Understanding barriers to and opportunities for integrated mobility in the Hamilton-Burlington region

A report to the Bay Area Climate Change Council
prepared by The Centre for Climate Change Management
at Mohawk College

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MOHAWK COLLEGE

CENTRE FOR CLIMATE CHANGE MANAGEMENT AT MOHAWK COLLEGE

Executive summary

The following research report was commissioned by the Bay Area Climate Change Council in spring 2020. Its objective is to provide members of Bay Area Climate Change Council (BACCC) with a better understanding of the current barriers to and opportunities for supporting integrated mobility in the cities of Hamilton and Burlington.

The Centre for Climate Change Management (the Centre) at Mohawk College recommends that BACCC form an integrated mobility implementation team, comprised from a diverse group of stakeholders that is representative of the wider community. The Centre recommends that, together, BACCC and the implementation team consider taking action in three key areas:

1. Support Hamilton and Burlington data collection methods and advocate for further utilization of big-data analysis to understand transportation and the movement of people in the Bay Area;
2. Further formalize the relationship between the City of Hamilton and the City of Burlington to better integrate aspects of the transportation system, adopt technology and encourage low-carbon travel;
3. Prepare for the future of mobility by supporting transportation education for youth to influence the perception of transportation and build a resilient environment.

1.0 Introduction

Over recent years, mobility has become an increasing priority for the Hamilton-Burlington region, otherwise known as the Bay Area. As part of a 2016 Hamilton-Burlington Greenhouse Gas inventory, transportation sector emissions accounted for 17% of total emissions in the Bay Area; growing to 42% if Hamilton's industrial sector is excluded.[1] Continuous population growth has put pressure on urban transportation planning and the increasing demand to move people through the region while still prioritizing the environmental impacts associated with transportation.

The rise of transportation options such as ride hailing and shared micro-mobility, and the increase of local public transportation ridership provided early signs of a promising future. But the impact of the COVID-19 pandemic has changed the landscape of transportation globally. Public transportation in the Bay Area has now seen ridership decline of as much as 77% compared to pre-pandemic levels. The impact to the shared transportation industry, although devastating, has provided us with the opportunity to build it back better than before.

With both municipal governments announcing climate emergencies in 2019, the Bay Area is now focused on opportunities to improve congestion, air quality, greenhouse gas (GHG) emissions and accessibility, while ultimately striving for carbon neutrality. Transportation accounts for 13% of total GHG emissions in Hamilton and 48% in Burlington; equivalent to a total of 1,698,963 tonnes of carbon dioxide equivalent or tCO_2e.[1]

While innovative transportation options are becoming more available, they are increasingly focused on independent journeys operated within disconnected networks.
By integrating the existing and upcoming range of transportation services, the Bay Area can succeed in lowering transportation-related emissions, while providing seamless, shared, low-carbon mobility.

2.0 Methodology

The objective of this research report is to provide members of BACCC with a better understanding of the current barriers to and opportunities for supporting integrated mobility in the Bay Area, with a focus on the strategies that will have the greatest potential to reduce GHG emissions and encourage low-carbon travel.

The findings will inform BACCC's development of an "implementation team" – a multi-sector working group that will focus on one or two specific actions in the next two to three years to help catalyze GHG reductions through promotion of integrated mobility.

In order to identify these barriers and find potential opportunities, staff at the Centre for Climate Change Management (the Centre) undertook the following research:

- Literature review;
- Attending webinars on relevant topics;
- Interviews with select stakeholders.

2.1 Literature review

Over an eight-week period, staff at the Centre conducted a comprehensive research project to better understand current barriers and opportunities.

A systematic literature review was conducted though the synthesis of various industry reports, municipal plans, community feedback, academic journals, best practices, comparable initiatives, advocacy articles, media, and forecasted trends. Through reviewing these resources as a whole, gaps, opportunities and new interpretations of information were identified. Subsequent to the literature review, 18 stakeholder interviews were conducted to gather further insight into integrated mobility. Stakeholder interviews and participation has been kept anonymous.

The literature findings were aligned with the stakeholder discussions to focus on key elements:

- **Problem framing:** mapping the system, naming current assets and key stakeholders, understanding drivers, barriers and gaps in the system;
- **Identifying potential interventions:** priority areas for action that may lead to systemic change;
- **Evaluating readiness:** understanding the necessary conditions for uptake of solutions.

