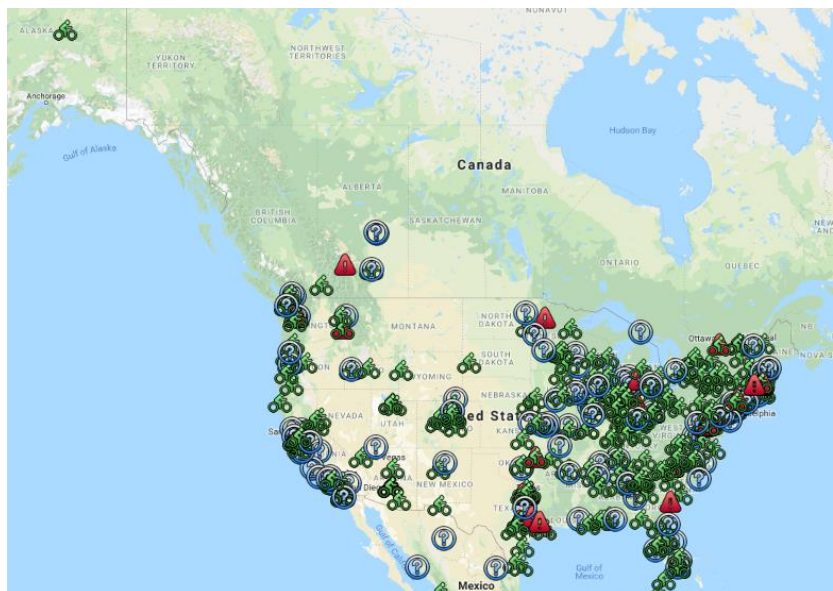


Figure 2 - Bike Sharing World Map - North America

Modern bike share systems are generally operated as either *docked* or *dockless* systems. Increasingly, *hybrid* systems seek to improve upon the dockless model by integrating key docked system elements. Docked and dockless systems are briefly summarised and pictured below, with key differences highlighted in **Table 2**.

2.4.1 DOCKED OR STATION BASED MODEL

Docked bike share systems provide users with access to bikes that are located throughout a sophisticated network of stations within a specified service area. Typically to serve an effective network, there are dozens to hundreds of docking stations throughout the service network, with more stations being added to locations of high usage, and as system usage grows. Each station has a specific number of docks to secure the bikes, enabling users to start and end their trip at any station where they find a bike or an open dock. A dense network of stations allows users to get closer to their true origin and destination, increasing

convenience. From time to time, operators will rebalance bicycles to better distribute them throughout the network.

Docked bike share systems are built and integrated into the existing transportation network, they offer users dependability in knowing where to find bicycles, and are accessed using a membership card, fob, or credit card. Users can generally purchase annual/monthly memberships to the bike share and increasingly can opt to pay per trip. A significant amount of planning goes into the siting and allocation of space for stations, the selection of the number of docks and bicycles at each station, and the overall number of bicycles in a city. The purpose being to create a reliable network that integrates well with other transportation modes.

Technology in the docking station helps the bike share operator to know how many bikes are located at each station, and which stations the bikes travel to. This supports redistribution of the bikes as well as further planning and expansion. Ownership models vary substantially ranging from publicly owned, non-profit with private contributions, to privately operated. The initial investment in the stations and bicycles is substantial, which can make expanding to accommodate growing demand a challenge. This access to capital is often a limiting factor in the growth model and has prompted a variety of funding partnerships including grants, and sponsorships.

2.4.2 DOCKLESS MODEL

Dockless bike sharing has rapidly emerged as a system type since 2015. Originating in China, the rapid expansion of dockless bike sharing was made possible due to the private ownership of these systems. Substantially more affordable to operate, technology has removed the need for expensive station-based infrastructure, and private operators can access capital to rapidly meet increased demand. Dockless systems offer the user convenience in the ability to generally start and end trips closer to their true destination, with the ability to leave the bike where desired. The bicycles are reserved, paid for, and accessed through a user's smart phone app, with users generally paying a per-trip fee based on time. GPS units on both the phone and bicycle provide a great deal of information that can be recorded regarding trip usage and travel patterns, as well as provide customers with a map of all the bicycles they can access nearby.



Figure 3 - Docked Bike Share at Station. Toronto, Ontario



Figure 4 - Dockless Bike Share in defined 'haven'. Calgary, Alberta

The convenience of being able to leave your bike at your true destination has, in certain circumstances, resulted in clutter of public spaces, users leaving bicycles blocking sidewalks, or locking the freestanding bike share bicycles to existing bike parking spaces reducing the parking for private bicycles. Local governments and private companies are working through unique approaches to deter this behaviour. Some examples include the addition of designated bicycle rack spaces, as well as geo-fenced areas which are programmed into the bike share operators smart phone app (and often physically painted on the sidewalk) which limit where users can leave the bicycles at the end of their trip. A variety of fees and/or benefits have been implemented to ensure users are leaving the bikes in these spaces.

Equity and accessibility have also been an evolving factor. Since users mainly access these bicycles by a smart phone app linked to their credit card, more accessible options are being developed to fully accommodate other users who may not have access to either. Cities are also requesting in agreements with service providers that they ensure bicycles are present in higher need areas where business might not have otherwise located. Age restrictions and local helmet laws can also pose issues of inequity, something currently being examined more closely in cities.

Dockless ownership models have evolved, growing from strictly private, to partnership options between non-profits focused on operations and membership services, and private companies focused on hardware and software. The system setup and operations of dockless systems are complex and vary in nature, which is why it is critical to enter into agreements and partnerships with a strong understanding of necessary by-laws, local policies, and contractual agreements that benefit both the municipality and the bike share operator.

Table 2 – Comparison of Bike Share Service Models

	Docked	Dockless	Hybrid
Trip Start / End Locations	Station based – trips start and end at stations.	Roaming – Trips start and end closer to their true origins and destinations. Trips can be completed through wheel locking or lock-to attachments in the bike which can lock the bike to adjacent infrastructure.	Systems that include a mix of both station-based and dockless elements. Users are encouraged to return bikes to designated stations or hubs through a mixture of incentives and disincentives.
Locking Mechanism	Locks into docking station	Wheel lock or lock to system	Wheel lock or lock to systems
Location Monitoring Systems	<ul style="list-style-type: none"> Locates where bikes are picked up and returned: Radio Frequency Identification Devices (RFIDs) Station occupancy rate monitoring 	GPS Unit on Bicycles and/or user cell phones	GPS Unit on Bicycles and/or user cell phones

	through real-time General Packet Radio Service (GPRS)		
Reservation/Booking System	Reservation made at station using membership card/fob/credit card	Reservation made by cell phone and charged to user credit card	Reservation made by cell phone and charged to user credit card

2.4.3 FLEET DIVERSITY

The demand for individualized mobility options has resulted in a significant uptake of bike sharing around the world. Providers have been working to accommodate a variety of fleet options, including mountain bikes for trail riding, and studded tires or fat bikes to accommodate winter riding. In the past few years this has expanded greatly to include other forms of what is now termed “Micro-Mobility” options, including access to electric bicycles (e-bikes) and electric scooters (e-scooters). These types of vehicles are often integrated into existing bike share services at a higher rental cost, allowing members to select the type of vehicle they use. However, they can also be operated as separate fleets by independent companies.

The number of users and trips generated by these various forms of micro-mobility options are substantial, and companies are rapidly working to meet growing demands. However, this does present challenges to municipalities trying to regulate the operation of these growing entities. The integration of e-bikes and e-scooters into the public right of way can be a challenge, as they pose conflicts to existing road users. Special consideration needs to be made as to where these types of services can operate, how they are regulated, and where they are stored and recharged. An overview of current legislation around these vehicles in the Ontario Highway Traffic Act, and City of Windsor Parks and Traffic By-laws can be found in **Appendix A**.

2.5 Bike Sharing in Canada

As of October 2018, there are 17 bike share systems and one scooter share system operating in Canada under a variety of operational and funding models. Key characteristics of these systems are shown in **Table 3**. As part of this project, a selection from this group was chosen for Peer System Interviews described in the next section of this report.

Table 3 – Bike Share in Canada: System Summary

City / Campus	System Name	Type	Start / End Trip Location	Mode	Year Started	Interface	Business Model	Fleet Size	User Cost
BIKE SHARE IN CANADIAN MUNICIPALITIES									
Victoria	U-Bicycle	Hybrid – can terminate within 10m of dropzone only (geo-fence)	Public bike racks in designated drop zones	Bike (interested in e-scooters)	2017	App only	Private Business (city pays nothing)	550 bikes	\$50 deposit; \$1 per 30 min. Day pass for \$15.75. Annual pass for \$157.50.
Vancouver	Mobi	Docked	Docking stations	Bike	2016	Member card (App available for reservations)	City contracted private operator (CycleHop) who owns all assets	2,000 bikes; 150 stations	\$9.75 (day), \$75 (3 mo), \$129 (1 yr) for 30 min rides; add'l 30 min \$2
University of British Columbia	Dropbike	Dockless	Anywhere on UBC campus-lock to infrastructure; parking in havens recommended but not required	Bike (interested in e-bikes and e-scooters)	2018	App only	Private Business (University pays nothing)	200 bikes	\$1 for 60 min + deposit
Other Lower Mainland	U-Bicycle (Richmond, Port Moody/ Port Coquitlam)	Dockless (attach to any infrastructure)	Public bike racks-lock-to infrastructure or havens.	Bike (interested in e-scooters)	2018	App only	Private Business (city pays nothing)	Lanford – 35 bikes; Richmond 56 bikes;	\$50 deposit; \$1 per 30 min. Day pass for \$15.75.

City / Campus	System Name	Type	Start / End Trip Location	Mode	Year Started	Interface	Business Model	Fleet Size	User Cost
		e or end in havens)						Port Moody/ Port Coquitlam – 30 bikes	Annual pass for \$157.50.
Kelowna	Dropbike	Dockless	Anywhere in homezone; parking in havens recommended but not required	Bike (interested in e-bikes, e-scooters as well)	2018	App only	Private Business (city pays nothing)	Up 1,500 bikes	\$1 for 60 min + deposit
Calgary	Open Market (multiple companies)	Dockless	Anywhere (no lock-to required)	Bike	2019	App only	Private businesses	Currently 375 bikes, licensed up to 10,000 bikes	Multiple companies
Waterloo Region	Dropbike	Dockless	Anywhere in homezone; parking in havens recommended but not required	Bike (interested in e-bikes as well)	2018	App only	Private Business (city pays nothing)	200-300 bikes	\$1 for 60 min + deposit
Elgin (Port Stanley)	Dropbike	Dockless	Anywhere in homezone	Bike (interested in e-bikes, e-scooters as well)	2018	App only	Private Business (city pays nothing)		\$1 for 60 min + deposit
Hamilton	SoBi	Hybrid (attach to	Anywhere in homezone (130	Bike	2015	Member card (App	Non-profit (though City	825 bikes; 130 hubs	9c per min (pay as you

City / Campus	System Name	Type	Start / End Trip Location	Mode	Year Started	Interface	Business Model	Fleet Size	User Cost
		hubs or any bike locks)	hubs for free or any bike lock for a \$1 fee)			available for reservations)	and Metrolinx are 'sponsors')		go) OR \$15/mo (90 min trip)
Toronto	Toronto Bike share	Docked	Docking stations	Bike	2011	App, credit card	Public; run by Toronto Parking Authority; city paid capital costs (\$4-6M); sponsorship pays op costs	3,750 bikes; 360 stations	\$3.25 (ride); \$7 (day); \$15 (3 day); \$99 (1 yr) for 30 min trips; +\$4 for extra 30 min
Oshawa	Dropbike	Dockless	Anywhere in homezone; parking in havens recommended but not required	Bike (interested in e-bikes, e-scooters as well)	2019 2 year pilot set to begin	App only	Private Business (city pays nothing)	TBD	\$1 for 60 min + deposit
Kingston	Dropbike	Dockless	Anywhere in homezone; parking in havens recommended but not required	Bike (interested in e-bikes, e-scooters as well)	2017 pilot; 2019 full launch	App only	Private Business (city pays nothing)	200+	\$1 for 60 min + deposit
Ottawa	VeloGo (CycleHop /HOPR)	Dockless	Anywhere in home zone though 'ponds' / havens are identified	Bike (HOPR has e-bikes and e-scooters in their offerings	2018	App only	Private business	500	\$1 to start ride; 16c per min; \$15/mo (30 min)

