

West Hants Regional Municipality **Zero Emission Transportation Feasibility Study**

Final Report

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Prepared for

West Hants Regional Municipality

76 Morison Drive
Windsor, NS B0N 2T0

Prepared by

WSP Canada Inc.
1 Spectacle Lake Drive
Dartmouth, NS B3B 1X7
T 902-835-9955

Quality control	Name	Date	Signature
Prepared by:	David McCusker	2026-07-16	
Reviewed by:	Courtney Pyne		

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Abbreviations

Abbreviation	Description
BEB	Battery-electric bus
CAPEX	Capital cost
CPTF	Canadian Public Transit Fund
GHG	Greenhouse gas
kWh	Kilowatt-hour
OPEX	Operational cost
PTAP	Public Transportation Assistance Program
RTSF	Rural Transit Solutions Fund
SOC	State of charge
WHRM	West Hants Regional Municipality

Executive summary

Purpose and Context

West Hants Regional Municipality commissioned this feasibility study to assess the need, viability, and implementation strategy for introducing public transit service, while considering coordination with existing demand-responsive transportation provided by West Hants Dial-a-Ride. The study responds directly to Council priorities, community feedback, and long-term goals related to equity, sustainability, energy and emissions reduction, economic development, and quality of life. The role public transit plays in improving inclusivity, social equity, and the environment are highlighted.

Key Findings

Strong Community Need and Support

- Nearly 100 survey responses and extensive stakeholder engagement demonstrate strong public interest in transit, particularly among seniors, youth, individuals without access to vehicles, and those with mobility challenges.
- 62% of respondents indicated they would consider using public transit if available, and 70% said they would be more likely to use it if routes and schedules align with daily needs (work, shopping, healthcare).
- Affordability, safety, accessibility, and reliability emerged as core expectations.

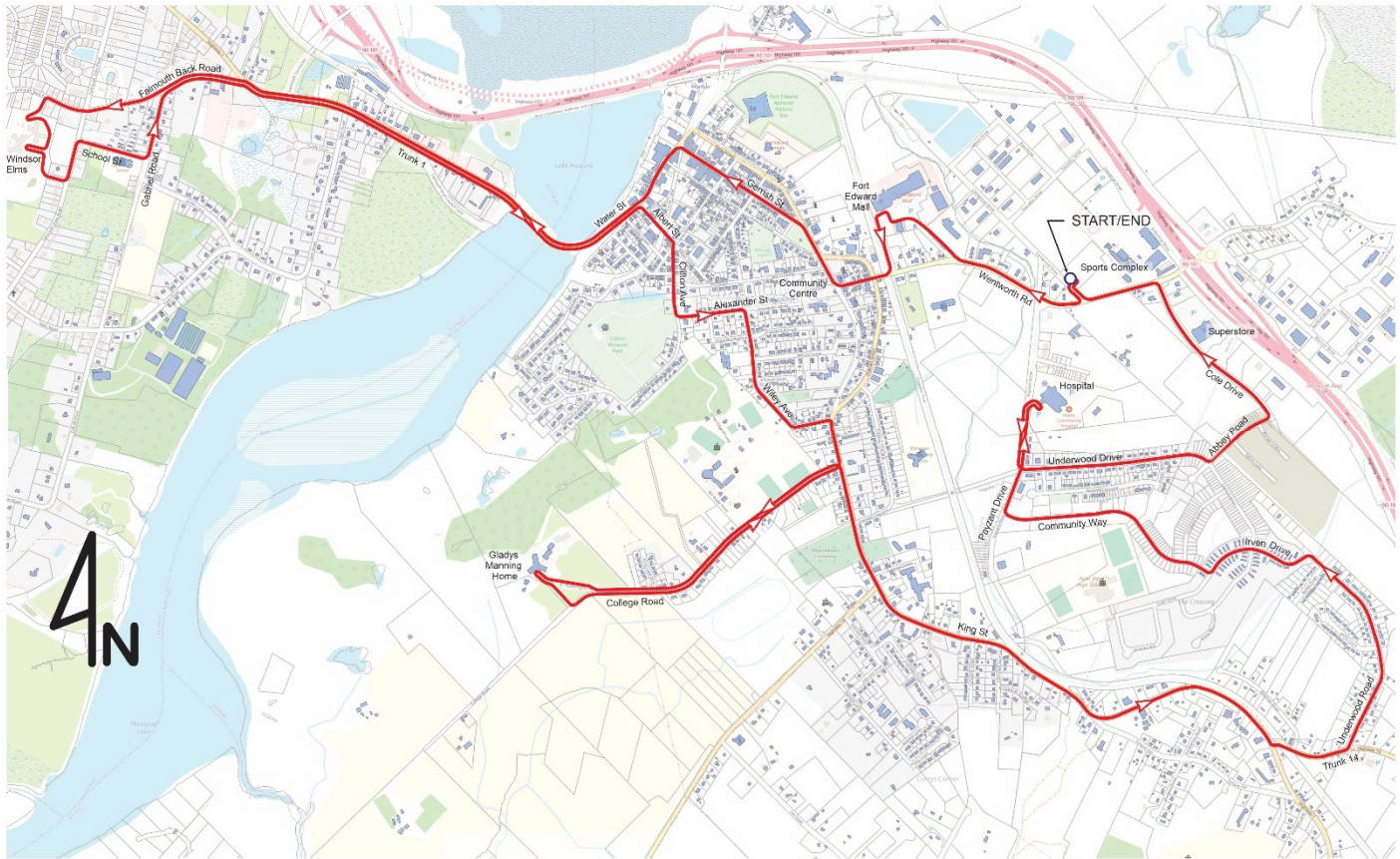
A Single Fixed Route Can Serve Most of Windsor-Falmouth Effectively

- A 60-minute loop route was selected as the preferred service plan (see Figure ES-1).
- Approximately 2900 residents are within 400m walking distance of the route which includes 85% of the former Town of Windsor residents. Nearly all key destinations (downtown Windsor, hospital, major retail, community facilities) would be within a 5-minute walk of a bus stop.
- The route design balances coverage, simplicity, and operational feasibility, while excluding expected low-ridership areas such as lower-density residential areas and the industrial park.

A Combination of Demand-Responsive and Fixed-Route Service Can Be an Effective and Affordable Solution to Rural Area Requirements

- In the past, an extension of Kings Transit service into West Hants demonstrated that daily fixed route service in rural and suburban areas will not generate sufficient ridership to justify service.
- If service to a rural area is provided one day each week, residents may organize their trip-making, such as shopping trips, social visits, and medical appointments, to be done on that day.

Figure ES-1: Preferred Fixed Route Plan



- For eight rural areas identified within WHRM, a rural day-a-week service will feature three to four scheduled round trips into Windsor from a stop at a community hub combined or the option of at-door pickup with a pre-booked appointment.

Urban Service Design Must Prioritize Simplicity and Reliability

- Comparative evaluation showed that while multi-loop options increase frequency on some corridors, they introduce schedule complexity and reduce coverage.
- A single, predictable route operating every 60 minutes was found to be more legible for users and better aligned with the Windsor-Falmouth area's scale and ridership expectations.

Ridership Will Be Modest but Meaningful

- Projected weekday ridership ranges from 55–88 trips per day, with annual ridership of 13,900–22,200 once the system stabilizes.
- Ridership is expected to build gradually over 1–2 years, underscoring the importance of marketing, education, and patience during startup.

Operating a Municipal Transit System Independently Is Challenging

- Operating a single-route transit system in-house presents staffing, maintenance, and redundancy risks.
- Leveraging an experienced third-party operator significantly reduces startup risk and improves reliability.

Capital and Operating Costs for Fixed Route Service are Significant but Comparable to Peer Communities

- Capital costs: \$1.98 million.
- Annual operating costs: \$344,000.
- Fare revenue will offset only a portion of costs, consistent with public transit norms in small communities.

Key Recommendations

1. Proceed with Implementation of a Fixed-Route Transit Service

- o Adopt the recommended single, 60-minute loop route operating weekdays from 7:00 a.m. to 8:00 p.m.
- o Defer evening and weekend service until ridership and funding can be reassessed.

2. Engage a Third-Party Operator

- o Pursue negotiations with Kings Transit, West Hants Dial-a-Ride, or another experienced operator rather than operating the service directly.
- o This approach minimizes operational risk, leverages existing expertise, and supports future integration with demand-responsive services.

3. Select a 35-Foot Urban Battery-Electric Bus

- o Use fully accessible, low-floor urban buses to accommodate projected demand and future growth (see Figure ES-2).
- o Choose battery-electric technology to reduce energy cost and GHG emissions and to assist in meeting community energy reduction targets.
- o Acquire a new or used 26-foot diesel mini-bus as a back-up.



Figure ES-2: 35ft Urban Transit Battery-Electric Bus

4. Adopt an Affordable, Accessible Fare Strategy

- o Target fares in the \$3 range, reflecting community willingness to pay while maintaining inclusivity.
- o Offer multiple payment options (cash, passes, electronic) to reduce barriers to use.

5. Invest in Visible, High-Quality Stop Infrastructure and Rider Information

- o Prioritize shelters, lighting, benches, and clear wayfinding at key stops.
- o Build infrastructure where needed to ensure the bus ramp can be safely deployed to board wheelchairs.
- o Implement real-time tracking or schedule apps to improve user confidence and perception of reliability.

6. Phase, Monitor, and Adapt

- o Treat the service as a scalable foundation, not a final product.
- o Monitor ridership, costs, and customer feedback closely, with annual reporting to Council.
- o Lobby the provincial government to implement integrated inter-regional service.

Overall Conclusion

While the introduction of a fixed-route transit service represents a significant financial commitment, the study concludes that it would deliver substantial social, economic, and quality-of-life benefits to WHRM residents. Community support is strong, the proposed service is appropriately scaled, and implementation risks can be managed through phased delivery and third-party operations. The recommended transit system provides WHRM with a realistic and flexible starting point for building a more inclusive and connected transportation network within the urbanized Windsor-Falmouth area to begin and, over time, throughout the Municipality and to Halifax Regional Municipality and Kings County.

1. Introduction

1.1 Background

West Hants Regional Municipality (WHRM) location in Nova Scotia extends from the Minas Basin to the eastern boundary with East Hants and southern boundary with Halifax Regional Municipality. The region's landscape includes small towns, agricultural corridors, and dispersed rural communities, all of which influence travel patterns and service access. A regional municipal government was created on April 1, 2020 with the merger of The Municipality of the District of West Hants and the Town of Windsor. The downtown core of West Hants Regional Municipality is anchored in Windsor, a historic community undergoing a period of strategic revitalization focused on enhancing its downtown and waterfront districts. Current redevelopment initiatives highlight Windsor's role as the Municipality's primary urban center, supporting renewed economic activity, cultural events, and public realm improvements.

WHRM has set a goal of 45% reduction in annual corporate and community greenhouse gas (GHG) emissions by 2030. To progress towards this goal, the WHRM GHG Emission Local Action Plan includes transportation-focused action items which explore opportunities to create a transportation hub and to integrate active transportation considerations into land use planning decisions. The Municipality is interested in focusing on the creation of a zero-emissions transit service that is reliable, affordable, and integrated with existing door-to-door service provided by West Hants Dial-A-Ride. This will support the Municipality in applying for future capital funding to develop transportation services.

1.2 Project Objective

WHRM recognizes that public transit can be transformative for the community and can achieve many important goals such as:

Improving inclusivity and social equity

Not every resident has access to a vehicle, whether due to age, economics, or physical limitations. Public transit provides affordable opportunities for travel without reliance on a private vehicle. This increased mobility can help reduce isolation and increase opportunities for social interaction.

Improving the environment

Traffic noise and exhaust can be noticeably reduced when trip-making is attracted to transit and away from vehicles. Road congestion and parking space requirements can also be reduced. People who take public transportation feel a sense of satisfaction knowing that they are doing their part to reduce air pollution and help the environment.

Contributing to the economic well-being of the community

Public transit helps reduce the cost of travel for individuals, as well as businesses. Businesses can attract employees from a broader pool when greater travel flexibility and choice is available. Public transportation can also reduce the amount of money spent on parking fees and gasoline. The amount of lost time and productivity associated with traffic congestion can also be decreased.

Increasing housing options

Public transit can increase housing options by making more areas accessible and desirable to live in, which encourages residential development in places that previously lacked viable transportation. It also reduces the need for car ownership, lowering household costs, and making a wider range of housing, including denser and more affordable options, feasible and attractive to residents.

Adding to the quality of life

Public transportation can improve the overall quality of life. It can reduce stress levels and lead to a healthier and more enjoyable lifestyle. It can provide access to areas that would otherwise be inaccessible, providing greater opportunities for education, employment, and leisure activities. The convenience of having reliable transportation options can also provide greater freedom and flexibility, allowing individuals to plan their days more effectively. All these factors can contribute to an improved sense of well-being and a better quality of life.

Adding to the value and attractiveness of residential and commercial properties

Residents and businesses looking to locate in a community often consider the availability of public transit and make it an important component of their decision-making. Younger residents, in particular, value the environmental and economic value of public transit and seek to make that a lifestyle choice. Studies have found that youth are more attracted to public transit than previous generations.

Car dependency is reducing among young people in high-income countries. Young people use multimodal transport more than other age groups, and policy makers can leverage this.

Delaying car-based lifestyles by providing alternatives is essential to behavioural change.

Ensuring affordability, accessibility and safety in transport systems should be the priority for policy makers, as these still do not exist in many places.¹

The stated objective of the feasibility study is to assess the need, viability, and implementation strategies for ensuring the goals for providing transit service are well understood from the outset. The goal is to develop a plan that both achieves what the community needs and is affordable, implementable, scalable, and sustainable for the Municipality.

¹ ITF (2024) Youth on the Move: Young People and Transport in the 21st Century", International Transport Forum Policy Papers, No. 128, OECD Publishing, Paris.

2. Existing Conditions

2.1 Study Area

The focus of this study is the jurisdictional extent of WHRM. Within the study area, two subareas were established: the urbanized Windsor-Falmouth area and the rural areas including Hantsport.

Consideration will also be given to extension of service to Kings County (connecting to Kings Transit) and to the Margeson Drive (planned) and Sackville Terminals in Halifax Regional Municipality (connecting to Halifax Transit).

2.2 Transportation Options

Demand-responsive transit service is currently provided by West Hants Dial-a-Ride. Appointments for an at-door pick-up can be made by any resident of the Municipality with a minimum of 24 hours advanced notice. Trips are normally made by seniors and those with accessibility challenges. The service typically delivers between 700 and 800 round trips per month. Many of the trips will travel to destinations outside of WHRM (typically health care facilities in metro Halifax). Fares are based on the distance traveled and may be subsidized. The fleet consists of vans and SUVs and includes hybrids and wheelchair-accessible vehicles. Drivers are both paid and volunteers.

An internet search indicates reveals listings for at least three taxi companies based in Windsor.

2.3 Street Network

Streets are normally classified by the function they provide. Arterials are intended to facilitate traffic flow more than land access and local streets are designed more for land access than they are for traffic flow. Collectors are the “middle ground” between the two.

For the development of fixed transit routing, it is important to focus on arterial and collector streets where the movement of larger vehicles like buses is better accommodated. A proposed classification for streets within the Municipality is provided in Appendix A.

2.4 Population

Population is what generates transit trips. Areas with higher population density can generate more transit trips within shorter travel distances. The distribution of population for the study area, as provided in 2021 census data, is shown in Figure 2-1. This data will be used to determine where transit service can most effectively reach residents.

To conduct a more finely-tuned assessment of how well populations are being reached by various servicing plans, several transit nodes and collection areas within the study area were established. These nodes approximate potential bus stop locations. Surrounding each node, an area within a 400m walking distance was determined. These nodes and areas are shown in Figure 2-2. 400m represents a five-minute walk at a normal pace, which is typically viewed as an acceptable walking time to get to a bus stop.

For this analysis, both single-family homes and apartment units are considered dwelling units. More importantly, every resident room within a multi-unit seniors' facility is considered a dwelling unit in recognition of the significance of seniors to transit trip generation. A summary of the total dwelling units by zone is provided in Table 2-1.