2.2 Webinars

During the COVID-19 pandemic, several webinars were hosted on transportation. Four of these webinars helped to inform the report – two hosted by Corporate Knights[2],one hosted by the Centre for Active Transportation[3], and one hosted by StreetLight Data[4].

2.3 Stakeholder interviews

In May and June 2020, staff from the Centre spoke with 18 stakeholders who have been involved in successfully implementing more integrated mobility systems into Canadian and American cities. Staff also engaged stakeholders who currently support key elements of public or private transportation in the Bay Area.

These interviews were semi-structured to allow interviewees to speak about their direct experience and expertise.

3.0 Definitions

Integrated mobility connects mobility providers to unify their platforms and services as one. Integrated mobility, sometimes referred to as integrated transportation, can be as simple as route connections joining bike lanes to a bus stop, and as sophisticated as employing smart technologies to link autonomous vehicles to traffic systems and live data.

By linking several transportation methods together, commuters can easily access routes that complement one another. Integrated mobility can allow commuters to use multimodal transportation to arrive at their desired destination. Perhaps a Hamilton commuter might use a bike share to ride to the nearest bus stop, to then catch a bus to get to a train connection in Burlington. Additionally, integrated mobility extends to the integration of payment, schedules, information and booking. By integrating all aspects of mobility into a unified platform, travel will become more efficient, sustainable and accessible.

For the purpose of this report, integrated mobility can be understood as a cohesive, multimodal transportation network that can be seamlessly accessed by any individual.

In order to seamlessly move people through communities, integrated mobility relies on robust co-operation between three key components:

1. **Public infrastructure:** Public transportation systems (HSR, Burlington Transit, GO Transit, etc.), bike lanes, trails, roads, etc.;
2. **Available resources**: Private transportation services, ride hailing and bike sharing (SoBi, Uber, Lyft, taxi services, etc.);
3. **Commuter:** Personal mobility, driving, active transportation (cycling, walking, micro-mobility etc.).

Each component brings necessary value and unique challenges to the integration of transportation in the Bay Area. They also provide opportunities for areas of action by the Bay Area Climate Change Council. By supporting these groups individually and by supporting the integration into one another, there is ample room for improved mobility.