City / Campus	System Name	Type	Start / End Trip Location	Mode	Year Started	Interface	Business Model	Fleet Size	User Cost
				so could pivot to other technology if desired)					
Montreal	BIXI	Docked	Docking stations	Bike	2009	Credit card, enter unlock code, bike key (for members). App available for reservations.	Public; run by Stationnement de Montreal	6,250; 540 stations	\$2.75 (trip); \$5 (day), \$14 (3 days), \$30.25 (month); \$80.50 (year) for 30 min trip
Westmount	Dropbike	Dockless	Anywhere in homezone; parking in havens recommended	Bike (interested in e-bikes, e-scooters as well)	2017	App only	Private Business (city pays nothing or gets paid)	50+	\$1 for 60 min + deposit

City / Campus	System Name	Type	Start / End Trip Location	Mode	Year Started	Interface	Business Model	Fleet Size	User Cost
BIKE SHARE ON CANADIAN UNIVERSITY CAMPUSES									
University of Manitoba (Winnipeg)	Dropbike	Dockless	Anywhere in homezone; parking in havens recommended but not required		2019	App only	Private Business (University pays nothing)	TBD – Estimated 50 bikes at launch	\$1 for 60 min + deposit
University of British Columbia	Dropbike	Dockless	Anywhere on UBC campus-lock to infrastructure; parking in havens recommended but not required	Bike (interested in e-bikes and e-scooters)	2018	App only	Private Business (University pays nothing)	200 bikes	\$1 for 60 min + deposit
SCOOTER-SHARE IN CANADA									
City of Waterloo	Lime	Dockless E-Scooter	Permitted on Waterloo Park promenade, Laurel Trail, University of Waterloo Campus and Research and Technology Park; cannot be operated on city streets	E-Scooter First Canadian Pilot	2019 – Pilot	App only	Private Business (city chose to pay \$10,000 for improved signage)	TBD	\$1 to unlock; 30 cents per min

3.0 Peer Systems Research

Research for this study included extensive interview conversations with both municipalities and operators across Canada and in neighbouring Detroit including:

Municipalities	Operators
<ul style="list-style-type: none"> • City of Victoria • City of Kingston • City of Hamilton • City of Calgary • City of Kelowna • UBC 	<ul style="list-style-type: none"> • SoBi (Hamilton) • Dropbike (Kingston, Kelowna, UBC) • U-Bicycle (Victoria) • Mobi (Vancouver) • MoGo (Detroit)

Summary of Key Findings are as follows:

- The industry has evolved with private operators now providing bike share services to municipalities of all sizes across Canada and the US for little to no-cost to municipalities. However, to accommodate local needs, a variety of organizational models can be implemented and/or integrated with private systems including non-profit, and public;
- Private dockless bike share operators can launch systems quickly and scale-up to hundreds of bikes within a relatively short time frame;
- Bikes do not require the same type of docking infrastructure as older systems, reducing capital costs. Bikes are tracked and charged using GPS;
- Short-term bike rentals are enabled using smart phone apps and most often require a credit card; while opportunities for providing services to those without access to a smart phone or credit card are technically feasible, not all operators support these services;
- Customers locate (and potentially reserve) bikes using the company's smart phone app, unlock the bike on their phone, then complete their ride;
- Trips most often must start and end within the system's coverage area (which typically includes higher density, mixed use neighbourhoods and primary activity zones such as downtowns);
- Many systems operate on a dockless or hybrid docked/dockless model, meaning that customers can often ride directly to their destinations;
- While costs to customers vary, they are typically in the \$1 to \$2/ hour range, with discounts for monthly or annual membership products;
- Operators view next generation micro-mobility technology such as e-bikes and e-scooters favourably and are generally open to work with municipalities on technology provision. One operator plans to transition their service offering to 100% e-bikes in the near future;
- Bikes can clutter-up sidewalks, presenting mobility challenges for pedestrians. Geofencing or encouraging parking in designated drop zones can discourage cluttering;
- Municipalities can request specific types of bikes to ensure integration with the transportation systems and accommodate various climate conditions (i.e. – aluminum bikes, studded tires, mountain bikes);

- Municipalities can specify service areas and payment / reservation options to ensure equitable access.

3.1 Inter-departmental Collaboration

The municipalities engaged as part of the peer interviews suggested the following departments be involved in decision making and evaluation around bike share planning and licensing:

- Streets / Transportation
- Maintenance and Operations
- Active Transportation
- Livable Streets
- Legal
- Real Estate
- Communications
- Parks
- Environment and Sustainability
- Economic Development

There was also the recommendation to include community partners, Business Improvement Areas, interested property owners, and local businesses.

4.0 Opportunity Assessment for Windsor

Bike share can be a key component of transportation plans that include a long-term vision for cycling. Because bike share reduces some barriers to cycling, it can help quickly boost the number of cyclists on the road. This, in turn, can generate a political constituency that supports cycling network improvements.

Windsor is in the midst of re-envisioning both transportation and recreational opportunities for its residents. The City is engaged in several concurrent studies and long-range plans, including a Transit Service Review that will reshape the existing transit network, as well as a new Recreation Master Plan which will look at opportunities to improve and integrate recreation opportunities for residents. The City of Windsor is also nearing completion of their new Active Transportation Master Plan - *Walk Wheel Windsor*, a 20-year plan to improve access and connections to walking, cycling, and transit for residents and visitors. The plan is guided by the following vision:

“By 2041, Windsor is a leader in active transportation. Walking, cycling, and transit are safe, convenient, and enjoyable mobility options for all residents and visitors, regardless of age, ability, trip purpose, or time of year.

Active Transportation connects Windsor’s local and regional communities, contributing to a resilient, equitable, and healthy city with a high quality of life for Windsor residents.”

The ATMP sets targets, with 20% of all commute trips to be made by walking, cycling, and transit by 2031 (25% by 2041), up from 10% currently. These targets build on pre-existing targets from the City’s Community Energy Plan that identify a 6% transit mode share by 2041.

Bike sharing can play a significant role in achieving these targets and is directly aligned with the following ATMP strategies:

- Goal 1: Connecting Communities
- Goal 3: Innovation and Integration
- Goal 4: Culture Shift
- Goal 5: Quality of Life

Bike sharing, and other micro-mobility services such as e-bikes and e-scooters, can play a key role in providing first-mile / last-mile integration with public transit, increasing the reach of the public transit system and making a car-free or car-light lifestyle a viable choice for a greater number of Windsor residents. As noted in the ITDP Bike Share Guide (2018):

As cities consider reframing their transportation network as a service that maximizes ease and efficiency for users, opportunities emerge for bike share to be seamlessly integrated into the larger transit system. While this may or may not translate into increased ridership, integration between transit and bike share would contribute to a better, more seamless transportation network.

The following factors render Windsor well suited to bike sharing:

- **Layout:** The location of the University of Windsor within 2-3 km of Downtown, proximity of major employers to Downtown, and commercial corridors near the core including University Avenue, Wyandotte Street, Sandwich Street, and Erie Street, result in origin-destination pairs that are well aligned with typical bike share trip lengths (1 to 3 km);
- **Riverfront Trail:** The riverfront pathway system is a well-developed cycling corridor in Windsor;
- **Topography:** Windsor's absence of large hills and barriers provides an ideal cycling environment for bike share users;
- **Grid Roadway System:** The City's roadway network is well defined and logical to navigate on foot or by bike;
- **Mild Climate:** Windsor has one of the mildest climates in Canada, allowing for a longer cycling season.

4.1 Public Input on Bike Sharing

Recent consultation conducted as part of Windsor's *Active Transportation Master Plan* noted a desire for a bike share system. A summary of comments below from the online Metroquest surveys, and the Fall 2018 Stakeholder Workshop identified a strong interest in bringing bike share to the city. The following themes relating to bike share were noted:

- Expanding the reach of active transportation through the provision of e-bikes in the bike share program;
- Leveraging bike share as a means to connect post-secondary institutions to the Downtown core;
- Creating more inviting spaces for people by leveraging bike share as a way to explore the city;
- Ensuring the bike share program is researched and integrated into other programs and activities throughout the city;
- Concerns around a lack of bike parking in central Windsor and potential pressure of additional bike share bikes on existing bike parking.

As part of the Community Road Show Series, approximately 350 individuals at a series of community events throughout the city were asked to gauge their interest and support for bike share, as well as identify where they would like to access the service. As shown in **Figure 2**, many individuals indicated that they would like to see bike share operating in the following areas:

- Riverfront
- University of Windsor
- Downtown
- Walkerville
- Ford City
- St. Clair College
- Tecumseh Mall

Bike Sharing

Contribute your thoughts on Bike Sharing in Windsor!

What is Bike Sharing?

A bike share is a program designed to support short-trips, by providing individuals with paid access to a fleet of bicycles in different locations throughout the city. It is different from a traditional bicycle rental in that it is typically used for short trips, and is often combined with access to public transit. The City of Windsor is currently evaluating the feasibility of a citywide bike share system. There are a variety of system types and organizational structures being explored.

Examples of citywide bike share systems:



MoGo bike share in Detroit, provides access to 430 bicycles, at 44 docking hubs throughout the city.

Image source: <https://wdrb.org/post/2017/05/31/85248-mogo-mpor-in-400r-ride-in-30al-weak>



SoBi bike share in Hamilton, provides access to 625 bicycles, at 155 hubs throughout the city.

Image source: <https://www.cbc.ca/news/canada/hamilton/headlines/hamilton-so-bi-bike-share-program-struggling-to-meet-its-most-ambitious-1.2744268>

If you would use bike share, where would you like to access it in Windsor? Use a sticky dot to let us know!



Figure 5 - Public Engagement Map

4.2 Visioning

The proposed vision and goals shape the overall approach to planning the bike share system and form the basis from which the system is designed, as well as its growth priorities over time. To understand their importance, it is first necessary to elaborate on the distinction between vision and goals:

- The **Vision** describes the broad aspirations for the bike share in Windsor. A vision statement is meant to be aspirational in guiding the future we are working towards.
- **Goals** help guide the City towards fulfilling its vision. Goals are meant to be overarching, simple, succinct statements that are easily remembered and referenced. Goals should also be easily measurable.

4.2.1 BIKE SHARE VISION

Throughout the Active Transportation Master Plan process, several City-wide policy documents were reviewed that contain transit, pedestrian, and cycling-related policies, plans, and goals. These plans and policies were used in conjunction with public feedback to form the basis of a long-term vision for active transportation in Windsor.

Here, we have brought several of these visions together, along with the measures of success for bike share to inform a bike share vision for the City of Windsor.