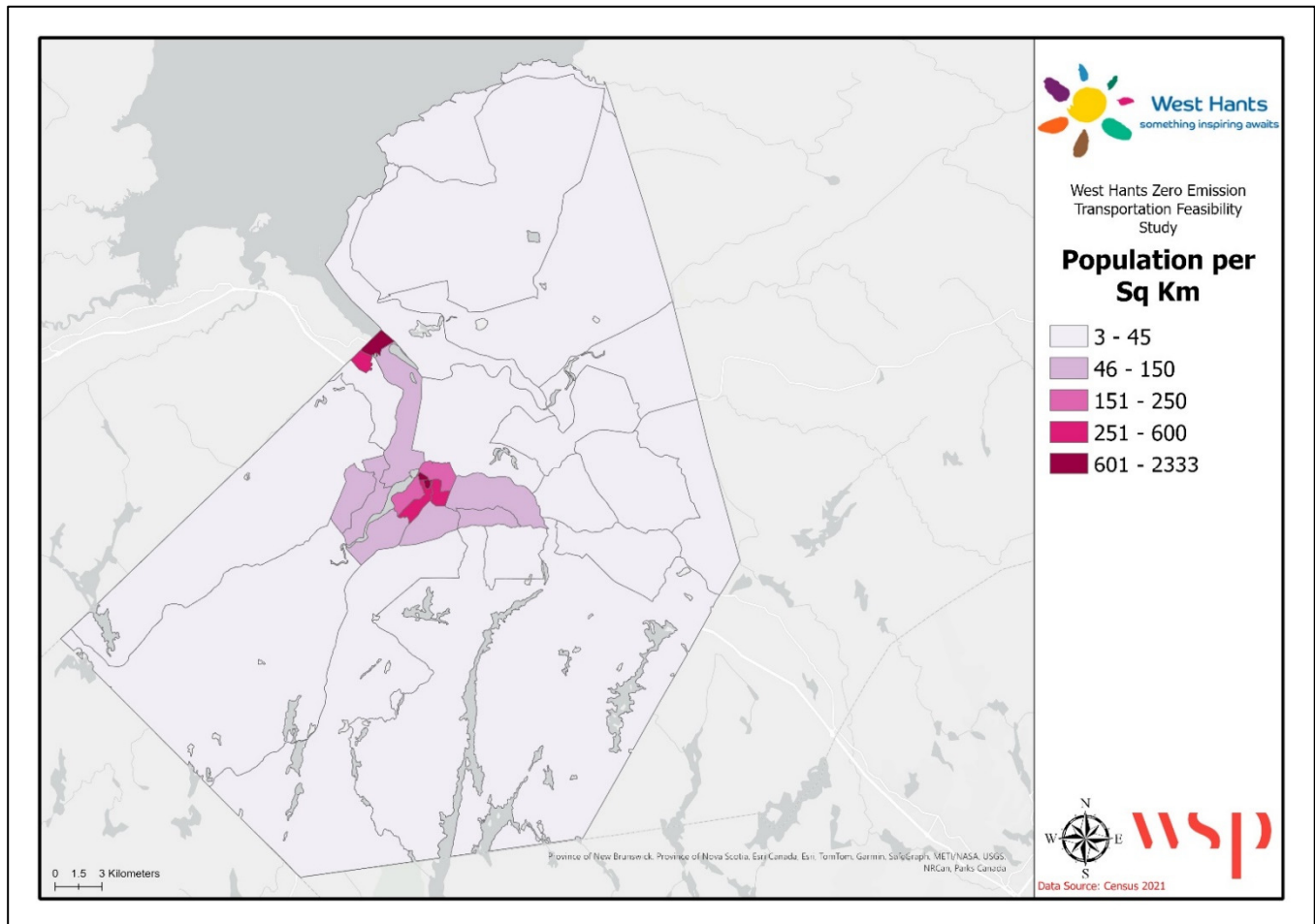


Figure 2-1: Population Density in the Study Area



Figure 2-2: Potential Transit Nodes and Collection Areas (Zones)

2.5 Destinations

While population generates transit trips, it is destinations that attract them. To determine how key destinations within the study area are distributed, a visual inventory was conducted. The locations of individual destinations within the study area collection zones were identified and a score was assigned to that zone to reflect the relative attractiveness of that zone for transit trips. This destination score was based on stakeholder and public feedback and the WSP study team's knowledge of small transit services within Nova Scotia.

There is no "value" to the destination points or formula used to calculate them. They are simply a relative ranking of their perceived importance in attracting potential transit trips. A summary of destination points by zone is provided in Table 2-1. This data will be used in the evaluation of route concepts to identify which options best connect to the key destinations within the study area.

Based on experience with similar services elsewhere in Nova Scotia, we have not assigned a significant number of destination points to the Morison Drive Industrial Area (Zones 12, 13 and 14). We have found that hourly transit service has low attractiveness for workplace commuting as the transit schedule is unlikely to provide good coordination with the workday schedule. Workers will either arrive by bus well before their workday begins or wait for the bus well after their workday ends. Consideration may be given to servicing areas like this with route diversions timed to align with shift changes or other service delivery models like vanpooling (see Section 3.6).

Table 2-1: Destination Score and Dwelling Units by Zone

Zone	Destinations Within Zone	Destination Score	Dwelling Units
1	- Downtown Windsor - Windsor Curling Club - Fort Edward Historical Site	8	122
2	- Downtown Windsor - Access NS	6	104
3	- Hants Aquatic Centre (Seasonal)	1	72
4			219
5	- Community Centre - Lawtons - Commercial Plaza	3	76
6			92
7	- King's Edgehill School	1	16
8			113
9	- Sobeys - Royal Canadian Legion - Kent - West Hants Education Centre	4	6
10	- West Hants Sports Complex - Hants Exhibition Arena - Atlantic Superstore - Maritime Bus	4	0
11	- Industrial Park	1	0
12	- West Hants Regional Municipality Offices	1	16
13	- Matthew 25 Windsor District Food Bank	1	26
14	- Biovectra	1	0
15	- Hants Community Hospital	4	122
16			37
17			88
18			216
19			48
20			17
21	- Commercial Plaza	1	37
22			67
23	- Three Mile Plains District School	1	40
24			47
25	- Payzant Home Building Centre - Hood Hardware & Automotive		28
26			48
27			67
28	- Avon View High School	1	0
29			103
30			88
31			61
32			47
33	- Haliburton Frisbee Park		25
34	- Various Commercial	1	37
35			27
36	- Falmouth District School - Windsor Elms	1	95
37			30
38	- Avon Valley Floral		28
39			69
40			51
41			32
42			42
43			60
44			78
45			26
Total		40	2623

2.6 Relevant Municipal Plans

Tying a transit service plan into to other municipal initiatives is an important step in ensuring the service can be seamlessly integrated into a municipal-wide strategic plan and can help support other strategies. A scan of existing municipal plans with connections to public transit includes the Municipal Planning Strategy, the Avon Region Active Transportation Plan and the GHG Emission Local Action Plan.

2.6.1 Municipal Planning Strategy (2008)

The current Municipal Planning Strategy makes no reference to public transit. It does, however, identify a street network hierarchy which will be relevant in determining which roadways are appropriate for routing buses on.

2.6.2 Avon Region Active Transportation Plan (2015)

“Active Avon” is an active transportation plan designed to improve options for safe and convenient non-motorized transportation across the Avon Region. There is little reference in the study to public transit other than noting that providing roadway access to King Street from the planned Garlandsn Crossing development provides an opportunity for both ends of development area to be served by transit. This connectivity may even allow transit to be routed through the site.

2.6.3 WHRM GHG Emission Local Action Plan

WHRM strives to promote a sustainable community, now and for future generations. As a member of the Partners for Climate Protection program, West Hants Council approved the goal of reducing greenhouse gas (GHG) emissions by 45% by 2030 and adopted a plan to reach that goal. The GHG Emission Local Action Plan outlines action items to achieve the 45% reduction and start WHRM on the path to net zero by 2050. One of the sustainability initiatives identified in the plan is to undertake this study, the Zero-Emissions Transportation Feasibility Study.

2.7 Jurisdictional Scan

A scan of one- or two-bus systems within Nova Scotia was conducted for comparative purposes. The data is provided in Table 2-2. The purpose of this exercise is not to mimic other systems but to understand what characteristics have made other systems successful. From this data we see how common one-hour loop systems have become in urban/suburban areas like Windsor-Falmouth. We can also get a sense of the types of fares offered and their cost.

Table 2-2: Jurisdictional Scan of Smaller One- and Two-Route Transit Systems in Nova Scotia

	ANTIGONISH	PICTOU COUNTY EXPANSION N.G./STELARTON		BRIDGEWATER	YARMOUTH
Municipality coverage	Town of Antigonish Antigonish County	Pictou County	Town of New Glasgow Town of Stellarton	Town of Bridgewater	Town of Yarmouth
Service operator	Community NFP	Community NFP	Community NFP	Municipality	Municipality
Primary bus	Gas cutaway		Gas cutaway	Gas cutaway	Gas cutaway
Passenger seats (w/o wheelchairs)	16		18	19	16
Accessibility	Lift		Low-floor	Low-floor	Low-Floor
Bike racks	No		No	Yes	Yes
Backup bus	Gas cutaway		Gas cutaway	Gas cutaway	Gas cutaway
Routing scheme	Loop	Linear	Loop	Loop	Loop
Service frequency	60 min	3 h 15 m approx	60 min	60 min	60 min
Weekday operating hours	7:00 - 19:00	6:40 - 20:20	7:00 - 21:00	6am - 8pm	7am - 7pm
Saturday operating hours	8:00 - 16:00	6:40 - 20:20	7:00 - 8:30	8am - 6pm	8am - 6pm
Sunday operating hours	no service	no service	9:00 - 17:00	no service	no service
Total weekly hours	68 hr		94 hr	80 hr	70 hr
Route length	20.0 km		22.6 km	16.9 km	13.2 km
Percentage of route flag stopping	100%	95%	70%	70%	90%
Annual operating cost	\$137,000		\$270,000	\$200,000	\$195,000
Annual fare revenue	\$13,000		\$90,000	\$45,000	\$33,000
Annual ridership	7,200		50,000	36,000	14,300
Single adult cash fare	\$2.00		\$3.00	\$2.00	\$2.00
Single student cash fare	\$2.00		\$3.00	\$1.50	\$2.00
Single senior cash fare	\$2.00		\$3.00	\$2.00	\$2.00
Monthly adult pass	\$55		\$70	\$45	\$50
Monthly student/youth pass	\$55		\$40	\$30	\$50
Monthly senior pass	\$55		\$60	\$45	\$50
Other fares	Day pass \$5.00 20-day pass \$55.00	Day pass \$5.00	Day pass \$7.50	10-ride adult \$18.00 10-ride student \$13.50 Family rate \$4.00	Tickets \$1.50

NOTES: Community NFP are not-for-profit groups that operate local on-demand transit service



2.8 Public Engagement

To understand the needs and expectations of the community relative to public transit, the WSP study team carried out a comprehensive public engagement program designed to gather meaningful input from residents and stakeholders.

To promote the engagement opportunities, the Municipality used both digital and direct outreach methods. Event and online survey information was shared across municipal social media channels to notify residents of upcoming opportunities to get involved.

A variety of engagement events was offered throughout the process, including:

- 11 Stakeholder Interviews;
- 2 Staff Workshop Sessions;
- 6 Public Open Houses; and
- An Online Community Survey.

Together, the communication efforts and engagement events helped ensure broad participation and provided valuable insight into the community's existing challenges, opportunities and aspirations for a transit service within the Municipality. A full summary of our engagement activities is included in a What We Heard Report that appears in Appendix B.

The findings from the stakeholder and community engagement activities conducted have been summarized into a series of "Key Themes". The input collected through internal and external stakeholder interviews, the community survey, and open houses provided valuable insight into the barriers, opportunities, and aspirations to help inform the development of the Zero Emission Transportation Study.

While the feedback received varies, several key themes were identified, which will support the development of the Study's recommendations. This section provides an overview of key themes heard throughout these engagement efforts, which have been categorized into the following four "Key Themes":

- Transit That Works for Real Life
- Access for All: Affordable, Inclusive, Easy & Safe to Use
- Connect Us, Locally and Regionally
- Sustainable by Design: A Transit System that Supports a Greener Future

Each theme is described in more detail below:

TRANSIT THAT WORKS FOR REAL LIFE

The engagement feedback emphasized the importance of reliability, convenience, and good routing. Overall, respondents are open to using transit, provided it aligns with their actual daily patterns. There was interest in having buses that run at times when they travel most (morning, midday, late afternoon)

and on weekends when demand remains strong. Convenient routes and stops, reliable schedules, and short walking distances to bus stops drive interest. Transit will attract riders only if it is dependable, accessible, and built around real travel behaviour, not hypothetical patterns.

Participants also highlighted the vital role that public transit can play in promoting independence, reducing social isolation, and enhancing overall quality of life, especially for those who rely on it as their primary mode of travel.

The Study should consider:

Reliability & Convenience

- o Prioritise reliable, convenient transit operations with schedules that align to actual resident travel patterns, including peak morning, midday, and late afternoon times as well as weekends.
- o Ensure that transit routing and scheduling respond to real-world demand, focusing on popular travel periods (7–10 a.m., 10 a.m.–4 p.m., 4–6 p.m. on weekdays) and high weekend demand (particularly Saturday mornings and afternoons).

62% of survey respondents indicated they would use transit, and 28% say “maybe” depending on how well it fits their needs.

Accessibility & Infrastructure

- o Design routes and stops to minimise walking distances, aiming for most residents to be within a 5-minute walk of a stop, as longer walks significantly reduce willingness to use transit.
- o Locate stops strategically near major destinations, workplaces, and community hubs to maximise utility and accessibility for users. The most common locations identified by survey respondents included, Downtown Windsor (83%), Atlantic Superstore on Cole Drive (77%) and Sobeys on Wentworth Road (74%).
- o Address operational barriers identified in the community, such as the need for reliable service during severe weather and on rural roads, and ensure stops are safe and well-designed.

Community Feedback & Personal Routines

- o Incorporate public feedback on motivators for transit use, such as routes and schedules that fit with personal routines, identified by 70% of survey respondents, and offer direct access to key destinations identified by 55% of survey respondents.

ACCESS FOR ALL: AFFORDABLE, INCLUSIVE, EASY & SAFE TO USE

From the feedback received, affordability emerged as a defining theme. WHRM residents want a transit system everyone can use with confidence. That means barrier free vehicles and stops, short and comfortable walks to bus stops, simple and flexible ways to pay, and clear information so riders always know where to go and how to ride. The desire for low to moderate fares is matched by a strong emphasis on keeping costs manageable for both individual households and the Municipality as a whole.



In developing recommendations, the study should consider a balanced approach that ensures financial sustainability, addresses resident preferences, and mitigates potential risks associated with funding and ridership.

The Study should consider:

Fare Structure & Payment Options

- o Exploring opportunities to provide affordable fare options that maintain long-term financial sustainability while ensuring accessibility for all users. Most respondents prefer one-way fares in the range of \$2.01–\$3 (29%), with a significant portion favouring \$3.01–\$4 (27%).
- o Consider multi-faceted payment methods, including electronic payment (e.g., app or tap cards), prepaid tickets or passes, and cash options to accommodate diverse user preferences and needs. 72% survey respondents prefer electronic payment methods, while 54% favour cash fares and approximately 50% would use prepaid passes.

Importance of Affordability and Accessibility

- o Affordable fares can not only drive ridership, but provide access for youth, seniors, and low-income community members to essential daily services. 63% of survey respondents say affordable cost is “very important” when choosing to use transit.
- o Design stops to be safe, comfortable, and accessible, considering mobility, age-friendly features, and shelter needs.

57% of survey respondents rated accessibility as ‘very important’.

Public Understanding, Safety & Perception

- o Improve public awareness and communication about services, schedules, and how to use transit.
- o Build a positive public perception of transit, especially given the community’s car-dependent baseline and skepticism of re-introducing a transit system.

Fiscal Responsibility & Sustainability

- o Use realistic service design principles to calibrate expectations and build toward ridership growth over time.
- o 49% of survey respondents express concern about the potential tax impact of launching and maintaining transit services.
- o Open-ended feedback highlights concerns about high per-ride costs, overall funding challenges, and ensuring a worthwhile return on investment.

CONNECT US, LOCALLY AND REGIONALLY

Participants emphasized that a future transit system should prioritize connections to key WHRM destinations like Downtown Windsor, major grocery stores, the hospital, and the Sports Complex. Beyond municipal borders, there was also strong interest for access to Halifax (via Sackville Terminal), New Minas, Acadia University, the airport, and other regional hubs. Transit isn't just about getting around the Municipality, it's about enabling work, education, healthcare, and shopping access across the region. Connectivity is a core community expectation.

The Study should consider:

Local Mobility and Access

- o Ensure strong connections to key local destinations such as Downtown Windsor, major grocery stores, Hants Community Hospital, and the Sports Complex to address the most frequently cited travel needs within WHRM.
- o Prioritize service reliability, consistency, and availability beyond peak hours to increase resident confidence and encourage greater ridership.
- o Design services that are responsive to rural density and dispersed community patterns, ensuring accessibility for all neighbourhoods.

Regional Connectivity

- o Consider exploring convenient links to regional hubs including New Minas, Sackville Terminal (for Halifax Transit), Halifax Airport, Wolfville/Acadia, and Kings Transit connections to support work, education, healthcare, and shopping needs across the region.

Flexibility and Demand-Responsiveness

- o Incorporate flexible, demand-responsive service options to accommodate varying trip purposes and times, especially for those with limited transportation alternatives.
- o Consider innovative approaches (e.g., on-demand transit, smaller vehicles, dynamic routes) tailored to rural realities and changing demand patterns.

Equity and Community Impact

- o Recognize transit as a community lifeline, giving special attention to the needs of seniors, youth, low-income residents, and people requiring access to medical or essential services.
- o Frame transit as a tool for social inclusion, independence, and community wellbeing, not solely as a zero-emissions initiative.

Lessons from Past Experience

- o Draw on learnings from previous transit attempts, focusing on right-sizing, sustainability, and strategies to avoid repeating past shortcomings related to low ridership and service unreliability.

SUSTAINABLE BY DESIGN: A TRANSIT SYSTEM THAT SUPPORTS A GREENER FUTURE

A sustainable transit system is more than just cleaner vehicles, it's a long-term investment in reducing emissions, supporting climate goals, and offering residents practical alternatives to car dependency. While environmental factors ranked lower than convenience and affordability for many respondents, the survey still shows meaningful interest in low emission travel, especially when paired with reliable service and strong connectivity. A sustainability theme signals that WHRM can grow transit thoughtfully: reducing environmental impact while improving day to day quality of life.

The Study should consider:

Balancing Emissions Reduction with Practicality

- o Only 18% of respondents identified zero-emission vehicles as a top motivator, suggesting environmental choices should be paired with convenience and reliability to attract riders.
- o As most residents rely on personal vehicles, even small shifts to transit can yield meaningful environmental benefits, reduce roadway demand, and support healthier, more resilient communities.
- o Respondents raised concerns about charging infrastructure, electric vehicle reliability, and how severe weather could impact operations, indicating the need for realistic implementation strategies.

Supporting Broader Climate and Sustainability Goals:

- o Design a transit system that is right-sized for rural realities to avoid underused services, ensuring resources, energy, and municipal investment are used efficiently.
- o Integrating transit with active transportation, compact land-use patterns, and multimodal connections helps reduce greenhouse gas emissions, vehicle dependency, and traffic impacts.

3. Service Models

3.1 Urban-Rural Fixed Route

An urban-rural fixed route service is a route that follows a set route on a set schedule and serves areas both within the urban Windsor-Falmouth area and rural areas within the Municipality. The routing that was previously operated by Kings Transit would fit this description. The Kings Transit service ran from Wolfville, through Grande-Pre, Hantsport, Falmouth, Windsor, and Brooklyn on a two-hour service frequency.