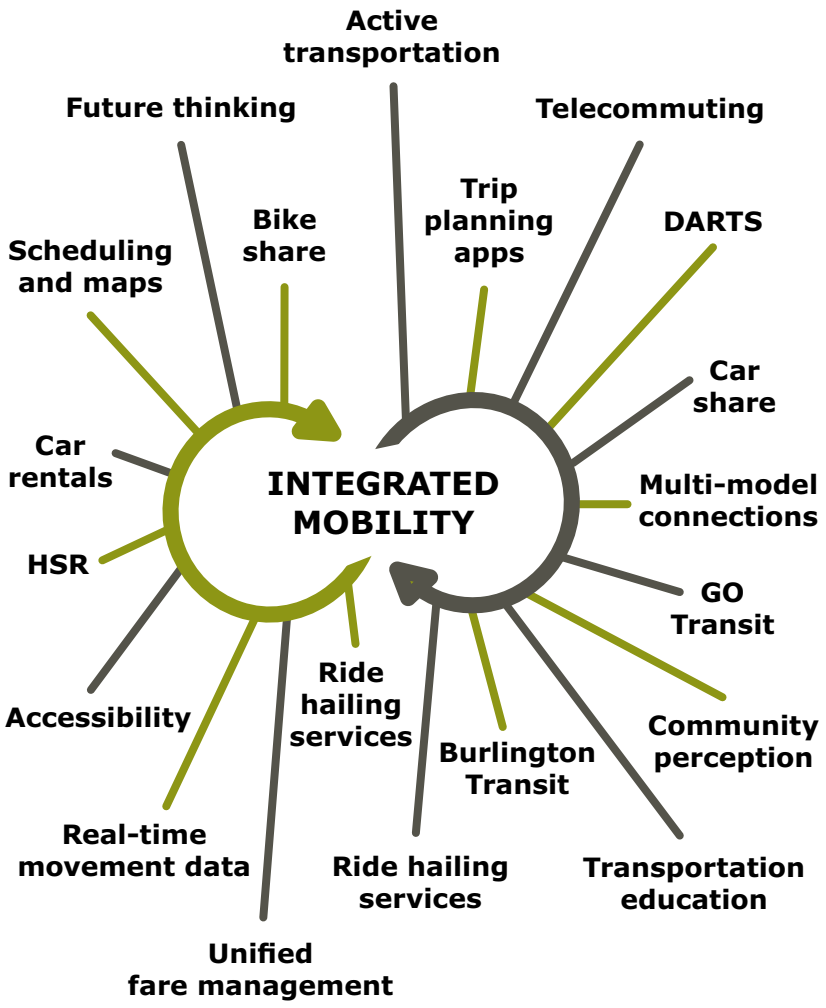


Figure 1.
Contributing factors for integrated mobility in the Bay Area.

4.0 BACCC's role in supporting climate action

As a collective impact initiative, BACCC has a unique opportunity to catalyze climate initiatives that support a wide range of citizens, and public and private organizations.

While BACCC has not formally established a theory of change, it is understood that BACCC's best efforts are spent on the following areas of action:

1. Advocacy in support of smart climate policies, programs and initiatives in the greater Hamilton-Burlington region;
2. Identifying gaps and convening stakeholders to design projects that will work to create solutions;
3. Securing initial support to help launch priority climate projects;
4. Measuring and reporting on greenhouse gas emissions through regional emissions inventories.

Progress is reported back to the community at BACCC's annual climate change forum.

BACCC, at its core, is a network of leaders and organizations committed to supporting climate action. But fundamental to BACCC's mission is recognition that BACCC cannot lead all climate actions. In many cases, other organizations and networks are better equipped to lead key actions. BACCC can lend support, but does not lead the following:

1. "On the ground" outreach and education on climate change;
2. Leading and sustaining multi-year programs (i.e. it does not establish a bicycling outreach program, but rather supports it);
3. Financially supporting programs beyond their development phase.

The recommendations provided in this report, therefore, focus on BACCC's unique position and the work it is best positioned to realize.

Figure 2.
Left: Hamilton's total GHG emissions by sector in 2016.
Right: Hamilton's GHG emissions in 2016, excluding industrial sector emissions.[1]

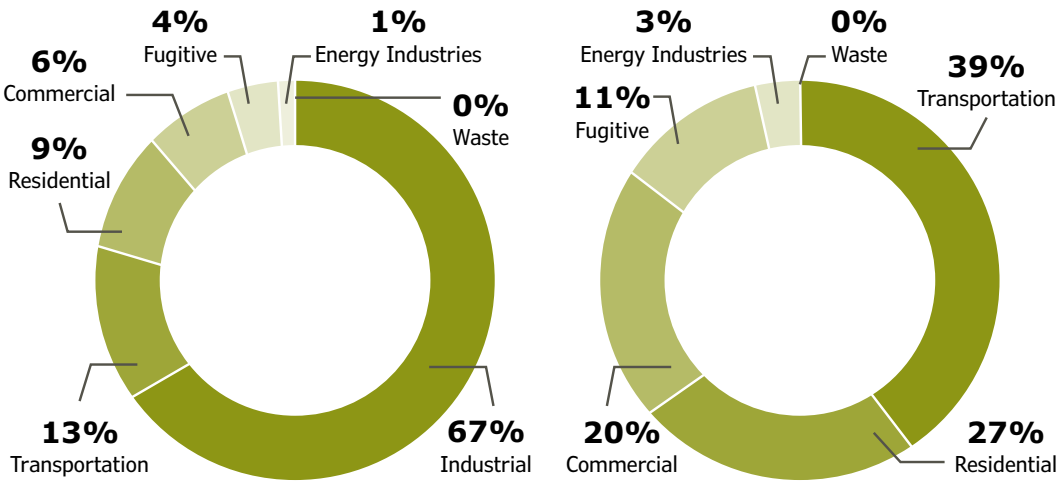
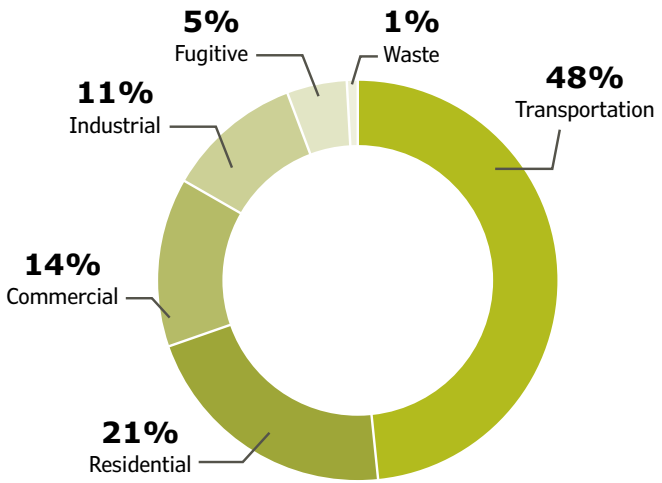


