Final Report

Hamilton Shared Micro-Mobility

Assessment of Operating Models, Funding Sources, and Role of Not-For-Profit Organizations

Prepared for City of Hamilton
by IBI Group
November 5, 2020

Executive Summary

Since 2015, Hamilton's bike share program has been an integral part of the way residents and visitors move around the city. It is the only public bike share in the Greater Toronto and Hamilton Area (GTHA) outside Toronto and has been recognized by the Transportation Association of Canada and Canada Clean 50 as a model for sustainable urban transportation. As of early 2020 prior to the pandemic, some 5% of Hamiltonians, nearly 27,000 people, are active members and they make over 30,000 trips a month.

As the micro-mobility market has evolved with the entry of venture-funded companies, dockless technologies, and electric vehicles, the program now operates in a very different environment from when it launched. Adding to the urgency for change, Uber's decision to cease operating the system as of June 2020, the lack of penalties for breaking that contract, and the lack of dedicated sources for operating funds together put the system in a precarious state.

This study is intended to identify the most suitable operating model to provide sustainable shared micro-mobility in Hamilton and leverage the wide range of new technologies in the market, as well as identify suitable non-tax-based funding sources, and potential expansion areas.

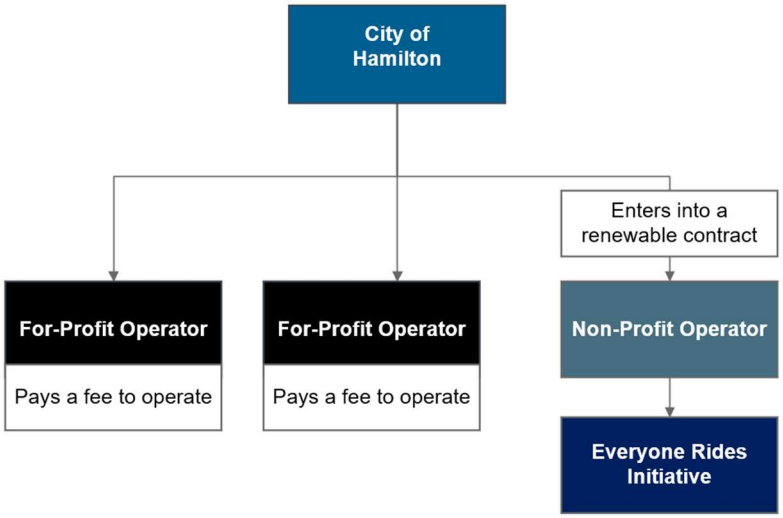
A contracted operator with dedicated funding alongside permitted operators that pay to operate and would be the best operating model for Hamilton

A peer review of nine North American cities revealed that cities that already had successful bike share systems before the rise of venture-funded operators have pursued hybrid operating models: Permit-based systems, where operators pay the City for the right to run their dockless vehicles, plus a City-run contracted system where the City has control over operations. Hybrid arrangements allow cities to have direct operational control over at least one of the operators to ensure that strategic mobility, equity, and community engagement goals are met while also allowing healthy competition in the market to encourage technology and process improvements and low prices to the end users.

Peer cities that did not have existing well-run bike share systems before dockless technology arrived were the ones that opted for a permit-only arrangement. The three peer cities that do not have a permitting system but have long-running bike share systems—Vancouver, Toronto, Philadelphia—are in jurisdictions that prohibit shared e-scooters. It is likely that these cities would also adopt a hybrid model if shared e-scooters become legal. Exhibit ES1.1 illustrates the proposed organizational structure for Hamilton.

The City of Hamilton is also well equipped to manage this type of hybrid system. The City's Licensing and By-law Enforcement Division is already equipped to enforce a permit program working with the Sustainable Mobility Program Manager and has already started review of the necessary by-law changes to allow shared e-scooters. The Sustainable Mobility Group can operate and manage the permit program on an ongoing basis. Under the current terms, the City can renew the current contract in February 2021, maintaining the current program and avoiding the costs and disruption of a procurement process. A renewal would also give the City time to assess how well the model works until the end of 2022, at which time a decision on a permanent model can be made.

Exhibit ES1.1: Illustration of Proposed Organizational Structure for Future Shared Micro-Mobility in Hamilton



Regardless of the operating model chosen, the principles of Hamilton's Everyone Rides Initiative should apply to all shared micro-mobility in the city

Hamilton residents and Council strongly supports providing equitable access to a range of sustainable transportation options across the city, and the Everyone Rides Initiative (ERI) currently run by HBSI is one way this is achieved. The program provides cycling education, outreach, discounted access to the bike share system, advice and support to the City on system expansion, and promotes a range of initiatives that remove barriers to cycling across the city.

Regardless of the operating model, most of the cities reviewed had equity considerations built into the shared micro-mobility programs, although few are as comprehensive as the ERI. These include discounts for low income riders, alternative payment arrangements for those without credit cards and/or smartphones, requirements or incentives for operators deploy some of their fleet in marginalized neighbourhoods, and targeted system expansion plans to ensure equitable distribution.

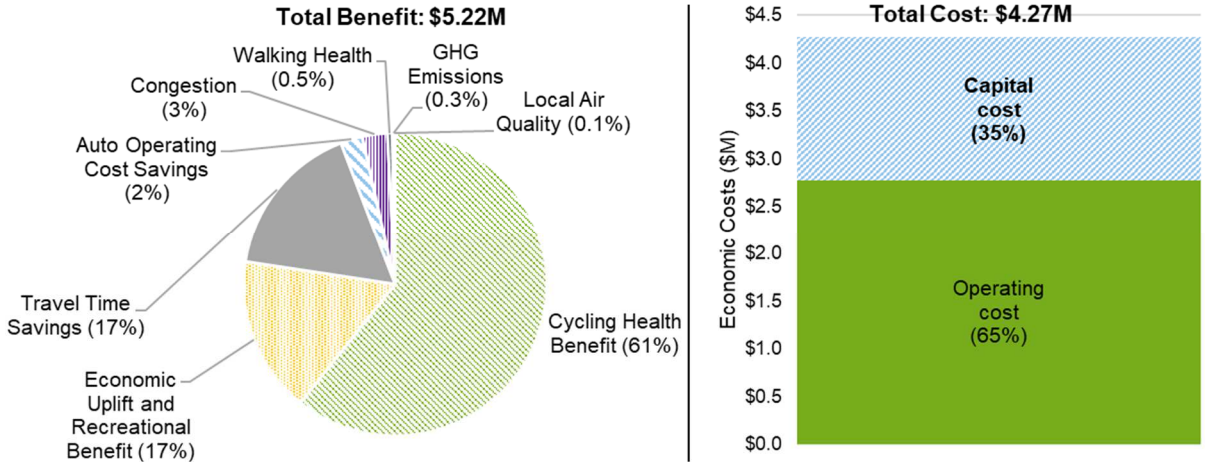
To-date the ERI has only had to consider equity issues related to the City's bike share system. Looking ahead, if permit-based operators are welcomed into the city, a program based on the same principles as the ERI program should be expanded to cover all shared micro-mobility in Hamilton regardless of operator or vehicle type. A portion of funding to offset costs of the expanded program should be paid by the permitted operators as a condition of their permits.

The economic case for shared micro-mobility has a benefit-cost ratio of 1.2, plus unmonetized Mobility, Equity, and Road Safety benefits

The business case for shared micro-mobility in Hamilton in this study considers the financial, economic, strategic, and deliverability cases, consistent with Metrolinx Business Case Guidance, which is used to assess transportation investments across the GTHA. The economic case for the contracted operation has a benefit-cost ratio of 1.22 and net benefit of $951,000 over five years as shown in Exhibit ES1.2. This does not, however, include Mobility and Equity benefits that come from providing a reliable, affordable public transport option to residents who currently do not drive and find it hard to access fixed-route transit. It also does not include Road Safety benefits due to having fewer cars on the road since there is insufficient GTHA-specific data to quantify the safety benefit of switching from driving to micro-mobility.

Cycling health benefits have been discounted by 50% compared to the Metrolinx guidance, recognizing that the future system may include electrified and motorized micro-mobility devices that require much less pedalling effort and therefore have lower health benefits.

Exhibit ES1.2: Economic Benefit-Cost Analysis of Shared Micro-mobility in Hamilton (2021-2025 Projection)



About 40% of the cycling health benefit comes from auto drivers switching to shared bikes. Some 50% of the cycling health benefits come from transit riders switching to the shared bike service. While this is a large proportion, this diversion from transit only accounts for 0.5% of HSR's annual ridership while providing potentially significant health benefits to users who choose the more active mode. These transit riders who switch are also those whose transit rides are less convenient, for example due to long distances to the bus stop or infrequent service.

The benefits of increase patronage of retail businesses that cyclists tend to bring compared to drivers (Economic Uplift) and the quality of life improvement to residents that would have a new reliable, affordable way to access the city's parks, green spaces, and other key non-work and non-school destinations (Recreational Benefit) are not easily monetized. Therefore, the Economic Uplift and Recreational Benefit is assumed to be worth 20% of the other monetized benefits.

The financial case shows that the net incremental costs of running the hybrid program from 2021-2025 is $3.5M, which includes periodic replacement of end-of-life assets and fare revenue.

Shared micro-mobility also aligns with the City's strategic priorities of Community Engagement, Healthy & Safe Communities, Clean & Green, and support Built Environment & Infrastructure through supporting multimodal transportation. It can provide a reliable and affordable alternative to the 230,000 daily auto-driver trips in Hamilton that are less than 5 km long.

Potential non tax-based revenue sources can generate funds to cover portions of the annual operating costs

Non-tax-based funding sources tend to cover all operating costs in the peer cities reviewed. Title sponsorship is an often-used option in the US, usually covering 30-60% of net operating costs for systems able to secure a sponsor. Healthcare-related businesses like insurance companies and hospital networks as well as prominent multi-national companies based in the host cities are sometimes eager to provide funding. This is less prevalent in Canada, but it is reasonable to expect under a conservative scenario that Hamilton could generate some $150,000-$200,000 per year in sponsorship, advertising, and donations.

According to the North American Bike Sharing Association, over 55% of all bike share systems are supported through municipal financial contributions, usually from municipal revenue sources.

Three municipal revenue sources for Hamilton's system were investigated as potential non-taxed based funding sources:

- A portion of net revenues from municipal parking in combination with an increase in parking fees or fines;
- A new micro-mobility reserve funded through fines generated by the City's Red-Light Camera program, although this would require additional research to determine if there is a precedent in Ontario for using these funds in this way; and
- Accessing a small portion of the Gas Tax for Transit revenue that the City receives from the provincial and federal governments to fund initiatives that support transit ridership. This also requires additional research to determine whether these funds can be used for capacity-building operational costs in addition to capital costs.

The above would be in addition to fees generated from the permit-based program, which is expected to be entirely self-funded by permit fees. Additionally, permitted operators would be expected to contribute $45,000-$150,000 per year toward the ERI program.

Neighbourhoods in Wards 4-8 and 14 show the highest potential demand for micro-mobility, and are potential candidates for expansion

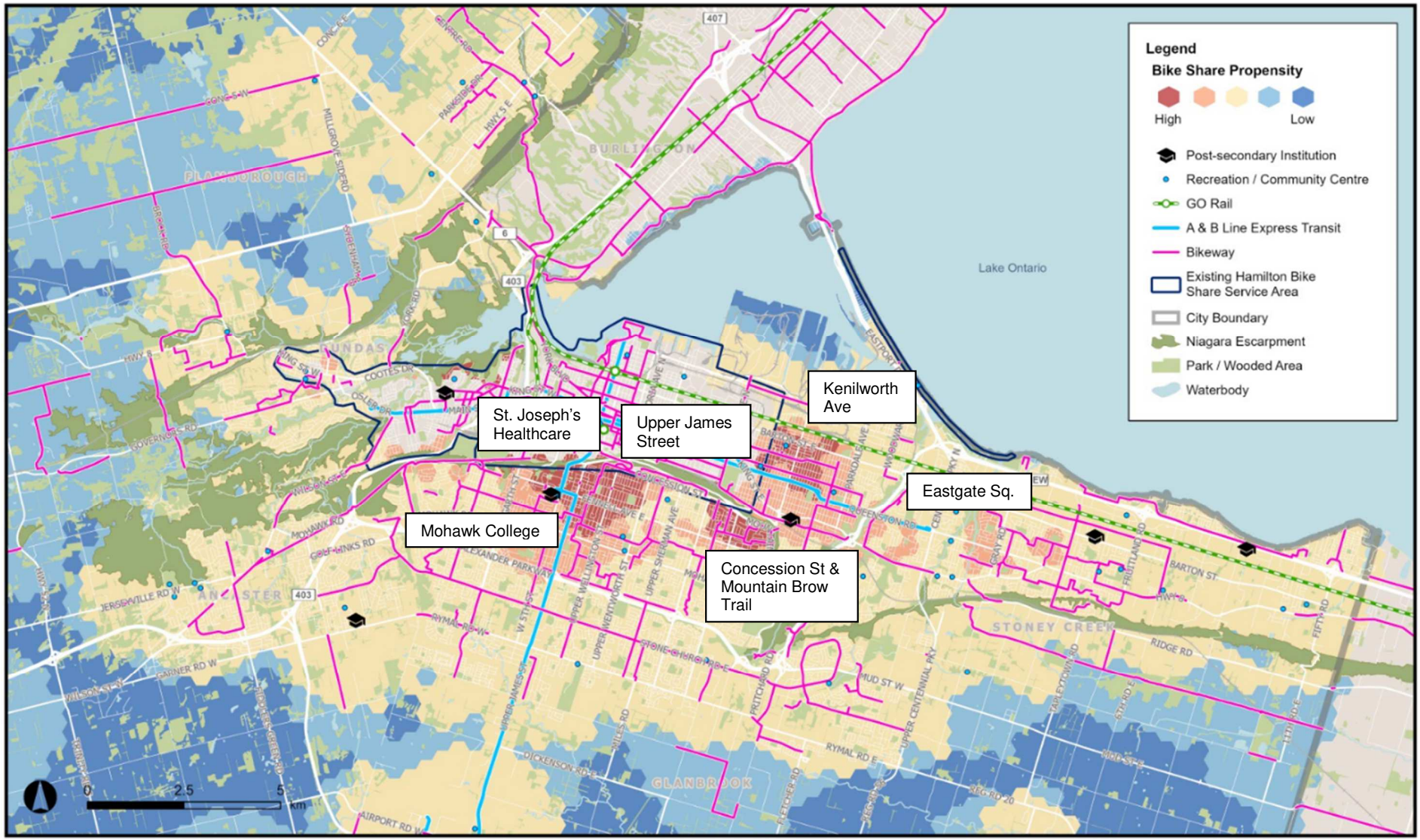
In this study the propensity for micro-mobility is measured by factors such as presence of cycling infrastructure, population and employment density, presence of higher-order transit, and presence of key destinations like community centres and higher education institutions. Exhibit ES1.3 illustrates where in Hamilton outside the existing service area has the highest propensity. The map highlights that areas around Mohawk College, St. Joseph's Healthcare Hamilton West 5th Campus, Kenilworth Ave corridor, Upper James St corridor, Concession St & the Mountain Brow Trail, and Eastgate Square should be the highest priority for future expansion. These results are similar to the Mountain Bike Share Feasibility Study conducted by the City in 2016.