Table 4 - Core Shaping Plans and Visions

Plan	Vision
Active Transportation Masterplan (2018)	<p>“By 2041, Windsor is a leader in active transportation. Walking, cycling, and transit are safe, convenient, and enjoyable mobility options for all residents and visitors, regardless of age, ability, trip purpose, or time of year.</p> <p>Active Transportation connects Windsor’s local and regional communities, contributing to a resilient, equitable, and healthy city with a high quality of life for Windsor residents.”</p>
Official Community Plan (2009)	<p>“Windsor is a quality city full of history and potential, with a diverse culture, a durable economy, and a healthy environment where citizens share a strong sense of belonging and a collective pride of place.”</p>
Downtown Transportation Strategy (2016)	<p>“Downtown Windsor becomes a vibrant and inviting place in which people want to work, play, and shop and have the opportunity to use transit, walking, and cycling modes rather than only motorized vehicles. “</p>
Transit Master Plan (2006)	<p>The long-term vision for the transit system is one that emphasizes quality of life, sustainability and economic development:</p> <ul style="list-style-type: none"> • Quality of Life– Transit needs to provide mobility options for all residents to ensure access to work, education, health care, shopping, social and recreational opportunities. • Sustainable – Transit needs to be a cost-effective alternative to the automobile for environmental reasons, affordable for the community, fiscally responsible to the taxpayers. • Economic Development – Transit needs to position itself as an “economic engine” for community growth and prosperity, with services and costs reflective of the City’s economic development initiatives and consistent with the growth in its residential and commercial sectors.
Community Energy Plan (2017)	<p>“The Community Energy Plan aims to create economic advantage, mitigate climate change, and improve energy performance. It strives to position Windsor as an energy centre of excellence that boasts efficient, innovative, and reliable energy systems that contribute to the quality of life of residents and businesses.”</p>
Parks & Outdoor Recreation Master Plan (2015)	<p>“To sustainably develop and maintain parkland and recreational activities with our natural and cultural resources; fostering economic growth within the city, while cultivating a quality of life for diverse, healthy, active and livable neighbourhoods.”</p>

According to ITDP's Bike Share Planning Guide, a successful system is dependent on several factors:

- Safe, reliable, affordable and accessible to all potential users
- Flexible and adaptable to changes in technology, trends and operating models
- Thoughtfully connected to public transit and other modes
- Able to leverage and generate expanded investments and land use dedicated to cycling
- A tool to help meet broader sustainability goals set by the city.

In compiling both current city visions and these best practice factors, the following is the proposed vision for bike sharing in the City of Windsor:

“Bike share in Windsor serves as an important and affordable connection to the transportation network, improving access to transit, and to key local destinations. The bike share system contributes to quality of life in the city, engaging both residents and visitors to enjoy what the city has to offer in a way that is healthy, sustainable, and convenient.”

4.2.2 BIKE SHARE GOALS

Bike share systems can support the city in achieving a variety of city-wide goals and strategic objectives. Using ITDP's Bike Share Planning Guide, and considering some of the City's existing goals, the following goals are proposed:

	Goal	Performance Metric
1	Increase cycling trips as a percentage of total trips	<ul style="list-style-type: none"> • Mode Share for All Trips and/or Mode Share to Work • Average daily trips per 1000 residents • Daily bike share trips
2	Increase access to transit – improving connections within the first and last mile of transit stops	<ul style="list-style-type: none"> • % of Bus Stops with 200 metres of a bike or station
3	Increasing opportunities for recreation throughout the city	<ul style="list-style-type: none"> • Average daily trips per bike • Average daily trips per bike outside of peak commuting hours (9-4pm & 6-9pm)
4	Improving environmental outcomes through improved air quality and reduced greenhouse gas emissions	<ul style="list-style-type: none"> • Reduced vehicle kilometres traveled (VKT) • Mode Share for All Trips and/or Mode Share to Work
5	Improving Transportation Equity in Windsor	<ul style="list-style-type: none"> • % of Low-Income Residents within 400 meters of a bike or station

4.3 Service Area Analysis

Bike sharing is typically used to accommodate short 10 – 25 minute / 1 to 3 km trips.¹ As a result, when planning a system service area, it is critical to plan it around dense, mixed use neighbourhoods with a multitude of trip origins and destinations within it. These neighbourhood types tend to have greater population density (potential customers), and typically have higher non-auto mode shares, resulting in higher trip generation capacity, in comparison to single or limited-use suburban neighbourhoods. The service area must find a balance between being large enough to accommodate a variety of trips and assortment of destinations and uses, but also small enough to not outstretch the network to ensure the appropriate number of bikes are available and dependable within the area.

In considering a service area for Windsor, a GIS analysis was conducted to map these key neighbourhood factors alongside one another. This approach supports the planning, and design of a bike share system and network that serves local community needs, destinations, is integrated with existing sustainable transportation networks, and supports those that are likely to use the service. This analysis also supports system logical scaling and phasing over time, considering natural extensions as the bike share service grows in the city.

4.3.1 MAPPING KEY RIDERSHIP AND NEIGHBOURHOOD FACTORS

The maps displayed in **Figures 6 through 10** display population density, mode share, transit ridership, destination density, and equity data gathered from the 2016 Canada Census and Transit Windsor in order to frame the recommendation for a bike share service area. The maps are described in further detail below.

- **Map 1 – Population Density and Core Employment Areas (Figure 6)**

This map displays relative population density across Windsor. Greater population density corresponds to a greater numbers of potential system users per square kilometre. The dark orange and red areas display residential densities of 2500-5600 per km², located throughout the Downtown, near the University, Walkerville, Ford City, and portions of Riverside. These areas do not correspond with regional employment areas located in both West Windsor and East Windsor.

- **Map 2 – Walking, Cycling, and Transit – Journey to Work (Figure 7)**

This map shows areas of the city with the highest non-auto mode share for the trip to work. The dark orange and red areas host higher proportions of residents who walk, cycle, or use transit as their primary means of getting to work. Individuals who already use non-auto modes are more likely to use new alternative services such as bike sharing for basic transportation needs as they are less likely to own a vehicle. The highest concentrations of these types of commuters are found in central Windsor from Sandwich to Ford City.

¹ NACTO Bike Share Statistics (2017): <https://nacto.org/bike-share-statistics-2017/>

- **Map 3 – Transit Usage and First/Last Mile Trips (Figure 8)**

Using Transit Windsor data, this map displays current transit usage (weekday average boardings) as well as a 300m walkshed buffer from each stop. Considering that bike share could be used to complete the first and last mile of a trip to and from transit, these areas of high transit use inform where we can expect bike share users connecting to transit would like to be able to access the service. In general, transit boardings are highest in central Windsor as well as at key destinations outside the core including St. Clair College, Tecumseh and Devonshire Malls, and various destinations along Tecumseh Road.

- **Map 4 – Destination Density and Existing/Planned Transportation Networks (Figure 9)**

This map provides an overview of areas with concentrations of high destination density within the City, with dark green displaying the highest density. The map shows where users will likely want to travel, and key transit routes and planned or existing bike routes that will require special consideration in planning for bike share trips. There is a notable concentration of destinations across central Windsor radiating outwards from the downtown, towards the University, Walkerville, Ford City, and eastward towards the Tecumseh Mall area.

- **Map 5 – Equity Analysis (Figure 10)**

Equity considerations are important when planning for bike share. Bike sharing has the potential to significantly expand accessibility for individuals who cannot afford to own a private automobile. The equity analysis map displays the relative location of low-income households. Core areas including Downtown, Walkerville, and Ford City as well as non-core areas including southern Sandwich, Remington and parts of Pillette, Riverside and Tecumseh host a higher concentration of lower income households.