Figure 3.
Burlington's total GHG emissions by sector from 2016.[1]



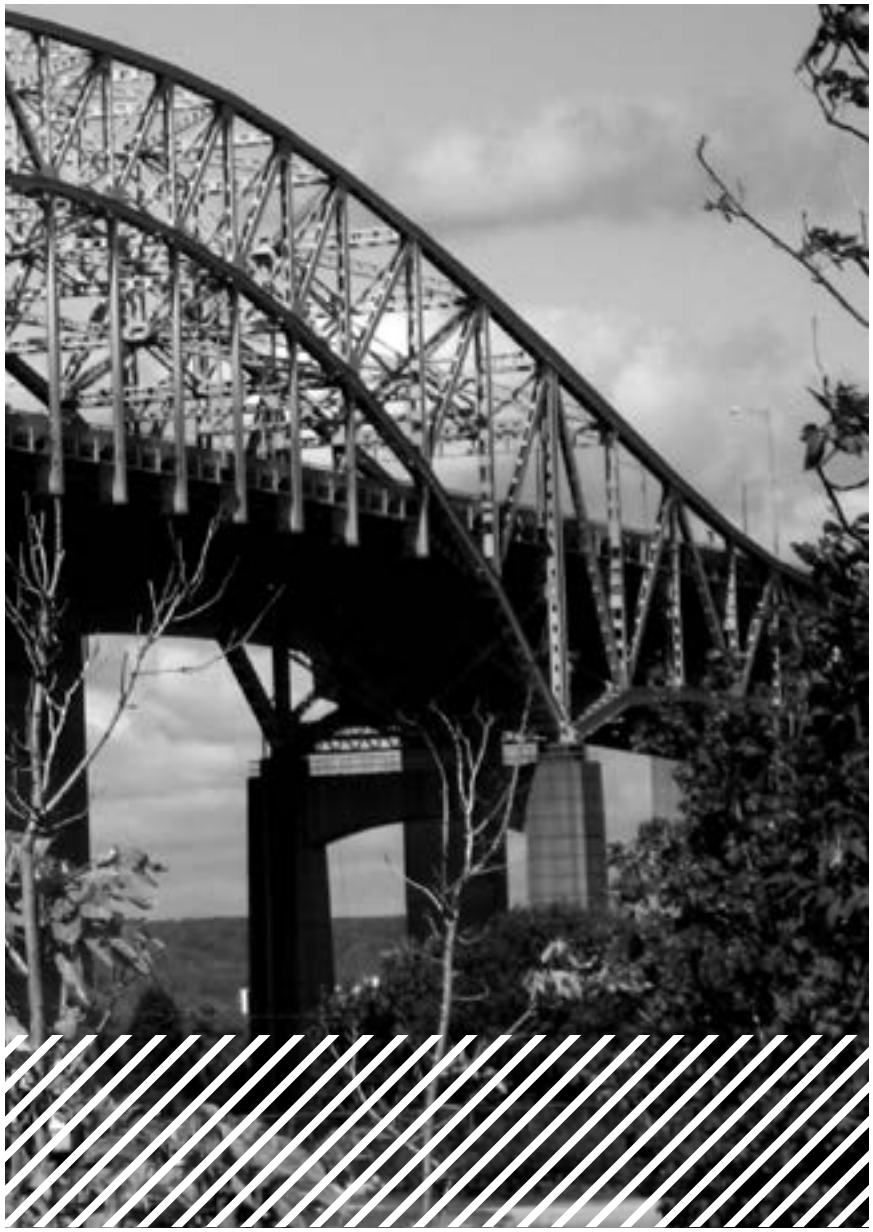
5.0 Bay Area GHG emissions

To effectively impact transportation-related GHGs in the Bay Area, it is important to understand the source of emissions for Hamilton and Burlington. Due to differences in their size, geographic location and industry presence, the associated emissions within Hamilton and Burlington should be reviewed separately. Hamilton is responsible for 87.3% of emissions for the Bay Area, while Burlington is responsible for the remaining 12.7%.