3.2 Urban Fixed Route

An urban fixed route service travels along a set route with a fixed schedule stopping, typically, at defined stops. In Nova Scotia, urban fixed route systems range from the large multi-route systems in Halifax Regional Municipal and Cape Breton Regional Municipality to the single-route systems in Bridgewater, Yarmouth and other Towns (see Table 2-2). Single-route systems within towns most frequently involve a single bus traveling a one-hour loop through the town.

3.3 Demand Responsive

Demand responsive transit involves vehicles that pick up passengers at their door and deliver them to the door of their destination. Reservations are needed in advance to book the service. Vehicles used are typically accessible vans or small mini-buses. Where possible, the service dispatcher will book multiple trips on the same vehicle. For this reason, services like this are often referred to as “shared taxi”.

West Hants Dial-a-Ride, one of many demand responsive services in Nova Scotia, provides service throughout WHRM.

3.4 Flex-Route

Flex-route transit combines aspects of fixed-route and demands responsive service. In this model, a bus operates along a defined route with scheduled timing points and fixed stops, but it has the flexibility to deviate to pick up or drop off passengers closer to their origins or destinations typically upon advance request. Riders can board or get off the bus at a flag or fixed stops along the main route and the bus will only leave the route if a deviation is requested. This service delivery model can improve accessibility and coverage for users beyond walking distance from main corridors while maintaining a basic level of scheduled service. However, operational complexity can increase as drivers must balance scheduled stops with deviations and careful management is required to avoid delays or missed connections. Public awareness and understanding of how to request deviations are also important for successful implementation.

Table 3-1: Fixed-Route vs Flex-Route Transit Models Comparison

Service Delivery Model	Key Features	Advantages	Challenges
Fixed-Route	Schedule, set route and stops	Predictable, reliable and easy to use	Inflexible, costly in low density areas with low ridership
Flex-Route	Follows a set route and schedule but can deviate within a defined area upon request	Increase coverage for dispersed populations, maintains some schedule predictability	Operational complexity

3.5 Rural Day-a-Week

One type of flex-route service that may prove successful in rural areas is what we have called Rural Day-a-Week service. The plan we have proposed would divide populated areas within the Municipality, but outside of the urban area, into eight service areas. Those service areas are shown in Figure 3-1.

The service plan would see each of these areas receive transit service one day each week. Within that day, a bus would travel from the Windsor Sports Complex and arrive a central community hub to drop off passengers. There would then be a window of 25-40 minutes within which the bus would travel to residences where a booking had been made for a pick-up. Passengers traveling to the area from Windsor could also request a drop-off at their home within this window. Once all of the drop-offs and pick-ups have been completed, the bus would return to the central community hub where waiting passengers would be picked up. At a scheduled time, the bus would depart the central community hub and travel back to the Windsor Sports Complex. This cycle would be repeated three or four times within each service day.

Along the route between Windsor and the central community hub, any resident could “flag-stop” the bus. This means that the resident waits on the shoulder of the road and waves to the bus driver as the bus approaches. The bus will stop to pick up the passenger provided it is safe to do so at that location. Similarly, a passenger already on the bus may ask the driver to stop to let them off at a specific location along the route.

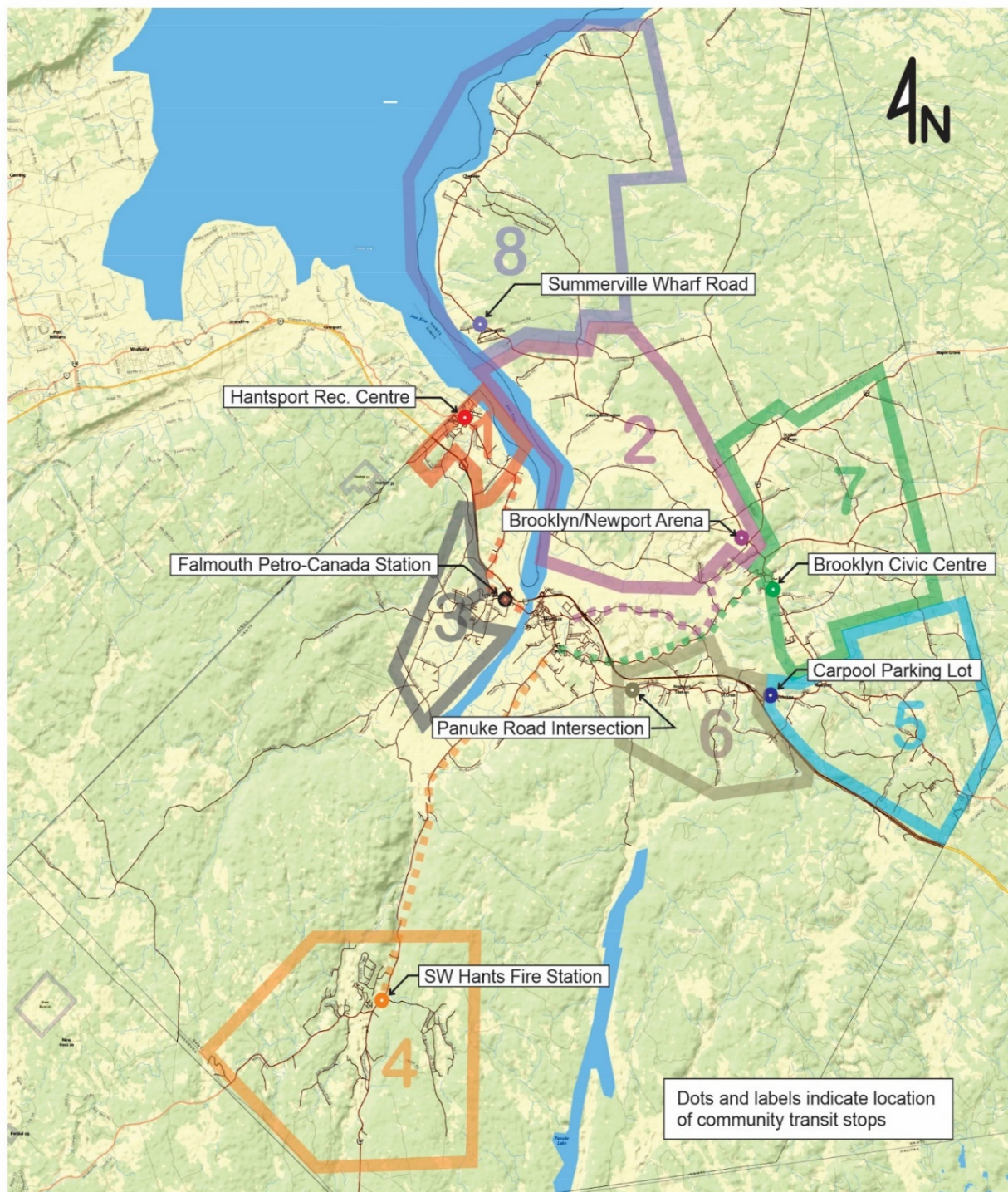


Figure 3-1: Service Areas and Community Points for Rural Service Model

3.6 Other Demand-Responsive Services

Other alternatives to delivering transit service have been explored elsewhere with mixed success. A summary of some of these service options is provided below.

Vanpooling can be used with a large employer or a “campus” of workplace locations in close proximity. A multi-passenger van will pick up employees in a single location or at their door within a specific community or neighbourhood and drop them off at a single workplace location. One workplace may have multiple vans that service several communities, but all make only one destination stop. The reverse is done at the end of the day and only one trip in and one trip out is made per day. Typically, the driver of the van is also an employee at the workplace. If vanpooling makes sense for an employer, or a campus of employers, they will implement it. A Municipality, however, may choose to subsidize the operation to get it started with the justification of better managing overall transportation in the region.

Third-party demand-responsive services provide the same type of service as the existing not-for-profit community operators in WHRM and elsewhere in Nova Scotia, but typically employ more technology in the management of trip reservations. VIA is one such provider, demonstrating how technology-enabled demand-responsive systems can support mobility needs in both rural and urban settings. The company operates on-demand transit services in several Canadian communities by supplying the platform used for real-time trip requests, vehicle routing, and shared-ride coordination. In York Region, VIA powers York Region Transit’s on-demand service across suburban and rural areas, expanding transit coverage where fixed-routes are less effective. VIA also supports smaller municipalities, including Kenora, Ontario, where it provides the operational platform for Kenora Transit, and Alma, Québec, where it enables Transport adapté d’Alma’s on-demand operations. Across Canada, VIA reports partnerships with 35 agencies, reflecting a broad operational presence and demonstrating how third-party demand-responsive systems are being used to enhance local mobility options.

Several Ontario municipalities have introduced or expanded on-demand transit services to address gaps in conventional public transportation. In Pembroke, a three-year pilot project was launched to restore local transit after a 12-year absence, offering six-day-a-week service using two eight-seat vehicles that riders can book through an app, web portal, or phone line at a fixed fare of five dollars per trip. In Ottawa’s Blackburn Hamlet, OC Transpo tested an on-demand service using spare Para Transpo minibuses on Sundays and select holidays, allowing same-day and next-day bookings between designated stops and Blair Station. As the pilot concluded, the City of Ottawa reported increased ridership and positive user feedback. In North Grenville, the Municipality introduced NGtransit, an on-demand bus service that can be booked between 30 minutes and one month in advance and operates daily within municipal limits, providing a new transportation option where taxis and ride-hailing are not available. In North Durham, Durham Region Transit continues to operate on-demand service in Uxbridge, Brock, and Scugog, with ridership increasing notably in Uxbridge and Brock and declining slightly in Scugog.

Ride-sharing services like Uber and Lyft (if available locally), or taxi services, can be positioned in rural areas to provide demand-responsive service. The Municipality would have to subsidize each trip to make the service attractive to the service providers and to keep it affordable for the users. A taxi subsidy model

removes the need for the Municipality to purchase vehicles, eliminating associated capital costs. Although taxi trips may have higher operating costs, the Municipality does not assume responsibility for service operations. Based on the projected ridership (see Section 9.2.2), subsidizing the same number of trips through a taxi program would cost the Municipality between \$97,000 to \$155,000 annually, assuming an average taxi fare of \$10 per trip and a user 'fare' price of \$3 (i.e. \$7 municipal subsidy). It is recommended that subsidies ONLY be extended to trips that begin and end within municipal boundaries and be extended to residents only. This approach offers cost avoidance related to vehicle ownership; however, it also presents challenges, including limited scalability and reduced ability to manage or coordinate service delivery. As service provision relies entirely on a private third party, servicing cannot be guaranteed for users, resulting in an option that would provide very good coverage – as taxis can travel anywhere – but very low guaranteed reliability.

The benefit of this type of hybrid service is that the fixed-route portion is limited to a route between Windsor and the central community point and travels other more remote roads only when there is demand. It can be more efficient than the existing dial-a-ride service because reservations are limited to certain fixed windows, potentially leading to a greater likelihood of multiple trips being captured on the same trip to or from Windsor.

3.7 Inter-Municipal Service

The Provincial Regional Transportation Plan (2025) identifies a new inter-municipal transit service that will allow people to travel around the region surrounding Halifax by bus or train. This service can connect to existing municipal transit service to expand the reach of trips that can be provided by transit. A map showing proposed inter-municipal service is provided in Figure 3-2.

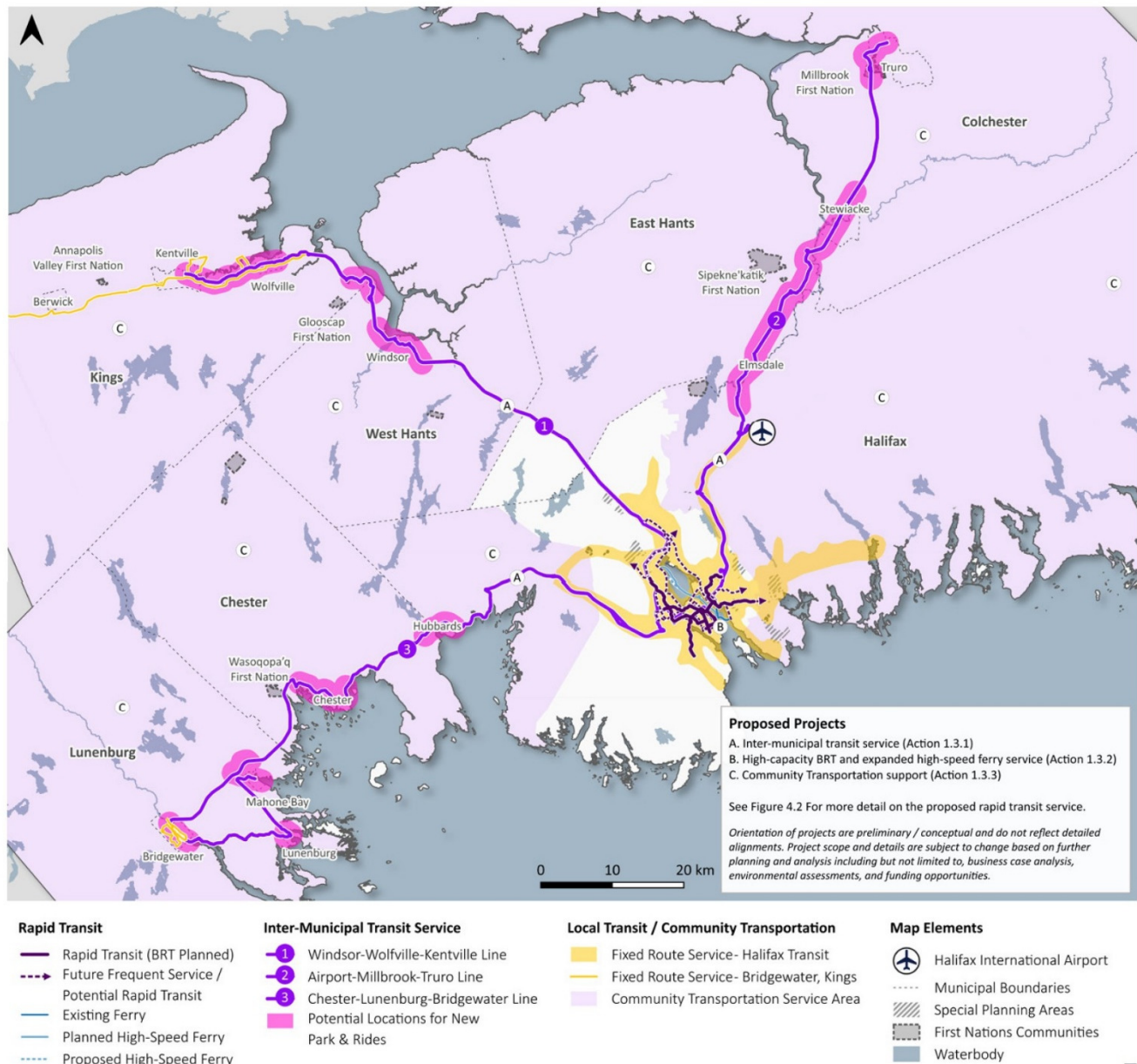


Figure 3-2: Proposed Inter-Municipal Transit Network (Provincial Transportation Plan)

3.8 Preferred Service Models

Following discussion with the WHRM Project Team and review of feedback from the engagement sessions, it was decided to focus on urban fixed-route service and rural day-a-week service for analysis. While it was agreed that Inter-Municipal service would be of benefit, that type of service would be beyond what the Municipality could offer on its own.

The following chapters provide further examination of those two service models.

4. Evaluating Urban Fixed-Route Service Concepts

The first step in developing a fixed-route service plan is to build a suite of routing concepts for evaluation and review. It is expected that the ideas contained in these concepts will lead to the development of new concepts, modified concepts, or combined concepts. The objective of this exercise is to use a comparative evaluation to focus on two concepts that best meet the needs of the community. From that point, a more extensive analysis and modeling process can be applied. Ultimately, a single Preferred Service Plan will be chosen. The full process is summarized in Figure 4-1.

4.1 Service Concepts

We initially produced a set of twelve concepts which are provided in Appendix C. The concepts were illustrated on a coarse map of the urban area arterial and collector street network. The concepts provide only minimal operating detail, allow those details to be developed in subsequent stages of the process. Along with each concept sketch, we provide some basic evaluation criteria described below.

Route cycle time

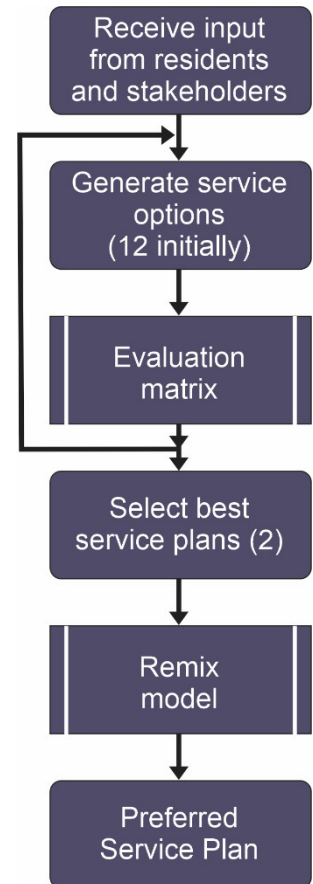
This is the time that the bus takes to complete the full route, inclusive of stops and dwelling time. A one-hour cycle is typical and results in an easily memorized schedule. Reducing the cycle length will improve the frequency of bus arrivals, however, results in a more complex arrival schedule. Increasing the cycle length will allow for a longer route length and a greater coverage area. Our concepts provide a range of cycle lengths.

Route in-service time

This is the time that the bus will be operating on the route, including normal stops for loading. The difference between the cycle time and the in-service time is called “dwell time”. Dwell time is built into one, or possibly two, locations along the route (i.e. the route “starting point”) to allow the driver a periodic break. The dwell time also helps to keep alignment with the route schedule if delays occur. Dwell time is also valuable for battery topping-up, if a battery-electric bus is selected. A dwell period of two to ten minutes is desirable.