Based on current station density in Hamilton, placing 4 stations per square-kilometre with 6.4 bikes per 1,000 residents to serve the roughly 30 km^2 expansion area would require 120 new stations and 557 bikes at a capital cost of roughly $2.3M. In addition, ongoing operating costs for the expansion would be about $435,000 annually. This expansion would be rolled out gradually as funding becomes available.

Other strategic areas for expansion that have other attributes such as strong cycling culture, suitable topography, strong local community support, and a wealth of key destinations include:

- Local community hubs such as downtown Ancaster, downtown Stoney Creek, and downtown Waterdown;
- Local attractions such as conservation areas; and
- Future regional transit hubs, namely Confederation GO station.

Exhibit ES1.3: Map showing areas outside current service area with highest propensity for micro-mobility



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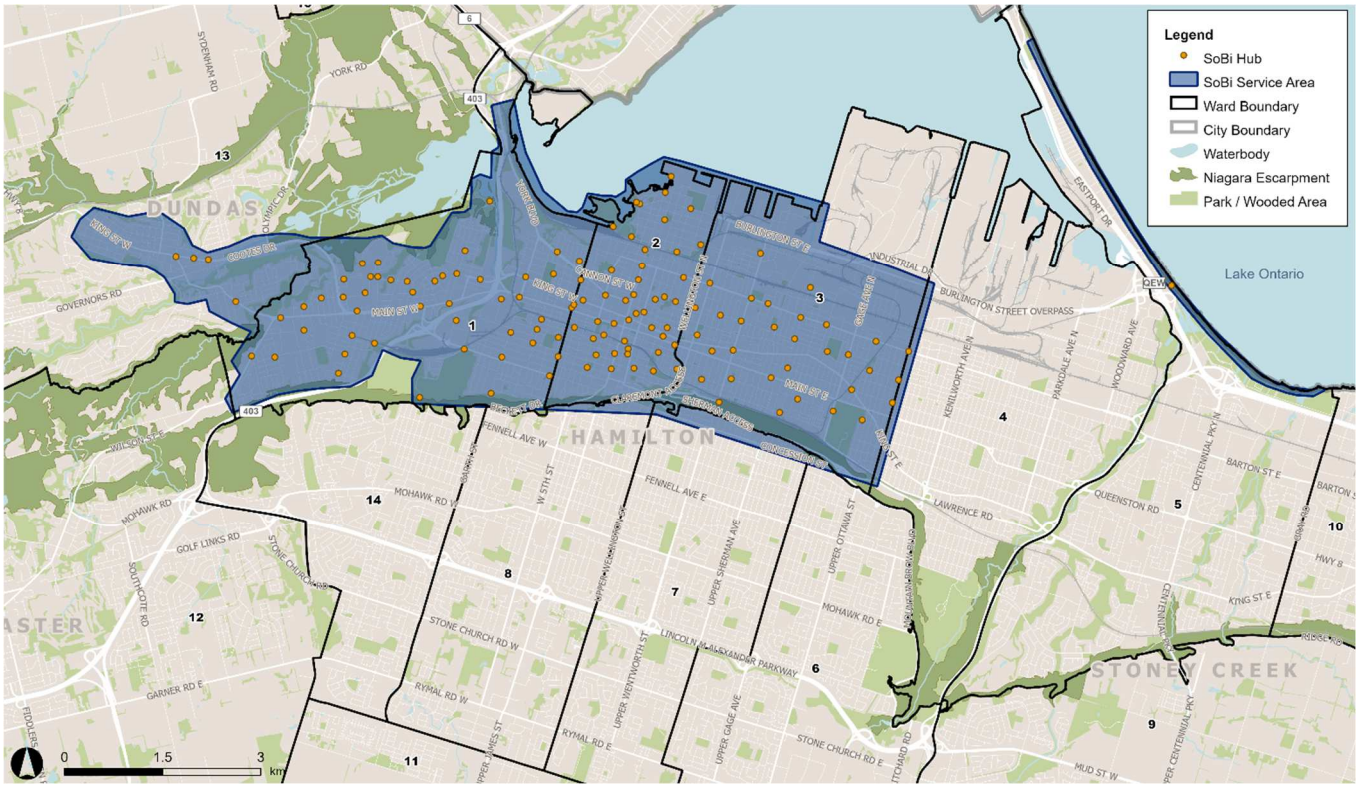
1 Introduction

Since 2015, Hamilton's bike share program has been an integral part of the way residents and visitors move around the city. It is the only public bike share in the Greater Toronto and Hamilton Area (GTHA) outside Toronto. As of early 2020 prior to the pandemic, some 5% of Hamiltonians, nearly 27,000 people, are active members and they make over 30,000 trips a month. The program has been awarded the Transportation Association of Canada's 2016 *Sustainable Urban Transportation Award* and the 2016 *Canada Clean 50 – Top 15 Project Award*. The Everyone Rides Initiative (ERI), run by the local not-for-profit Hamilton Bike Share Inc. (HBSI), is Canada's first bike share equity program and has been removing barriers to cycling in the city since 2015.

While the City of Hamilton owns the bicycles and stations, it has always contracted with others to operate the system. The bike share system was one of the first free floating, or "smart bike", systems in Canada. It now totals 825 bikes spread across 35 km^2 of Wards 1, 2, and 3 as shown in Exhibit 1.1. It was procured based on a Design-Build-Operate-Maintain Request for Proposals (RFP) process for an exclusive operator. The City purchased the bikes, but the system was to be self-sustaining, with no further operating funding support from the City.

Exhibit 1.1: Map Showing Hamilton Bike Share Service Area

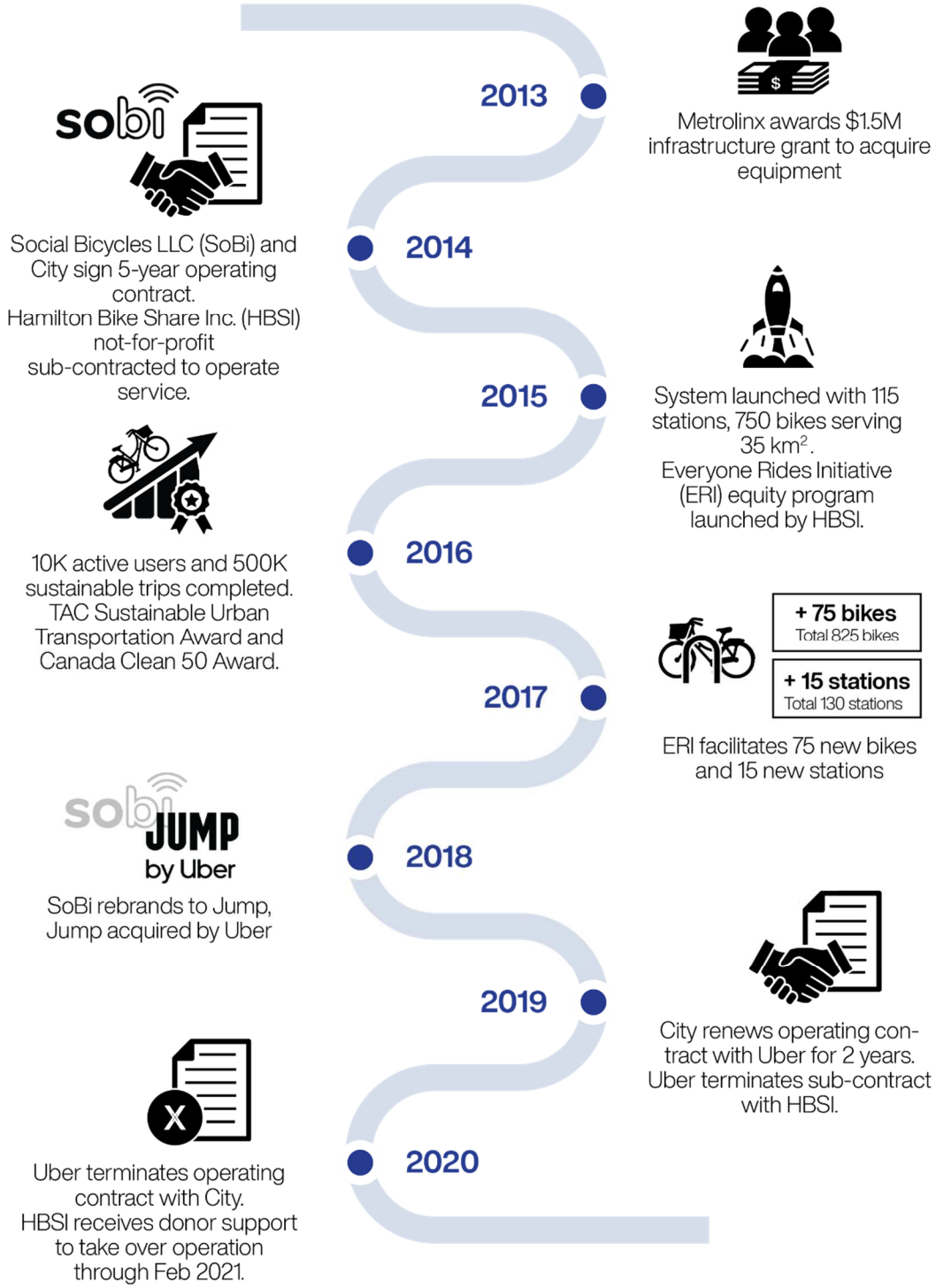


Between 2015 and 2019, the system had been operated by HBSI under sub-contract to Social Bicycles since launch. Uber acquired the operation in 2018 and brought all services in-house a year later after terminating HBSI's sub-contract.

Uber's decision to cease operating the system as of June 2020, well ahead of the contracted February 2021 end date, the lack of penalties for breaking that contract, and the lack of dedicated sources for operating funds together put the system in a precarious state. HBSI has

filled the role of interim operator while donations from a wide range of sources has filled the funding gap until February next year. Beyond that, the path forward for public shared micro-mobility in Hamilton is unclear. Exhibit 1.2 illustrates the milestones in the systems history.

Exhibit 1.2: Timeline of Major Milestones in Hamilton Bike Share



1.1 Study Objectives

This study is intended to identify the most suitable way to provide sustainable shared micro-mobility in Hamilton given the local context. Specifically, the objectives of the study are to:

- Define a preferred operating model, which is intended to be flexible enough to adapt to multiple vehicle technologies (e.g. e-scooters, conventional bikes, and e-bikes) while being financially and operationally sustainable for a five-year period;
- Define the role of not-for-profit organizations like HBSI in the preferred structure;
- Estimate potential costs and benefits, focusing on non-tax base revenue sources and including economic benefits such as reduction in vehicle-kilometres travelled, greenhouse gas emissions, and improvements in community wellbeing; and
- Develop a strategy for expanding the service to new neighbourhoods over time.

The findings generated in this study will inform the City's next steps in setting up an organizational structure and procuring trusted partners to continue delivering high-quality shared micro-mobility to residents well beyond the end of the current contract in February 2021.

2 Peer Review

A peer review was undertaken to better understand operations and practices of other micro-mobility systems. The peer review provides a deeper understanding of the following:

- Organizational structures that could work best for a mid-sized city like Hamilton;
- How permit-based systems work, particularly when run alongside city-run systems;
- Operational funding arrangements that have been sustainable, including where sponsorships work best;
- How to ensure operators remain for the duration of their contracts;
- How best to plan for and delivery service area expansions; and
- The level of municipal staff oversight required.

The peer review was undertaken through desktop research with conference calls held with selected jurisdictions to help augment the overall understanding. Hamilton's approach to micro-mobility will attempt to build upon the lessons learned in other jurisdictions, as well as its own experience with SoBi.

2.1 Overview of Peer Systems

Nine cities were identified for the initial review. These were: Toronto, Vancouver, Kelowna, Calgary, Seattle, Washington (DC), Portland, Minneapolis, and Philadelphia. Of these, follow-up interviews were conducted with representatives from Philadelphia, Washington, Toronto, and Kelowna. A summary of the systems and important features are outlined below.

- **Toronto:** Bike Share Toronto is Canada's second largest bicycle sharing program (following Montreal's BIXI system). The service is a dock-based bike share. When the current season's expansion is completed, the system will have 625 stations, more than 11,000 docking points, and more than 6,500 bicycles. Program management is awarded via the RFP process. The most recent award was a 5-year term for a single for-profit operator.
- **Vancouver:** Mobi by Shaw Go is a dock-based bike share system in Vancouver. It is differentiated from other dock-based systems by allowing riders to lock the bikes anywhere to make a stopover and holds the distinction of being the only bike share in Canada requiring and providing helmets for all riders. Operations are contracted out to a for profit operator.
- **Kelowna:** Micro-mobility in Kelowna is based on a permit system that allows multiple private sector firms to apply to deploy their own vehicles subject to the terms of the permit. As of August 2020, the system permitted e-scooters, e-bicycles, and e-mopeds. Issuance of a permit, however, does not necessarily mean that the vehicles are available. E-scooters are the most abundant type of shared micro-mobility, despite only being legally allowed to operate on a few off-road corridors. The program is partly funded by the City's broader sustainable mobility program, which aims to promote active transportation and other non-driving modes.
- **Calgary:** Calgary has initiated pilot programs for both dockless bicycles and e-scooters through a permit system. In March 2020, however, bikes were pulled from the streets by the private operator, leaving e-scooters as the only shared mobility available. Up to 2,500 e-scooters have been permitted between three companies.

- **Seattle:** Shared micro-mobility in Seattle is a permit-based system with bicycles and e-bicycles available as of August 2020. An e-scooter share is expected to launch in the coming months. Seattle was the first city in the United States to pilot a free-floating bike share.
- **Washington, DC:** Capital Bikeshare expands across the Metro DC area providing a hybrid dock-based bike share service. Bikes can be locked outside of docks for a fee. This program is administered by the District Department of Transportation and operations are contracted to a single private operator through an RFP process. The DC area also has several private companies allowed to provide dockless bicycles and e-scooters, which operate independently of Capital Bikeshare through a permit program also administered by the District Department of Transportation.
- **Portland:** BIKETOWN is a hybrid system that is transitioning to an all e-bicycle fleet during the summer of 2020. The original launch in 2016 was funded with a $2M grant from the federal government and a $10M title sponsorship. The title sponsorship was renewed in 2020 for 5 more years at $8M. No general city funds are used to operate the system. There is also an ongoing pilot e-scooter program in which five private operators are participating through a permit program run by the Portland Bureau of Transportation.
- **Minneapolis:** The Nice Ride program includes bicycles, e-bicycles and e-scooters, integrated under a single non-profit administrator that outsources operations to the for-profit firm Motivate. The system began with a docked bicycle system but is transitioning to a dockless system. The system is the only one that was reviewed to have e-scooters integrated into the typical public bike share structure (owing to Lyft's ownership of Motivate). Despite the cross-branding, e-scooters and shared bicycles have different fee structures. Bird e-scooters are also allowed, but not integrated into the Nice Ride system. Funding largely comes from user fees and title sponsorship.
- **Philadelphia:** Indego is a docked bike share system administered by the City's Office of Transportation, Infrastructure, and Sustainability with operations outsourced to a single private operator via RFP. Non-profit groups are heavily involved in system planning, outreach, marketing, and equity programming alongside City staff. The program is largely funded by user fees and a title sponsor (Independence Blue Cross).