As seen in Figure 2, Hamilton's robust industrial sector accounts for the largest percentage of the city's emissions, representing 67% of the total emissions, while only 13% of emissions are attributed to transportation. When excluding industrial sector emissions, the transportation sector then accounts for 39% (1,096,430 tCO_2e) of the emissions in Hamilton. Most transportation emissions come from single-passenger commuter and family vehicles, with 88.4% of Hamilton's transportation sector emissions being attributed to light trucks and cars.[1] According to the 2016 census, 75.9% of Hamilton residents commute to work as a driver (Table 2).

As seen in Figure 3, within the city of Burlington, 48% (602,533 tCO_2e) of emissions are a result of the transportation sector. Again, most transportation emissions come from single-passenger commuter and family vehicles, with 91.5% of Burlington's transportation sector emissions coming from light trucks and cars.[1] According to the 2016 census, 80.1% of Burlington residents commute to work as a driver (Table 2).

For both Hamilton and Burlington to meet their climate targets, transportation-related emissions must be significantly reduced. In keeping with each city's climate goals, this must be achieved by 2040 in Burlington and 2050 in Hamilton. Integrating multimodal transportation networks is one of the most important opportunities for the region to reach its climate goals – both for mitigation and adaptation.



6.0 Summary of key findings

6.1 Support Hamilton and Burlington data collection methods and advocate for further utilization of big-data analysis to understand transportation and the movement of people in the Bay Area.

Timeline: Convene and initiate within the next 6-12 months

The Bay Area lacks consolidated, accessible and current transportation data. After speaking with several stakeholders, it became clear that this was a shared concern. Although other cities are at times envious of the transportation data that Hamilton and Burlington have to work with, there is still great room to improve. The opportunity to collect live data using big-data technology cannot be ignored.

Having regular access to up-to-date data will allow for informed decision-making and accurate examination into the feasibility of a low-carbon mobility network that will provide commuters with more low-carbon options. The recent changes to the SoBi bike share system is a strong example of the need to see "live" movement data to understand how a system is working, especially in a time of change.

Currently, the Transportation Tomorrow Survey (TTS) acts as a primary tool when making transportation-related decisions in the Hamilton-Burlington region. It is a robust survey that takes place every five years, originating in 1986. It is a very useful tool to identify some trends within transportation. However, in recent years, the TTS has identified some biases that exist within the data.[5] Originating as a landline telephone survey, historically the survey saw strong response rates. However, in 2011 and 2016, the survey methodologies were forced to adapt to a growing lack of landline phones and, instead, offered the survey in an online format. The 2016 survey experienced a drop in response rates, specifically for Hamilton. This has led to the development of the TTS 2.0 Project, which aims to address the weaknesses of the

current TTS and develop the next generation of data collection. What the current TTS has to offer in terms of accessibility and historical storytelling, it lacks in live data and ability to display short-term and current trends (Table 3).

Hamilton should follow in the footsteps of Burlington and adopt a big-data platform that captures transportation analysis primarily through anonymous smartphone data.

Burlington's progressive Integrative Mobility Plan utilizes StreetLight Data – a transportation analytics platform that delivers travel pattern data to support planning and mobility. Other transportation leaders, such as Vancouver, Toronto and Montreal, have utilized StreetLight Data's functionalities to strengthen their services.

If Hamilton collected data using the same platform as Burlington, the neighbouring cities would be able to seamlessly track movement between and within their borders. This would lead to effective collaborative decision-making, real-time analysis of trends and travel impacts, and the ability to make informed decisions almost immediately.

Additionally, there is opportunity for BACCC to advocate for further standardization of data to advance the availability of bike share, shared mobility and trail data. The General Transit Feed Specification (GTFS) is common format data that permits sharing of public transportation information. Standardizing the data across additional forms of transportation modes would allow for the delivery of information to commuters in a robust and unified platform.