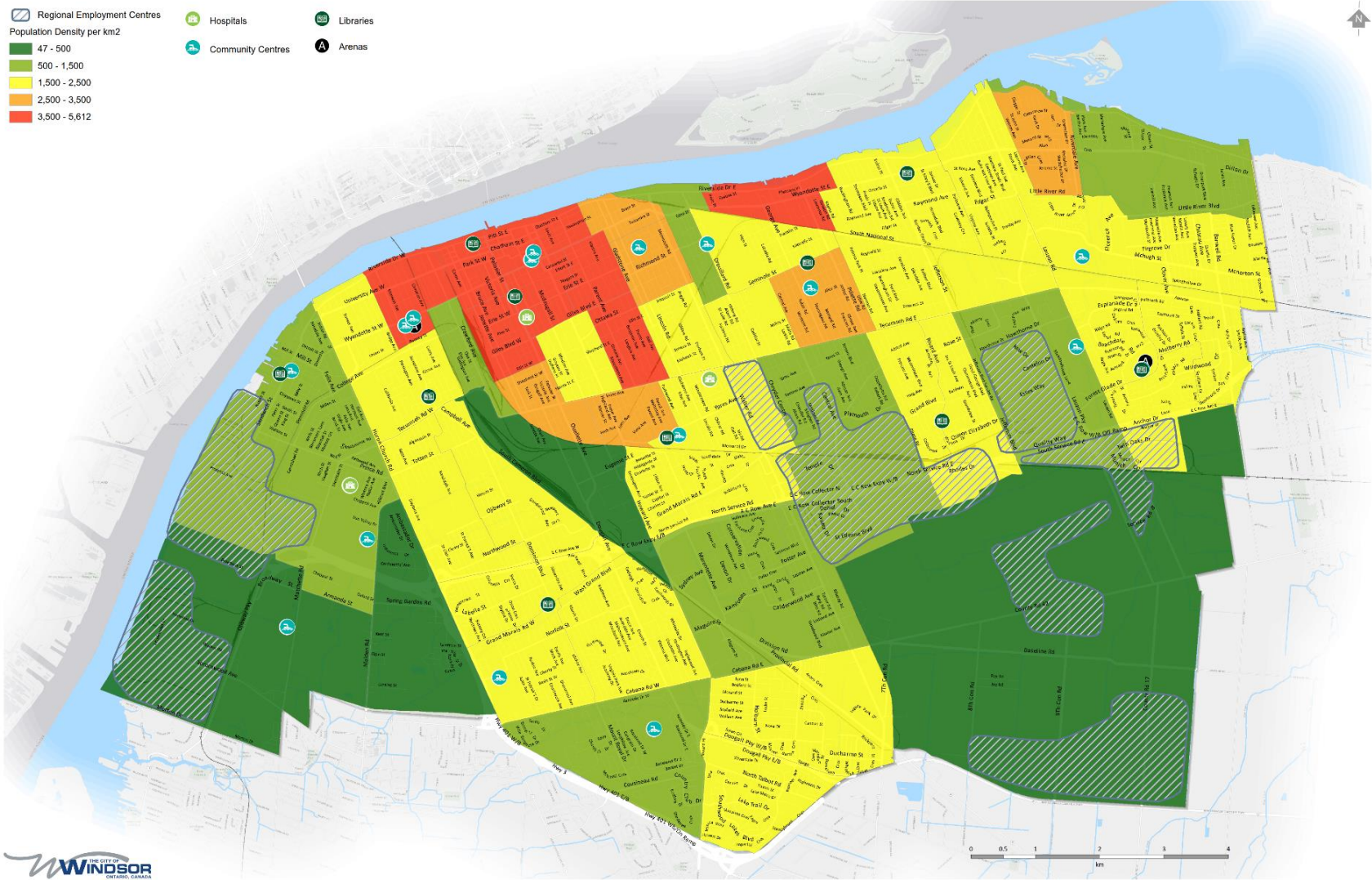


Figure 6 - Population Density and Core Employment Areas

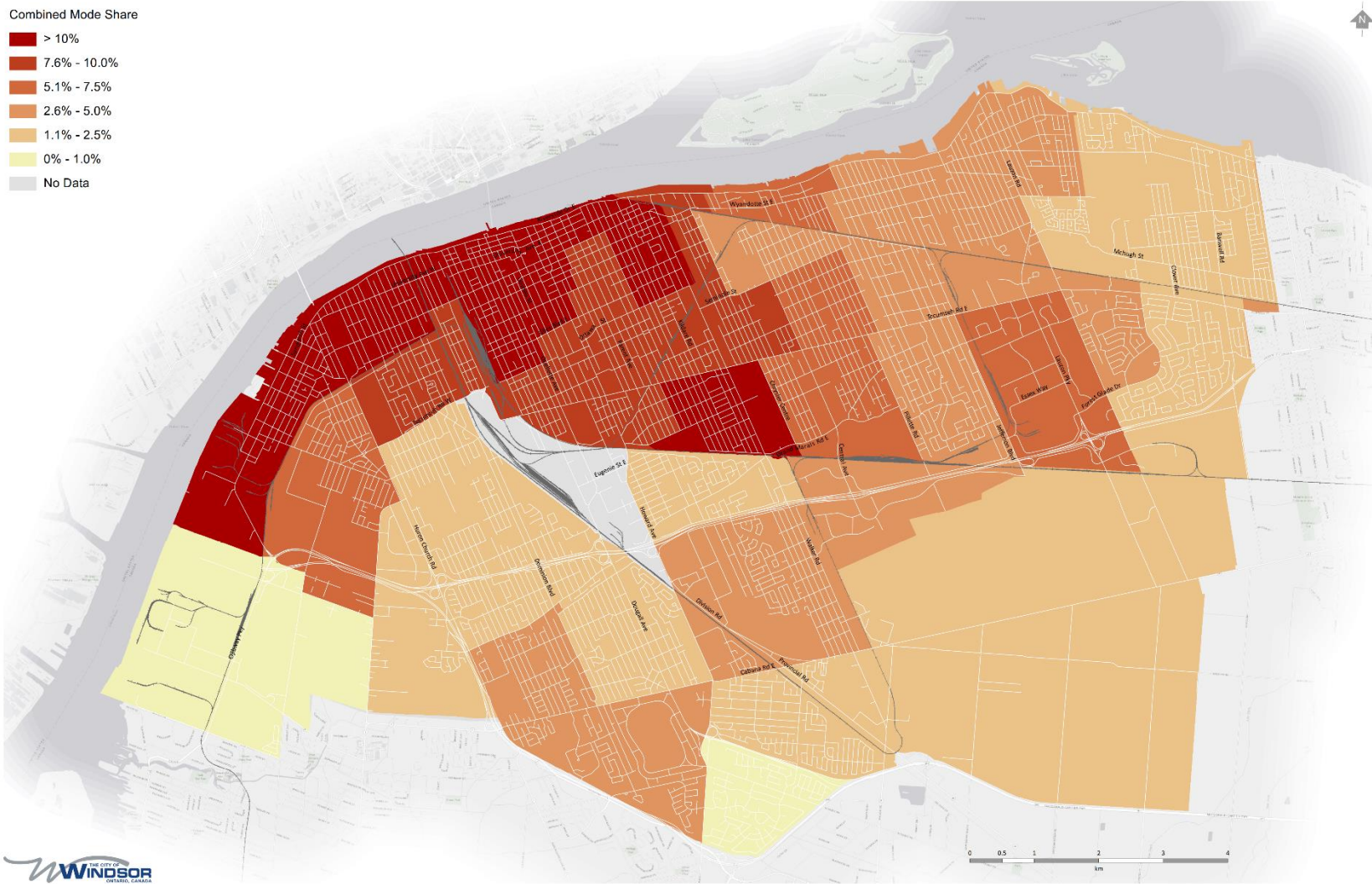


Figure 7 - Combined Sustainable Mode Share Map - Walking, Cycling and Transit Use in Windsor, 2016 Census

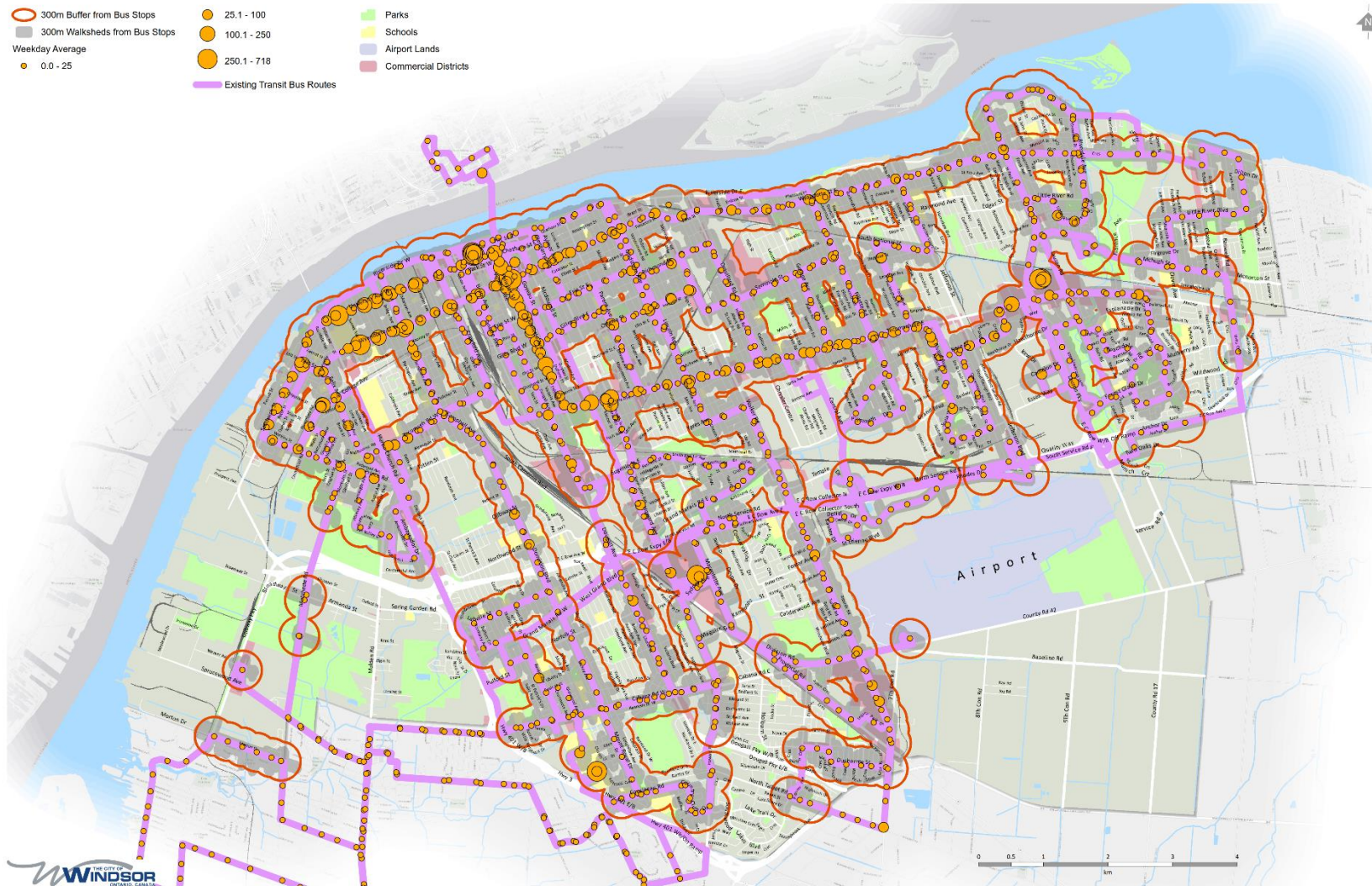


Figure 8 - Transit Usage and Bus Stop Walksheds

Percent Low Income Population

- Very High
- High
- Moderate
- Low
- Very Low

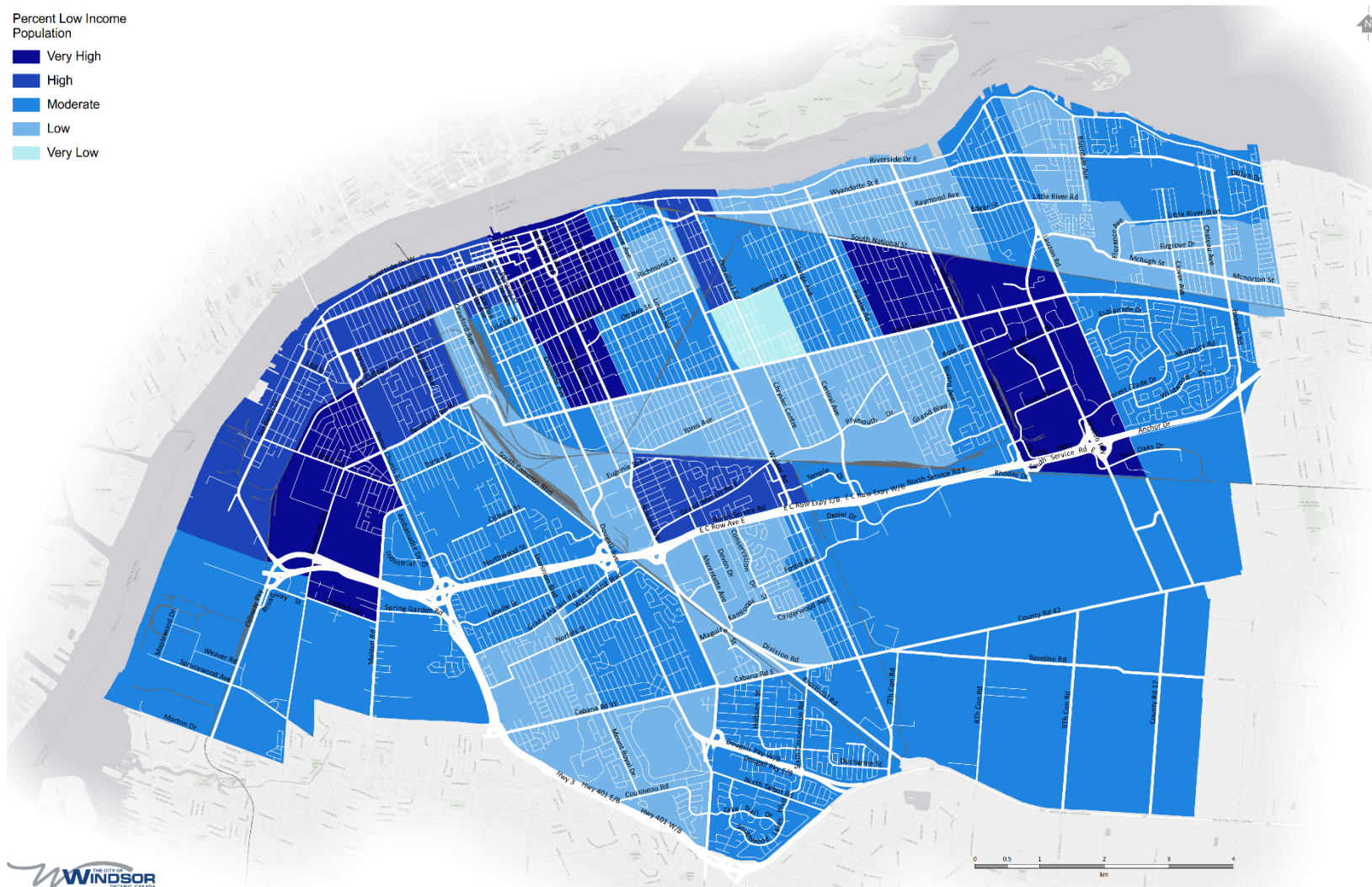


Figure 10 - Equity Analysis - Overall Equity Need

4.4 Phase 1: Service Area Recommendation

Central Windsor including the Sandwich to Walkerville and Detroit River to Tecumseh Road axes support the highest residential densities, most favourable mode shares, and highest concentration of key destinations in the City. This is re-enforced by the transit data, which shows highest levels of transit activity within a similar zone, with notable activity outside central Windsor at St Clair College, Tecumseh Mall, and Devonshire Mall.