Number of dwelling units in service area

For each of the routing concepts, we have determined which nodes (see Figure 2-2) will be serviced and therefore how many dwelling units will be within 400 metres walking distance from the candidate route.



**Figure 4-1:
Process Chart**

Destination points in service area

Similar to the dwelling unit assessment, we have determined how many “destination points” are within 400m of each route. Destination points are described in Section 2.5 of this report.

4.2 Routing Approaches

There are two general approaches to developing a route: loop and out-and-back. Nearly every Nova Scotia Town with a single-route transit service (Pictou County, Antigonish County, Yarmouth, Bridgewater, and planned for Lunenburg County) uses a one-hour loop model. The transit route planned for East Hants, however, is a one-hour out-and-back. Recently introduced routes to supplement the core Pictou County route are also out-and-back in their layout.

The benefit of a loop model is that it provides coverage of a broad geographic area. The downside of a one-hour loop is that the sum of an A-to-B and a return B-to-A trip is always going to be one hour, even if A and B are close in proximity. Also, if there is a large amount of dwelling time built into the route plan, there will be some passengers who are enroute to their destination who will have to sit through that dwell time. With an out-and-back route, the A-to-B and B-to-A trip times will be essentially identical and correspond to the distance between the two points. Dwelling time will be built into the terminus points where the bus should be empty of passengers.

Our concepts primarily reflect the loop model, but some are out-and-back routing combined with smaller loops.

4.3 Evaluation Results

The ability of each of the routing concepts to reach dwelling units and destination points within its service area (a 400-metre walking distance of the route) is a critical measure of potential ridership. Table 2-1 shows, for each of the concepts evaluated, how many dwelling units and destination points are within walking distance of the route.

Along with the concept sketches, we produced a comparative evaluation matrix. The matrix and the criteria used in it are shown in Figure 4-3.

An evaluation matrix is a tool that allows important success criteria for a transit service to be measured and compared for a range of service concept options. Our intent with this matrix is not to use its scoring as the sole indicator of success. The matrix is intended to be supportive of using subjective judgement combined with objective measurement in determining what will work best for the service area.

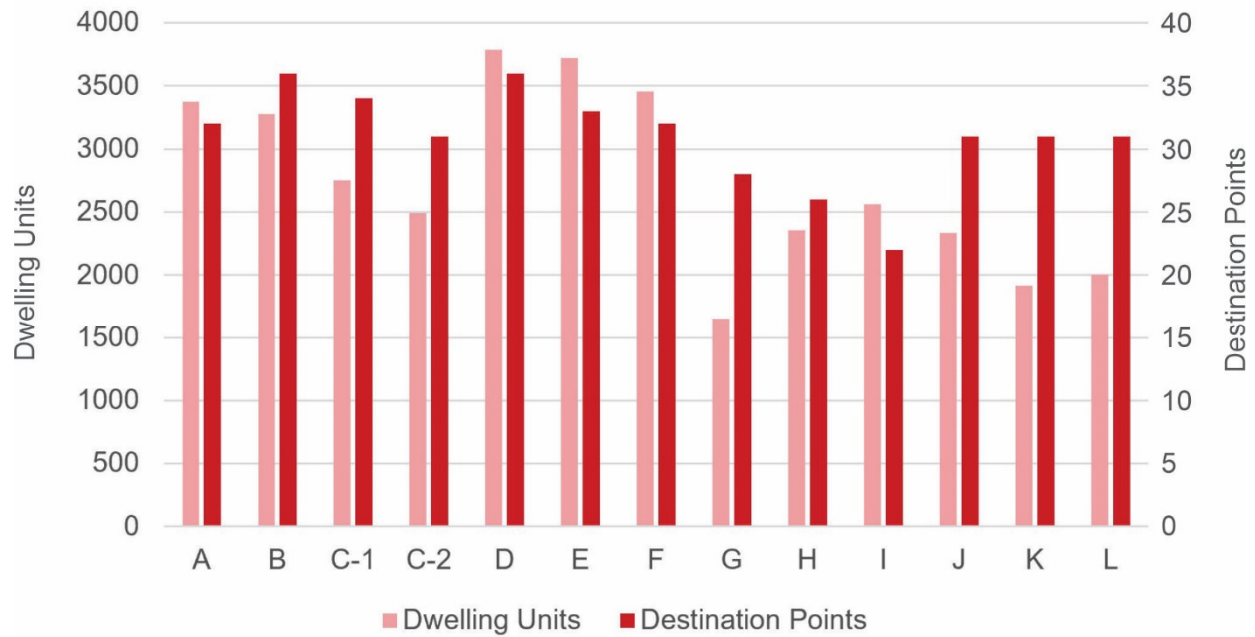


Figure 4-2: Dwelling Units and Destination Points by Service Option

CRITERIA	RATIONALE	ROUTE OPTION													
		A	B	C	C-1	C-2	D	E	F	G	H	I	J	K	L
Dwelling Units in Service Area	The more dwelling units that are captured, the greater the number of potential transit users.														
Destination Targets in Service Area	Servicing more destinations provides more choices for users.														
Dwelling Time	Dwell time is important to maintain schedule adherence and to give the driver a rest break. It is also valuable for battery top-ups when using battery electric buses.														
Service Frequency	A more frequent service provides more opportunity for transit users to use the bus.														
Clarity for Customers	A clear schedule makes it easier for users to understand. A complicated route that uses the same road multiple times or a route where the bus arrival time is inconsistent could lead to customer confusion which														
Total Points (out of 25)		16	17	20	15	15	18	18	17	13	15	12	13	16	15

Meets the criteria well

Mostly meets the criteria

Partially meets the criteria

Mostly misses meeting the criteria

Fails to meet the criteria

Figure 4-3: Evaluation Matrix

4.4 Selection of Preferred Service Plan

Following a review with Municipal staff it was determined that the most effective routing concepts to move forward to detailed analysis were Concept A and Concept C with some modifications. The modified concepts were renamed as Service Plan 1 and Service Plan 2 and are described below.

Service Plan 1

This plan consists of two separate routes (shown as two different colors in Figure 4-4), served alternately by a single bus. Each of the routes will take 45 minutes to complete, meaning that two consecutive runs of each route will take 90 minutes. The result is that locations covered by a single route will receive service once every 90 minutes while locations along the overlapping sections will receive service every 45 minutes. The benefit of this approach is that key core areas receive a higher service frequency while outer areas receive a lower frequency of service. The result is that more overall coverage is provided compared to Service Plan 2. An important negative to this plan is that the daily schedule will be less intuitive than a service that operates every hour.

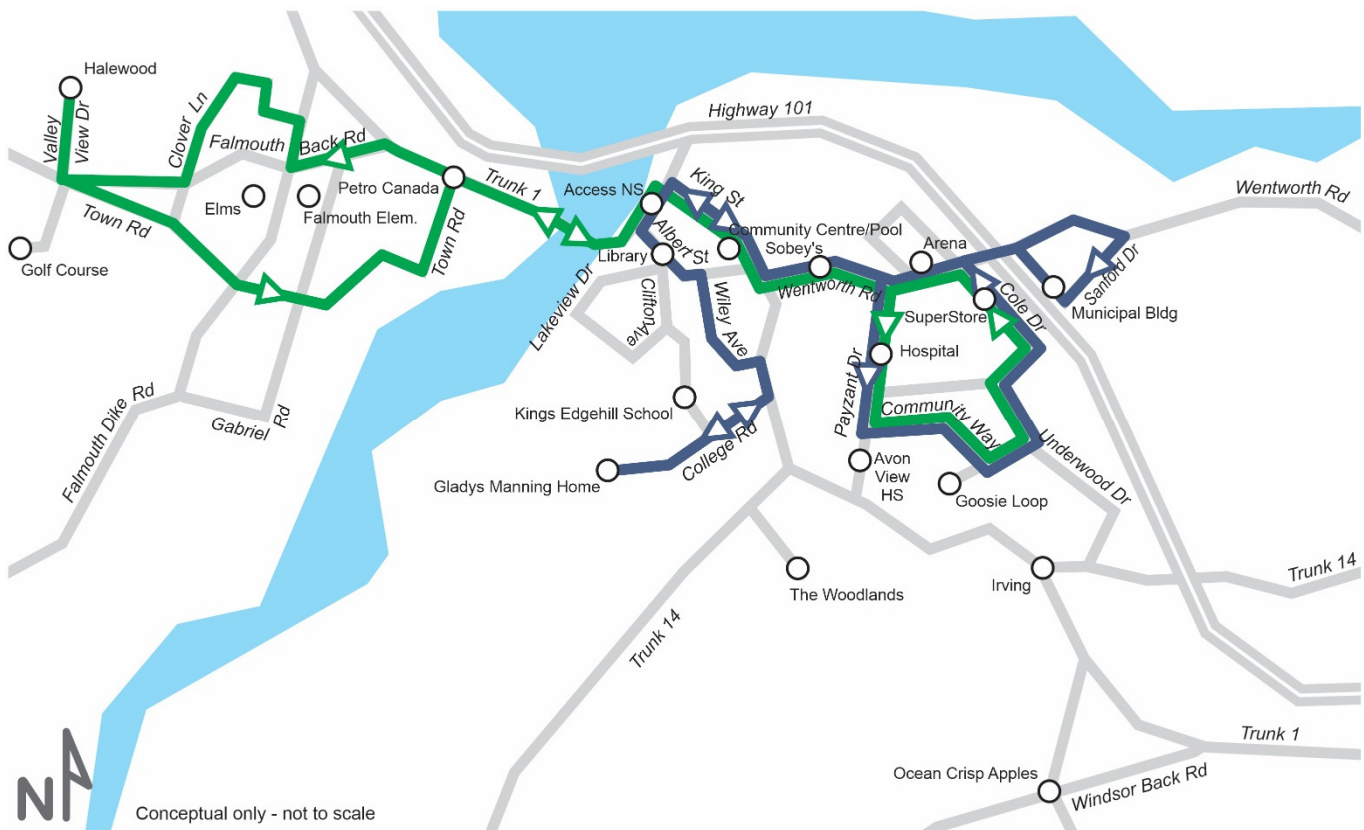


Figure 4-4: Service Plan 1 Preliminary Layout

Service Plan 2

This plan is designed for a single bus traveling a one-hour loop through Windsor and Falmouth and is shown in Figure 4-5. The route serves most key destinations including downtown Windsor, the Sports Complex, Sobeys, Superstore, the Hospital, the Gladys Manning Home, and Windsor Elms.

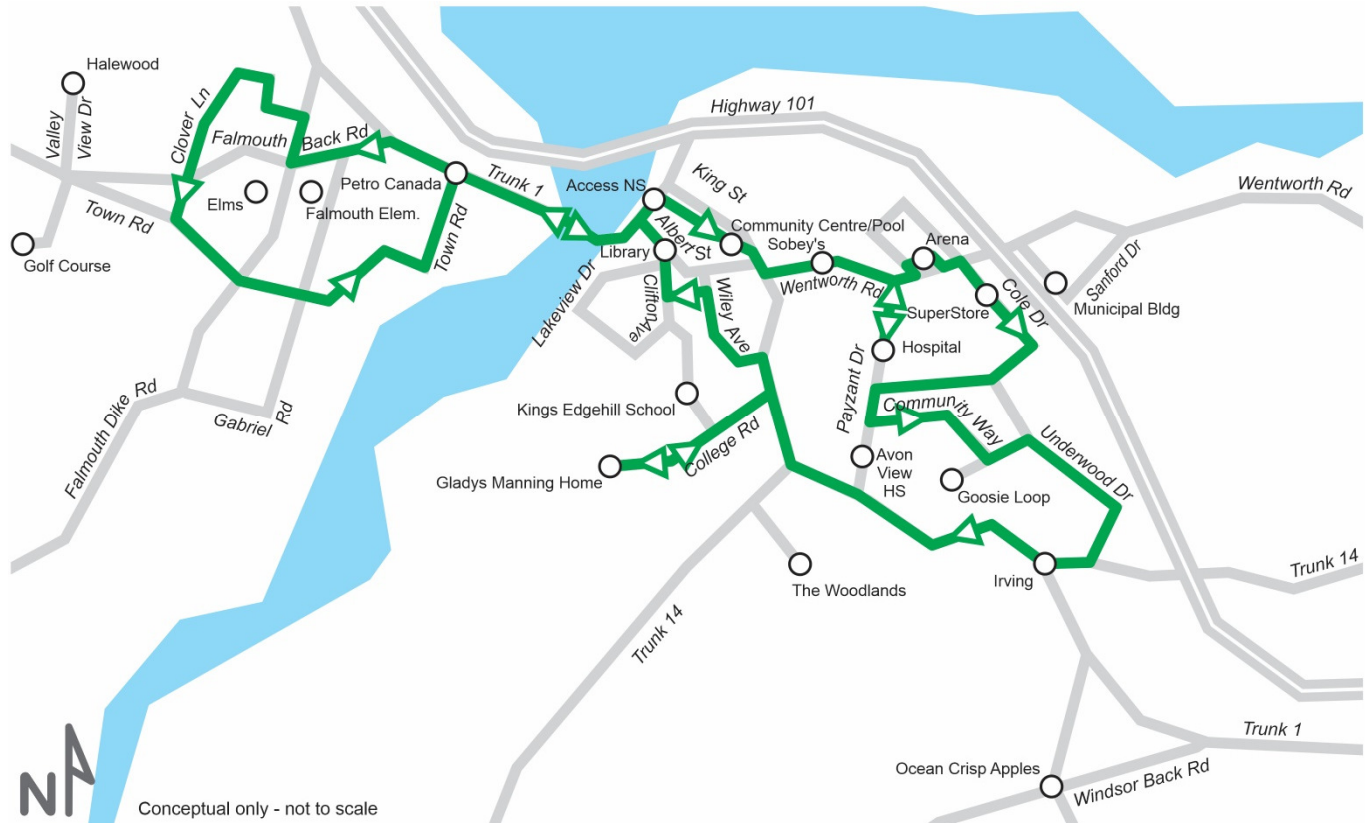


Figure 4-5: Service Plan 2 Preliminary Layout

Following further review with the WHRM Project Team it was determined that Service Plan 2 was preferable to Service Plan 1. The following modifications were determined to benefit the functionality of the route and to bring its travel time within a range that would allow for a high level of confidence in completing each cycle within one hour with some dwelling time. The modifications were:

- Using Gerrish Street instead of King Street as it is more central to the business district
- Cutting out Clover Lane and Town Road in Falmouth (single family homes) and providing more direct service to Windsor Elms and Falmouth Elementary School
- Connecting to the Hospital via Underwood Drive instead of Wentworth Road

Ultimately these adjustments resulted in a Preferred Service Plan which is shown in Figure 4-6.

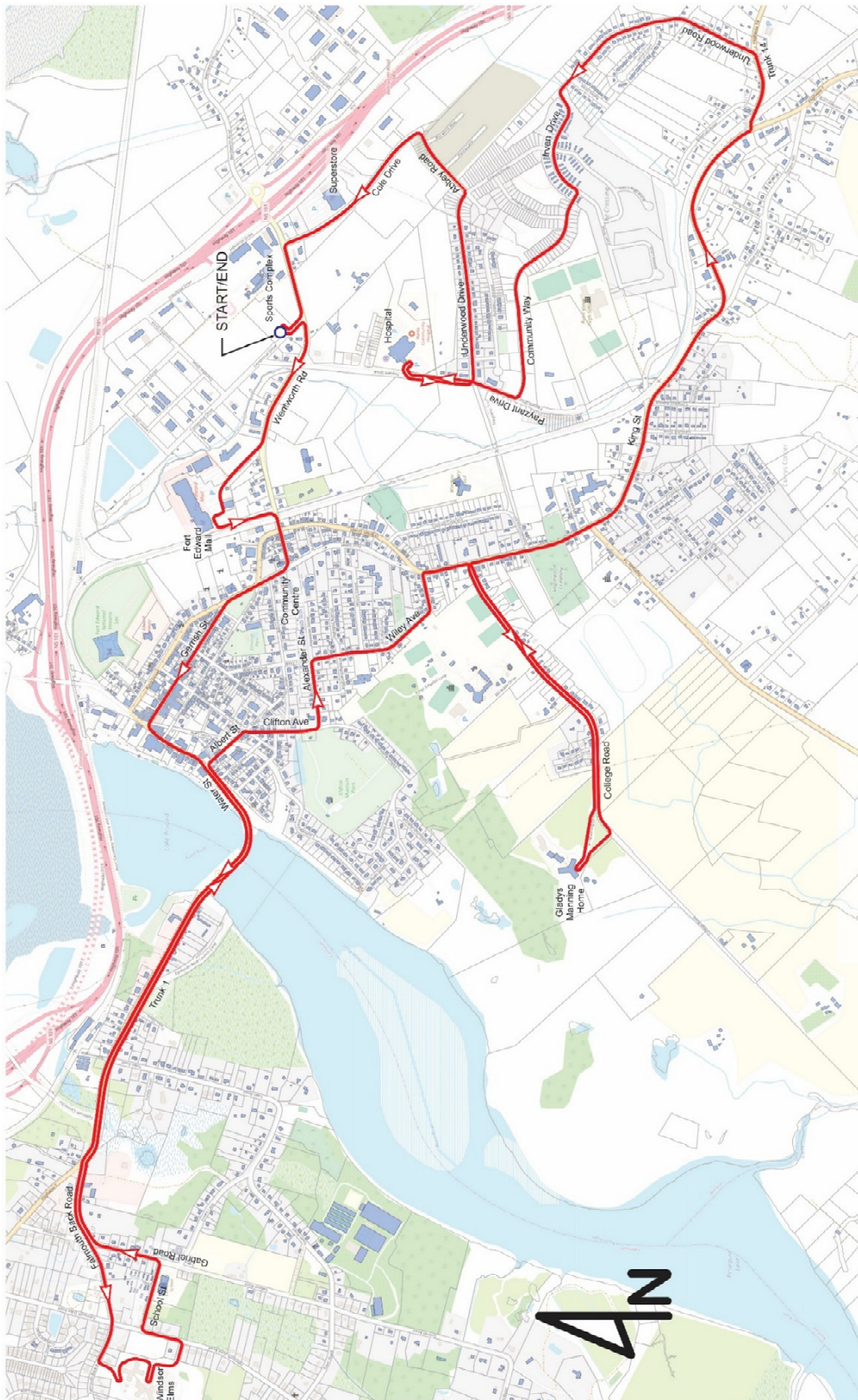


Figure 4-6: Route Layout of Preferred Service Plan

As displayed in Figure 4-7, the preferred route provides coverage to approximately 2,900 people within a five-minute walking distance (400m radius) of the bus route, or approximately 85% of population within the former Town of Windsor.