Key operating statistics for the peer-reviewed systems are outlined in Exhibit 2.1.

Exhibit 2.1 :Key Statistics for Peer Systems

	Pop. Density	Type of Micro-mobility	Micro-mobility Statistics	User Fees	Farebox Recovery	Operating Expenses
Hamilton (Population: 536,917)	480.6 /km^2	Bicycles (hybrid system)	825 bikes, 130+ hubs	Pay as you go, monthly and 6-month plans	29% (2020 estimate)	$52 per dock per month, $88 per bike per month
Toronto (Population: 2,731,571)	4,334.4 /km^2	Bicycles (station-based system)	6,850 bikes, 625 stations (by end of 2020)	Annual, 3-day, day, single trip passes	50% (2017)	$2.58 per trip[1]
Vancouver (Population: 631,486)	5,492.6 /km^2	Bicycles (station-based system)	~2,000 bikes, ~200 stations	Day, monthly, annual passes	Unknown	Unknown

	Pop. Density	Type of Micro-mobility	Micro-mobility Statistics	User Fees	Farebox Recovery	Operating Expenses
Calgary (Population: 1,239,220)	1,501.1 /km^2	E-scooters	~2,500 scooters	Varies by operator	n/a	None
Kelowna (Population: 142,146)	601.3 /km^2	E-scooters, e-bikes e-mopeds,	~700 scooters, 50 e-bikes, 25 e-mopeds (permitted)	Varies by operator	n/a	None
Philadelphia (Population: 1,584,064)	4,554.8 /km^2	Bicycles (station-based system)	~1000 bikes, ~136 stations	Day, monthly, annual passes	~41% (2017 forecasted)	$284/bike per month[2], $155 per dock per month
Minneapolis (Population: 429,606)	3,071.7 /km^2	Bicycles (docked and dockless), e-bicycles, e-scooters	~1,350 bikes, ~160 stations – system is transitioning to dockless or hybrid system	Single ride, day, 30-day, annual passes, e-bicycle and e-scooter are pay as you go	Unknown	$50 per dock per month, $98 per bike per month
Washington (Metro Area) (Population: 6,216,589)	418.7 /km^2	Bicycles (hybrid), e-bicycles (hybrid), bicycles (dockless), e-scooters	Capital Bikeshare: ~5,000 bikes, ~900 e-bikes, ~600 stations, Private: ~1,900 e-scooters, ~90 dockless bikes.	Single trip, day, 3-day, 30-day and annual passes; $1 extra to unlock an e-bike	~90% in DC, ~52% in Arlington	$2.55 per trip[1], $101 per dock per month, $207 per bike per month
Portland (Population: 654,741)	1,894.7 /km^2	E-bicycles (hybrid), e-scooters	1,500 e-bicycles (in process of relaunching, will remove 1,000 standard bicycles), up to 1,250 e-scooters allowed per permit issued, 5 permit holders	Pay as you go, monthly and annual passes; prices vary by operator for e-scooters	Unknown	Unknown. No operating costs paid by City.
Seattle (Population: 753,675)	3,464.6 /km^2	Bicycles (dockless), e-scooters (pilot to be launched in 2020)	7,000 bikes (as of May 2019) with plans to expand to 10,000.	Varies by operator	n/a	None

[1] ITDP Bike Share Planning Guide

[2] Indego 2018 Business Plan Update

2.2 Organizational Characteristics

2.2.1 Organizational Structure

The peer systems can be classified into three broad organizational structures:

- Publicly-owned and administered systems with a single contracted private company operating the system, e.g. Toronto, Vancouver, Philadelphia;
- Permit-based systems, with multiple private companies operating their own devices, subject to terms defined in the permit, e.g. Kelowna, Calgary, Seattle; and
- A combination of the above, e.g. Washington, Portland, Minneapolis.

All micro-mobility systems have some level of oversight at either the municipal level or through a designated non-profit (e.g. Minneapolis and to some extent Philadelphia). This requires a small complement of municipal staff overseeing the contracted operations, typically 0.3 – 1 Full Time Equivalent (FTE), and resources to enforce permit conditions.

In public (usually dock-based) systems, it is typical for the municipality or an arm's length agency to own physical assets. For permit-based systems, physical assets are owned by individual operators. In Washington, DC, where public and private systems are both available, officials noted that the launch of the private e-scooters and bicycles initially decreased ridership for the public system. However, the overall number of trips taken by micro-mobility increased, which was an important objective for the region.

The three peer cities that do not have a permitting system are in jurisdictions that prohibit shared e-scooters[1], suggesting that permitting systems are a common approach to blending city-run and entirely private-sector run micro-mobility. With Ontario's January 2020 e-scooter Pilot, Toronto Council has started discussion on whether e-scooters should be allowed and under what model. In most cases, cities that did not have existing bike share systems before dockless technology arrived were the ones that opted for a permit-only arrangement. Washington DC, Portland, and Minneapolis more closely reflect Hamilton's situation of already having micro-mobility assets deployed and in good working order where higher levels of government also allow e-scooters.

Two of the cities reviewed had recently changed their operating models. With the expiry of the initial vendor contract, Philadelphia took the opportunity to issue an RFP with an updated contract structure. The city sought to shift some risk and cost to the operator by changing to a concession model that set fixed per-dock payments with set service-level targets. They also sought to leverage private investment to help with system expansion by entering into a 10-year agreement, which allows the time for the operator to recover initial capital investments in assets required for expansion.

In Minneapolis, Nice Ride had previously been both owned and operated by a non-profit organization. Under a business structure updated in 2018, operations were outsourced to a for-profit company, which absorbed previous non-profit staff while the non-profit retained its oversight role. This transition was a direct response to the rise in for-profit companies with the capital, technology, and processes in place to deliver a wider range and larger number of micro-mobility devices than could be achieved with only local resources. However, the non-profit uses its oversight role to ensure transparency and innovation, order, equity, robust data sharing, and prioritization of quality and reliability over growth.

A contracted operator running the City's bike share assets alongside permitted dockless operators is a common arrangement in peer cities that already own bike share assets like Hamilton.

2.2.2 Operator Retention

Peer cities that own micro-mobility assents tend to have operator contracts with clear clauses covering data sharing, penalties for early termination, fixed periodic payments by the city, and allowances to allow for service area expansion during the term of the contract. No unusual or

[1] Kelowna only allows e-scooters on off-road paths to comply with British Columbia's laws regarding e-scooters on public streets.

unexpected operator retention techniques were found—in fact, Hamilton's contract with Uber that did not include early termination penalties, data sharing, etc. was unusual compared to the peer cities.

Cities with permitted operators tend not to have any operator retention rules or penalties for an operator leaving unexpectedly. Many cities require operators to set aside a fund to cover the costs of removing vehicles from the street if the operator ceases operations, but this is not structured to penalize early departure. It is simply meant to ensure that the city is not left to cover unexpected clean-up costs.

2.2.3 Equity Considerations

Regardless of the organizational structure, most of the cities reviewed had some sort of equity consideration built into the shared micro-mobility program. These took the shape of one or more of the following:

- Discounts/special passes for low income individuals, e.g. Vancouver, Philadelphia, Washington, Minneapolis, Portland, Seattle. Qualifying criteria and size of the discount varied among cities;
- Alternative payment arrangements intended to improve accessibility for those without a credit card and/or a smartphone, e.g. Vancouver, Portland, Minneapolis;
- Service requirements built into operator contracts or permit systems that aim to increase access within lower income or priority neighbourhoods, typically implemented through a provision that a certain number or percentage of devices be located within identified areas, e.g. Minneapolis, Portland, Seattle; and
- Targeted expansion to lower income or equity areas for docked/publicly-administered shared mobility systems, e.g. Washington

Calgary's bike and e-scooter permit application asked for applicants to submit low income pricing scheme proposals and alternative to credit card and/or smartphone access proposals, however it is unclear if these have been implemented.

Toronto's bike share does not offer any sort of discounted pass or stated equity considerations. Kelowna's permit-based system does not include any equity considerations, but it was noted that devices were most likely to be deployed in the city's lower income areas due to the built form and other geographic considerations.

Hamilton's ERI program run by HBSI should apply to all shared micro-mobility, including permitted operator systems if those are allowed in the city.

2.2.4 Role of a Non-Profit Organization

Minneapolis stands out among the peers for the prominent role of its non-profit. Nice Ride Minnesota (NRM) has been the operator since launch in 2010 and since 2018 has been the manager of the contracted operator. It also oversees all equity programs and guides service expansion. That program is funded through user fees, title sponsorship, and grants provided by state and federal government programs.

In Philadelphia, the non-profit Better Bike Share Partnership takes on a more advisory role in addition to running equity programs and community outreach. For example, the non-profit helps guide service expansion to ensure disadvantaged communities are not left out and provides input to the City on operational considerations that may improve access to residents. They do not directly operate any part of the system. Funding is provided by private donations.

These experiences show that cities that already have an established non-profit with the skills and resources to run shared micro-mobility can provide effective service while meeting community engagement and equity goals. Non-profits can also be flexible in sub-contracting operators to supplement their skills and gain access to better technology and processes.

Hamilton should continue to leverage the experience of its local non-profit HBSI in an operating capacity but remain open to HBSI partnering with for-profit operators to bring technological improvements.

2.3 Funding Sources

Funding sources vary, and Hamilton will likely need to craft its own approach to funding, particularly in identifying suitable non-tax-based government sources for operating funds. This section briefly describes sources found in the peer systems as a guide for Hamilton.

2.3.1 Operating Funds

In permit-based micro-mobility systems, revenues were general generated through the permitting process. Fee structures vary from flat annual license fees to variable charges based on trips and/or fleet size.

In public systems, operating revenues typically come from user fees, sponsorship, advertising and/or grants. User fees are typically a large portion of total system revenue. However, user fees do not recover the costs of running the system. To make up this shortfall, bike share systems typically pursue alternative revenue streams. These are:

- **Title sponsorship:** The peer review found that title sponsors have been easier to find and retain for American systems than Canadian. For example, Biketown in Portland is sponsored by Nike, which is based that city. In Philadelphia, the health insurer Independence Blue Cross contributes USD$2 million annually, and staff noted that health care providers and insurers are typically eager to participate. Minneapolis also receives significant funding from its sponsor, Blue Cross Blueshield Minnesota. The structure of healthcare in the US provides potentially broader scope for private for-profit companies to sponsor micro-mobility if it aligns with their own public health goals and marketing/PR programs.

  In Toronto, TD Bank provided title sponsorship at a rate of CAD$750,000 annually but opted not to renew the contract after 2016. Despite an ongoing search, Bike Share Toronto has not been able to secure a title sponsor since. Vancouver, however, was able to secure a multi-year title sponsorship agreement with Shaw Communications (value was not disclosed).

- **Advertising:** Separate from a title sponsor, there is potential to place advertisements on physical assets, typically kiosks and stations. This revenue source tends to be relatively small. The North American Bikeshare Association 2016 Benchmarking Survey found that advertising amounted to just 2% of system revenue across 18 systems surveyed. Indego in Philadelphia assumed just $200 per month per station in advertising revenue in their business planning exercise.

- **Grants:** Additional revenue from private or public grants that are used on operating costs. Philadelphia's Indego receives 2% of operating revenues from private grants. The North American Bikeshare Association 2016 Benchmarking Survey found that grants amounted to 20% of system revenue across 18 systems surveyed. It should be noted that grants may not be consistent sources of funding.

- **Government Funding:** It is rare for shared micro-mobility to receive significant direct municipal funding from general tax revenues. Toronto receives some annual funding from city Council through non-tax-based sources such as the Public Realm Reserve. Philadelphia's Indego and Capital Bikeshare in Metro DC also receive occasional government funding from various funds dedicated to climate change, sustainable transportation, innovation, and similar initiatives but these tend not to be consistent sources year-to-year.

2.3.2 Capital Funds

Capital funding is typically paid for through government or private grants and other sources of government funding. For example, in Toronto, capital expansion has been funded through various governmental grants, plus contributions from Ontario Planning Act Section 37 and Section 45 reserves when matching is required. Additional capital funding for Toronto comes from the City's Public Realm Reserve and the Toronto Parking Authority Capital Reserve.

Sponsorship should be sought for Hamilton, but the City should be conservative in estimating how much funding could be obtained this way. Ongoing operating funding sources are city-specific, and Hamilton should develop its own potential sources based on the local context.

2.4 Expansion Approaches

Peer cities with contracted operations tend to focus on providing good coverage of micro-mobility vehicles throughout the city rather than focusing only on profitable neighbourhoods. However, they also include cycling propensity analysis or similar technique to judge whether residents of a neighbourhood are likely to use micro-mobility if it was deployed there, so the goal is not simply to distribute bikes and scooters everywhere in a city.

Toronto's most recent expansion, for example, extends further north outside the dense downtown core but in lower density suburban neighbourhoods in North York and Scarborough, staff have chosen to pilot smaller deployments of bikes to gauge response before investing heavily in suburban expansion.

Philadelphia and Toronto's contracts with their operators both allow for service expansion. Payment is per dock, so the operators will see a revenue increase if the service grows. Both cities also made their expansion plans clear during procurement, so the vendor had a chance to agree to the terms. In Portland and Philadelphia, the operator and sponsors are also directly investing in service improvements either by procuring more bikes or upgrading to e-bikes.

Funding for capital expansion is typically through government or donor grants, except in cases like Portland and Philadelphia where the operator sees a vested interest in paying for expansion.

Permit-based systems like Kelowna and Calgary are much more reliant on the operator's own initiative to expand. Some US cities like Los Angeles incentivize permit-based system expansion through reduced permit fees, while others allow fleet size increases if the operators reach certain vehicle distribution targets.

A robust data-driven approach to prioritizing expansion areas should be pursued, keeping in mind equity considerations and the desire to bring micro-mobility to all residents. Contracted operators should be paid either per vehicle or per dock to align their revenue expectations with expansion goals.

3 Assessment of Micro-mobility Operating Models

In the five years since Hamilton's bike share system launched, micro-mobility has grown to not only include bike sharing, but also scooter sharing and e-bike sharing. This growing micro-mobility industry has seen an influx of venture capital (VC)-backed companies with new service delivery models. Lime, Spin, and Bird, among others, launched self-funded micro-mobility programs that require no financial or operational input from cities, for better and worse. Uber and Lyft also acquired micro-mobility companies and integrated them into ride hailing platforms to become multi-modal operators.