Implementation of bike sharing is recommended in two phases. **Phase 1** would establish a bike share in central Windsor, generally between the River Pathway (N), Prince Road (W), Tecumseh Road (S), and Drouillard Road (E). At 22.6 km², the recommended service area covers 15% of the City and includes approximately 65,000 residents (30% of Windsor's population). The recommended service area would provide the critical ridership and neighbourhood factors necessary for system success including most suitable population densities; destination densities including key destinations such as Downtown, the riverfront, and the University of Windsor campus; highest non-auto mode shares; and in general, the highest supporting transit activity. The service area is designed to accommodate typical 1 to 3 km bike share trip lengths. The draft service area is neither too large to be cumbersome for operations nor too small to limit the usefulness of a point-to-point system. Systems that are too large can result in bikes being spread too thin across the system and a reduction in on-demand reliability for system users. Conversely, systems that are too small can result in too many key destinations being outside of system boundaries.

The size and key population characteristics of Windsor's draft Phase 1 service area are benchmarked against bike sharing systems of varying sizes in **Table 5**. At 22.6 km², Windsor's proposed service area is comparable in size and characteristics to peer city systems such as Hamilton, Madison, WI, and Boulder, CO.

Table 5 - Bike Share Service Area Characteristics

City	City Population	Service Area Population (% of Total Pop)	Service Area Size (km ²)
Montreal	1,944,000	802,000 (41%)	213
Vancouver	631,000	175,000 (28%)	22
Hamilton	537,000	116,000 (22%)	38
Madison, WI	253,000	58,000 (23%)	19
Boulder, CO	109,000	38,000 (35%)	18
Windsor	217,000	65,000 (30%)	22.6

Success in Phase 1 could result in the bike share expanding to destinations outside the Phase 1 service boundaries including Tecumseh Mall, Devonshire Mall, and St. Clair College, as shown in Phase 2 on the Draft Service Area Map. Careful consideration of the effect of expansion on service levels is required if and when the system is expanded beyond Phase 1 boundaries.

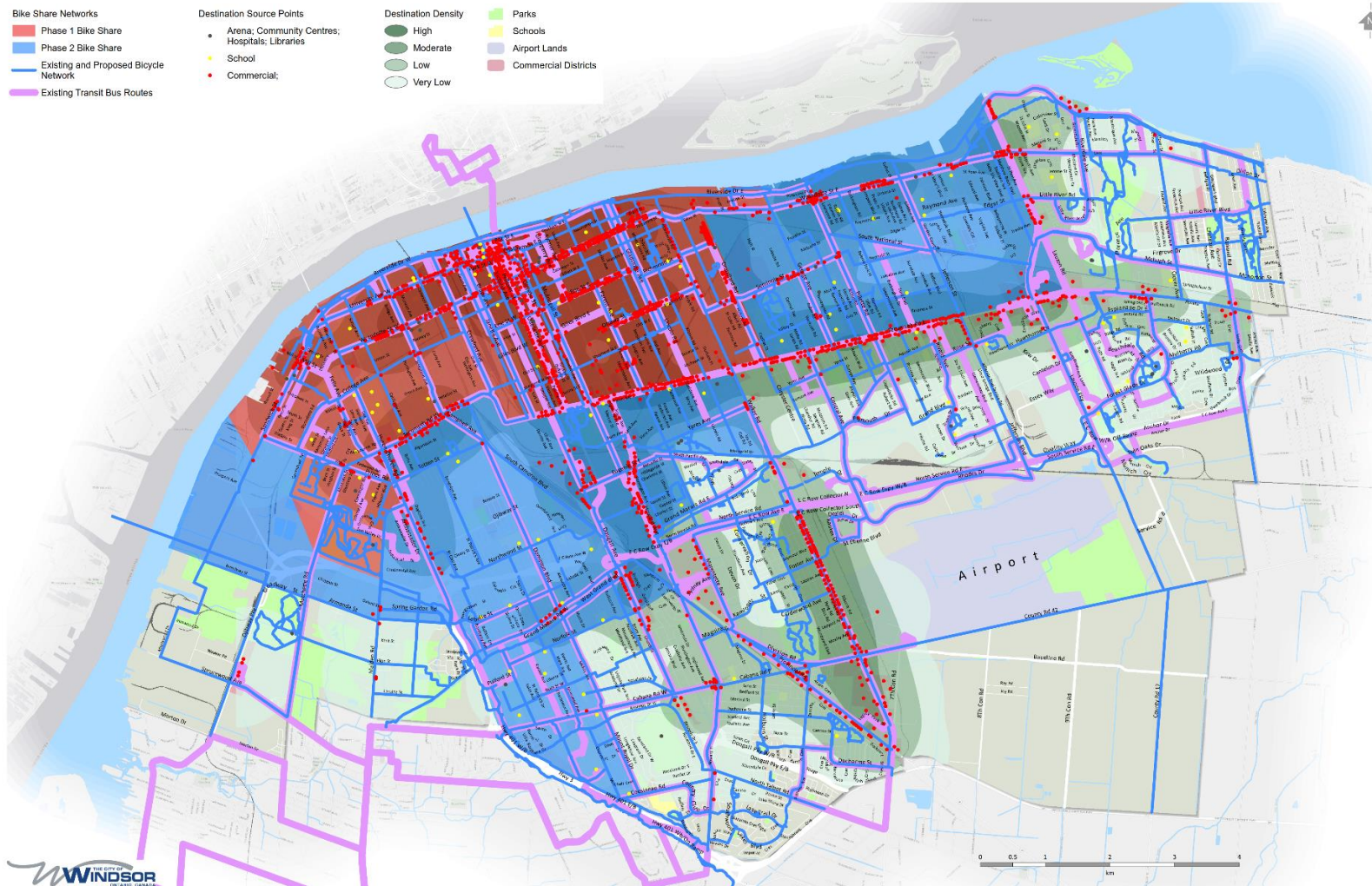


Figure 11 - Recommended Service Area

4.5 Fleet Size Recommendation (Phase 1)

The size of a bike share system is determined by the number of bikes. If a bike share system has too few bikes, it will have little to no chance of success. According to the *ITDP – Bike Share Planning Guide (2018)*, to establish reliability at a level that will generate subsequent rides, users must be able to find a functioning, ready-to-ride bike when they need it.

Bike share fleet size is benchmarked in **Table 6**. In general, North American systems provide 6 to 8 bikes per 1,000 residents. Peer communities such as Hamilton, Boulder, CO and Madison, WI support bike concentrations ranging between 17 and 22 bikes per square km.

Table 6 - Comparative Bike Share Fleet Size and Concentration

City	Fleet Size (Total Bikes)	Service Area Population	Service Area Size (km ²)	Bikes / 1,000 Residents	Bikes / km ²
Montreal	6,250	802,000 (41%)	213	8	29
Vancouver	1,200	175,000 (28%)	22	7	54
Hamilton	825	116,000 (22%)	38	7	22
Madison, WI	350	58,000 (23%)	19	6	18
Boulder, CO	305	38,000 (35%)	18	8	17

Windsor’s recommended fleet size is developed by applying a 7 bike per 1,000 resident ratio to the population of the service area. As displayed in **Table 7**, approximately **450 bikes** are recommended for Phase 1 of Windsor’s bike share system. This results in a service concentration of 20 bikes per square km, on par with peer cities such as Hamilton, Madison, and Boulder.

Table 7 - Windsor Bike Share - Phase 1 Fleet Size Recommendation

Benchmark Bikes / 1,000 Residents	7 bikes per 1,000 residents
Windsor Phase 1 Service Area	22.6 km ²
Windsor Phase 1 Service Area Population	65,000
Recommended Fleet	450
Bike Concentration	20 bikes per km ²

4.6 Estimated Trip Generation (Phase 1)

Daily and annual trip generation for Phase 1 is estimated by benchmarking trip uptake rates from other communities, displayed in **Table 8**.

Table 8 - Comparative Bike Share System Trip Uptake Rates (Trips per Bike per Day)

City	Uptake Rate (Trips per Bike per Day)
Montreal	3.6
Vancouver	3.3
Hamilton	1.4
Madison, WI	1.7
Boulder, CO	1.5

Assuming a conservative trip uptake rate of 1.5 trips per bike per day, at a system size of 450 bikes, Windsor can expect an average of 675 trips per day when the system is in operation. Assuming the system functions year-round, 246,400 trips are estimated annually. These estimates reflect a mature system and cannot be expected in the first or second year of operation.

5.0 Implementation and Operations

The City of Windsor could pursue one of three models to implement bike sharing, as described in **Table 9**.

Table 9 – Bike Share Ownership and Operation Models

Model	Description	Example
1. Traditional – Public Sector Owned	Municipality (or a non-profit) owns fleet, manages and operates the system. Municipality generally assumes responsibility for cost overruns.	Montreal, Toronto, Vancouver, Hamilton, Detroit
2. Private – RFP (Exclusive Operator)	Municipality issues an RFP to operate and manage a bike share system based on a set of service standards. A successful proponent delivers the service at no-cost to the municipality but has the right (typically exclusive) of operation on City infrastructure.	Victoria, Kelowna, UBC, Kingston, etc.
3. Private – Permit (Multiple Operators)	Municipality allows multiple companies to operate within city boundaries.	Calgary

To assist the City in making an informed decision on implementation, the following section includes a comprehensive multiple account evaluation of the three ownership and operation models described above.

5.1 Public versus Private Ownership and Operation Models

While a traditional (public sector) bike share model provides more direct municipal control and oversight, traditional models leave the municipality ultimately responsible for capital and annual operating costs.

5.1.1 COST AND REVENUE PROJECTION FOR TRADITIONAL BIKE SHARE

A high-level feasibility analysis was conducted to assess the costs of implementing a traditional bike share model in Windsor. Under this model, the City would own the bicycles and would be responsible for the success of the system.

Capital and operations costs are benchmarked from the City of Hamilton’s SoBi system and are as displayed in **Table 10**.

Table 10 - Hamilton SoBi System Simplified Costs and Revenues

Category	Cost
Capital Cost per Bike	\$2,000
Operations Cost per Bike (all-in operating cost estimate)	\$950 to \$1,150
Pay as You Go Revenue	\$0.09 per minute

*Hamilton SoBi system costs (Peter Topolovic, December 2018)

Economic calculations assume a system size of 450 bikes and 675 trips per day (246,375 trips annually), as per this report’s fleet size recommendation. A modern dockless system is assumed. For simplicity of calculations, all trips are assumed as pay as you go at a rate of \$0.09 / minute. An average trip duration of 20 minutes is assumed.

- **Capital cost estimate:** Assuming a capital cost of \$2,000 per bicycle and a fleet size of 450 bikes, the system is projected to cost \$900,000 in capital (cost of bikes) to initiate. These estimates are conservative and exclude any specialized signage, pavement markings, racks, hubs or hybrid station infrastructure.
- **Annual operating cost estimate:** Assuming \$1,100 per bike in operations costs, annual system-wide operations costs of \$495,000 can be anticipated.
- **Revenue estimate:** Assuming similar trip characteristics as Hamilton’s SoBi system, Windsor’s bike share system would generate \$443,475 in revenue on annual basis.

Isolating for operations costs alone, the system would result in a net annual operating loss of \$51,500 and would likely need to be subsidized by the City. Developing partnerships would be vital to addressing the funding shortfall and would likely be comprised of:

- Advertising revenue
- Sponsorships
- Grant funding
- Higher level government funding

5.1.2 MULTIPLE ACCOUNT EVALUATION

A Multiple Account Evaluation (MAE) of traditional public, private – RFP (exclusive operator), and private – permit (multiple operator) bike share models is summarized in **Table 11**.