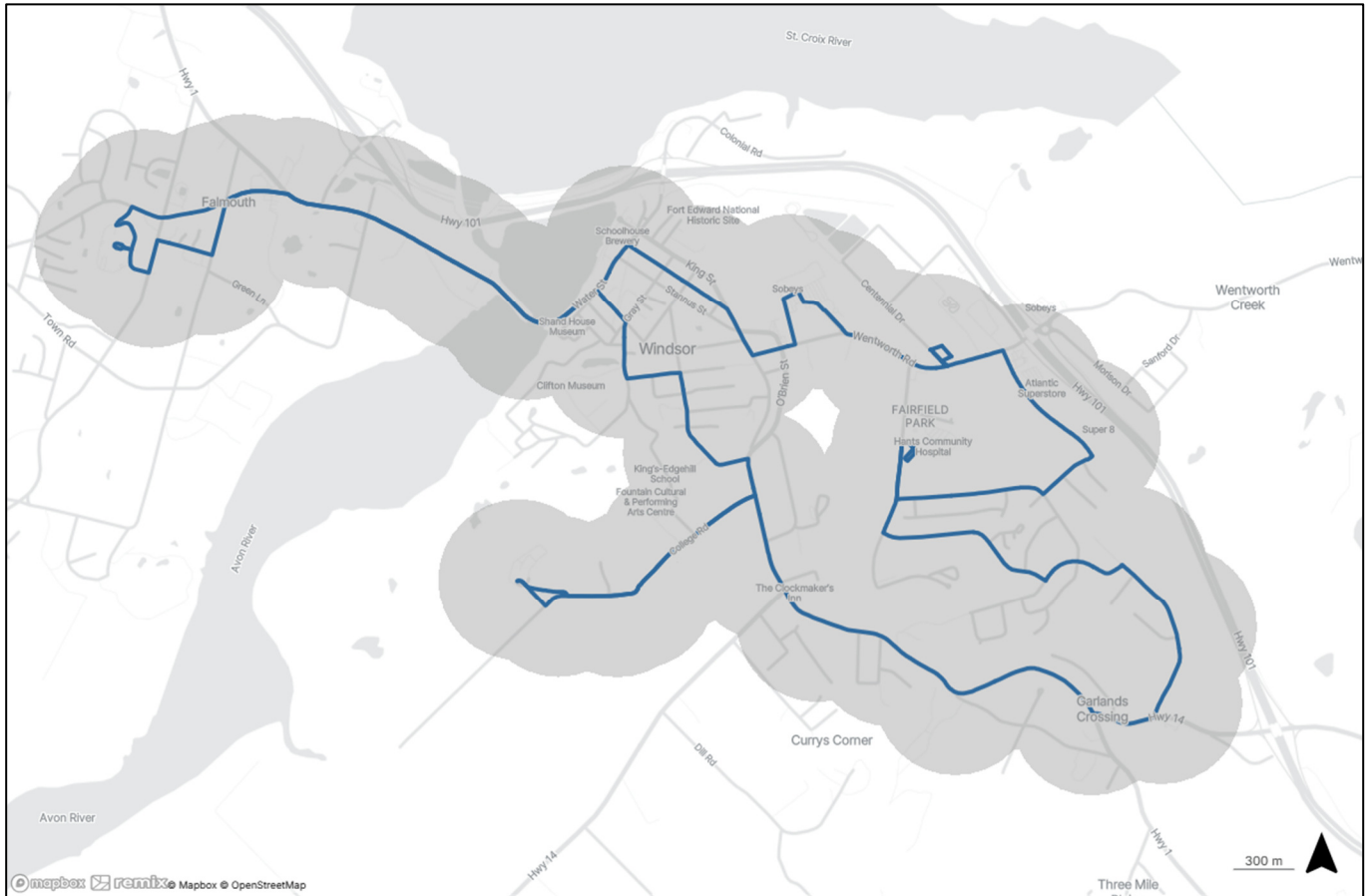


Figure 4-7: Areas Within 400m Walking Distance of Preferred Route

5. Operating Options

There are a number of ways for a Municipality to approach the operation of its fixed-route public transit system. The most obvious way is for the Municipality to take on the operation itself. This can be a daunting undertaking, however, as even the smallest transit systems must deal with issues such as maintaining back-up vehicles and back-up drivers. This is much more efficiently handled in a multi-route system than it is in a single-route system.

Options to a municipally-operated transit service are present and working effectively in the Atlantic Provinces. Table 4.4 provides a summary of operational options and examples of each that we are aware of.

Table 4.4: Transit Operating Models in Atlantic Canada

Operator	Description	Examples
Municipality	WHRM would operate the service itself, hiring staff and creating a Transit division within the organization.	Halifax Transit, Transit Cape Breton, Bridgewater Transit, and Yarmouth Transit
Community Not-for-Profit	West Hants Dial-a-Ride would operate the service with funding from the Municipality as well as other sources.	Antigonish Transit CHAD Transit (Pictou County)
Multi-System Operator	Although we are aware of few examples, we believe Nova Scotia would benefit from having a single operator for its multiple smaller non-contiguous transit systems. Kings Transit Authority might be positioned to take on a role like this.	BC Transit ²
Private Sector Operator	There are some private sector bus charter companies within Nova Scotia who could be procured through a tendering process to operate a fix route.	Charlottetown Transit

Any of these models could be a good fit for WHRM, although as we discuss further in Section 13.4, it will be challenging for the Municipality to operate a single-route service itself. West Hants Dial-a-Ride (community not-for-profit), Kings Transit (multi-system operator) and Coach Atlantic (private sector operator) could all be engaged in discussion related to service provision.

² BC Transit, which began as the Urban Transit Authority in 1979 is a provincial crown agency charged with providing transit service throughout BC outside of the Greater Vancouver Area. Victoria Transit is the only service operated directly by BC Transit, while regional services in over fifty other communities are operated either by the Municipality or by a private contractor. In addition to funding, the individual regional services receive high-level planning and operational support from BC Transit.

6. Selecting a Vehicle

6.1 Vehicle Types

There are three basic types of design that can be selected for an urban public transit bus. Each is listed and described below. Although a life-cycle costing analysis specific to the WHRM service was not part of this project, we provide some general observations to compare cost and performance of each bus type.

Highway Coach

A highway coach is designed mostly for charters and inter-city travel. Seating is typically high quality, individual seats and loading is normally done only through a front door. These buses have compartments for luggage and may be equipped with a washroom. They are often not designed to be accessible. Highway coaches are designed for longer inter-city trips and not well suited to the constant boarding and deboarding characteristics of urban transit routes.



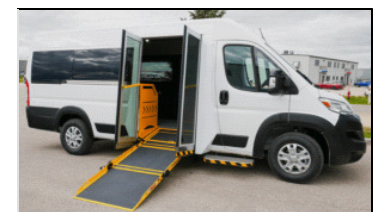
Urban Transit Bus

An urban transit bus is purpose-built for operating in urban areas. The structure of the vehicle is extremely sound and buses can often achieve one million kilometers during their service life. Most urban transit buses today are built with a low-floor design. The bus is able to “kneel” as it stops at the curb and deploy a boarding ramp, if needed, for accessible access. These vehicles are available in standard lengths of 35 feet, 40 feet, and 60 feet (accordion-style). A 35-foot bus, which is most suited to fixed-route ridership expectations for WHRM, will seat about 32 and can handle standing loads in addition to that. An urban transit bus would be inappropriate for rural service, as there is a need for maneuverability on narrow roads and private driveways.



Mini-Bus

A mini-bus starts with a standard truck chassis and is typically referred to as a “cutaway”. The seating and shell of the bus is then built onto the truck chassis. There are a number of configurations and lengths to which these buses are designed. Some mini-buses have low-floor accessible access, while some have a wheelchair lift at the rear of the vehicle. The seating capacity is typically 16-20, fewer when wheelchairs are being accommodated. A mini-bus is not designed for standing loads and provides a lower quality ride (noise, space, passenger maneuverability) than an urban transit bus or a highway coach.



In addition to additional passenger capacity and comfort, a key benefit of the urban transit bus is that it will have more than double the service life of a mini-bus.

While the increased seating capacity and the extended service life of the urban transit bus justify the significant investment, we recognize that the high up-front cost can be an impediment to a quick-start or pilot implementation of the service. An alternative would be to purchase new or used mini-buses. A 26-foot mini-bus would provide capacity for only 18 passengers (fewer if wheelchairs are included). While this capacity may be adequate initially, it is likely to be exceeded as the service matures. Ensuring that the capacity of the vehicles is not exceeded is critical to the success of the service, as riders left waiting at the stop as a full bus passes by is a major deterrent to continued use of the service.

One active vehicle plus one spare vehicle is required to provide the service as described. A spare vehicle is essential to the reliable functioning of any transit system. All vehicles require periodic maintenance and servicing and can occasionally break down (or need to be transported to a larger community to address a major repair).

6.2 Propulsion

There is also a choice to be made in propulsion type. Although a range of propulsion options is available for urban transit buses including overhead-electric (trolleys) and hydrogen cell, the popular propulsion options for both urban transit and mini-buses are gas/diesel, hybrid, and battery-electric. As a general rule, a battery-electric bus will cost double that of a diesel/gas bus to purchase but result in half of the operating costs (including both powering and maintenance). Normally, a life-cycle analysis will demonstrate a reduced overall cost for battery-electric over diesel/gas. Hybrid buses normally fall between those two options. One issue that arises from the selection of battery-electric vehicles is that they currently do not have sufficient battery capacity to do a full day of service without recharge. A strategic approach to managing this may include midday recharging or swapping buses in and out of service to be recharged.

6.3 Used Buses

In addition to acquiring a new vehicle, purchasing a used bus is an option. In the past, Halifax Transit has made decommissioned urban transit buses and mini-buses (Access-A-Bus and MetroX buses) available to transit systems in Nova Scotia at no cost. Halifax Stanfield Airport retires vehicles in their Park-and-Fly service well before the end of their typical service life and those vehicles become available for purchase from time to time. A variety of used buses are always available through brokers. Most notably, Scotiashare Bus Sales in Moncton carries an extensive inventory of used mini-buses suitable for service in WHRM.

7. Operational Assessment of Rural Day-a-Week Service

This feasibility analysis provides a high-level assessment of BEB performance, as well as the potential costs and environmental benefits associated with operating BEBs on the proposed rural day-a-week service plan identified in Section 3.5 and Appendix D.

BEBs typically have insufficient battery capacity to complete a full day of service without periodic recharging or swapping out for a fully charged bus. Accordingly, daily deployment of BEBs requires a degree of strategic planning that is not needed with a diesel or gasoline bus.

7.1 Modelling Scenarios

Two scenarios (summer and winter) are explored to capture different weather conditions. These scenarios are used as “building blocks” to develop a service model that is effective, reliable, expandable, and meets the practical needs of the Municipality as a first step in implementing electrified transit service.

To identify the most suitable battery-electric bus (BEB) for the proposed rural routes, WSP conducted a market scan of currently available cutaway electric mini-bus models. The results of this review are summarized in Table 7-1. Based on the assessment, the Girardin Micro Bird G5 platform was selected as the reference vehicle for this analysis. Compared to other available mini-bus BEB models, this vehicle offers a larger battery capacity and competitive energy consumption performance (kWh/km), which improves operational flexibility and range under varying operating conditions.

Table 7-1: Market Scan of Selected Mini-Bus BEBs and Key Performance Characteristics

Make	Model	Nominal Battery Capacity (kWh)	Usable Battery Capacity (kWh)	kWh/km (Summer)	kWh/km (Winter)
GreenPower	EV Star	118	94.4	0.45	0.67
Optimal	EV– S1LF	113	90.4	0.57	0.84
Endera	B4/B5 XR	144	115.2	0.62	0.92
Karsan	e-JEST	88	70.4	0.42	0.62
Micro Bird	G5	175	140	0.55	0.81

Table 7-2 summarizes the inputs for two modelling scenarios and lists high-level specifications for the BEB and associated charging infrastructure.

Table 7-2: Scenario Summary Table

Item	Summer	Winter
Temperatures (°C)	15 °C	–10 °C
GVWR (kg)	6,580	
Battery Capacity (kWh)	175	
Usable Battery Capacity (kWh)	140	
Power of Charger (kW)	62.5	
Minimum Level of Charge	20%	

7.2 Routing Assumptions

Table 7-3 shows the technical assumptions used in this feasibility study, which serves as the foundation for analysing the possible performance of BEBs. For feasibility studies, it is important to consider the worst-case scenario which, for WHRM, is the winter condition using electric-powered heating. Additionally, it is important to note that factors such as route topography and driver behaviour can also impact the performance of BEBs, which is not specifically accounted for rural routes electrification assessment. Instead of a detailed physics-based calculation, the service of rural routes is based on extrapolations of energy consumption rates as reported by manufacturers.

Table 7-3: List of Assumptions – Rural Routes

Item	Description of assumptions	Source
1	The nominal battery size for a Micro Bird G5 is 175 kWh.	OEM Website
2	The energy efficiency for a Micro Bird G5 is 0.55 kWh/km in summer	Battery Capacity divided by Range from Website
3	The energy efficiency for a BEB is 48% greater in Winter (0.81 kWh/km)	Assessing the cold weather impact on battery electric transit buses
4	The maximum output power of the L3 depot charger for a Micro Bird G5 is 100 kW.	OEM Website
5	The efficiency of all chargers is 94%.	Industry standard
6	80% of the battery capacity is usable.	Industry standard
7	The bus depot is located 1 km from the terminal at the Sports Complex.	WSP analysis

8	Pull-out and pull-in trips each require approximately 1 minute of travel time.	WSP analysis
9	The aging of battery is not considered in the analysis	Not in Scope
10	Cost of MicroBird G5 is \$292,300.00	Not available online. Used the average of 25ft BEBs that were available to WSP.
11	Cost of 62.5kW Charger is \$32,400	Convert from US to CAD
12	Charger installation cost is \$100,000	Convert from US to CAD

7.3 Predictive Performance of BEBs – Summer

The summer scenario assumes that the BEB runs with an average temperature of 15°C, therefore not requiring the activation of HVAC equipment that could draw additional energy from the battery. Moreover, it is assumed that the BEB does not have access to on-route chargers. Therefore, the vehicle must return to the garage for both mid-day and overnight charging.

Under the proposed schedule, the total number of trips and total service distance for each day are provided in Table 7-4. Daily energy consumption is calculated using the manufacturer's reported energy consumption rate, as illustrated in Figure 7-1. The Friday service is associated with the largest distance travelled. Therefore, the BEB exhibits the highest energy consumption on this day.

Table 7-4: Rural Routes Service Summary

Service Day	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Total Distance (km)
Tuesday	4			4					366.4
Wednesday		4	4						273.2
Thursday						4	4		338.0
Friday					3			3	443.4

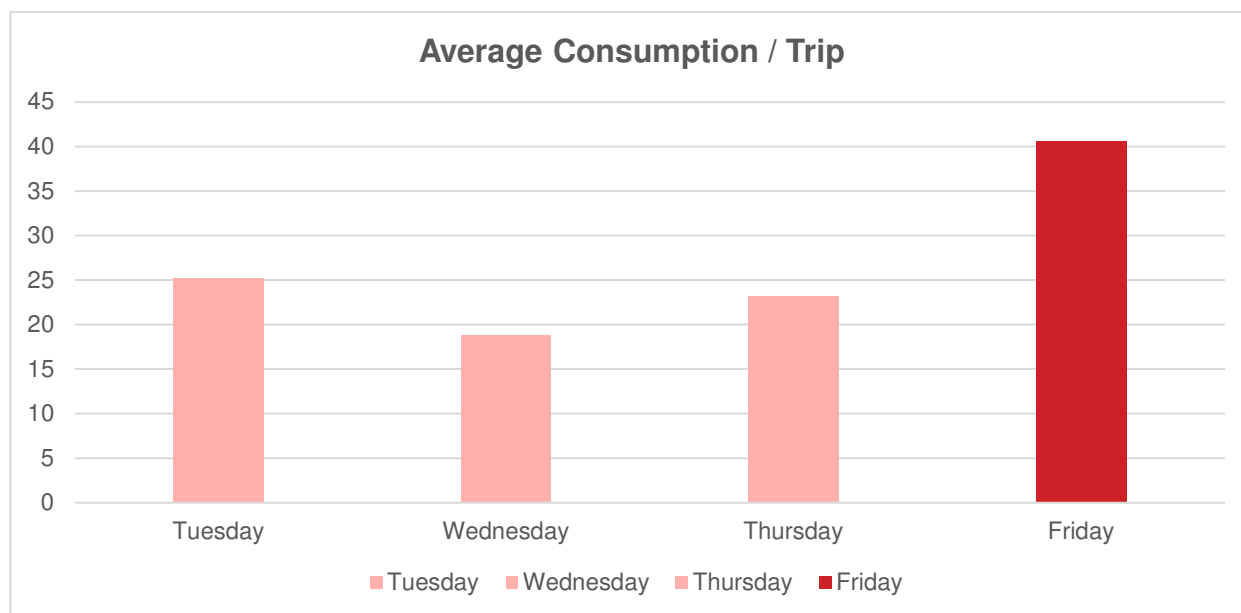


Figure 7-1: Rural Routes Average Energy Consumption per Trip – Summer

Understanding changes in battery state of charge (SOC), both at the planning stage and during operations, is critical for successful fleet electrification. The usable portion of the battery is assumed to be 80% of its nominal capacity. While allowable/safe discharge levels vary among manufacturers, maintaining a 20% buffer complies with most OEM operational procedures and provides some resilience for the operator.