Now that the Ministry of Transportation Ontario (MTO) has approved a 5-year pilot program for e-scooters, letting municipalities determine where they can operate through bylaws and permits, the micro-mobility market in cities like Hamilton has become potentially more attractive.

A key decision for the City of Hamilton's future shared mobility program will be to determine which operating and funding model is appropriate. The models largely fall into four groups:

- Exclusive for-profit operator contracted to the City;
- Exclusive non-profit operator contracted to the City;
- Non-exclusive permit-based for-profit operators; and
- Mix of non-exclusive permit-based for-profit operators and a contracted operator.

The **Mix of Non-Exclusive Permit-Based For-Profit Operators and Contracted Operator** is the preferred operating model utilizing a variety of funding sources to diversify and build support for micro-mobility and ensure for-profit operators are attracted to Hamilton.

This chapter describes the models, describes the factors used to assess the models, and recommends a preferred model for Hamilton.

3.1 Regulatory and Contractual Considerations

In this context, exclusive operator contracts are assumed to include penalties for early termination, fixed terms and options to renew, and a fixed periodic payment per vehicle, per dock, or per station to the operator. The operator is viewed as a paid service provider, giving municipal staff some control over key decisions such as expansion and level of service.

Unlike the exclusive contract arrangement, permitted operators typically pay the municipality for the right to operate on public property with fees usually set just high enough to cover expenses to the city in overseeing the program. Permits may also set aside funds to remove vehicles from public property if an operator leaves.

Regulations would need to be modified in two ways to allow non-exclusive models in Hamilton:

- A new bylaw to govern dockless e-scooter use on municipal streets would be needed given that most permit-based operators in the market use e-scooters; and
- A new permit or licence regime is needed to regulate the market.

Permits may include restrictions, penalties, and incentives to guide operations but since the operators would not be paid service providers to the city, municipal staff have limited control over decision-making and operators are usually free to leave without penalty.

Under the Ontario Municipal Act, the City of Hamilton can issue licences or permits. Licenses allow any qualified service provider that pays the appropriate fee to operate in the city, but they do not regulate how service is provided. Licences can be revoked for non-compliance with the terms and conditions, but staff would be limited in their ability to ensure orderly operations

without control over the number of operators, vehicles, or distribution. It is very uncommon for North American cities to issue micro-mobility licences.

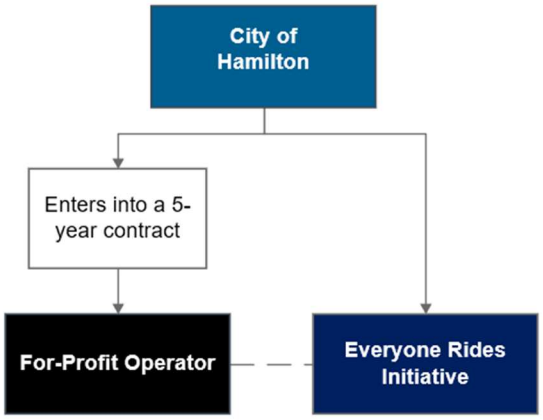
A permit allows municipalities to introduce regulations for services provided to the public and offers a way to articulate operating standards based on policy goals and limits on the number of operators, vehicles, and other characteristics. Permits can be revoked for non-compliance with terms and conditions. Most North American cities with non-exclusive micro-mobility services use permits. **This is the preferred option for Hamilton should it pursue a non-exclusive system.**

3.2 Operating Models Considered

3.2.1 Exclusive Contracted For-Profit Operator

Example Cities: Philadelphia, Toronto

Under this model, a new for-profit company enters into an exclusive agreement with the City of Hamilton to operate a micro-mobility service using the existing bikes and equipment, but with the opportunity to add to or upgrade that fleet over time. The ERI would be run independently either directly by City staff or under the current arrangement through Hamilton Bike Share Inc. (HBSI) and would be coordinated with the system operator.



Procurement would follow a standard RFP process and the city would pay the operator to provide the service (e.g. Toronto, Philadelphia, and Washington DC pay CAD$89, USD$125, and USD$99 monthly per dock respectively). Service expansion would be planned by the City and terms for operating the expanded service would be part of the contract. The City would be responsible for acquiring any new assets needed to serve an expanded service area, although in some cases operators have invested their own funds into expansion and upgrades (e.g. Lyft in Chicago, Portland, and Philadelphia).

A similar operating model was used from in Hamilton from the 2015 launch until Uber left in June 2020. The City of Hamilton contracted Social Bicycles LLC (later Jump then Uber) to manage operations on the City's behalf. However, that arrangement did not include payment to the operator, no data sharing agreement, and no penalty for early termination, which is an atypical arrangement in North America.

Stakeholder Consultation Comments

During this study's stakeholder consultation session on July 23rd, 2020, participants expressed that this model could bring VC funding and the experience of a large operator to the city, while transferring financial risk to the operator and providing a consistent user experience with potentially new vehicle types. However, they also cautioned that there may be less focus on social programming, less city control and lower incentives to improve service due to lack of competition. This arrangement is also vulnerable to a loss of VC funding and risk of revenues not being reinvested in Hamilton.

3.2.2 Exclusive Contracted Not-For-Profit Operator

Example Cities: Pittsburgh

This model would see a not-for-profit organization enter into an exclusive agreement with the City of Hamilton to operate a micro-mobility service using the city's bikes and stations. Hamilton Bike Share Inc. (HBSI) is the only not-for-profit that exists in Hamilton today with the skills, experience, and mandate to operate such a service. However, this does not preclude the City from pursuing an RFP and, at minimum, the City should pursue a Request for Expressions of Interest (RFEI) to ensure there are no other entities that could delivery high-quality service. This could take place immediately, or in two years after the renewal of the current contract ends. This would give City staff time to solidify funding sources and prepare both the RFEI and RFP—a process that typically takes at least a year.

Service expansion, capital funding, and operational funding would be the City's responsibility like the for-profit model on page 12 but administration of the ERI program would be with the operator.

The current interim operating model in Hamilton is similar to this arrangement. From July 2020 until February 2021 HBSI has an exclusive contract with the City to operate the service using existing bikes and equipment, but the contract does not include penalties, incentives, or financial support from the city.

Nice Ride Minnesota (NRM) is a not-for-profit that owns and operates the bike share in Minneapolis, MN under a 10-year exclusive agreement with the city effective in 2010. NRM's mission to pursue equity, reliability, and quality of service and its core belief that "bike sharing is a public good"[2] align with the city's broader transportation goals and ensure that the local community is deeply involved in decision making through their local not-for-profit. Operations are substantially funded through title sponsorship, which is common in the US but less so in Canada. NRM also receives capital funding from the Metropolitan Council, and state and federal grants. While NRM initially directly operated the service, it sub-contracted Motivate in 2018 while retaining its oversight role.

The NRM example shows that equity programs like Hamilton's ERI can be well integrated into this setup given a not-for-profit's intrinsic values, skill sets, and experience. In the case of Minneapolis, the City is also able to remove itself from virtually all operational decisions since NRM's mandate and values align with the City's direction.

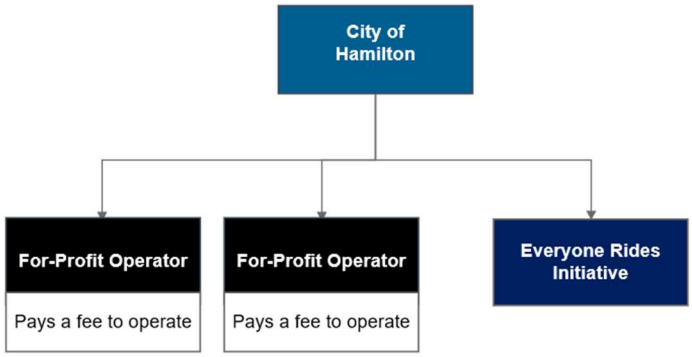
Stakeholder Consultation Comments

During this study's stakeholder consultation session on July 23rd, 2020, participants expressed that the benefits of a non-profit organization is that the organization is guided by a Board of Directors that is comprised of members of the community, provides a continuity of service, is committed to equity programming, and its revenues are invested back into the program. However, they noted that a variety of funding sources may be required to support the organization and it can be limited in the ability to introduce new technologies if there is not enough investment.

[2] Source: https://managesharedmobilitymn.org/

3.2.3 Non-Exclusive Permit-Based For-Profit Operators

Example Cities: Kelowna, Calgary, Edmonton



This model would see a permit process established to allow multiple for-profit companies (e.g. Spin, Lime) to operate micro-mobility services in Hamilton with their equipment. The City of Hamilton Licensing and Compliance Department has the staff and expertise to enforce the permits and Sustainable Mobility Staff in Transportation Planning have the expertise to operate the permit program. No RFP would be pursued in this case[3], which could simplify the process.

The city-owned bikes and stations would likely be retired under this model since for-profit permit-based operators tend to use their proprietary vehicle and app designs in competitive environments. There is no strong market for resale of public bike share equipment, so the City would need to pay to remove and safely dispose of or donate the equipment.

Funding and service expansion would be the responsibility of the operators, but the City would also relinquish most direct control over how services are delivered. This could result in frequent turnover of operators, no guarantees that operators would remain in the city, and no guarantees that operators would run service in the winter or operate bikes, which the City already owns. Many cities with permit-only regimes have faced these challenges.

The terms of the permits would set some service parameters like acceptable fleet sizes and incentives to expand (e.g. the right to expand fleet or discounted permit fee once targets are met). Funding to oversee the program would come from permit fees paid by the operators. Permit fees could be up to $75,000 per year either as a flat fee, per-device fee, per-trip fee, or a combination. Per-vehicle performance bonds and fees to relocate improperly parked vehicles are also common.

In this operating model, the Everyone Rides Initiative would be managed independently either by the City or through HBSI but coordinated with the multiple for-profit operators who would be required to contribute to the program's funding.

Stakeholder Consultation Comments

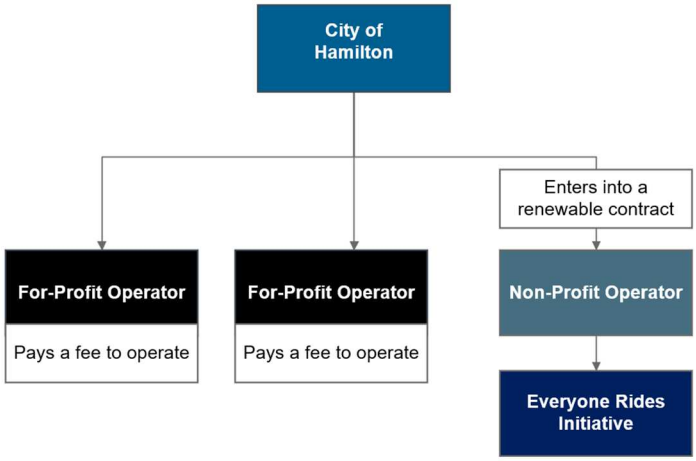
During this study's stakeholder consultation session on July 23rd, 2020, participants expressed that the City could use performance bonds to ensure service standards, expand faster with cheaper dockless technology, and competition in the market could drive innovation, increase service levels and lower prices for users. However, they noted that for-profit operators may choose to focus on profitable areas creating an inequitable service, users would have an inconsistent experience with multiple memberships, apps, etc., there may be overcrowding in the pubic right-of-way, and there less of a guarantee that the system will continue to operate as a transit service or continue to operate at all.

[3] Interviews with Toronto and Philadelphia city staff who recently completed RFPs for their bike share systems highlighted that there is very little market interest in bidding on non-exclusive operating contracts.

3.2.4 Mix of Non-Exclusive Permit-Based For-Profit Operators and a Contracted Operator

Example Cities: Minneapolis, Memphis, Washington DC, Portland

This model is common in US cities that, like Hamilton, had successful bike share systems before venture capital funded micro-mobility companies arrived, but where authorities also see benefits in having alternative technologies and business models to provide more choices. Washington DC's city-run Capital Bikeshare, for example, operates alongside up to 10,000 e-scooters run by four operators.



In Hamilton's case, an effective arrangement would draw on HBSI's skills, experience, and mandate as a contracted operator as described on page 13, potentially with some measure of exclusivity (e.g. only the contracted operator can use bikes), alongside a permit system that allows multiple for-profit companies to operate as described on page 14. This arrangement works well for NRM in Minneapolis where the bike share operates alongside Bird and Lyft e-scooters.

The existing equipment owned by the City would be operated by the not-for-profit organization and the City would provide capital and operating funding to the contracted operator. The not-for-profit organization would also run the ERI and coordinate with the for-profit operators as needed to administer that program. The for-profit permit-based operators would receive no funding from the City but would need to pay applicable permit fees to operate.

In this model, the for-profit operators could also pay an equity fee to the non-profit contracted operator in order to ensure equity programs are sustainable and ensure a broad range of residents from different incomes and backgrounds continue to have access to affordable and healthy modes of transportation. The equity fee provision also offsets the risk of for-profit operators shutting down their services.

Stakeholder Consultation Comments

During this study's stakeholder consultation session on July 23rd, 2020, participants expressed that having competition between operators could lead to lower prices and better services and this model maintains the existing infrastructure through a contracted operator. There is potential to collaborate between operators to retain an equity and community focus, if the contractor is a non-profit then revenues would be invested back into the service, and this model brings local and international operating experience together. However, they noted that this model bears the risk of the non-profit operator having to compete with for-profit companies, requires a variety of funding sources to support the non-profit operator, and may create additional overhead for the City to manage additional operators.

3.3 Assessment and Recommendation for Preferred Operating Model

Three themes with a total of 10 factors were developed in consultation with Hamilton staff to guide the assessment of the four operating models:

- **Risks to the City and Program** – Financial risk, the likelihood of losing operators, and similar challenges vary depending on the operating model selected.

  While liability risk is a consideration, the level of risk does not differentiate the different models, so it was excluded here. Based on advice from the City's Legal Services and Risk Management team who assessed the current bike share system[4], the City's risk of liability for tertiary claims arising from cyclist injury due to malfunctioning bike or injury on a municipal road due to infrastructure issues in using a third-party operator is similar or less than the risk of other city-owned infrastructure. Risk mitigation would require operators to have at least $5 million in liability insurance and would be specified in the contract and/or permit terms.

- **Supports City Goals for High and Consistent Quality of Service and Community Involvement** – The City places high value on equity, quality of services, and community engagement, which should all be reflected in the model.

- **Ease of Administration** – Models that require less overhead from Hamilton staff and can leverage existing local knowledge and resources are valued higher.

In the Assessment of Operating Models and Funding Sources Technical Memorandum in (Section 1.3), 10 factors that fall into these themes are described. Exhibit 3.1 shows the results of assessing the four models against these 10 factors. The results of a SWOT analysis evaluating the four operating models is also located in (Section 1.3.1).

[4] Liability risk assessment was documented in the Hamilton Staff Report to Council PW13015.