Table 11 – Multiple Account Evaluation Contrasting Bike Share Ownership and Operation Models

Account	Traditional Public	Private - RFP (Exclusive Operator)	Private - Permit (Multiple Operators)
Capital Costs to City of Windsor	\$900,000 (450 bikes)	<ul style="list-style-type: none"> \$0 (450+ bikes) Option to contribute public or grant funds to partner in serving specific areas, adding bike parking 	<ul style="list-style-type: none"> \$0 (450+ bikes) Operators pay for business license to start-up and operate.
Annual Operating Costs to City of Windsor	\$495,000 (450 bikes)	<ul style="list-style-type: none"> \$0 (450+ bikes) Staff time required to work with and regulate operator 	<ul style="list-style-type: none"> \$0 (450+ bikes) Permit fees cover costs incurred by city: application, permit fee per bike, bicycle parking improvement fee, security deposits
Annual Revenue to City of Windsor	\$443,475	\$0	\$0
Cost Overruns	City responsible	Third party operator responsible	Third party operator(s) responsible
Number of Operators	One operator	Generally, one operator with exclusive right of operation	Number of operators limited by those issued permits
Ownership, Day-to-Day Management, and Operations	<ul style="list-style-type: none"> Municipality owns fleet and is ultimately responsible for the management and operation of the system 	<ul style="list-style-type: none"> Third party operator owns fleet and is responsible for the management and operation of the system 	<ul style="list-style-type: none"> Third party operator(s) own fleet and are responsible for the management and operation of the system
Upkeep and Maintenance	<ul style="list-style-type: none"> Municipality responsible for upkeep and maintenance 	<ul style="list-style-type: none"> Third party operator responsible for upkeep and maintenance 	<ul style="list-style-type: none"> Third party operator(s) responsible for upkeep and maintenance
System Access and Payment Method	<ul style="list-style-type: none"> Smart Phone app Credit Card Membership Card 	<ul style="list-style-type: none"> Credit Card through Smart Phone app 	<ul style="list-style-type: none"> Credit Card through Smart Phone app

Account	Traditional Public	Private - RFP (Exclusive Operator)	Private - Permit (Multiple Operators)
		<ul style="list-style-type: none"> Some operators working on other access systems which can be requested through the RFP 	<ul style="list-style-type: none"> Some operators working on other access systems which can be a license requirement
User Fees	<ul style="list-style-type: none"> City determines user fees 	<ul style="list-style-type: none"> Third party operator determines user fees 	<ul style="list-style-type: none"> Third party operator(s) determine user fees
Equity <ul style="list-style-type: none"> Low-Income Communities Costs of Service Access (Phone/Credit Card) Age and Helmet Provision 	<ul style="list-style-type: none"> Equity issues simpler to address with public ownership and operation. 	<ul style="list-style-type: none"> Can be regulated in the RFP, though some items are currently under development and require partnerships with the municipality to address. 	<ul style="list-style-type: none"> Can be regulated in the license, though some items are currently under development and require partnerships with the municipality to address.
Integration with Transit Windsor	<ul style="list-style-type: none"> Planned in partnership with Transit Windsor 	<ul style="list-style-type: none"> Complements business model, and can also be regulated in RFP. 	<ul style="list-style-type: none"> Complements business model, and can also be regulated in the license.
Fleet Diversity	<ul style="list-style-type: none"> Relatively inflexible fleet as City owns the fleet as purchased. Docked model makes it more difficult to integrate other bicycle or micro-mobility options. Dockless model increases opportunities for fleet diversity. 	<ul style="list-style-type: none"> Generally easy to implement diversity of options following initial trial period, though a waiting period is not always required. Bike share operators are often willing to experiment with alternative fleet types / or swap out existing fleet for specialized equipment (i.e. e- 	<ul style="list-style-type: none"> Generally easy to implement diversity of options following initial trial period, through a waiting period is not always required. Bike share operators are often willing to experiment with alternative fleet types / or swap out existing fleet for specialized equipment (i.e. e-

Account	Traditional Public	Private - RFP (Exclusive Operator)	Private - Permit (Multiple Operators)
		bikes) with no cost to the City	bikes) with no cost to the City
Growth (Fleet Size)	<ul style="list-style-type: none"> • Growth limited by funds available for expansion 	<ul style="list-style-type: none"> • Growth limited through RFP permit and through discussions of responsible growth based on usage 	<ul style="list-style-type: none"> • Growth limited through permit
Parking Management	<ul style="list-style-type: none"> • Docked model: Parking limited to docking stations • Dockless model: Options range from public property to specific bike racks, to geo-fenced defined areas. 	<ul style="list-style-type: none"> • As defined by city and operator. Options range from public property to specific bike racks, to geo-fenced defined areas. 	<ul style="list-style-type: none"> • As defined by city and operator. Options range from public property to specific bike racks, to geo-fenced defined areas.
Data Sharing	<ul style="list-style-type: none"> • For docked systems, data is linked to system purchase. Docked systems typically measure number of bikes in docking stations and do not use GPS to track movement patterns. • For dockless systems, data can include corridor link volumes, allowing the City to track movement patterns; this can aid in planning for active transportation investments 	<ul style="list-style-type: none"> • Municipality can request sharing of GPS data; stipulations to be included in RFP • Data can include corridor link volumes, allowing the City to track movement patterns; this can aid in planning for active transportation investments 	<ul style="list-style-type: none"> • Municipality can request sharing of GPS data; stipulations to be a license requirement • Data can include corridor link volumes, allowing the City to track movement patterns; this can aid in planning for active transportation investments

In general, choosing to pursue a traditional – public ownership and operation model provides the City with strong control and oversight of the system, which may allow the City to more easily direct the system toward key equity and transit system integration imperatives. However, public ownership and control comes at a financial cost to the City and leaves the City ultimately responsible for upkeep and maintenance. At an expected capital cost of \$900,000, annual operating cost of \$495,000 and annual revenue projection of \$443,750, the system is unlikely to generate revenue for Windsor. A traditional – public ownership model renders the city responsible for fleet replacement, insurance, and potential theft and damage to property, as well as liability for bike share use – all of which are additional to the \$495,000 annual operating cost estimate. A traditional – public ownership model would additionally leave the City responsible for cost overruns while either of the private ownership models would place the commercial viability, fleet maintenance, and liability of the bike share system onto a third party operator.

5.2 Funding Opportunities

Whether a traditional public or private ownership and operation model is selected, grant funding opportunities are an important consideration. With the high capital and operating costs of a public system, grant funding is often required by most cities to enable a launch; however, most funding programs exclusively focus on capital costs. In a private ownership model, private companies take on the capital and operating costs of launching and operating the system. However, grant funding might still prove useful in these circumstances to enhance or complement the service provided. For example, grant funding might support private operators to partner with and expand services the municipality would like to see made available. This might include serving select high priority areas from an equity standpoint, installing more bike parking, or enabling membership subsidy programs the City would like to pursue. Several potential grant funding options include:

- Government of Canada – Public Transit Infrastructure Fund
- Ontario Trillium Foundation – Grow Grants
- Federation of Canadian Municipalities – Green Municipal Fund
- Corporate Sponsorship Partners

5.3 Tools to Regulate Third-Party Operators

With a trend away from publicly operated and funded bike share systems, current research and best practices focus on supporting governments with the planning and regulation of private bike share systems. In 2018, the National Association of City Transportation Officials (NACTO) published *Guidelines for the Regulation and Management of Shared Active Transportation*. Also published in 2018 was the Institute for Transportation and Development Policy's (ITDP) *Bike Share Planning Guide*.

The last two years have also witnessed the growth of private bike share services across Canada. A number of Canadian municipalities have now entered into agreements with third party owner-

operators to provide bike share services at no cost to municipalities. These agreements detail the responsibilities of each party and are typically the primary (and in most cases the only) document that enables and regulates bike sharing.

In recognition of the developing nature of this industry, most agreements have short licensing periods (1 to 3 years), and many are characterized as ‘pilots’. Near the end of the licensing period, many municipalities have conducted or are planning to conduct a period of reflection and review to assess the merits and demerits of the trial through user data and public consultation. Jurisdictions, such as Kelowna, Kingston, and Victoria, have already assessed their system operations and have applied core learnings into a revised set of terms and either re-issued an RFP or updated their licensing structure.

Municipalities generally *have not amended existing bylaws* to launch third-party bike shares. Indeed of the five Canadian jurisdictions consulted by the project team on this question, none had amended their bylaws in order to launch bike sharing.

The components of bike share service agreements typically include the following:

- financial contributions;
- operations plans;
- license terms;
- data reporting requirements;
- equipment standards;
- fleet size;
- service area;
- transit integration; and,
- insurance requirements.

The City of Calgary, City of Kingston, and the University of British Columbia courteously shared the requirements that make-up their agreements as detailed in their RFPs (Kingston, UBC) and Licensing Framework (Calgary). These documents have been shared with the City of Windsor through a separate memorandum. **Table 12** summarizes the key requirements and guidelines for private operators that were established in these documents. This table is intended to serve as a reference for the City of Windsor upon which to structure an implementation agreement for a regulated private bike share system that aligns with the City’s visions and goals for bike sharing.

Table 12 – Key Requirements and Guidelines for Private Operators Outlined in Shared Mobility Agreements

	City of Kingston (RFP)	University of British Columbia (License – granted through RFP)	City of Calgary – License Framework for Bike Share
Exclusivity	Exclusive – another operator would need to use private property.	Non-Exclusive	Non-Exclusive
Financial Contributions from Municipal Entity	None Proposals must show in-kind time required by the City for 5 operating years.	None	None
Financial Contributions Required of Private Operators	All capital and operations costs.	Performance Bond, Annual Licensing Fee, Annual Program Administrative Fee per Bike. Licensee shall reimburse for any costs (plus 15%) incurred by the university for violations of the agreement, or for repair/maintenance of UBC or public property. All capital and operations costs.	\$600 Application Fee (\$300 for re-application), Phase one Permit Fee of \$15 per bicycle based on approved fleet size, Bicycle Parking Improvement Fee of \$5 per bicycle based on approved fleet size. Refundable security deposit of \$25 per bicycle to a maximum of \$15,000 per Permit Holder. All capital and operations costs.
Operations Plan	Must have local office with customer service contact and use local bike repair services.	Licensee will have a staffed operations centre within the Campus or City of Vancouver and have 24-hour customer service for customers to report safety, maintenance, or parking issues.	Licensee must provide operations plan including service area map, samples of app interface, maintenance plan, staffing plan, and winter season operations plan. Must have 24-hour customer service phone number and email, as well as direct contact for city staff. Must provide 3 free memberships to City to assist in review of compliance.

	City of Kingston (RFP)	University of British Columbia (License – granted through RFP)	City of Calgary – License Framework for Bike Share
Term of License	Three-year License	One-year Pilot License	Two-year Pilot License
User Interface and Payment Systems	Simple to use Protects personal information and privacy of user Affordable and provides option for access for those without smart phone or credit card.	Must ensure users have quality high standard interface. Encouraged to integrate with regional transportation programs like TransLink Compass Card.	Must provide proposed payment plan outlining how the applicant will provide service to those without smartphones and those without a credit card.
Costs	Must submit costs in proposal as well as package options for memberships/pay per use, and surcharges and extra fees.	Licensee retains right to set pricing and user fees, but will consult UBC in doing so.	Must provide proposed rental rate structure including daily, monthly, or annual pass costs. Must also provide any discount rates for low income residents, students, or corporate groups.
Data Reporting Standards	High quality aggregated data to the city including trip start/end, average trip distance, system use, frequency of bus rack use.	Users personal and financial information must be protected. UBC will be given access to the fleet management portal and have access to real-time data feeds (GBFS). Monthly reports of # of bikes, km traveled, breakdown by age/gender, UBC status. Also, monthly trip records for each trip should be provided including GIS data.	Very detailed data reporting standards. Inventory list, access to real time information and GBFS feed, access to trip/fleet/parking/incident/maintenance data at all times. To ensure consistency specific data standards are outlined and provided for each of these areas.
Repair	Must use local bike repair shop. Must include in the proposal how bikes will be repaired, expected	Maintain all bikes in a safe and functional state, and promptly remove any damaged, unsafe or non-functional	Inoperable bicycles must be removed immediately. Once notified of an issue, the permit holder must lock down the bicycle to ensure it cannot be used.