Figure 7-2 illustrates the BEB's SOC profile throughout the day across all service days. Under this scenario, two of the four trips fall below the 20% SOC threshold, indicating that they are not electrifiable without operational adjustments.

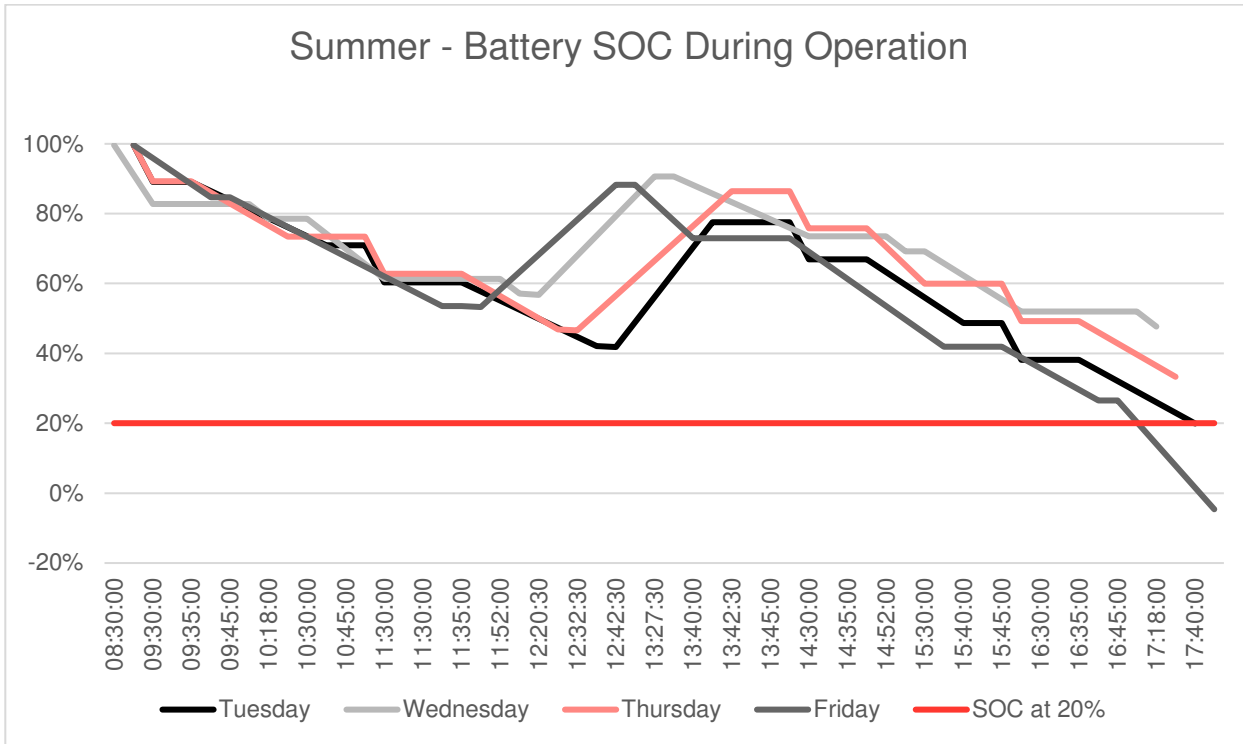


Figure 7-2: Rural Routes BEB SOC During Operation – Summer

Figure 7-2 shows all four service days within a single time frame, beginning at the earliest scheduled start time (8:30 AM) and ending at the latest scheduled end time (6:30 PM). Table 7-5 provides a detailed breakdown of energy consumption and battery SOC throughout the service schedule.

Based on this analysis, the battery SOC on both Tuesday and Friday drops below the 20% threshold during the final trip. Friday shows a more significant shortfall, with the SOC reaching a theoretical value of -5%, meaning that 105% of the nominal battery capacity would be necessary to complete the service. In contrast, Tuesday falls only 1% below the threshold, which could likely be mitigated with approximately five additional minutes of mid-day charging.

Table 7-5: Rural Routes Service Schedule and Battery SOC for Summer

	Round Trip #	Start Time	End time	Battery level (kWh)	Charging Event	Charge Start	Charge End	Charging Duration (H)	Energy Delivered (kWh)
Tue	1	8:45	9:30	156.5	No				
	2	9:35	10:40	124.6	No				
	3	10:45	11:30	106.1	No				
	4	11:35	12:40	74.2	Yes	12:42	13:42	1	62.5
	5	13:45	14:30	117.7	No				
	6	14:35	15:40	85.8	No				
	7	15:45	16:30	67.3	No				
	8	16:35	17:40	35.4	No				
Wed	1	8:30	9:30	144.9	No				
	2	9:52	10:18	137.4	No				
	3	10:30	11:30	107.4	No				
	4	11:52	12:18	99.9	Yes	12:20	13:27	1.12	59.34
	5	13:30	14:30	128.6	No				
	6	14:52	15:18	121.1	No				
	7	15:30	16:30	91.0	No				
	8	16:52	17:18	83.5	No				
Thur	1	8:45	9:30	156.3	No				
	2	9:35	10:30	128.5	No				
	3	10:45	11:30	109.8	No				
	4	11:35	12:30	82.1	Yes	12:32	13:42	1.17	69.81
	5	13:45	14:30	132.6	No				
	6	14:35	15:30	104.8	No				
	7	15:45	16:30	86.1	No				
	8	16:35	17:30	58.4	No				
Fri	1	8:45	9:40	148.2	No				
	2	9:45	11:35	93.7	Yes	11:37	12:42	1.08	61.38
	3	12:45	13:40	127.7	No				
	4	13:45	15:35	73.2	No				
	5	15:45	16:40	46.4	No				
	6	16:45	18:35	-8.0	No				

Under the current assumptions, a BEB can successfully complete the full scheduled service on Wednesdays and Thursdays during summer.

7.4 Predictive Performance of BEBs – Winter

As in the summer scenario, the BEB is also assumed to rely exclusively on depot chargers during winter. However, the winter scenario assumes the operation of electric-powered heating.

Figure 7-3 displays the average energy consumption per trip for the winter scenario.

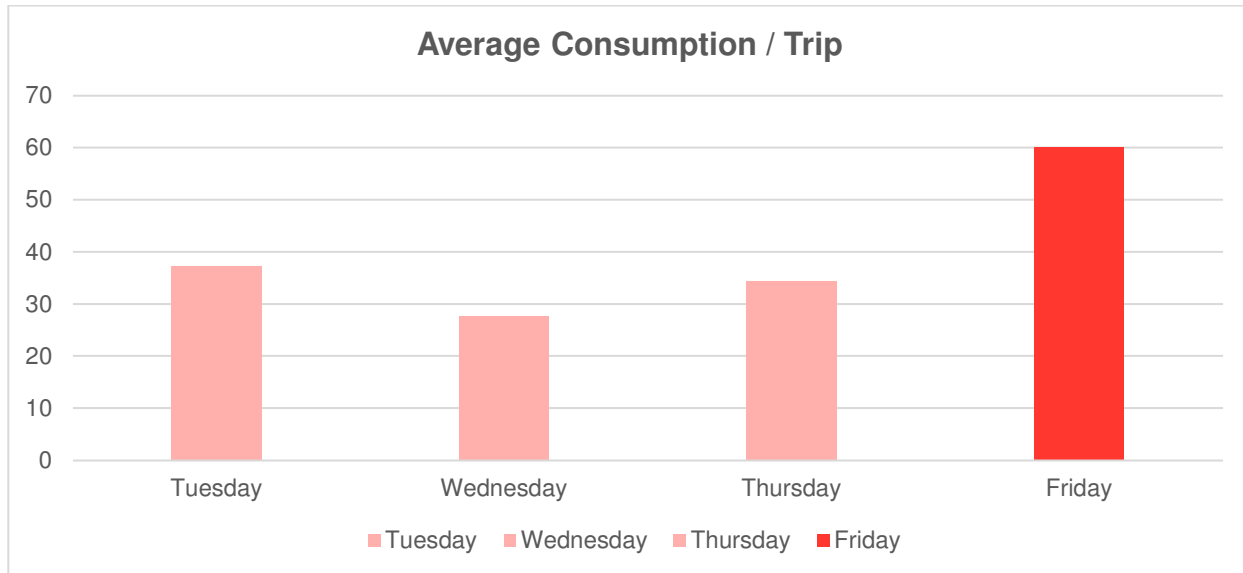


Figure 7-3: Rural Routes Average Energy Consumption per Trip – Winter

Figure 7-4 illustrates the BEB's SOC profile throughout the day across all service days under this scenario.

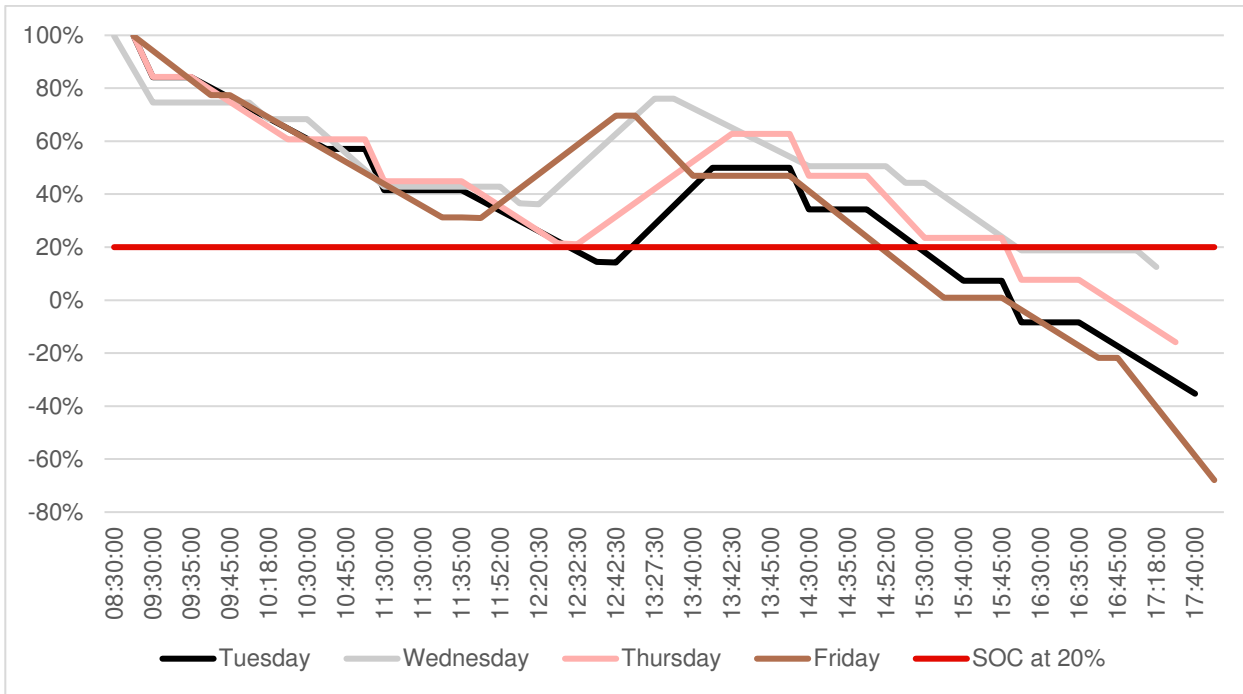


Figure 7-4 Rural Routes BEB SOC During Operation – Winter

Table 7-6, summarizes the end SOC for each service day. Due to the higher energy consumption, the BEB’s battery level drops below the 20% SOC threshold across all service days, indicating that the service is not electrifiable without significant operational or infrastructure adjustments. For example, the simulated SOC for the Friday service reaches a value of approximately -70%. This demonstrates that, without increasing the frequency and duration of charging sessions, the vehicle would be unable to complete the scheduled service.

Table 7-6: Rural Routes Winter Electrification Index

Weekday	End SOC %	Electrifiable?
Tuesday	-35	No
Wednesday	12	No
Thursday	-16	No
Friday	-68	No

Table 7-7 provides a detailed breakdown of energy consumption and battery SOC throughout the service schedule. As we see in this table, the BEB is unable to complete its schedule for any of the days.

Table 7-7: Rural Routes Service Schedule and Battery SOC for Winter

	Round Trip #	Start Time	End time	Battery level (kWh)	Charging Event	Charge Start	Charge End	Charging Duration (H)	Energy Delivered (kWh)
Tue	1	8:45	9:30	147.6	No				
	2	9:35	10:40	100.4	No				
	3	10:45	11:30	73.1	No				
	4	11:35	12:40	25.9	Yes	12:42	13:42	1	62.5
	5	13:45	14:30	60.5	No				
	6	14:35	15:40	13.3	No				
	7	15:45	16:30	-14.1	No				
	8	16:35	17:40	-61.3	No				
Wed	1	8:30	9:30	130.5	No				
	2	9:52	10:18	119.4	No				
	3	10:30	11:30	74.9	No				
	4	11:52	12:18	63.8	Yes	12:20	13:27	1.12	69.79
	5	13:30	14:30	88.5	No				
	6	14:52	15:18	77.5	No				
	7	15:30	16:30	32.9	No				
	8	16:52	17:18	21.9	No				
Thur	1	8:45	9:30	147.3	No				
	2	9:35	10:30	106.2	No				
	3	10:45	11:30	78.5	No				
	4	11:35	12:30	37.4	Yes	12:32	13:42	1.17	72.92
	5	13:45	14:30	82.1	No				
	6	14:35	15:30	41.0	No				
	7	15:45	16:30	13.3	No				
	8	16:35	17:30	-27.8	No				
Fri	1	8:45	9:40	135.3	No				
	2	9:45	11:35	54.7	Yes	11:37	12:42	1.08	67.71
	3	12:45	13:40	82.1	No				
	4	13:45	15:35	1.5	No				
	5	15:45	16:40	-38.2	No				
	6	16:45	18:35	-118.8	No				



None of the scheduled services can be completed by a BEB under the winter scenario.

7.5 Summary of Feasibility Analysis

Table 7-8 summarizes the outcomes of the feasibility analysis with the two scenarios. The winter scenario showed the worst performance, failing to complete the schedule in its entirety. In contrast, the summer scenario failed for two out of the four days, although in one of the failures the battery SOC was short by only 1%.

Table 7-8: Feasibility Analysis Summary

Scenario #	Scenario Description	Result
Summer	One 25ft BEB with overnight and midday charging operating without electric-powered HVAC	Fails Tuesdays and Fridays
Winter	One 25ft BEB with overnight and midday charging operating with electric-powered HVAC	Fails all services

7.6 Cost Analysis

7.6.1 Inputs and Assumptions

The cost analysis compares annual operating and capital costs based on the assumptions listed in Table 7-9.

Table 7-9: Rural Routes Inputs and Assumptions for Lifecycle Analysis Comparison

	Item	Unit	Value
Tuesday	Total Daily Mileage	km	366
	Annual Operation Days	#	52
	Total Annual Mileage	km	19,053
Wednesday	Total Daily Mileage	km	273
	Annual Operation Days	#	52
	Total Annual Mileage	km	14,206
Thursday	Total Daily Mileage	km	338
	Annual Operation Days	#	52
	Total Annual Mileage	km	17,576
Friday	Total Daily Mileage	km	443
	Annual Operation Days	#	52
	Total Annual Mileage	km	23,057
BEB Efficiency	Average Consumption Rate (Summer)	kWh/km	0.62
	Average Consumption Rate (Winter)	kWh/km	0.92
Charger	25ft BEB Charger Level 3	kW	62.5
	Charger Efficiency	%	94%
Electricity	0 To 200*(Peak Demand Value)	\$/kWh/kVA	0.14528
	200*(Peak Demand Value) Plus	\$/kWh	0.11954
	Demand Charge	\$/kVA	8.332
	Demand Side Management Cost Recovery	\$/kWh	0.01225
	Power Factor	n/a	0.9
Maintenance	BEB Maintenance Cost Factor	\$/km	0.067 ³
Schedule	Each Service Operates 52 Days Per Year		
Price points	The Price Point of the Girardin Micro Bird G5 Model	\$	292,300
	The Price Point of 62.5kw Chargepoint Express 250 CPE250	\$	32,400 (USD24k)
	Charger Installation Cost	\$	100,000

³ https://www.crebsl.com/documents/pdf/transport/etude_electrification-tc_crebsl_web.pdf

7.6.2 Operational Cost (OPEX)

Only two key operational cost items are considered: maintenance and fuel/electricity. Labour costs to operate vehicles, vehicle insurance and software subscription costs are excluded.

For maintenance cost, any major/overhaul repairs are excluded from the analysis. Since midday charging is enabled and most services fail, the maximum power demand (charger rating of 62.5kW) is achieved every month.

In practice, real-world operating conditions throughout the year reflect elements of both scenarios, as temperature variations are inherently seasonal and directly influence electricity consumption. As discussed in the previous sections, harsher weather conditions increase energy demand, particularly due to additional HVAC loads. To provide a more representative estimate of annual operational costs, a specific scenario has been developed in which half of the annual service is assumed to occur under summer conditions and the other half under winter conditions.

Table 7-10 shows key inputs and the results of the operational cost estimations.

Table 7-10: Key inputs and OPEX results

Parameters	Unit	Summer	Winter
Annual Mileage	km	36,946	36,946
Electricity Usage (monthly)	kWh	3,603	5,332
Number of Chargers	#	1	
Unmanaged Charging Peak Demand	kW	62.5	
Energy Charge (first 200kWh)		\$2,147	\$2,147
Energy Charge (excess of 200kWh)		\$407	\$614
Demand Charge		\$616	
Demand Side Management Cost Recovery Rider (DRCC)		\$45	\$67
Monthly Electricity Cost		\$3,200	\$3,400
Season Electricity Charge		\$19,000	\$20,00
Yearly Electricity Charge		\$39,000	
Yearly Maintenance		\$3,000	
Annual OPEX		\$42,000	

7.6.3 Capital Cost (CAPEX)

The capital cost calculation includes three main parts: the cost of vehicles, chargers and chargers' installation. Table 7-11 lists these cost items for the electrification of the rural routes.