Advancements in the areas of technology and data will ensure the cities of Hamilton and Burlington are well positioned for the future adoption of electric and automated vehicles.

Recommended action

BACCC should advocate for the cities of Burlington and Hamilton to utilize big data to understand the movement of people through the region, and make better informed transportation decisions.

Introducing new data collection methods will require the immediate next steps to be undertaken:

- Convene with City of Burlington staff to understand best practices for adopting big-data analysis;
- Engage stakeholders and consultants to identify desired outcomes of data collection;
- Identify funding opportunities to support the acquisition of big-data analysis;
- Support development for long-term implementation, including data collection, utilization and information sharing.

6.2 Further formalize the relationship between the cities of Hamilton and Burlington to better integrate aspects of the transportation system, adopt shared technologies, and encourage low-carbon travel.

Timeline: Initiate in the next 6 months

When it comes to mobility in the Bay Area, there is no formal partnership between the cities of Hamilton and Burlington to move forward with integrated transportation networks. By improving coordination of services and communication, the regions could better integrate transportation at a higher level of service. For example, due to specific restrictions, Burlington Transit cannot pick up passengers as it leaves Hamilton. This creates underutilized movement through the city and production of unnecessary emissions. As well, the Waterdown region struggles with HSR services and routes, despite its proximity to Burlington.

Through the development of Bay Area policies and practices, BACCC can support efficiencies within our current system while preparing for the future systems of mobility. With forward-looking thinking, Hamilton and Burlington can work together to prepare for the future. For example, ridership must be improved before the shift to electric buses can become feasible. If we look forward to the future of electric and automated transportation, we will be able to develop a strong system that can seamlessly transition to technological advances, especially if done in partnership.

In recent years, communities throughout Canada and around the world have embraced a range of pro-pedestrian policies and witnessed a growing number of people cycling, walking and using shared transportation. That shift has only accelerated during the pandemic. Complete streets that offer a range of active transportation options are sustainable and practical solutions for a post-pandemic future.

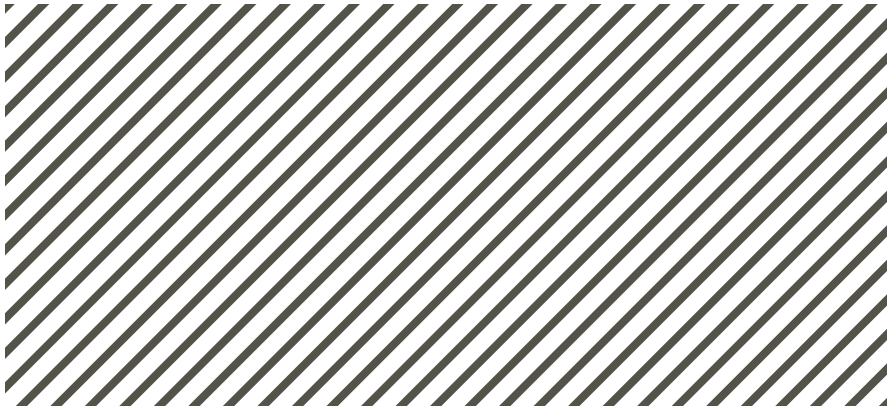
Finally, the integration of technologies into the current transportation networks in the Bay Area is a key area for improvement. Technology often allows for flexibility and control over systems, even during times of crisis. Throughout the pandemic, we have lost the ability to count passengers and monitor trips through PRESTO. Shared technologies could encourage contactless payment, seamless trip planning, and integrated fare management. This would allow the current system to modernize and more effectively adapt to societal changes.

Recommended action

BACCC should advocate for the cities of Burlington and Hamilton to formalize the Bay Area mobility relationship to better address efficiencies within the current and future transportation networks.

Formalizing this relationship will require the immediate next steps to be undertaken:

- Engage stakeholders to identify key areas of weakness where policies and practices could mutually benefit transportation networks for both Hamilton and Burlington;
- Develop a memorandum of understanding which identifies current gaps to be addressed through intra-regional transportation;
- Support key stakeholders to further implement integration of transportation networks.



6.3 Prepare for the future of mobility by supporting transportation education for youth to influence the perception of transportation and build a resilient environment.