	City of Kingston (RFP)	University of British Columbia (License – granted through RFP)	City of Calgary – License Framework for Bike Share
	service life, and replacement strategy.	bikes from campus. All maintenance records will be sent to UBC monthly.	Maintenance data must be updated and submitted monthly.
Rebalancing	Rebalancing of bicycles to locations and unreturned bicycles must occur daily (once per 24 hours, Monday to Friday and once per weekend).	Inspect any hubs or stations at regular intervals and not less than once per day ensure they are kept in a safe, tidy, and sanitary condition. Provide incentives to customers who return bikes to hubs or stations. If UBC must remove the bike, the licensee shall have 24 hours to retrieve bike from where it has been stored following which an additional \$10 will be charged for storage.	Bicycles must be rebalanced every 24 hours. Permit holders must respond to pedestrian obstructions and safety concerns no later than two hours. The city may remove or re-park bicycles in violation with the permit and deduct from the security deposit for fees, resources, and staff time.
Equipment Standards	Sturdy bicycle, with adjustable seat/handlebars, cargo basket, front/rear lights, bells, 1+ gears, GPS technology, compatible with transit bike rack.	A diverse fleet of bikes are encouraged to meet a variety of user needs. E-bikes must meet BC’s Motor Vehicle Act Motor Assisted Cycle Regulation. Electric scooters require written approval. Bikes must meet Provincial safety requirements, have automatic lights on front/back, bell, easy breaks and gear shifting system, tool-free seat adjustments, on-board GPS, kickstand.	Must meet ISO 43.150 – Cycles subsection 4210. As well as Alberta Government Vehicle Equipment Regulations. All images and descriptions need to be included in license application. Must include adjustable seat posts, all-weather tires, front/rear fenders, cargo basket, bell, kickstand, lights on front/back, GPS location tracking, unique identifying number and permit number.
Fleet Size	As many as feasible. Minimum 200, with 50 racks/stations.	Initial fleet of 200 bikes in the first four months, summer fleet of 325 bikes within 60 days of launch, and Fall fleet	In Phase one, the minimum fleet size is 250 per permit holder. An applicant may apply up to 750 bicycles. They

	City of Kingston (RFP)	University of British Columbia (License – granted through RFP)	City of Calgary – License Framework for Bike Share
		to be approved by University in advance, with anticipation of up to 2000 bikes by end of the term. Fees must be received per bike in advance of expansion.	city may adjust the permitted amount at any time.
Service Area	Preference for larger service area that will support existing and planned investment in bicycle infrastructure, serve in high density areas, key destinations, and integrated with transit. 10 locations were specified that must be served.	Service area will be outlined in geofenced hubs, and any adjustments will require permission of UBC. A specified list of restricted areas are not permitted and outlined in the agreement.	Service area will be outlined in geofenced hubs, and any adjustments require City permission. A winter service area is outlined in the agreement.
Storage	Designated racks or provision of intuitive locations to place bicycles. Racks and locations not to be removed during winter months.	Bikes can only be locked by being at a designated geo-fenced hubs or stations, on hard surfaces that are not prohibited locations (6.6), or at existing bike racks.	Very detailed parking requirements for various types of streets/locations including: sidewalks, streets, parks, designated parking areas, no parking zones, and temporary restrictions. Bikes can park on sidewalk as long as they are not blocking the 2 metre pedestrian zone, driveways, or street furniture. No parking within 0.5 metres of trees or shrubs. In parks bicycles must not be parked on pathways or within 1.0 metres of pathway. Parking is very specific in defined zones such as business improvement areas, and parks. Specific zones such as transit corridors banned from use. Temporary

	City of Kingston (RFP)	University of British Columbia (License – granted through RFP)	City of Calgary – License Framework for Bike Share
			and seasonal parking restrictions also apply.
User Education		Provider is responsible for educating users on BC Helmet Regulations, that they follow traffic laws, that they yield to pedestrians, and about appropriate bike parking and usage. Users are not permitted to operate bicycles under the influence of drugs or alcohol.	Must educate customers on how to use services, proper riding behaviour, how to operate and park bicycles, helmet laws. An education plan must be provided and show how education plan will be delivered, including attendance at public meetings and community events to provide education and support to users.
Transit Integration	Integration with transit bike rack and Trans-Pass preferred.	Licensee is encouraged to incorporate capability to integrate payment and access systems with other regional mobility systems, including TransLink’s Compass Card System.	Special parking arrangements to be made in transportation hubs.
Insurance Requirements	Proof of Commercial General Liability Insurance in Province of Ontario no less than \$5 million. Motor vehicle liability insurance in the amount of no less than \$2 million. WSIB coverage.	Commercial General Liability Insurance minimum \$10 million per occurrence and annual aggregate. Professional Liability Insurance \$1,000,000 per occurrence. Workers Compensation Coverage. Employee Dishonesty Insurance not less than \$200,000. Motor Vehicle Liability Insurance of at least \$5,000,000. WorkSafe BC Registration.	Commercial General Liability Insurance not less than \$10 million, and must include the city as additional insured. Property Insurance. Automobile Third Party Insurance not less than \$2 million. Cyber and privacy liability insurance for \$2 million.

5.4 E-Bikes and E-Scooters

- **E-Bikes**

Many municipalities have encouraged third party operators to provide electric assist bicycles (e-bikes) to their bike share fleet. E-bikes are seen as being able to increase the appeal of the service to a broader population and extend the reach of transit by enlarging the transit catchment area – broadening first mile/last mile connectivity to transit to a wider geography.

The *Ontario Highway Traffic Act* generally permits e-bikes to be operated on any road where a standard bicycle can be ridden. E-bikes in Ontario must have:

- steering handlebars
- working pedals
- an electric motor not exceeding 500 Watts
- a maximum speed of 32 km/h
- a maximum weight of 120 kg
- a permanent label from the manufacturer in both English and French stating that the e-bike conforms to the federal definition of a power-assisted bicycle

To operate an e-bike, an individual must be 16 years of age or older, wear a helmet, and follow the same rules of the road as normal cyclists.

The *City of Windsor Traffic Bylaw* generally regards and regulates bicycles and e-bicycles similarly, with the exception of on shared pathways where e-bikes are prohibited as noted:

- 25. (3) No person shall operate a Power Assisted Bicycle (e-bike) on a pathway shared by pedestrians and bicycles or on a pedestrian trail.

The *City of Windsor Parks Bylaw* does not consider 'motor assist bicycles' as bicycles, and as such, operation of e-bikes within parks are restricted to roadways or parking areas.

E-bikes could be incorporated into a bikeshare service in Windsor without amendments to provincial legislation or existing bylaws. Under existing bylaws, e-bikes could be operated in the same locations as standard bikes with the exception of within parks and on shared pathways (including the riverfront path system).

- **E-Scooters**

Third party micro-mobility operators are increasingly looking to expand their service offerings to include electric assist kick scooters (e-scooters). E-scooters are single occupant vehicles with an integrated battery that have a maximum speed of 24.9 km/h and have a range of approximately 30 km. E-scooters are now being provided for rent by a number of private companies including Lime, Bird, Scoot, Skip and Spin in many US cities (including Detroit). In these cities, e-scooters are generally parked on city sidewalks and are unlocked via a smart phone app, just like dockless bike share bicycles.

Currently, the *Ontario Highway Traffic Act* does not permit the operation of e-scooters on public roadways in Ontario. The *City of Windsor Traffic Bylaw* considers e-scooters as 'vehicles'; vehicles are banned from operating on sidewalks and footpaths. Additionally the *City of Windsor Parks Bylaw* considers e-scooters as 'vehicles' and does not permit their operation on park grounds or paths. As such, under current provincial legislation and existing bylaws, **e-scooters cannot be operated within the public right of way in Windsor.**

Even if a bylaw amendment were pursued to enable e-scooter operation on sidewalks, Provincial legislation would need to be amended to permit operation on Provincial and municipal roadway vehicle and bike lanes. Putting aside the legalities, it is unclear at this time if the benefits associated with e-scooters outweigh the risks of introducing a new transportation mode whose speed differential (25 km/h vs pedestrian speeds of 3-5 km/h) presents new hazards to existing sidewalk users.

As of February 2019, the only jurisdiction in Canada to permit e-scooter rentals is the City of Waterloo. Waterloo worked with Lime to establish an e-scooter *pilot route* along the Laurel Trail connecting David Johnson Research and Technology Park through Waterloo Park. The city used a geofence – a virtual barrier – to try and keep riders inside that test area – to varying degrees of success. Scooters can only be operated on trails and private driveways in the Waterloo pilot and are not permitted on public roads, in accordance with the *Ontario Highway Traffic Act*.

6.0 Recommendation

In order to serve the best interests of the City of Windsor, and in light of current market trends in the bike share industry, **the findings of this report recommend that the City pursue a partnership with one or multiple private operators to provide bike share and/or e-bike share services to Windsor for little to no cost to the municipality.** To balance trip directness, fleet availability, and mitigate bicycle clutter at high use locations, **a hybrid-dockless model is recommended.**

Under this approach, the bike share fleet would be fully owned and operated by the private sector but regulated by the City. In general, the private bike share provider would be responsible for provisioning bikes and e-bikes, bike upkeep and maintenance, system operations, and customer interface (including providing a public website or phone app that provides access to bicycles) in exchange for the right to operate their business on City property. This approach is most likely to satisfy the objective of providing bike sharing and e-bike sharing services to Windsor, while minimizing financial risk to the City. Under the recommended approach, capital and operating costs (including any potential cost overruns) are borne by the private sector. In the event that the initiative is unsuccessful, the City would not be responsible for defunct rolling stock, stations, or other infrastructure tied to the program.

To ensure the City of Windsor is able to achieve its vision and objectives for bike sharing under a private ownership and operation model, it is recommended that the City establish clear requirements in the context of a *PILOT* service agreement with one or many operators.

No changes to City bylaws are required to establish bike sharing in Windsor. Current bylaws allow for the operation of bicycles on public roadways and pathways. E-bikes could be operated in the same locations as standard bikes with the exception of within parks and on shared pathways (including the riverfront path system). If the City is intent on permitting e-bikes to operate on shared pathways, an amendment to the *Traffic Bylaw* would be required to remove section 25 (3):

No person shall operate a Power Assisted Bicycle (e-bike) on a pathway shared by pedestrians and bicycles or on a pedestrian trail.

The incorporation of blanket e-scooter sharing into Windsor's micro-mobility service offering is not recommended at this time as legally, e-scooters cannot be operated within the public right-of-way, according to the *Ontario Highway Traffic Act*. This recommendation does not preclude the establishment of a closed e-scooter pilot course off of public roadways. If there is desire to pursue a closed course, careful consideration would be required as to what trip origin and destination pairs are targeted and which corridors are appropriate for e-scooter travel.

While this report does not recommend whether to pursue an exclusive operator agreement via an RFP or a permit license structure, the following framework for bike share is recommended for the City of Windsor:

Table 13 – Recommended Bike Share Framework

Item	Recommendation
Fleet Size	At least 450 bicycles
Fleet Composition	Combination of standard bicycles and e-bikes
Service Area	See <i>Figure 12 (Phase 1)</i>
Service Period	Year-round operation
Term of License	One or two year pilot license
Parking Management	Hybrid dockless model; bike share system to be generally free floating / dockless EXCEPT near high activity areas, where designated geo-fenced drop-zones will regulate pick-up / drop-off locations and mitigate clutter.
Financial Contributions from City of Windsor	None Staff time anticipated to work with and regulate operator(s)
Financial Contributions Required of Private Operators	All capital and operations costs. Annual Licensing Fee OR application fee, Annual Program Administrative Fee per Bike. Licensee shall reimburse for any costs (plus penalty) incurred by the City for violations of the agreement, or for repair/maintenance of public property.
Cost Overruns	Operator(s) responsible for any cost overruns
Upkeep and Maintenance	Operator(s) responsible for fleet upkeep and maintenance
Operations Plan	Operator(s) must provide operations and maintenance plan, staffing plan. Must have 24-hour customer service phone number and email, as well as direct contact for City staff.
User Interface and Payment Systems	Operator(s) to be responsible for providing a simple to use access portal that protects personal information and the privacy of the user. To ensure access for all, the operator(s) must provide a proposed payment plan outlining how the operator(s) will provide service to those without smartphones and those without a credit card.
Costs	Operator(s) retains the right to set pricing and user fees, but will consult with the City in doing so. Must submit costs in proposal as well as package options for memberships/pay per use, and surcharges and extra fees.
Data Reporting Standards	Operator(s) must protect users personal and financial information.