Exhibit 3.1: Assessment of Potential Operating Models

Factor	Operating Model			
	Contracted For-Profit	Contracted Not-For-Profit	Non-Exclusive Permitted For-Profits	Mix of Permitted and Contracted
Risks to City and Program				
Failure due to loss of operator	▲ Low risk due to service-provider contract with penalties for early termination.	▲ Low risk due to service-provider contract with penalties for early termination.	▼ High risk as permits do not oblige operators to stay and City would have no alternatives if they leave.	▲ Low risk due to service-provider contract with at least one operator with penalties for early termination.
Inability to secure an operator	▲ Low risk. Several for-profit contractors already operate with this model in Toronto, Washington DC, Portland.	▬ Medium risk. Only one local operator and there is less guarantee less guarantee that they have a sustainable funding if operational costs are not covered by City revenues or grants.	▬ Medium risk. Ottawa is the only Ontario city to pilot this model, although the largest micro-mobility companies have expressed interest in Hamilton.	▲ Low risk. Blended approach gives City more options to ensure that an operator can be secured.
Financial risk to the program	▲ Low risk. City would arrange funding through non-tax based sources and sponsorship.	▲ Low risk. City would arrange funding through non-tax based sources and sponsorship. Not-for-profit may also be eligible for grants.	▼ High risk. It is common for operators to leave cities after a one or two years to find more profitable areas.	▲ Low risk. Blended approach combines City funding with potential VC-backed operators.
Supports City Goals for High and Consistent Quality of Service and Community Involvement				
Supports a consistent user experience throughout the City	▲ Most consistent since a single operator works toward specific contract terms.	▲ Most consistent since a single operator works toward specific contract terms.	▼ Little consistency is ensured since operators set their own standards within broad guidelines.	▬ Contracted operator sets a standard/example for permitted operators but consistency still varies.
Allows greater direct City influence on decision-making regarding operations and service expansion.	▲ City has high influence as the client in a service-provider relationship with operator.	▲ City has high influence as the client in a service-provider relationship with operator.	▼ City has some influence through permit terms but little direct control.	▲ City has high influence as the client in a service-provider relationship with operator.

Factor	Operating Model			
	Contracted For-Profit	**Contracted Not-For-Profit**	**Non-Exclusive Permitted For-Profits**	**Mix of Permitted and Contracted**
Supports City's 2016 – 2025 Strategic Plan Priority of "Community Engagement and Participation"	— Some engagement as City could require community participation in planning/running the service through contract.	▲ High engagement and participation possible since not-for-profit is run by members of the community.	▼ Low engagement and participation as operators typically only accountable to private sector interests.	▲ Potentially high engagement and participation if a local not-for-profit run by members of the community is the contracted operator.
Encourages regular technology and process improvements that increase efficiency and/or quality of service	— Large for-profits could bring cost-saving improvements from other cities but fixed contract may lower incentive to do so.	▼ May be less able to invest in improvements that have high up-front costs.	▲ Highly motivated in a competitive environment to use the most efficient technologies and processes.	▲ Competitive environment could drive improvement. A contracted not-for-profit may not be able to invest to keep pace.
Ease of System Administration				
Supports re-use of local institutional knowledge developed over 5-years of SoBi Hamilton	▼ Unlikely that any for-profit operator with local expertise would be secured.	▲ HBSI has operated the current system since launch and has the most institutional knowledge.	▼ Unlikely that any for-profit operator with local expertise would be included.	▲ Could leverage HBSI's institutional knowledge through direct contract.
Level of city staff involvement required to manage program	▲ Low. Experience in other cities suggests less than 1 FTE to manage contract.	▲ Low. Experience in other cities suggests less than 1 FTE to manage contract.	▲ Low as City is not a manager, but enforcement of permit rules required.	— Existing staffing levels would be required to manage both the contractor and the permitted operators.
Ease of integration with other modes of transportation to support a potential future Mobility as a Service platform	▲ Easy integration as only one operator is involved, and contract can require integration.	— Only one operator is involved. Not-for-profit may be less able to invest in technology upgrades to integrate.	▼ Difficult as many operators may need to be integrated and City provides no funding for integration.	— Contract can require integration. Permitted operators may be harder to integrate.

3.4 Preferred Operating Model for Hamilton

On balance, the **Mix of Non-Exclusive Permit-Based For-Profit Operators and Contracted Operator** model is preferred for a mid-sized city with an existing bike share system and equity program like Hamilton. To continue the operation of one of the most successful micro-mobility equity programs in North America and to provide a continuity of service as the permit process is created, it is preferred to extend the existing operations contract with HBSI through the two-year contract extension mechanism built into the existing contract. This option staggers the City's risk and workload, allowing it to develop a robust permit program now and work with HBSI over the next 2 years to determine the next steps for a procurement in 2023.

It should also be noted that HBSI exists for the sole purpose of operating bike share and over the 2-year analysis period, the City has options to sell the entire system to HBSI or merge HBSI as an agency of the City similar to other entities like a parking or conservation authority, a trust or an independent body with Council representation on its board. Contracting HBSI allows the City to leverage skills and experience of a competent local operator that is dedicated to operating equitable micro-mobility in Hamilton and is familiar with the needs of the residents. Should the City of Hamilton extend HBSI existing contract, the contract should stipulate that HBSI share anonymous collected data on system performance and financial statements with the City of Hamilton.

There is a risk that the permit-based operators require high levels of enforcement to maintain order on public rights of way, but also has the added burden of overseeing two parallel micro-mobility programs. Calgary, Edmonton, and Ottawa, having already launched permit-based programs, will be able to offer specific guidance to Hamilton on how best to structure a permit program to minimize these risks.

Since the preferred model requires municipal funding, the City will need to identify and secure suitable ongoing operational funds for the contracted portion of the model. Funding sources available to Hamilton are discussed in Chapter 5.

3.4.1 Contract/Permit Considerations

Under the preferred operating model, some key operating considerations should be included in both the direct contract and, to the extent possible, in the permits granted to permitted operators. These allow the City of Hamilton to ensure that operators are providing the necessary level of service*:*

- **Rebalancing requirements:** Rebalancing vehicles to ensure an adequate number of vehicles are available across the system. For example, Capital Bikeshare sets a service standard that no station may remain full or empty for more than 3 hours between 6 a.m. and midnight. Staff may fill or empty stations late at night in anticipation of rush hour demand. The rebalancing standards have a direct relationship to the cost of operations. A strict rebalancing standard would increase operations costs and vice versa.
- **Fleet Deployment:** At any given time, a percentage of the system's fleet will be out of service due to maintenance. Deployment standards determine what proportion of the fleet must be in active at any one time. Requirements may be reduced in the winter due to lower demand and fleet management strategies.
- **Inspection and Maintenance:** Agreements should stipulate how often vehicles and stations are inspected. Capital Bikeshare requires that vehicles are inspected and maintained at least every 30 days. Maintenance schedules may vary depending on the intensity of use in the program.

- **Customer Service Standards:** Contracts should stipulate quality of service standards including call centre wait times and customer service satisfaction ratings. Standards may stipulate that telephone operators are available in more than one language to if required by City of Hamilton standards.
- **Support for ERI:** Permitted operators should be required to offer a discounted option to support low income residents or accept payment media that ERI may provide directly to users. Permitted operators should also be required to support a defined number of ERI's outreach initiatives per year. They should also pay an equity fee to the ERI program to mitigate the increased costs of running an equity program that covers multiple operators, vehicle types, and service delivery approaches

4 Business Case for Shared Micro-Mobility

A business case analysis was conducted to assess the feasibility of public shared micro-mobility in Hamilton. The approach follows Metrolinx's April 2019 *Business Case Manual Volume 2: Guidance,* which is an accepted GTHA framework that is regularly used to assess other transportation initiatives in the region. It consists of four cases as follows:

Economic –The economic case answers the question "what is the investment's overall value to Hamilton society" using standard economic analysis factors and techniques tailored to the GTHA context.

Financial – The financial case answers the question "how much will the investment cost the City of Hamilton" using standard accounting and financial analysis principles within the GTHA context.

Strategic – The solution should advance the City's mission "To provide high quality cost conscious public services that contribute to a healthy, safe and prosperous community, in a sustainable manner." Specifically, it should align with the priorities of Community Engagement, Healthy & Safe Communities, Clean & Green, and support Built Environment & Infrastructure through supporting multimodal transportation.

Deliverability – This perspective considers the question "what is required to deliver and operate the investment", focusing on whether Hamilton has the resources and skills to implement the proposed solution.

The base case scenario for comparison is the "do nothing" option where the current bike share operation would end in February 2021 without a replacement and the equipment discarded. A five-year horizon is used, which is short by transportation investment standards, but aligns with typical contract durations for shared micro-mobility operations in North America.

The analysis also focuses on the contracted operation, recognizing that this is where the City will be making the most investment of both money and staff time. The permit-based part of the solution is self-funded with no net financial impact to the City and very low "deliverability" responsibilities to the City beyond setting up the permit program.

Present value of the net incremental financial costs over the five-year period compared to the base case amount to **$3.5M**, which includes $875,000 in fare revenues. The economic analysis shows a **benefit-cost ratio (BCR) of 1.22 and a net present value of $951,000**, plus some unmonetized Mobility, Equity and Road Safety benefits.

The rest of this chapter details the complete business case analysis.

4.1 Covid-19 Impact on Ridership

Statistics on the direct impact of the Covid-19 pandemic on bike share ridership in Hamilton were not available for this study. However, figures made public by Capital Bikeshare (Washington DC), NYC Citibike (New York City), and Santander Cycles (London UK) show that June 2020 ridership has rebounded to 61%, 89%, and 96% of June 2019 levels. Anecdotally,

media reports also suggest that cycling has seen a boom in many US and European cities during the pandemic[5] as businesses re-open but people continue to avoid crowded public transit.

For this analysis, it is therefore assumed that Hamilton's bike share ridership will rebound to at least 2019 levels by the end of 2020.

4.2 Economic Case

In the base case, the only cost to the City would be storage and disposal (through donations and/or recycling) of the existing assets when the contract ends in 2021. Media reports of confidential Council meetings held in May 2020 indicated that this could cost about $130,000[6].

4.2.1 Capital Costs

These costs are those associated with replacing bike parts and bikes that are damaged beyond repair or that have reached end of life, but do not include costs of expanding the existing service (see Chapter 6). To date, Hamilton has not replaced any of its bikes so 750 bikes in the fleet are over five years old[7]. The Institute for Transportation and Development Policy (ITDP) suggests in its 2018 *Bikeshare Planning Guide* that shared bikes typically have lifespans of three to five years. In its 2018 business plan, Philadelphia's Indego program estimated a maximum lifespan of 10 years with the bulk of replacements happening after seven years of operations.

In the Hamilton case, it is assumed that 15%, 50%, and 35% of the fleet will have to be replaced in years seven, eight, and nine of operations respectively at a cost of $2,000 per unit[8]. Obsolescence of the bikes' electronic components may be the main driver of bikes in Hamilton reaching end of life since they are "smart bikes".

Stations tend to have longer lifespans than bikes, particularly those in "smart bike" systems like Hamilton's where most of the technology is on the bike rather than the station. Washington DC's 2020 capital plan anticipates that only 10% of stations need to be replaced within 10 years while Philadelphia's capital plan projects that only 15% of stations would be replaced in that time (both systems use "smart hubs" rather than "smart bikes"). Furthermore, in 2020 all stations in Hamilton were refurbished and galvanized. Station replacement costs are therefore excluded from this forecast. Exhibit 4.1 shows the capital cost projection to maintain the current fleet of 825 bikes and shows a discounted present value of just under $1.5M.

Exhibit 4.1: Projected Capital Costs of System, 2021-2025

Year of Expenditure	2021	2022	2023	2024	2025	TOTAL
Bikes Acquired	0	113	375	274	38	**800**
Capital Cost (Real Dollars)	$0	$225,000	$750,000	$547,500	$75,000	**$1,597,500**
Discounted Present Value	$0	$210,000	$700,000	$511,000	$70,000	**$1,491,000**

Note: A discount rate of 3.5% annually is used, consistent with Metrolinx's business case guidance.

4.2.2 Operating Costs

Operating costs make up a greater share of the costs. In 2020, these include rebalancing, maintenance and repairs totalling $390,000; website and app development, insurance, facility

[5] The Economist. (May 31, 2020). How lockdown converted the world to cycling, and the speedbumps that lie ahead. (2020, May 31). Retrieved August 24, 2020, from https://www.economist.com/international/2020/05/31/how-lockdown-converted-the-world-to-cycling-and-the-speedbumps-that-lie-ahead
[6] Van Dongen, M. (May 28, 2020). Taxpayers face $130,000 bill to 'mothball' Hamilton's popular bike share. *The Hamilton Spectator*, Retrieved from https://www.thespec.com/
[7] Another 75 bikes were purchased in 2017 so a small subset of the fleet is only three years old.
[8] Costs pertain to conventional bikes. Recent 2020 estimates for e-bikes for Washington's Capital Bikeshare were CAD$3,200 each, plus additional operational costs.

leasing and utilities, and administration totalling $143,500; and, unique to “smart bikes”, bike connectivity fees which are paid per device totalling $111,000. Exhibit 4.2 shows the total 5-year costs and the discounted present value.

Exhibit 4.2: Projected Operating Costs of System, 2021-2025

Year of Expenditure	2021-2025 Costs
Maintenance, Rebalancing	$1,950,000
Insurance, Administration	$717,500
Bike Connectivity	$555,000
Total Operating Cost	$3,222,500
Discounted Present Value	$2,910,000

Note: A discount rate of 3.5% annually is used, consistent with Metrolinx’s business case guidance.

4.2.3 Benefits

For this analysis, the monetized benefits of shared micro-mobility are categorized as:

- **Auto operating cost savings** – the reduction in indirect costs of vehicle ownership such as depreciation and insurance;
- **GHG emissions reduction** – the reduction of carbon dioxide and other emissions;
- **Local air quality improvement** – the reduction of toxic gasses such as nitrous oxides, carbon monoxide, and fine particles;
- **Travel time savings** – the reduction in travel time, including time spent waiting (e.g. waiting at a transit stop);
- **Traffic congestion reduction** – a result of having fewer autos on the road; and
- **Cycling and walking health benefit** – the active nature of walking and cycling improves the health of users.

These benefits are monetized using the factors in Metrolinx’s Business Case Guidance, which allow direct conversion of VKT changes into dollar amounts.

In addition to these monetizable benefits for which the guidance provides conversion factors, the Economic Uplift and Recreational benefit and the Mobility, Equity, and Road Safety benefits of shared micro-mobility are more difficult to quantify and monetize. These are discussed further in the next sub-sections.

Economic Uplift and Recreational Benefit

Some communities have seen economic benefits to retail businesses of cycling infrastructure and programs operating close to those businesses. Recent studies of the Bloor Street Bikeway in Toronto[9] showed that cyclists spent more and visited nearby businesses more often after the bike way was installed and more cycling trips could be safely made.