Timeline: Convene in the next 6 months and implement over 1-3 years

Community engagement with members of the Bay Area has consistently revealed the negative perceptions of active and public transportation held among young people. Children as young as six years old have expressed their belief that public transit is for "poor people," or in other circumstances, it's referred to as the "loser cruiser." This perception of public transportation discourages youth from embracing transit as they grow up and, instead, encourages the use of single-occupancy vehicles. BACCC must consider the Bay Area's future demographics and recognize the potential to influence perceptions of its transportation network. Transportation ridership among younger demographics has increased consecutively over the past several years.[6] It is important for the Bay Area to amplify that trend by continuing to demonstrate the value of alternative transportation.

Lessons and conversations surrounding weather, waste, and water occur in primary classrooms, but discussions of transportation and public transit do not. As children transition to teenagers, there is particular excitement surrounding learning how to drive. Sixteen year-olds go through training and testing to become well-informed, safe drivers. However, when it comes to cycling education, there is no investment. By encouraging more common active transportation education programs, neighbourhoods could see a rise in cycling confidence levels and safe practices.

Other Canadian municipalities have adopted free transit for children and/or youth. The City of Kingston for example, has seen ridership increase after removing fares for children and secondary school students.[7] Prior to eliminating fares for students, they accounted for 28,000 rides per year, and now that number has reached more than 600,000 rides. Increasing the availability of transportation results in youth becoming more familiar with the transit system and increasing the likelihood for future use, all while empowering youth to access all areas of their neighbourhoods. In fact, studies have shown that increased access to alternative transportation directly correlates with increased success rates for students.[8] By partnering with school boards and educational institutions, BACCC has the opportunity to impact the curriculum and availability of transportation.

Recommended action

BACCC should advocate for policies that support the importance of low-carbon transportation education for our younger populations and prepare the cities of Hamilton and Burlington for the future of travel by increasing access to alternative transportation methods for youth.

Creating this culture shift will require the immediate next steps to be undertaken:

- Develop the business case to understand the potential of free transit access for secondary students;
- Analyze the current market of educational transportation programming offered by school boards and partner organizations;
- Identify and advocate for funding opportunities from the provincial and federal government that support more accessible transit.

Photo: Wikimedia Commons

7.0 Conclusion

The advancement of integrated mobility is one of the most important opportunities to reduce greenhouse gas emissions in the Hamilton-Burlington Bay Area region, and to prepare our communities to confront climate change.

In order for the cities of Burlington and Hamilton to meet their goals of becoming carbon neutral by 2040 and 2050 respectively, transportation networks will need to be supported as they evolve.

BACCC has an important role in supporting the development and successful implementation of transportation programming, analysis, and education. BACCC can help design effective infrastructure, influence future commuters, and engage and inform stakeholders to drive success.

To meet this opportunity, BACCC will need to support action within the next six months and continue to advocate, catalyze, and initiate action over the coming years.

Adopting and supporting integration of mobility is both a timely and impactful opportunity to drive climate action in the Bay Area.

8.0 Appendices

Appendix A: Tables

Table 1: Key transportation findings from the 2016 Census Survey from Hamilton and Burlington.[9]

	Hamilton[10]	Burlington[11]
Area	1,117.29 km2	185.7 km2
Population	536,917	183,314
Characteristic	Rate (%)	Rate (%)
Single detached house	57.3	51.5
High rise apartment (>5 storeys)	15.9	16.2
Other	26.7	32.3
Work within census subdivision of residence	66.9	42.0
Work outside of census subdivision of residence	33.1	58.0
Commute to work as a driver	75.9	80.1
Commute to work as a passenger	7.2	5.8
Commute to work on public transit	10.5	9.1
Commute to work by walking	4.6	3.3
Commute to work by bicycle	0.9	0.8
Commute to work by other	0.9	0.9

Table 2: Origin-Destination Trips as reported in the Transportation Tomorrow Survey (TTS).[12]

2016	To	
From	City of Hamilton	City of Burlington
City of Hamilton	457,800 (71.7%)	32,200 (5.0%)
City of Burlington	32,400 (8.4%)	253,600 (65.7%)
2011	To	
From	City of Hamilton	City of Burlington
City of Hamilton	492,400 (74.3%)	32,100 (4.8%)
City of Burlington	32,400 (8.3%)	259,300 (66.7%)

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