Given that the number of vehicles and chargers remains consistent across all scenarios, the following cost estimate applies equally to each case. It is important to note that the installation costs for Level 3 (DC fast) chargers can vary significantly depending on site-specific conditions, and the estimate provided for this project is high-level in nature, based on industry averages and WSP's experience from comparable past projects.

Site-specific factors, such as trenching distances and ground conditions, required utility service upgrades, transformer sizing and availability, switchgear modifications, panel capacity, protection requirements, and associated civil works (e.g., paving restoration, bollards, drainage adjustments, and foundation work), can materially influence the total installed cost at each location. As a result, detailed design and coordination with the local utility will be required to refine these costs during subsequent project phases.

Table 7-11: Capital Cost Breakdown

Parameter	Cost
BEB Vehicle Cost ⁴	\$300,000
Charger Cost ⁵	\$30,000
Charger Installation	\$100,000
Total	\$430,000

7.7 Greenhouse Gas (GHG) Emissions

Although BEBs do not emit greenhouse gases during operation, the generation of electricity does produce some emissions. Nova Scotia Power has published data on GHG emissions from electricity generation⁵, as shown in Figure 7-5. Since the historical data, spanning from 2005 to 2024, follows a clear linear trend, linear regression is used to project emissions through to 2035. A significant reduction in GHG emissions was observed in 2023 compared to 2022, however the GHG emissions came back up for year 2024, but it is still in line with general trend of GHG reduction over the years.

⁴ WisDOT heavy Duty Bus Price Sheet. <https://wisconsin.gov/Documents/doing-bus/local-gov/astnce-pgms/transit/procurement/hdb-price.xlsx> (Conversion rate of USD to CAD is 1:1.37)

⁵ <https://www.nspower.ca/cleanandgreen/air-emissions-reporting>, Nova Scotia Power

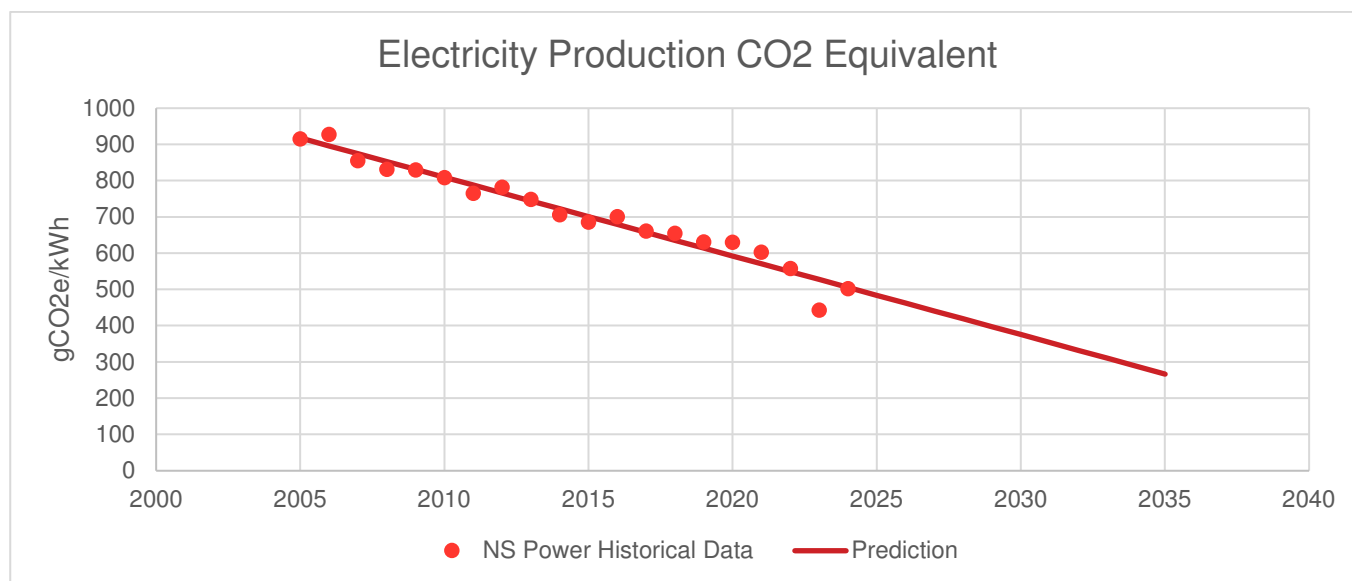


Figure 7-5: Historical Records and Predictions of GHG Emissions from Electricity Generation in Nova Scotia.

For comparison, GHG emissions from gasoline powered buses are calculated based on the amount of gasoline consumed. Gasoline buses are assumed to perform with an average consumption rate of 26.1L/100km (9 mpg)⁶. The total yearly distance for these rural routes, as broken by season in Table 7-10, is equal to 73,892km. Therefore, a yearly total of 19,286 litres of gasoline are consumed. The carbon intensity of gasoline is based on the Canadian federal government's clean fuel standard, as summarized in Table 7-12. After year 2030, the carbon intensity for gasoline will remain the same as year 2030. Note that the carbon intensity measures the total GHG emissions generated through the fuel's entire life cycle, including extraction, refining, transportation and final combustion in a vehicle, i.e., both the well-to-tank and the tank-to-wheel parts.

Table 7-12: Carbon Intensity of Gasoline According to Clean Fuel Standard of Canada

Gasoline	2026	2027	2028	2029	2030 and after
Carbon Intensity (gCO ₂ /MJ)	88.8	87.6	86.4	85.2	84
Carbon Intensity (gCO ₂ /L)	3,037	2,996	2,955	2,914	2,873
Gasoline Energy Density (MJ/L) ⁷	34.2				

⁶ The True Cost of Owning a Bus: A Practical Fuel Budgeting Guide

⁷ Energy density, Wikipedia.

The CO₂ projections of electricity generation from Figure 7-5 together with the gasoline carbon intensity values from Table 7-12 provide annual GHG emission estimates for both BEBs and gasoline buses from year 2026 to 2035 which is shown in Table 7-13 and Figure 7-6. It is evident that BEBs generate significantly lower GHG emissions compared to alternative gasoline buses.

Table 7-13: Annual GHG Emissions (Tonnes/year) Comparison Between BEBs and Gasoline Buses – Year-Round Scenario

Annual GHG	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Bus (electric)	24.8	23.6	22.4	21.3	20.1	19.0	17.8	16.6	15.5	14.3
Bus (gasoline)	58.6	57.9	57.1	56.3	55.5	55.5	55.5	55.5	55.5	55.5
Reduction	58%	59%	61%	62%	64%	66%	68%	70%	72%	74%

The reduction of GHG emissions by BEBs starts at 58% in year 2026 and increases to 74% in year 2035 according to predictions. Additionally, the reduction of GHG emissions from operating BEBs will likely decrease further after year 2035 as it is expected that Nova Scotia's electricity grid will continue to get cleaner and the carbon intensity of gasoline will remain relatively constant after year 2030.

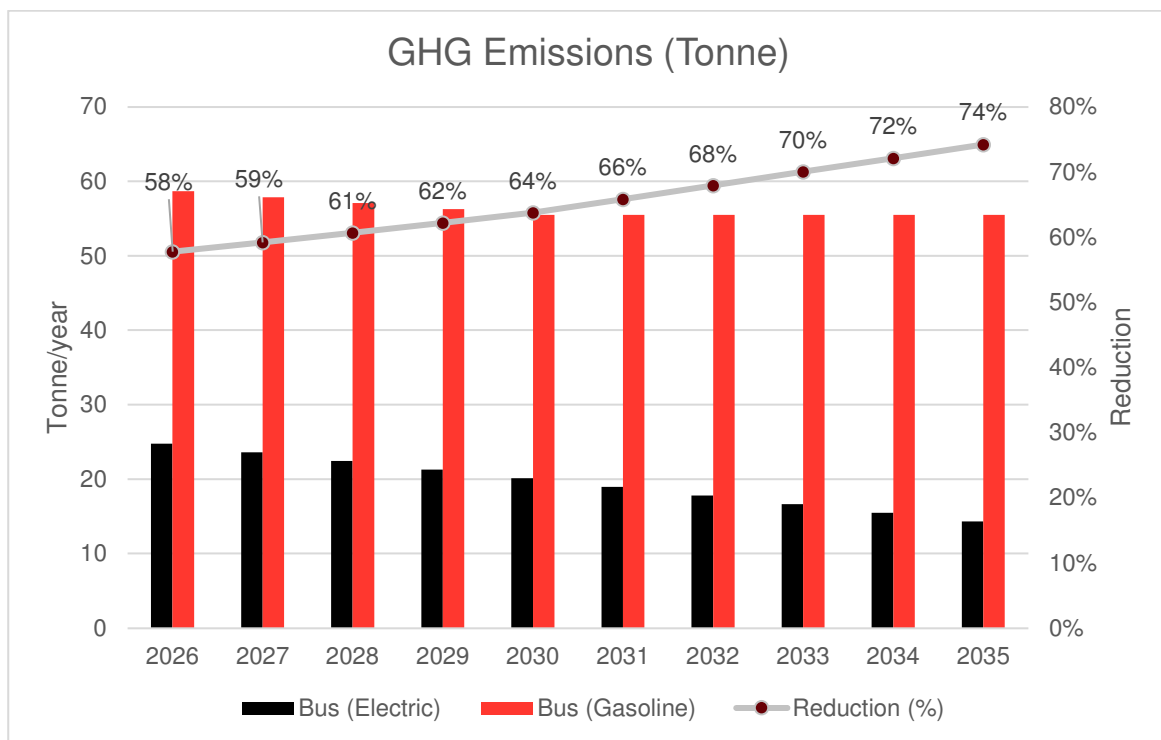


Figure 7-6: Annual GHG Emissions Comparison Between BEBs and gasoline buses.

8. Operational Assessment of Fixed-Route Service

This section analyzes deployment of 40ft and 35ft BEBs to a fixed route. The routing is described in Section 3.2 and Appendix E. The operational schedules are designed, the high-level cost analysis is presented, and the potential GHG emission reductions are calculated.

8.1 Vehicle Selection

Assuming a quarter of all daily rides take place on a single trip at the high total ridership projection of 88 rides per day, a vehicle would need to be able to accommodate 22 passengers at any given time. While it is recognized that these assumptions are conservative, they would not be able to be reliably supported in a mini-bus. As such, a **35-foot urban transit bus** is most appropriate for use in WHRM. Vehicles of this type typically accommodate up to 32 people in seats (plus an additional 35 standees) and can be rendered 100% wheelchair accessible. A 35-foot urban transit bus additionally allows for opportunities to grow ridership without fear of capacity constraints. Having adequate passenger capacity at all times is critical for the success of a transit system. Although a full load may be a rarity, when a bus has to pass by a stop where passengers are waiting because there is no room on the bus for them, perception of the service is severely harmed.

8.2 Fixed-Route Scenarios and Assumptions

The fixed route is assumed to be operational five times per week, 52 weeks per year. Round trips are assumed to take one hour to complete. The first departure is 7AM and last departure is 7PM for a total of 13 trips per day. This modelling exercise did not consider any downtime/recovery time throughout the vehicle service. The garage is assumed to be the Municipal Works Depot on Park Drive near to the starting/ending point of the loop at the Sports Complex. A pull-out and pull-in distance of one kilometre is assumed in all calculations. It is assumed that buses would take three minutes to cover the two kilometres of total non-revenue distance. The modelling work also assumes that the garage turnaround time assumed is approximately 30 minutes. Although detailed schedules are outside the scope of the current work, non-revenue and turnaround times (start and end of day) are considered to estimate the available time for charging BEBs. After subtracting 13 hours of service, 30 minutes of garage turnaround time and three minutes of non-revenue time from a full day (24h), the minimum available charging time is 10.45 hours. More time is available in the cases when a BEB does not complete the full service and returns to the garage earlier.

As outlined in Table 8-1, five modelling scenarios were developed: Baseline, Scenario 1, Scenario 2, Scenario 3 and Scenario 4. The Baseline scenario considers one 40ft diesel bus for the entire service. Scenarios 1 and 2 consider the deployment of one 40ft BEB of 550 kWh and 660 kWh of nominal battery capacity respectively. Scenarios 3 and 4 consider the deployment of one 35ft BEB of 440 kWh and 550 kWh of nominal battery capacity respectively. These battery capacity figures represent the span of battery capacities of long-range BEBs currently available in the Canadian market.

Table 8-1: Modelling Scenarios – Fixed-Routes

	Baseline	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
Bus Type	40ft Diesel	40ft BEB		40ft BEB		35ft BEB		35ft BEB	
Battery Size (kWh)	N/A	550		660		440		550	
Temperature	N/A	15 °C (26 weeks)	-10 °C (26 weeks)	15 °C (26 weeks)	-10 °C (26 weeks)	15 °C (26 weeks)	-10 °C (26 weeks)	15 °C (26 weeks)	-10 °C (26 weeks)
Back-up Bus	No	Yes (Diesel)	No	No	No	Yes (Diesel)	Yes (Diesel)	No	Yes (Diesel)

Scenario 1 considers a supplementary 40ft diesel bus when the BEB is not able to complete the full service. Similarly, Scenarios 3 and 4 consider a supplementary 35ft diesel mini-bus. This supplementary diesel bus is best added towards mid-day, when ridership is lower. BEBs are assumed to only charge at the garage, not on-route. Diesel buses have been selected as the supplementary vehicle, since the expense of a BEB is not justified for a bus in limited service.

The energy consumption associated with non-revenue distances is calculated by extrapolating the route average consumption rate (kWh/km). As in the case of the rural routes, seasonality is captured by modelling a 26-weeks summer scenario and a 26-weeks winter scenario. Average ambient temperatures are assumed to be 15°C for summer and -10°C for winter.

WSP's BOLT modelling tool simulated the BEBs operating in the 21.19km (excluding non-revenue distances) fixed-route. For the 40ft BEB, it resulted an energy consumption of 30.36 kWh and 37.42kWh for the summer and winter scenarios, respectively. Therefore, the average 40ft BEB consumption rate is approximately 1.433kWh/km and 1.766kWh/km for the summer and winter scenarios respectively. Similarly, the 35ft BEB simulations resulted in an energy consumption of 27.14 kWh and 34.20 kWh for the summer and winter scenarios, respectively. Therefore, the average 35ft BEB consumption rate is approximately 1.281kWh/km and 1.614kWh/km for the summer and winter scenarios respectively.

As in the rural routes case, the usable portion of the battery is assumed to be 80% of its nominal capacity.

The 40ft diesel bus included in the Baseline and the supplementary diesel bus eventually employed in Scenarios 1 and 2 is assumed to perform with an average consumption rate of 57L/100km.⁸ The 35ft diesel mini-bus eventually employed in Scenarios 3 and 4 is assumed to perform with an average consumption rate of 50L/100km based on WSP's internal consumption rate database.

⁸ [CUTRIC Renewable-Natural-Gas-as-a-Complementary-Solution-to-Decarbonizing-Transit June-30-2022.pdf](#)

The power demand is estimated assuming that a smart charging software is used to minimize demand charges in the electricity bill. The energy consumed by the bus is assumed to be evenly spread across the entire available charging time interval. The calculations also capture energy losses in the charging equipment by assuming a total charging system efficiency of 94%. As the modelling results show, a 30-50kW power demand is required. This work assumes the deployment of one charging unit rated at approximately 60kW.

Table 8-2 summarizes the assumptions for the analysis of the fixed-route.

Table 8-2: List of Assumptions – Fixed-Route

Item	Description of assumptions	Source
1	Route is operational five times per week, 52 weeks per year. No downtime considered.	Modelling/route design
2	Round trips take one hour and service is from 7AM to 7PM.	Modelling/route design
3	The garage is 1km from starting/ending point. Vehicle takes three minutes to cover two kilometers of non-revenue distance.	Modelling/operations
4	Garage turnaround time is approximately 30 minutes.	Modelling/operations
6	BEBs only charge in the garage after the service.	Modelling/scenarios
7	Seasonality: 26-weeks summer and 26-weeks winter. Mean temperatures are 15°C for summer and -10°C for winter.	Modelling/energy consumption
8	The usable portion of the battery is assumed to be 80% of its nominal capacity.	Modelling/energy consumption
9	The 40ft diesel bus is assumed to perform with average consumption rate of 57L/100km while the 35ft diesel bus is assumed to perform with a consumption rate of 50L/100km.	<u>CUTRIC Report</u> , Internal WSP database.
10	Power demand calculation assumes smart charging software.	Modelling/power demand
11	The charging equipment efficiency is 94%.	Modelling/energy consumption
12	Carbon intensity of diesel fuel is assumed to be 3,648 gCO ₂ e/L ⁹	Modelling/GHG emissions

⁹ 2025 Biofuels in Canada by Navius Research

8.2.1 Predictive Performance – Scenario 1 (40ft, 550kWh BEB)

Table 8-3 shows the vehicle schedule along the distance (km), the energy (kWh) and the battery SOC (%) at the end of each trip. It also shows a breakdown between the summer and winter scenarios.

Table 8-3: Performance of BEB on Fixed-Route: Scenario 1

Round Trip	Departure Time	Distance at end of trip (km)	Energy at end of trip (summer, kWh)	SOC at end of trip (summer, %)	Energy at end of trip (winter, kWh)	SOC at end of trip (winter, %)
1	7:00:00	22.2	31.8	94.2%	39.2	92.9%
2	8:00:00	43.4	62.2	88.7%	76.6	86.1%
3	9:00:00	64.6	92.5	83.2%	114.0	79.3%
4	10:00:00	85.8	122.9	77.7%	151.5	72.5%
5	11:00:00	107.0	153.3	72.1%	188.9	65.7%
6	12:00:00	128.1	183.6	66.6%	226.3	58.9%
7	13:00:00	149.3	214.0	61.1%	263.7	52.1%
8	14:00:00	170.5	244.4	55.6%	301.1	45.2%
9	15:00:00	191.7	274.7	50.1%	338.6	38.4%
10	16:00:00	212.9	305.1	44.5%	376.0	31.6%
11	17:00:00	234.1	335.5	39.0%	413.4	24.8%
12	18:00:00	255.3	365.8	33.5%	450.8	18.0%
13	19:00:00	277.5	397.6	27.7%	490.0	10.9%

As seen in Table 8-3, the Scenario 1 BEB (40ft, 550kWh) is only capable of completing its full service during summer. During the warmer months, the BEB can return to the garage with a battery SOC of almost 28% after completing all 13 trips. However, during the colder months, the BEB can only complete 11 of the 13 trips before dropping the battery SOC below 20%.