While similar studies have yet to be done to quantify the economic uplift that cyclists bring to retail businesses in Hamilton, the observations in nearby Toronto suggest that there is some additional economic benefit to local Business Improvement Areas.

From a recreational perspective, a significant portion of Hamilton’s bike share ridership occurs on weekends indicating that thousands of trips a year are also made to enjoy the city’s parks, green spaces, attractions, and other non-work and non-school destinations. There is a benefit to

[9] City of Toronto. November, 2019. *Bikeways and Business on Bloor Street: Research Summary.*

residents of having a reliable, affordable way to enjoy the amenities of the city, which shows as an improvement in quality of life.

Economic uplift and recreational benefits are difficult to quantify and monetize. For this study, these are assumed to be worth 20% of the more easily quantified VKT-based benefits.

Mobility and Equity Benefit

Mobility, Equity, and Road Safety benefits are also difficult to quantify and monetize in this context but together they provide additional support for the case for shared micro-mobility.

There are some neighbourhoods in Hamilton where it may be difficult to provide cost-effective fixed-route transit to improve mobility of residents. In some cases, buses may not come frequently enough to satisfy residents desire to make short trips around the neighbourhood while in other cases, residents may simply live too far away from the route they want to take. For residents who do not have the choice to use a car, this challenge finding public mobility options is a potential equity concern as they may be excluded from some activities and opportunities that other Hamiltonians have access to.

Shared micro-mobility can help fill this gap by offering a reliable first and last mile connection to transit where the route residents want to take is beyond walking distance. It also provides a viable option for those residents who would have foregone the trip altogether given the mobility challenges they face. HBSI has also recently tested offering shared tricycles for those residents who find it difficult to ride a bicycle, further expanding equitable travel choices.

Road Safety Benefit

The Metrolinx guidance indicates that road safety benefits are generated as users switch from auto due to having fewer cars on the road. This finding is supported by a February 2020 report by the Organization for Economic Cooperation and Development's International Transport Forum (OECD-ITF) that noted "*a trip by car or by motorcycle in a dense urban area is more likely to result in a traffic fatality than a trip by micro-vehicle…*"[10]. In addition, the concept of "safety in numbers" based on observations that cities with high bike mode shares see fewer road deaths, suggests that shared micro-mobility in Hamilton could make streets safer.

However, Ontario's *Preliminary 2019 Road Safety Annual Report* shows that, on an absolute basis, the proportion of cyclist-involves crashes that result in major injury or death is over twice as high as the proportion of auto crashes that result major injury or death.

These findings indicate that it is still unclear how best to quantify the potential road safety impact of shifting people from driving to micro-mobility even though this benefit may exist.

Estimation of Modal Shift and Impact on VKT

Surveys of shared micro-mobility users in Hamilton[11], Montreal[12], Calgary[13], and Portland[14] show that the degree to which drivers, transit users, and people who ride their own bikes shift to shared micro-mobility varies. Most shared micro-mobility riders typically come from transit and walking modes, although 10-35% of riders come from the auto-driver mode.

[10] OECD-ITF. February 2020. *Safe Micro-mobility*. p20. Retrieved from https://www.itf-oecd.org/sites/default/files/docs/safe-micro-mobility_1.pdf
[11] Civicplan. 2018. *SoBi Hamilton Member Survey, 2018.*
[12] Fuller, D., Gauvin, L., Kestens, Y., Morency, P., & Drouin, L. (2013). The potential modal shift and health benefits of implementing a public bicycle share program in Montreal, Canada. *International Journal of Behavioral Nutrition and Physical Activity*, 10(1), 66. doi:10.1186/1479-5868-10-66
[13] City of Calgary. January 2020. *Electric Scooter Share Pilot – Stakeholder Report*.
[14] Portland Bureau of Transportation. 2019. *2018 E-Scooter Findings Report*.

Based on these surveys, the assumed modal shifts applicable to Hamilton are:

- Trips previously made by auto-driver mode would account for 25% of shard micro-mobility trips;
- Trips previously made by transit account for 30% of shard micro-mobility trips;
- Trips previously made by walking account for 30% of shard micro-mobility trips; and
- The remainder of the shared micro-mobility trips, 15%, would come from cyclists who choose the shared mode over using their own bikes.

HBSI reports that in 2018 some 366,600 trips were taken on bike share, roughly 8% of all bike trips in the city. Based on the 2016 Transportation Tomorrow Survey (TTS), the average cycling trip in Hamilton is 3.4 km long. Walking trips tend to be shorter, averaging 1.3 km according to TTS so every walking trip diverted to shared micro-mobility would be shorter than the average bike trip in Hamilton. Other key assumptions made include:

- Every bike share trip includes an average 580 m of walking[15]—half of that to access shared micro-mobility and half to walk to the destination;
- TTS indicates that transit trips on HSR include about 650 m of walking to and from bus stops, so every transit trip diverted reduces walking;
- Trips made with personal bikes are assumed not to include any walking so every personal bike trip diverted adds some walking as described in the first bullet above;
- Rebalancing shared micro-mobility devices is usually done by truck and these vehicles are assumed add 64 auto VKT a day moving devices around; and
- Auto-driver trips are assumed not to include any walking so every auto-driver trip diverted also adds an element of walking.

Exhibit 4.3 summarizes the changes in distances for the auto-driver, walking, and cycling.

Exhibit 4.3: Changes in Total Distance Travelled by Mode over 2021-2025 Analysis Period

	Change in kms Travelled
Auto Distance Change	**-1,350,100**
Drivers switching to micro-mobility	-1,469,800
Rebalancing trucks	119,600
Walking Distance Change	**6,900**
Walkers switching to micro-mobility	-386,000
Transit users switching to micro-mobility	-10,400
Bike owners switching to shared micro-mobility	151,100
Drivers walking to micro-mobility	252,000
Cycling Distance Change	**3,619,000**
Walkers switching to micro-mobility	386,000
Transit users switching to micro-mobility	1,763,600
Drivers switching to micro-mobility	1,469,800

Note: Bike share trips are assumed to grow at the same rate as population growth, about 1.18% annually consistent with Ontario Ministry of Finance forecasts for Hamilton.

[15] Based on current station spacing of 300-400 m, although the distribution is not even throughout the service area.

Travel Time Savings

Cycling in Hamilton is faster than walking and transit, but slower than driving. Average cycling speeds in the GTHA tend to be around 14 kph while average walking speed is about 5.3 kph[16]. The average transit travel speed is taken to be 12.4 kph, which considers the Canadian Urban Transit Association (CUTA) reported average Hamilton Street Railway (HSR) speed of 18.1 kph, as well as a typical wait time of just over 11 minutes based on upcoming Fall 2020 schedules. Since each minute waiting feels more onerous to users than a minute spent travelling, that wait time is multiplied by 2.5 to arrive at the final travel time[17].

While all drivers do not see a travel time benefit, the 25% of drivers estimated to switch to micro-mobility are likely those who do experience some time savings, likely because they would otherwise have to drive in congested downtown conditions. The "Rule of Half" is applied here, recognizing that all users will not realize 100% of the travel time savings and only half the total travel time saved is counted. This brings the total travel time saved by switching to bike share to just over 10,000 hours per year.

Monetization of Benefits

Exhibit 4.4 shows the total benefits estimated. The quickly falling prices of e-bikes could allow transition of some of the fleet to e-bikes in the coming years with no increase in costs. However, the lower effort to pedal would reduce the cycling health benefit. To account for this potential, the cycling health benefit has been discounted 50% here.

Exhibit 4.4: Monetized economic benefits of shared micro-mobility

Benefit	Present Value (2020 $)
Benefits of Auto VKT Change	**$277,000**
Auto Operating Cost Savings	$122,000
GHG Emissions Savings	$13,500
Local Air Quality Savings	$2,500
Congestion Improvement Benefit	$139,000
Travel Time Savings+	**$876,500**
Walking Health Benefit	**$27,000**
Cycling Health Benefit (Discounted 50%)	**$3,171,500**
Sub-Total	$4,352,000
Economic Uplift and Recreational Benefit	20%
TOTAL BENEFITS	**$5,222,000**

Notes:
+Travel time savings are subject to the "Rule of Half", which only counts half the travel time saved because not all users are expected to realize 100% of the travel time savings.
Discount rate of 3.5% annually and all monetization rates are based on Metrolinx's business case guidance.

Just over 40% of the increase in cycling VKT, which represents most of the benefits, is due to auto-driver trip diversion. Diversion from transit represents about 50% of increased cycling VKT. While this cannibalization of another sustainable mode is not desirable, it only represents about 0.5% of annual HSR ridership while generating significant health benefits for those users who choose to switch modes.

[16] Based on Metrolinx Business Case Guidance
[17] Metrolinx Business Case Guidance suggests a weight of 2.5 for transit wait times.

4.2.4 Summary of Benefit-Cost Ratio

Two economic indicators are used to assess the economic case: benefit-cost ratio (BCR) and net present value (NPV). BCR is the total benefits divided by the total incremental costs. The BCR for continuing bike share service is 1.22. NPV takes the difference between the total benefits and incremental costs. The NPV for continuing bike share service is $951,000. The costs and benefits are summarized in Exhibit 4.5.

Note that this BCR does not account for Mobility, Equity, and Road Safety benefits.

Exhibit 4.5: Economic Cost-Benefit Comparison

Benefit	Present Value (2020 $)
Total Incremental Costs	**$4,271,000**
Capital Costs	$1,491,000
Operating Costs	$2,910,000
Cost of Base Case	-$130,000
Total Benefits	**$5,222,000**
Benefit-Cost Ratio	**1.22**
Net Present Value	**$951,000**

4.3 Financial Case

Costs and revenues in the financial analysis include a 2% annual inflation to real dollar values and a 5.5% annual discount rate, which differs from the economic case, consistent with the Metrolinx guidance. The financial case also considers fare revenues.

Based on 2020 revenue estimates made by HBSI, the current bike share system will be able to cover 29% of its operating costs through fare revenue, which is estimated to be $187,000 in 2020. The present value of net incremental costs over the base case amount to $3.5M over the five-year period. These costs are detailed in Exhibit 4.6.

Exhibit 4.6: Present Value (PV) of costs and revenues of the system, 2021-2025

Year of Expenditure	2021	2022	2023	2024	2025	TOTAL
Costs						
PV of Capital Costs	$0	$210,319	$677,804	$478,382	$63,358	**$1,429,863**
PV Operating Costs	$635,500	$626,500	$618,500	$609,500	$601,000	**$3,091,000**
Revenues						
PV of Fare Revenue*	$183,000	$178,500	$175,000	$171,000	$167,500	**$875,000**
Net Incremental Cost						
PV of Net Cost over Base Case	**$322,500⁺**	**$658,319**	**$1,121,304**	**$916,882**	**$496,858**	**$3,515,863**

Notes: Ridership assumed to grow at 1.18% per year, in line with Ontario Ministry of Finance population growth forecasts.
⁺2021 net incremental costs include $130,000 in bike storage/discard fees for the base case.
*Fare revenue based on information provided by HBSI and consider to be a conservative estimate based on current pricing.

4.4 Strategic Case

The proposed shared micro-mobility program, which includes a contracted operation directly managed by the City and a vendor-led permit-based system, advances the City's mission and its strategic priorities. Specifically:

- **Community Engagement:** HBSI, the current operator and future operator if the current contract is renewed, is a local not-for-profit whose directors and staff are drawn from within the community. Hamiltonians are deeply engaged in every aspect of running that operation as well as its equity program, the ERI;
- **Healthy & Safe Communities:** The health benefits of leading active lifestyles are clear and incorporating more cycling and walking to/from shared bikes and micro-mobility devices is an important way for more Hamiltonians to increase their activity levels. A public, shared micro-mobility system brings this opportunity to more residents across the city, particularly as the system expands into communities currently dominated by car travel;
- **Clean & Green:** The reduction in GHG emissions and improved local air quality are important impacts of shared micro-mobility as people choose bikes, scooters, and other devices over driving. While most micro-mobility users will shift from transit, walking, and using their own bikes, the estimated 25% of riders who will switch from driving will have a positive impact on the City's environmental goals; and
- **Built Environment & Infrastructure:** Achieving the City's multi-modal transportation goals, namely reducing dependence on single-occupant vehicles, depends on promoting, supporting, and prioritizing sustainable alternatives like micro-mobility. For the 230,000 daily car trips[18] in Hamilton that are less than 5 km long, shared micro-mobility may be an affordable, reliable alternative to driving.

4.5 Deliverability

Hamilton is well prepared to oversee the delivery and operation of shared micro-mobility. The city was an early adopter of bike share with its 2015 launch of the current system and today it remains the only city in the GTHA besides Toronto to have a shared micro-mobility system. City staff have therefore developed internal skills, processes, and knowledge to procure and manage the contracted shared micro-mobility program recommended by this study.

The existing bike share operator contract, which was taken over by HBSI and extends until February 2021, already makes provision for a 2-year renewal if the City and HBSI are both satisfied with the system's performance. HBSI, as the long-standing operator, has the skills and experience to operate the current system under contract, and their role managing the ERI program relieves the City of direct responsibility for administering the equity program.

The City of Hamilton is capable and well prepared to oversee the delivery and operations of the proposed shared micro-mobility program.

[18] Based on 2016 Transportation Tomorrow Survey, auto driver trips only.

5 Potential Funding Sources

The costs of running the recommended shared micro-mobility model can be grouped as follows:

- City staff time to oversee both the contractor and the permitted operators;
- Funding to process permit applications and enforce the permit rules through actions like removing abandoned vehicles from the public rights of way;
- Operating funds (net of revenues) to pay the operator for maintenance, rebalancing, etc.; and
- Periodic capital investment to replace old equipment, or to expand the system;

The first two costs are already largely covered by the City's existing budget allocations. The City already has staff that allocate a portion of their time to oversee the current bike share system, and the City of Hamilton Licensing and By-law Enforcement Division has the skills and resources to process and enforce permits. The new responsibilities of the licensing department would be funded through a permit application fee and fees for each enforcement action (fees would be determined by the licensing department on a cost recovery basis). The relationship with the permitted operators and the overall operation of the program would be through the Sustainable Mobility Program Manager which would be responsible for overall program policy, fee collection and distribution.

To ensure the financial sustainability of the base bike share system and equity program, it is estimated that around $450,000 per year would be required. Potential non-levy revenue sources that could be explored include revenues from parking, sponsorship, advertising, donations, and gas taxes.

This chapter describes different funding sources, estimates potential funding amounts and provides a preferred the factors used to assess the models, and recommends a preferred model for Hamilton.

5.1 Operating Costs to be Funded

Ongoing operations and capital investment would be new costs that need to be funded through new sources. Operating funds are harder to secure so this discussion focuses on operating funding sources. Estimates in Chapter 4 indicate that the present value of net operating costs in 2021 will be about $452,500 after user fees are considered.