Item	Recommendation
	<p>The City of Windsor will be given access to the fleet management portal and have access to real-time data feeds (GBFS). Monthly reports of number of bikes, km travelled, breakdown by age/gender.</p> <p>Also, monthly trip records for each trip should be provided (including route) including GIS data.</p>
<p>Repair</p>	<p>The operator(s) is/are to maintain all bikes in a safe and functional state, and promptly remove any damaged, unsafe or non-functional bikes from public property.</p> <p>Once notified of an issue, the operator(s) must lock down the bicycle to ensure it cannot be used.</p> <p>Maintenance data must be updated and submitted monthly.</p>
<p>Rebalancing</p>	<p>Bicycles must be rebalanced every 24 hours. Operator(s) must respond to pedestrian obstructions and safety concerns within several hours.</p> <p>Operator(s) must inspect any hubs or stations (if applicable) at least once per day to ensure they are kept in safe, tidy, and sanitary conditions.</p> <p>The City may remove or re-park bicycles in violation with the permit and deduct from the security deposit for fees, resources, and staff time.</p>
<p>Equipment Standards</p>	<p>Bikes must meet Provincial safety requirements and include adjustable seat posts, all-weather tires, front/rear fenders, GPS location tracking, unique identification number and permit number. E-bikes must conform to Provincial requirements.</p>
<p>Storage</p>	<p>Bikes to be parked at:</p> <ul style="list-style-type: none"> (1) Bike racks (i.e. post and ring) (2) Designated areas in geo-fenced hubs or stations (where applicable); (3) Bikes shall not block a 2 metre pedestrian zone, driveways, or street furniture. No parking within 0.5m of trees or shrubs. Bicycles must not be parked where these minimum distance requirements cannot be met. <p>Operator(s) should have in-app ability to communicate by text or alert to let the customer know if a bicycle is parked in a non-permitted area.</p> <p>All bicycles must remain in an upright position with both wheels in contact with the ground.</p>

Item	Recommendation
User Education	Operator(s) must educate customers on how to use services, proper riding behaviour, how to operate and park bicycles, helmet laws. An education plan must be provided and show how education plan will be delivered, including attendance at public meetings and community events to provide education and support to users.
Transit Integration	Operator(s) is/are encouraged to incorporate the capability to integrate payment and access systems with Transit Windsor. Special parking arrangements are to be considered in collaboration with the Transit Windsor and the City of Windsor in transportation hubs.
Insurance Requirements	Proof of Commercial General Liability Insurance in Province of Ontario – no less than \$5 million. Motor vehicle liability insurance in the amount of no less than \$2 million. WSIB coverage.

Appendix A

Current Regulations Related to E-Bikes and E-Scooters

The following information has been copied from the Ontario Highway Traffic Act, and City of Windsor By-Laws for reference as part of this report and ongoing discussions around fleet diversity as part of bike share planning.

Ontario Highway Traffic Act:

Definitions:

- “motorcycle” means a self-propelled vehicle having a seat or saddle for the use of the driver and designed to travel on not more than three wheels in contact with the ground, and includes a motor scooter, but does not include a motor assisted bicycle; (“motocyclette”)
- “motor assisted bicycle” means a bicycle,
 - (a) that is fitted with pedals that are operable at all times to propel the bicycle,
 - (b) that weighs not more than fifty-five kilograms,
 - (c) that has no hand or foot operated clutch or gearbox driven by the motor and transferring power to the driven wheel,
 - (d) that has an attached motor driven by electricity or having a piston displacement of not more than fifty cubic centimetres, and
 - (e) that does not have sufficient power to enable the bicycle to attain a speed greater than 50 kilometres per hour on level ground within a distance of 2 kilometres from a standing start; (“cyclomoteur”)
- “motor vehicle” includes an automobile, a motorcycle, a motor assisted bicycle unless otherwise indicated in this Act, and any other vehicle propelled or driven otherwise than by muscular power, but does not include a street car or other motor vehicle running only upon rails, a power-assisted bicycle, a motorized snow vehicle, a traction engine, a farm tractor, a self-propelled implement of husbandry or a road-building machine; (“véhicule automobile”)
- “power-assisted bicycle” means a bicycle that,
 - (a) is a power-assisted bicycle as defined in subsection 2 (1) of the *Motor Vehicle Safety Regulations* made under the *Motor Vehicle Safety Act* (Canada),
 - (b) bears a label affixed by the manufacturer in compliance with the definition referred to in clause (a),

(c) is fitted at all times with pedals that are operable to propel the bicycle, and

(d) is capable at all times of being propelled on level ground solely by using muscular power to operate the pedals;

As such, electric scooters in Ontario are only permitted on private property that does not have public vehicle access and, if allowed by municipal bylaws, on sidewalks and pathways.

Frequently Asked Questions:

E-bikes are motorized bicycles that can look like conventional bicycles, scooters or limited-speed motorcycles. This information will help you learn the rules about e-bikes so you can ride safely.

What is an e-bike?

E-bikes in Ontario must have:

- steering handlebars
- working pedals
- an electric motor not exceeding 500 Watts
- a maximum speed of 32 km/h
- a maximum weight of 120 kg
- a permanent label from the manufacturer in both English and French stating that your e-bike conforms to the federal definition of a power-assisted bicycle
- It is illegal to modify your e-bike's motor to make it more powerful or to increase the speed of your e-bike.

What e-bike riders need:

You **don't** need a driver's licence, vehicle permit or licence plate to ride an e-bike, but you **do** need to:

- be 16 or older
- wear an approved bicycle or motorcycle helmet
- keep your e-bike in good working order
- You also need to follow the same rules of the road as regular cyclists.

Where to ride an e-bike:

You can ride your e-bike on most roads and highways where conventional bikes are permitted, with some exceptions.

You **can't** ride your e-bike:

- on certain provincial controlled access highways, such as the 400 series, the Queen Elizabeth Way, the Queensway in Ottawa or the Kitchener-Waterloo Expressway
- on municipal roads, including sidewalks, where bicycles are banned under municipal by-laws
- on municipal roads, sidewalks, bike paths, bike trails or bike lanes where e-bikes are prohibited

City of Windsor Parks By-Law 200-2002:

Definitions:

- “BICYCLE” includes a tricycle and unicycle but does not include a motor assisted bicycle;
- “MOTORIZED RECREATIONAL VEHICLE” means a snowmobile, go-cart, trail bike, mini bike, all terrain vehicle, or similar vehicle, propelled by an internal combustion engine;

By-Laws:

- 7.1 (2) Unless authorized by permit, and except as provided in respect of section 7.4 with respect to bicycles, no person shall, while in a Park, drive, operate, pull or ride any vehicle except on a roadway or parking area.
- 7.2 Parking No person shall, in any Park: (1) park or leave a vehicle except in a designated area for parking;
- 7.4 While in any Park, no person shall:
 - (1) ride, operate, or be in the possession of any bicycle where posted to prohibit same; or
 - (2) obstruct, inconvenience or endanger other users of the Park while riding or operating a bicycle.
- 7.5 Motorized Recreational Vehicles No person shall ride, drive, park or be in possession or control of a motorized recreational vehicle in any Park except in a designated area.
- 7.7 Speed Unless authorized by permit, while in a Park no person shall operate: (1) any vehicle on a roadway at a speed in excess of the posted limit; or (2) a bicycle other than on a roadway at a speed in excess of 20 kilometres per hour.

City of Windsor Traffic By-Law 9148:

Definitions:

- "Bicycle" includes tricycles having a wheel or wheels of more than sixty centimetres (60 cm.) in diameter;
- "Motorcycle" means a self-propelled vehicle having a seat or saddle for the use of the driver and designed to travel on not more than three (3) wheels in contact with the ground, and including a bicycle with a motor attached and a motor scooter;
- "Skateboard" shall mean a board with rollers or wheels attached thereto and operated without a steering device and by balancing upon such board and shall include articles known as surf boards or surfing boards.
- "Power Assisted Bicycle (e-bike)" shall mean a power assisted bicycle as defined by the Highway Traffic Act, R.S.O. 1990, cH-8 as amended.

Part 5 – General Rules:

- 9. No person shall operate slow moving construction or farming equipment, a horse, a vehicle drawn by a horse, a motorcycle having a cylinder swept volume of 50 cubic centimeters or less, a motorcycle driven by electricity stored in the vehicle, a motor assisted bicycle or a wheelchair on any portion of the E. C. Row Expressway or Dougall Parkway (between Howard Avenue and Sixth Concession Road) with the exception of those vehicles used in the maintenance of the Expressway.

Part 7 - REGULATIONS RE-BICYCLES AND/OR POWER ASSISTED BICYCLES (E-BIKES):

- 22. (1) A person operating a bicycle or power assisted bicycle (e-bike) upon a highway shall ride as near the righthand side of the highway as practical and shall exercise due care when a standing vehicle or one proceeding in the same direction.
- 22. (2) Persons operating bicycles or power assisted bicycles (e-bikes) upon a highway shall ride in a single file, except when passing another vehicle
- 23. No person operating a bicycle or power assisted bicycle (e-bike) shall carry any package, bundle or article which prevents the rider from keeping both hands on the handle bars
- 24. No person shall park a bicycle or power assisted bicycle (e-bike) on a road except in a manner as to cause the least possible obstruction to pedestrians or vehicular traffic
- 25. (1) No person shall ride a bicycle with a wheel or wheels more than sixty centimetres (60 cm) in diameter or a Power Assisted Bicycle (e-bike) upon a sidewalk
- 25. (2) No person shall operate a bicycle or a Power Assisted Bicycle (e-bike) on the E. C. Row Expressway or Dougall Parkway (between Roseland Drive East and Sixth Concession Road
- 25. (3) No person shall operate a Power Assisted Bicycle (e-bike) on a pathway shared by pedestrians and bicycles or on a pedestrian trail.
- 25. B. i. Subject to section 25c no person shall operate a vehicle other than a bicycle or a power assisted bicycle (e-bike) in any lane or portion of a bicycle lane when properly worded or marked signs have been erected and are on display except:
 - (1) For the purpose of ingress to or egress from a private lane or driveway adjacent to the designated lane;
 - (2) For the purpose of making a turn at a highway intersecting the designated lane;
 - (3) For the purpose of entering or exiting a curb lane used for parking;
 - (4) For the purpose of actually being engaged in the loading or unloading of disabled persons as defined in the Highway Traffic Act and its regulations; or
 - (5) For the purpose of a school bus actively engaged in the picking up or dropping off school children.
- Section 25B does not apply to the following vehicles which are driven or stopped in any lane or portion of a bicycle lane when properly worded or marked signs have been erected and are on display
 - i. Emergency vehicles, being vehicles operated to assist in fire fighting and fire prevention, ambulances, and vehicles operated by the Windsor Police Service.
 - ii. Public transit motor vehicles owned and operated by the Transit Windsor as part of its regular public transportation service.
 - iii. Vehicles actually engaged in works, undertaken for or on behalf of The Corporation of the City of Windsor, Transit Windsor or a public utility, including utilities providing telephone, natural gas or cable television services.