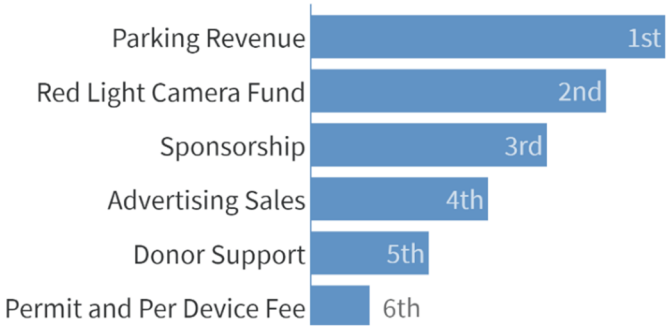
The funding sources available for micro-mobility in Hamilton include government sources, sponsorship and advertising, private donations and grants, and permit fees and the remainder of this section describes each of those sources.

It is recommended that the City prioritize securing red-light camera funds, parking revenue through small parking fine increases, Gas Tax funding, and station sponsorship.

5.2 Stakeholder Consultation Feedback

During the stakeholder consultation session, participants ranked potential funding sources for the City of Hamilton to investigate. Exhibit 5.1 shows the results of this activity below and highlight that stakeholders prioritized non-tax based municipal funding sources. These were thought to be stable funding sources and present the least amount of risk.

Exhibit 5.1: Stakeholder Ranking of Potential Revenue Sources



5.3 Government Funding Sources

Parking revenue, fines collected from red light cameras, and Ontario's Gas Tax Fund for Public Transit are potential stable government funding sources that could support micro-mobility. Municipal revenues are not meant to cover the full cost of the full bike share program. They provide a portion of the funding that covers the bare minimum cost. The operator will be responsible for collecting user fees, sponsorships and advertising to provide additional levels of service and replacement of parts.

5.3.1 Municipal Parking Revenue

The City of Hamilton collects revenue from parking lots, street parking, parking permits, and tickets. Revenue offsets direct operating costs of the parking program, and net revenues are directed to a reserve fund for future capital works or are otherwise allocated by Council.

Interviews conducted with the Managers of Parking Operations and Parking Enforcement revealed that parking tends not to generate enough profits to directly fund micro-mobility at the current rates (rates were increased in March 2020).

A previous analysis conducted by the City of Hamilton determined that a $10 per month increase for monthly parking permits would generate a net annual increase in revenue of $306,000 based on 2,550 monthly permits issued[19]. Higher rates could be levied in 2021 to support the bike share operations. Staff have the delegated authority to adjust parking rates in off-street lots.

The rationale for funding bike share operations from increases in monthly parking fees is to tie the programs together in terms of commuters. Bike share, along with public transit, creates new options for commuters and encourages them to use travel modes other than single occupant vehicles to get to work. A small increase in monthly parking fees that is used to partially fund the bike share program helps to offset the impact of daily commuter parking on the City's roads and congestion, and reduces the need to build more parking garages.

The City also has the option to increase parking fines. A $1 average increase, for example, could generate about $240,000.

It is recommended that the City of Hamilton conduct further research to determine the feasibility of using municipal parking revenue to fund micro-mobility operations. Staff should also seek clarity from Council and other City governments as to past precedence for using municipal parking revenue to fund operations of transit and shared mobility programs.

[19] City of Hamilton. November 19, 2019. *Parking Fee Review*. https://pub-hamilton.escribemeetings.com/filestream.ashx?DocumentId=212061

5.3.2 Red Light Camera Revenue

The City of Hamilton collects $260 for each red-light camera ticket issued, and net funds collected are directed to a road safety improvement reserve. In 2019, nearly 22,000 red light camera tickets were issued in the city[20]. Reserve funds have been used for a range of neighbourhood liveability, walkability, and safety initiatives. As levels of cycling increase, injury and fatalities have been shown to decrease. This effect is known as "safety in numbers" and is seen when comparing cyclist fatalities in countries that have high overall rates of cycling with countries with lower rates of cycling. Based on Transportation Tomorrow Survey and Hamilton Bike Share statistics, shared micro-mobility in Hamilton accounts for about 8% of bike trips, giving it a notable impact on the number of cyclists on the streets.

It is recommended that the City of Hamilton further investigate the use of a small portion of red-light camera revenue collected by the City of Hamilton to fund micro-mobility. Staff will need to seek clarity from City Council and work with the City's red-light camera team to ensure this is a viable option. Staff should also consult with other municipalities that allocate red-light camera funds to innovative, high-impact projects.

5.3.3 Gas Tax Funding

In the 2019-2020 year, Hamilton received $11.4M in Gas Tax funding for public transit from the Province. This funding can be spent on either capital or operating expenses of the transit system, including projects that increase transit ridership. To justify tapping into this funding source, the City would need to shape the future program so that it directly contributes to transit ridership. Staff will need to seek clarity from Provincial and Federal sources as to the intended use of the funds, and obtain clarification from City Council on using these funds for shared micro-mobility.

While data on bike-to-bus transfers in Hamilton are not available, the future system could be better integrated with HSR both physically with bike parking and stations at bus stops, and through fare integration that offers discounts to encourage those transfers. Promotional campaigns that encourage using micro-mobility as a first and last mile connection to HSR would also support these transfers.

Further discussion with HSR and City staff is required to detail any by-law or organizational changes that would be needed to justify allocating a portion of Gas Tax funds to micro-mobility (e.g. would the micro-mobility program need to be brought under the control of HSR to be eligible for funding, and what data reporting requirements would need to be met).

It is recommended that the City continue to investigate the use of a small portion of gas tax revenue to fund bike share operations. While this could be challenging since there is little precedent in Ontario, it should not be seen as a barrier. There is a demonstrated need for and strong benefit of transit and transit-supportive initiatives, so innovative ways to boost transit ridership should not be ignored.

5.4 Sponsorship and Advertising

5.4.1 Sponsorship

A micro-mobility sponsorship is an arrangement with a private company for a fixed amount of money that can be used for operations or capital purchases. There are different levels of sponsorship such as a title sponsor (highest investment covering entire system) or a station sponsor (limited to single or small subset of stations). A title sponsor typically reserves naming rights for the bikeshare system.

Based on previous experience and interviews with experts in the sponsorship field who have worked with Montreal, there is limited interest in major title sponsorship from a private organization in Hamilton. Station sponsorship may be more practical, and Hamilton bike share had a sponsorship program that offered station and bike sponsorship in the past. This could include local Business Improvement Areas (BIAs) and post-secondary institutions sponsoring stations near them.

In June 2020, a variety of sponsors contributed $100,000 to ensure the continuity of bike share, but this was an unusual year. **It is recommended that the City seek at least $60,000 annually in targeted station sponsorship revenue.** The City and its operator should also continue to work with 3rd party firms, the City's revenue generation office and local companies to develop a made-in-Hamilton sponsorship program that contributes a minimum of $500 per bike per year.

5.4.2 Advertising

Advertising enables companies offering products or services to display ads on the micro-mobility equipment (e.g. on bike baskets, on station infrastructure). Advertising requires an arrangement with a private company for a fixed amount of money that can be used for operations or capital purchases. Revenue can be earned by selling advertising at stations or on bicycles under different terms than a sponsor agreement. Advertising is typically a shorter agreement than a sponsorship agreement. Previously, Hamilton Bike Share had an advertising program that offered station poster space for upcoming events, products and attractions.

However, advertising tends to bring relatively low amounts of funding and it is unclear how much funding could be collected this way. The most efficient approach may be to lease advertising space on equipment to the same organization that currently manages other advertising on public property like benches and bus shelters.

It is recommended that the City of Hamilton utilize advertising revenue to fund micro-mobility operations by seeking at least $75,000 annually advertising revenue.

5.5 Donor Support

Donor support includes funding given to the operator or the City of Hamilton from private organizations or individuals (e.g. crowdsourcing). Donors may be recognized publicly but typically do not receive any promotional space on the equipment. The donor may receive a tax receipt from the City of Hamilton. Donor support is typically a one-time funding source, so effort would be required to raise donations annually to consistently fund the program. However, most donors will only contribute if the City is also contributing to operations.

In June 2020, HBSI raised over $72,000 to continue operations through crowdsourcing, plus $100,000 in one-time charitable contributions from a major donor but this was an unusual year. A donor-City matching program may be the most realistic approach moving forward, which means that the City would need to source some minimum amount of matching funds.

It is recommended that the City of Hamilton use donor funding for micro-mobility operations by seeking at least $25,000 from donors annually.

5.6 Permit Fees

Exhibit 5.2 shows example fees associated with non-exclusive for-profit permit models in some North American cities. Fees tend to reflect both direct and indirect program costs as well as programming to support safe, equitable use of micro-mobility like Hamilton's ERI program.

Exhibit 5.2: Example Permit Fees for Non-Exclusive Operators

Fee Type	Fee Amount
Application/Permit Fee	$600 per application (Calgary) $150 (Denver) $2,500 (Oakland) $20,000 (Los Angeles, Santa Monica)
Per Device Fee	$50 (Calgary) $130, reduced to $39 in disadvantaged communities (Los Angeles) $130 + $1/day (Santa Monica)
Per Trip Fee	$0.10 when parked or left standing in a metered zone during hours of operation (Oakland)
Performance Bond	$25 per Electric Scooter to a maximum of $15,000 per Permit Holder (Calgary) $15 per device to a maximum of $5,000 per permit holder (Kelowna) $20/bike & $30/e-scooter (Denver) $80/vehicle (Los Angeles) $10,000 (Seattle)
Electric Scooter education and encouragement	$10 per Electric Scooter (Calgary)

It is unusual for permit fees to cross-subsidize contracted operations run by the city. Washington DC, Portland, and Minneapolis are some examples of cities with mixed contracted and permitted operators and the programs tend to be funded separately. From a commercial perspective, it may be challenging for Hamilton to justify charging a for-profit entity a fee to subsidize what is in effect a competitor. The City risks not attracting and retaining any permitted operators if they must agree to cross-subsidize.

However, Hamilton also has Canada's first and one of North America's top micro-mobility equity programs. In order to ensure the equity program is supported, it may be justified for for-profit operators to have to provide an equity fee to the ERI to offset the impacts of operations. It should be noted that a review of for-profit equity programs indicate they are not comprehensive or community-based and therefore should not be relied upon as an equity strategy. The ERI should be considered the only equity program that all operators must contribute to because it is an existing community-based program that has maintained strong relationships with groups in the City that help those in need.

Should a permit-based operating model be chosen by the City, **it is recommended that the City charge for-profit operators between $45,000 and $125,000 annually to fund the ERI.** The City would need to conduct a more thorough assessment of potential funding needs of the ERI program to finalize this figure.

5.7 Capital Grant Programs

Grant funding for capital investment is usually easier to secure and City staff have been successful in securing capital funds from a range of sources over the lifetime of the existing system. The City of Hamilton should also continue to apply to the appropriate provincial and federal grant programs to enhance or complement the existing infrastructure and programs. Potential grant programs include but are not limited to:

- Canada Healthy Communities Initiative, Government of Canada;
- Public Transit Infrastructure Fund, Government of Canada;
- Grow Grants, Ontario Trillium Foundation; and
- Green Municipal Fund, Federation of Canadian Municipalities.

6 Expansion Strategy

The existing micro-mobility service area is primarily located in the lower city in Wards 1, 2, 3, and 13. Expanding the micro-mobility service area to the rest of the City of Hamilton's urban areas is a priority, but this expansion must be done in a phased approach. The approach should have the appropriate number of devices and stations and the required capital and operating funding to ensure the expanded system does not fail as a result of overexpansion.

The proposed strategy focuses on neighbourhoods with the highest propensity to use micro-mobility based on travel behaviour and demographic considerations. Based on this strategy, the priorities should be the areas surrounding Mohawk College, St. Joseph's Healthcare Hamilton West 5th Campus, Kenilworth Street corridor, Upper James Street corridor, and Eastgate Square.

In all, the expansion to the entire 30 km^2 area with the highest propensity outside the current service area could cost $2.3M for 120 stations and 557 bikes, as well as about $435,000 a year in operating costs. These costs would be phased in over time as funding becomes available.

The rest of this chapter describes the approach to prioritizing the expansion areas.

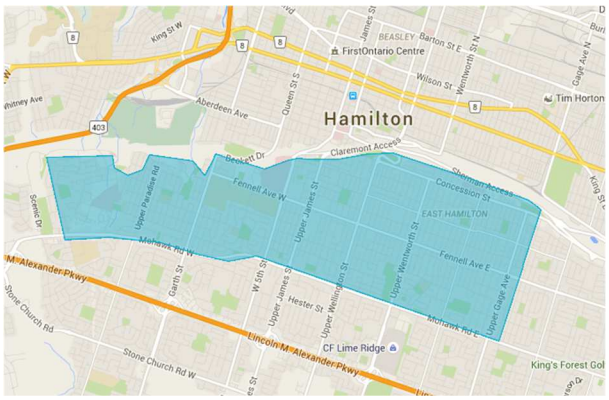
6.1 Existing Expansion Plans

A "Mountain Bike Share Feasibility Study" was prepared in 2016 to evaluate the feasibility of extending the existing bike share system to the Hamilton Escarpment neighbourhoods ("the Mountain"). This study included infrastructure and operational costs required to properly establish and serve a significant portion of Wards 6, 7 and 8, as well as other key considerations. Two system design options were considered:

- **Option 1:** Small Mountain Expansion (Upper Gage to Garth to Fennel, 5.3 km^2) shown in Exhibit 6.1, and
- **Option 2:** Large Mountain Expansion (Upper Gage to Scenic to Mohawk, 13.2 km^2) shown in Exhibit 6.2.

Exhibit 6.1: Option 1: Small Mountain Expansion

Exhibit 6.2 Option 2: Large Mountain Expansion



The study determined that the capital cost to establish a Mountain system would be between $577,000 and $1.4 M, depending on the extent of the service area. Annual operations would cost between $148,000 and $263,000. The cost estimate did not take into consideration user fees (revenue).

6.2 Approach to Prioritizing Expansion Areas

A propensity analysis of the City of Hamilton was conducted to find areas outside of the existing service area that could best support shared micro-mobility. The results of the propensity analysis show the relative likelihood of micro-mobility demand.

The analysis is organized by a grid of 500-metre-wide hexagons clipped to Hamilton's boundary. The size of the hexagon corresponds roughly to a coverage area of a micro-mobility station (5 to 10-minute walk).

Exhibit 6.3 outlines the data and weighting used to create the propensity map. These factors are typically found in areas of high micro-mobility demand and act as a data-driven guide to where shared micro-mobility deployments may be most used by residents. The propensity analysis uses proportional scaling, where each factor is normalized into a score between 0 and 1 before being weighted. The analysis constrains outliers at the top of each sample range so that all values over a particular percentile rank (99% for most measures) receive a score of 1. A weighting factor was applied to the factors considered stronger predictors of micro-mobility demand. Data from the Transportation Tomorrow Survey (TTS), the City of Hamilton's Open Data Portal, and Metrolinx was used to complete the analysis.

Exhibit 6.3: Data Used in Micro-mobility Propensity Analysis

Data	Source	Weight
Population density by traffic zone	TTS	2
Density of young people (20 – 35 years old) per traffic zone	TTS	1
Number of trips by bike or walking	TTS	2.5
Number of trips by transit	TTS	0.5
Number of zero car households	TTS	1
Number of jobs per traffic zone	TTS	0.5
Number of school trips (over the age of 16) per traffic zone	TTS	0.5
Metres of bike infrastructure within one kilometre	City of Hamilton	0.75
Distance to A and B Line Express (within 2 km)	City of Hamilton	0.5
Community centers (2 km radius)	City of Hamilton	0.5
Post-Secondary Institutions (2 km radius)	City of Hamilton	0.5
GO Train stops within 2 km	Metrolinx	0.5

Below is a description of why each factor is used in this propensity analysis:

- **Population density by traffic zone:** Where there is a higher population density, there are more potential users to use the micro-mobility service;
- **Density of young people (20 – 35 years old) per traffic zone:** People between the ages of 20 and 35 are most likely to use micro-mobility services;
- **Number of trips by bike or walking:** The number of existing walking and bike trips demonstrate where demand for a micro-mobility service is and is one of the best indicators of micro-mobility demand;
- **Number of trips by transit:** Micro-mobility services is often used to connect to transit as a "first and last-mile" connection.

- **Number of zero car households:** Households that do not have a car are more likely to use micro-mobility services compared to households that have access to a privately-owned car;
- **Number of jobs per traffic zone:** Employment is a large factor that influences micro-mobility demand as where there is a higher number of jobs, there are more potential users to use the micro-mobility service;
- **Number of school trips (over the age of 16) per traffic zone:** Students are less likely to own a car and rely on sustainable modes like micro-mobility services and transit to travel to and from school and recreationally. Post-secondary students are the most likely to use micro-mobility services as high school students that live outside of walking distance to schools are usually provided with school bus service.
- **Metres of bike infrastructure within one kilometre:** Access to cycling infrastructure within one kilometre provides potential users with infrastructure to use;
- **Distance to A and B Line Express (within 2 km):** Micro-mobility services are often used to connect to rapid transit as a “first and last-mile” service and are most successful when strategically located to support rapid transit service;
- **Community centers (2 km radius):** Community centres are popular destinations for members of the community;
- **Post-Secondary Institutions (2 km radius):** Post-secondary institutions major destinations for micro-mobility services; and
- **Regional Transit stops (GO Station) (within 2 km):** Micro-mobility services are often used to connect to regional transit as a “first and last-mile” service and are successful when strategically located to support regional transit service.

6.3 Preliminary Expansion Priorities

The results of the propensity analysis are displayed in Exhibit 6.4. These red areas highlight neighbourhoods outside of the existing service area that have the greatest potential for a micro-mobility service. The areas of highest micro-mobility propensity are concentrated in Wards 4, 5, 6, 7, 8, and 14.

The areas highlighted encompass key destinations such as the area surrounding Mohawk College, St. Joseph’s Healthcare Hamilton West 5th Campus, Concession St & the Mountain Brow, Kenilworth Street corridor, Upper James Street corridor, and areas surrounding Eastgate Square.

The areas highlighted between Upper Sherman Ave and Mountain Brow Blvd, north of Fennell Ave E should be reviewed in greater detail prior to finalizing an expansion plan on the Mountain. The service area, number of stations and bikes may differ upon the completion of a detailed feasibility study of the area and consultation with residents.

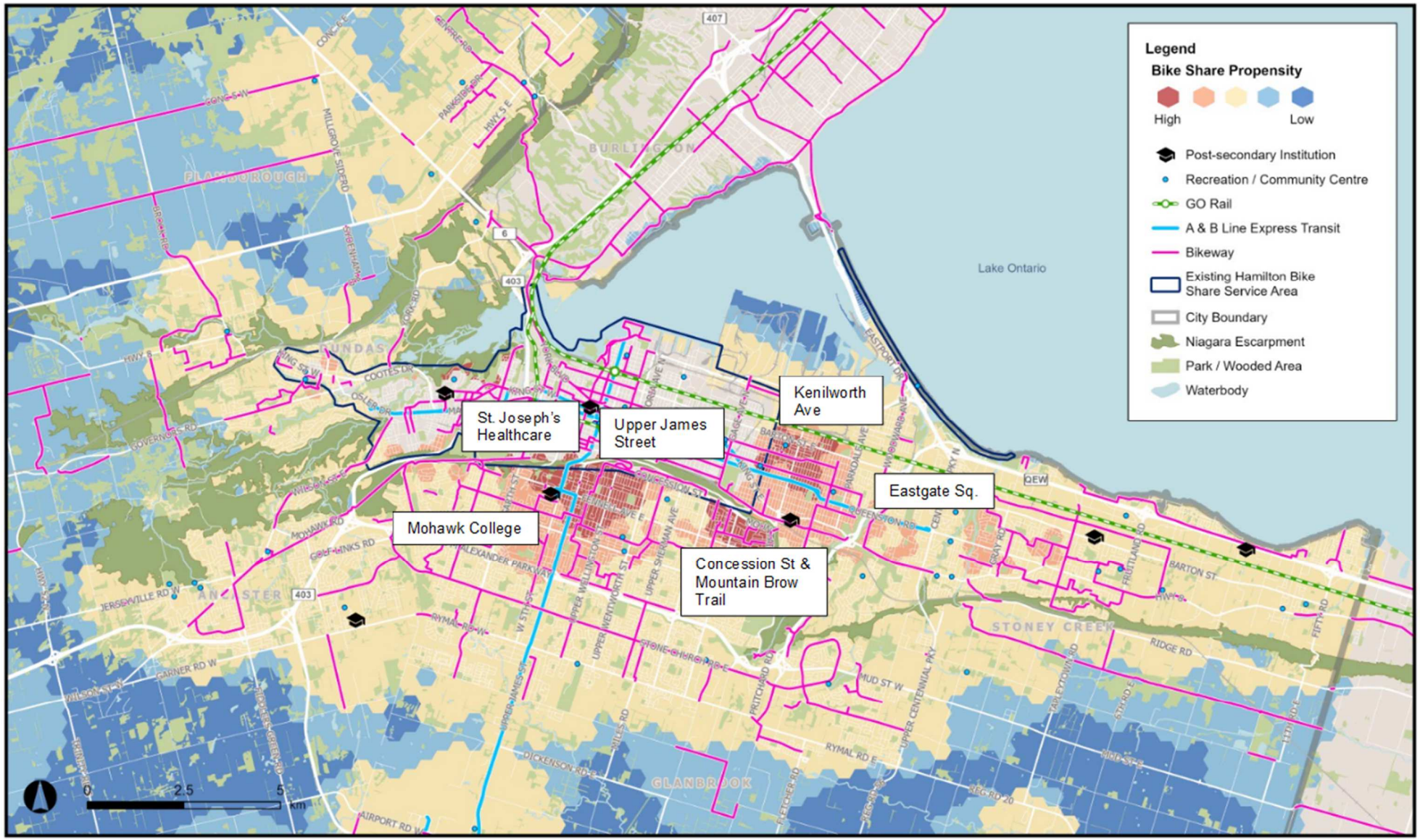
The total area of these highlighted areas is 30 km^2. Based on the existing service levels in Hamilton, there are approximately 4 stations per square kilometre. Approximately 120 stations are required in addition to the existing 130 stations to successfully expand the system to the highlighted areas. The installation cost is included in the capital cost. The capital costs for a variety of stations (e.g. no signage, small, large, kiosk, etc.) is approximately $1.2M. The total population of the identified area is 87,090. Based on existing service levels in Hamilton, there are approximately 6.4 bikes per 1,000 residents. Approximately 557 bikes are required in addition to the existing 825 bikes. The capital costs for 557 bikes is approximately $1.1M. **The**

total capital cost estimate for this expansion would be approximately $2.3M for 120 stations and 557 bikes.

Based on the estimated operating cost of the existing system, this expansion would cost approximately $36,000 per month to operate. This operating cost estimate does not consider the additional distance that would be required for the operators to travel, additional storage and fleet maintenance space required, and additional vehicles required for the expansion. **The total operating cost estimate for this expansion per year would be approximately $435,000.**

The expansion should be phased in over time (e.g. expand to Kenilworth, then Stoney Creek, then the Mountain). The capital and operating cost to expand would likely be distributed over several years. A detailed feasibility study is required to determine the phasing of expansion to these priority areas.

Exhibit 6.4: Map showing micro-mobility propensity in Hamilton



6.4 Other Strategic Destinations

The propensity analysis is a quantitative analysis that does not consider other qualitative factors such as local cycling culture, topography, local community, key destinations, and future rapid and regional transit.

Other areas to consider in future expansion areas include but are not limited to:

- **Local Community Hubs:** Local hubs such as Downtown Ancaster, Downtown Stoney Creek, and Downtown Waterdown are popular destinations for members of the community but do not reflect the same quantitative characteristics of a successful micro-mobility service such as population and employment density;
- **Key Destinations:** Key destinations that are major attractions for Hamiltonians that are isolated from other factors that support micro-mobility such as Conservation Areas are popular for recreational activities. Other destinations such as the Royal Botanical Gardens is accessible by bike, but is located in Burlington; and
- **Future Regional Transit:** All-day, hourly GO Train service from Confederation GO located near Centennial Parkway N and the QEW is planned. Regional transit hubs such as Confederation GO are major destinations for micro-mobility, however, it is unclear as to when all-day service will be available at the GO station.

7 The Way Forward

This study has shown that while Hamilton's existing bike share system may currently be in a precarious state due to organizational, contractual, and funding challenges, the fundamentals of the system are sound. Bikes and stations are in good condition, 5% of the population are active members of the program, and HBSI has proven to be a reliable, community-based operator whose mandate aligns well with the City's sustainable mobility goals. The growth in dockless e-bike and e-scooter businesses provides opportunities to broaden the scope of micro-mobility in Hamilton by welcoming well-run players to complement the City's system.

- Peer cities that already had successful bike share systems before the rise of venture-funded operators, like Hamilton, have found success in hybrid programs: Permit-based systems, where operators pay the City for the right to run their dockless vehicles, plus a City-run contracted system where the City has direct control over operations. Targeted equity programs ensure that low income and other marginalized groups have access to shared micro-mobility.
- Hamilton and its contracted operator HBSI have the skills, experience, and resources to run a similar hybrid system given Ontario's E-Scooter Pilot program. The City's Licensing and Compliance Department is already equipped to develop and enforce a permit program working with the Sustainable Mobility Program Manager. The City and HBSI can renew the contract in February 2021, maintaining the current program and avoiding the costs of a lengthy procurement.
- The net incremental costs of running the hybrid program from 2021-2025 is $3.5M (just over $450,000 a year), which includes periodic replacement of end-of-life assets and fare revenue. The economic case for the contracted operation has a benefit-cost ratio of 1.22 and a net present value of $951,000 over the five years. This excludes additional Mobility, Equity, and Road Safety benefits, which were not quantified.
- Shared micro-mobility aligns with the City's strategic priorities of Community Engagement, Healthy & Safe Communities, Clean & Green, and support Built Environment & Infrastructure through supporting multimodal transportation. It can provide a reliable and affordable alternative to the 230,000 daily auto-driver trips in Hamilton that are less than 5 km long.
- Potential non-tax-based funding sources can generate funds to cover portions of the annual operating costs. Potential sources include some of the net revenues from the City's Parking Program; a portion of the Red-Light Camera Fund; some revenue from the Ontario Gas Tax Funding for Transit; and Sponsorship, Advertising, and Donations. Any excess funds could be used to expand the existing system, purchase new technology, and support a greater level of service.
- Roughly 30 km^2 of Hamilton on the mountain and just east of the current service area show the highest propensity for micro-mobility trips, namely areas around Mohawk College, St. Joseph's Healthcare Hamilton West 5th Campus, Kenilworth Street corridor, Upper James Street corridor, the Mountain Brow Trail, and areas surrounding Eastgate Square. These are highest priority areas for expansion and could cost about $2.3M in capital funds and cost approximately $435,000 per year to operate.

This study provides the City with an evidence-based analysis that drew on local data, direct stakeholder engagement with Hamilton's cycling community, and broad research on and interviews with cities across North America that have successful shared micro-mobility programs. With this information, the City is well prepared to take the next steps to ensure that shared micro-mobility remains an integral part of getting around Hamilton for years to come.

Appendix A – Summary of Organizational Characteristics of Peer Systems

Summary of Organizational Characteristics of Peer Systems

	Org. Structure	Operations Funding	Capital Funding	Service Expansion Approaches	Equity Programs
Toronto	Public administration, single private operator (5-year term)	User fees, partnerships (CAA) and public subsidy. No title sponsor or advertising revenue	Metrolinx, Public Transit Infrastructure Fund (Federal Grant), Public Realm Reserve Fund, TPA Capital Expenditure Reserve Fund (2018)	Annual expansion depends on amount of capital funding available. Pilot satellite locations in 2020 to expand into inner suburbs (York U, Scarborough)	None, though recent discussion has focused on expanding to lower income areas outside of the downtown core.
Vancouver	Public administration, single private operator	User fees, title sponsorship, city subsidy			Low income annual pass, no credit card required
Calgary	Permit-based system	Permit fees by operators	n/a		None.
Kelowna	Permit-based system	Permit fees by operators	n/a		None.
Philadelphia	Public administration, single private operator (10-year term)	User fees, advertising revenue, title sponsorship, station sponsorships	City, state and federal funding		Low income passes, locating of new stations in underserved areas.
Minneapolis	Public administration, single private operators (bikes, e-bikes, e-scooters), permit system for other e-scooter operators	User fees, major sponsorship	Major sponsor, city and federal funding (system launch)		Minimum number of scooters must be deployed in areas lacking last-mile transit options, low income pricing options and alternative access programs must be provided (cash and non-smartphone)

	Org. Structure	Operations Funding	Capital Funding	Service Expansion Approaches	Equity Programs
Washington (Metro Area)	Public administration, single private operator (Capital Bikeshare); permit-based system for other private operators	User fees, advertising revenue, development proffer revenue; shortfall made up through General Fund revenue; permit fees by operators	DDOT capital budgeting – no specific source	Policies: Balance between growth and infill; half of all new stations should be located in equity and access areas	Low income passes, target expansion to lower income areas, overarching objective to reach parity between ridership and general District population (ethnicity, gender, income, etc.)
Portland	Public administration, single private operator, permit-based system for private operators	User fees, title sponsorship. No city money for operations.	Title sponsorship contributed to initial capital costs, federal grants,		Low income discount program (BIKETOWN for all), low income pricing plan for e-scooters, program to allow e-scooter rentals without needing a smartphone, equity clause built into permit system for e-scooter distribution
Seattle	Permit-based system	Permit fees by operators	n/a		Equity Focus Areas where operators are required to distribute 10% or more of deployed fleet, low income pricing.