After correcting the winter scenario and deploying a diesel bus to deliver the last two trips, the Scenario 1 results are summarized as follows:

Summer:

- The 40ft BEB can deliver all 13 trips. It travels 277.5km, consumes 397.6kWh and has a final SOC of 27.7%
- The 40ft BEB has 10.45h for charging, resulting in 40.5kW of power demand

Winter:

- The 40ft BEB can deliver 11 of the 13 trips. It travels 235.1km, consumes 415.2kWh and has a final SOC of 24.5%
- The 40ft BEB has 12.45h for charging, resulting in 35.5kW of power demand
- A 40ft diesel bus would have to be deployed to deliver the last two trips for a total of 44.4km and 25.3L of fuel consumed
- Figure 8-1 illustrates the SOC trend against the fixed 20% threshold for the summer and winter scenarios.

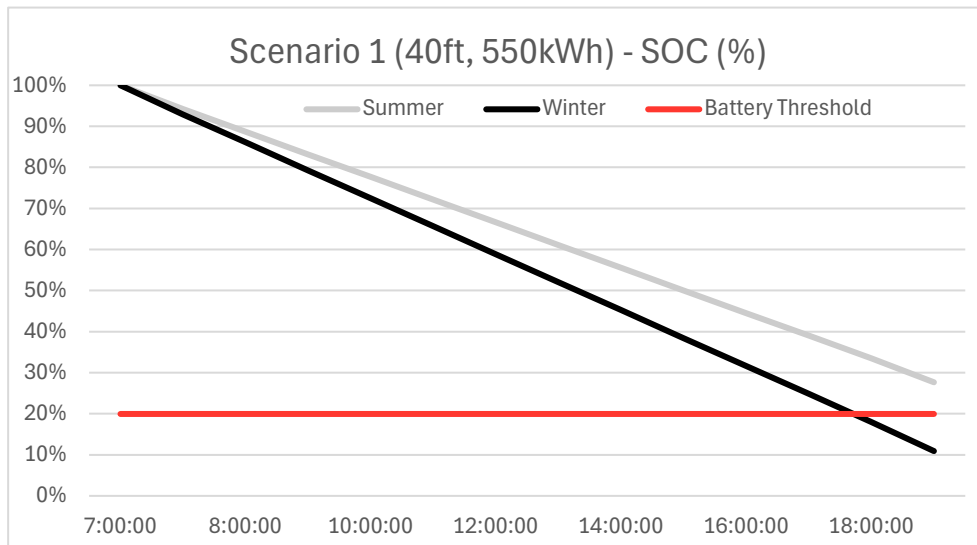


Figure 8-1: Fixed Route BEB SOC - Scenario 1

8.2.2 Predictive Performance – Scenario 2 (40ft, 660kWh BEB)

Table 8-4 shows the vehicle schedule along the distance (km), the energy (kWh) and the battery SOC (%) at the end of each trip. It also shows a breakdown between the summer and winter scenarios.

Table 8-4: Performance of BEB on Fixed-Route: Scenario 2

Round Trip	Start Time	Distance (km)	Energy Summer (kWh)	Battery SOC Summer (%)	Energy Winter (kWh)	Battery SOC Winter (%)
1	7:00:00	22.2	31.8	95.2%	39.2	94.1%
2	8:00:00	43.4	62.2	90.6%	76.6	88.4%
3	9:00:00	64.6	92.5	86.0%	114.0	82.7%
4	10:00:00	85.8	122.9	81.4%	151.5	77.1%
5	11:00:00	107.0	153.3	76.8%	188.9	71.4%
6	12:00:00	128.1	183.6	72.2%	226.3	65.7%
7	13:00:00	149.3	214.0	67.6%	263.7	60.0%
8	14:00:00	170.5	244.4	63.0%	301.1	54.4%
9	15:00:00	191.7	274.7	58.4%	338.6	48.7%
10	16:00:00	212.9	305.1	53.8%	376.0	43.0%
11	17:00:00	234.1	335.5	49.2%	413.4	37.4%
12	18:00:00	255.3	365.8	44.6%	450.8	31.7%
13	19:00:00	277.5	397.6	39.8%	490.0	25.8%

As seen in Table 8-4, the Scenario 2 BEB (40ft, 660kWh) is capable of completing its full service during both summer and winter. During the warmer months, the BEB can return to the garage with a battery SOC of almost 40% and during the colder months it can return to the garage with a battery SOC of almost 26% after completing all 13 trips.

The Scenario 2 results are summarized as follows:

Summer:

- The 40ft BEB can deliver all 13 trips. It travels 277.5km, consumes 397.6kWh and has a final SOC of 39.8%
- The 40ft BEB has 10.45h for charging, resulting in 40.5kW of power demand

Winter:

- The 40ft BEB can deliver all 13 trips. It travels 277.5km, consumes 490.0kWh and has a final SOC of 25.8%
- The 40ft BEB has 10.45h for charging, resulting in 49.9kW of power demand

Figure 8-2 illustrates the SOC trend against the fixed 20% threshold for the summer and winter scenarios.

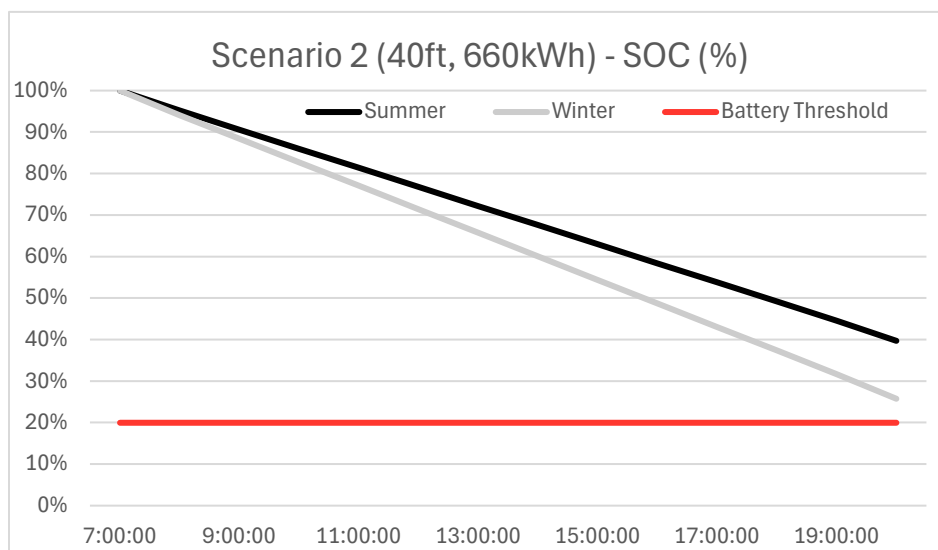


Figure 8-2: Fixed Route BEB SOC - Scenario 2

8.2.3 Predictive Performance – Scenario 3 (35ft, 440kWh BEB)

Table 8-5 shows the vehicle schedule along the distance (km), the energy (kWh) and the battery SOC (%) at the end of each trip. It also shows a breakdown between the summer and winter scenarios.

Table 8-5: Performance of BEB on Fixed-Route: Scenario 3

Round Trip	Departure Time	Distance at end of trip (km)	Energy at end of trip (summer, kWh)	SOC at end of trip (summer, %)	Energy at end of trip (winter, kWh)	SOC at end of trip (winter, %)
1	7:00:00	22.2	28.4	93.5%	35.8	91.9%
2	8:00:00	43.4	55.6	87.4%	70.0	84.1%
3	9:00:00	64.6	82.7	81.2%	104.2	76.3%
4	10:00:00	85.8	109.9	75.0%	138.4	68.5%
5	11:00:00	107.0	137.0	68.9%	172.6	60.8%
6	12:00:00	128.1	164.1	62.7%	206.8	53.0%
7	13:00:00	149.3	191.3	56.5%	241.0	45.2%
8	14:00:00	170.5	218.4	50.4%	275.2	37.5%
9	15:00:00	191.7	245.6	44.2%	309.4	29.7%
10	16:00:00	212.9	272.7	38.0%	343.6	21.9%
11	17:00:00	234.1	299.9	31.8%	377.8	14.1%
12	18:00:00	255.3	327.0	25.7%	412.0	6.4%
13	19:00:00	277.5	355.4	19.2%	447.8	-1.8%

As seen in Table 8-5, the Scenario 3 BEB (35ft, 440kWh) is incapable of completing its full service during both summer and winter. During the warmer months, the BEB could deliver 12 trips with a final SOC of 25% and during colder months it could deliver 10 trips with a final SOC of 22%.

After correcting the service and deploying a diesel bus to deliver the last trips, the Scenario 3 results are summarized as follows:

Summer:

- The 35ft BEB can deliver 12 of the 13 trips. It travels 256.3km, consumes 328.3kWh and has a final SOC of 25.4%
- The 35ft BEB has 11.45h for charging, resulting in 30.5kW of power demand
- A 26ft diesel backup mini-bus would have to be deployed to deliver one mid-day trip for a total of 23.2km and 11.6L of fuel consumed

Winter:

- The 35ft BEB can deliver 10 of the 13 trips. It travels 213.9km, consumes 345.2kWh and has a final SOC of 21.5%
- The BEB has 13.45h for charging, resulting in 27.3kW of power demand
- A 26ft backup diesel mini-bus would have to be deployed to deliver three mid-day trips for a total of 65.6km and 32.8L of fuel consumed

Figure 8-3 illustrates the SOC trend against the fixed 20% threshold for the summer and winter scenarios.

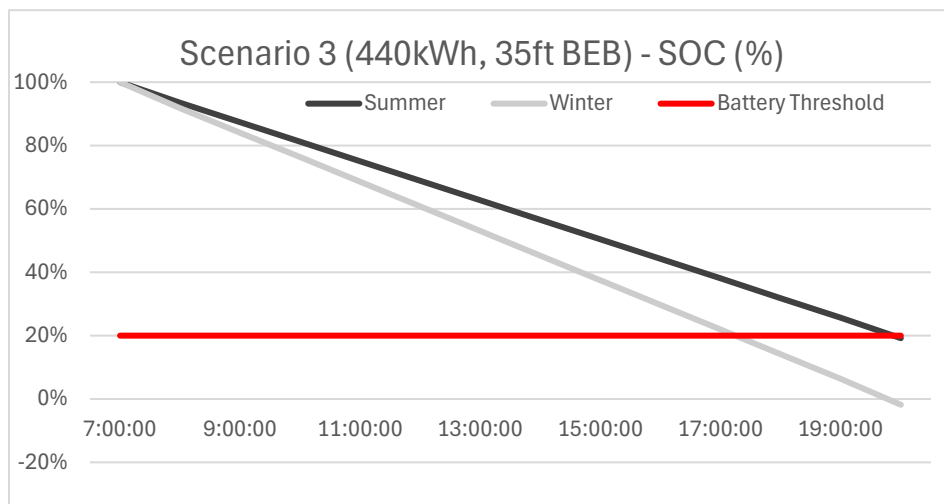


Figure 8-3: Fixed Route BEB SOC - Scenario 3

8.2.4 Predictive Performance – Scenario 4 (35ft, 550 kWh BEB)

Table 8-6 shows the vehicle schedule along the distance (km), the energy (kWh) and the battery SOC (%) at the end of each trip. It also shows a breakdown between the summer and winter scenarios.

Table 8-6: Performance of BEB on Fixed-Route: Scenario 4

Round Trip	Start Time	Distance (km)	Energy Summer (kWh)	Battery SOC Summer (%)	Energy Winter (kWh)	Battery SOC Winter (%)
1	7:00:00	22.2	28.4	94.8%	35.8	93.5%
2	8:00:00	43.4	55.6	89.9%	70.0	87.3%
3	9:00:00	64.6	82.7	85.0%	104.2	81.1%
4	10:00:00	85.8	109.9	80.0%	138.4	74.8%
5	11:00:00	107.0	137.0	75.1%	172.6	68.6%
6	12:00:00	128.1	164.1	70.2%	206.8	62.4%
7	13:00:00	149.3	191.3	65.2%	241.0	56.2%
8	14:00:00	170.5	218.4	60.3%	275.2	50.0%
9	15:00:00	191.7	245.6	55.3%	309.4	43.7%
10	16:00:00	212.9	272.7	50.4%	343.6	37.5%
11	17:00:00	234.1	299.9	45.5%	377.8	31.3%
12	18:00:00	255.3	327.0	40.5%	412.0	25.1%
13	19:00:00	277.5	355.4	35.4%	447.8	18.6%

As seen in Table 8-6 the Scenario 4 BEB (35ft 550kWh) is incapable of completing its full service during winter. During the warmer months, the BEB can complete the service and return to the garage with a battery SOC of 35%. During the colder months, it can complete 12 trips and return to the garage with a battery SOC of almost 25%.

The Scenario 4 results are summarized as follows:

Summer:

- The 35ft BEB can deliver all 13 trips. It travels 277.5km, consumes 355.4kWh and has a final SOC of 35.4%
- The 35ft BEB has 10.45h for charging, resulting in 36.2kW of power demand

Winter:

- The BEB can deliver 12 of the 13 trips. It travels 256.3km, consumes 413.6kWh and has a final SOC of 24.8%
- The BEB has 11.45h for charging, resulting in 38.4kW of power demand
- A 26ft backup diesel mini-bus would have to be deployed to deliver one mid-day trip for a total of 23.2km and 11.6L of fuel consumed

Figure 8-4 illustrates the SOC trend against the fixed 20% threshold for the summer and winter scenarios.

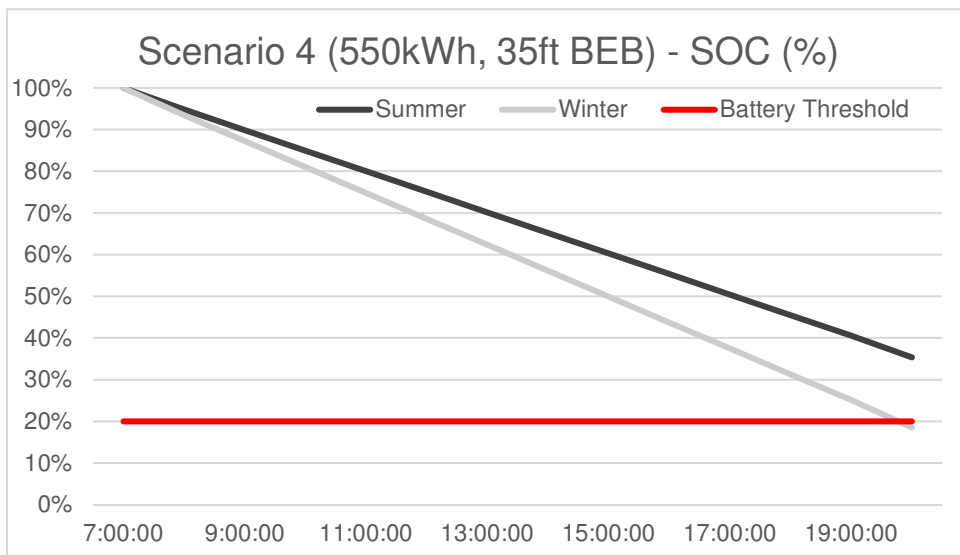


Figure 8-4: Fixed Route BEB SOC - Scenario 4

8.3 Cost Analysis

This cost analysis section presents a high-level assessment of key capital and operational expenditures for the electrification scenarios of the fixed-route. The Baseline costs are compared with electrification Scenarios 1, 2, 3 and 4. CAPEX includes the cost of vehicles and charging infrastructure and OPEX includes costs with fuel/energy and maintenance.

8.3.1 Inputs and Assumptions

A detailed assessment of the charging infrastructure installation costs is out of the scope of the present study. Installation costs can vary significantly and depend on local features such as proximity to a suitable power source and availability of physical space to place the charging equipment. High-level cost estimates for chargers and their installation are presented in Table 7-11. The cost of a range of potential vehicles are summarized in Table 8-7.

Table 8-7: Price of Vehicles

Vehicle	Price	Source
40ft - diesel urban bus	\$900,000	WSP Internal Information
35ft - diesel urban bus	\$700,000	WSP Internal Information
40ft – 550kWh urban BEB	\$1,600,000	WSP Internal Information
40ft – 660kWh urban BEB	\$1,760,000	Value extrapolated from 40ft 550kWh model to account the larger battery.
35ft – 440kWh urban BEB	\$1,350,000	WSP Internal Information
35ft – 550kWh urban BEB	\$1,480,000	Value extrapolated from 35ft 440kWh model to account the larger battery.
26ft – diesel mini-bus	\$220,000	WSP Internal Information

The operational expenditure calculations only include fuel, electricity and vehicle maintenance costs. Labour costs to operate vehicles, vehicle insurance, diesel exhaust fluid and software subscription costs are excluded.

Diesel fuel costs are assumed to be \$1.90/L according to the Natural Resources Canada’s Monthly Average Retail Prices for Diesel in 2026¹⁰, filtering Halifax.

The monthly energy consumption and power demand are calculated to estimate the cost with electricity. Electricity rates from NS Power are used assumed that the electrical service would be exclusively dedicated to power BEBs. Moreover, the service is assumed to be classified under Small Industrial Rate 21, which is applicable to industrial use, including farming and processing, where the regular billing demand is less than 250 kVA or 225 kW. The electricity cost rates for both demand and volumetric components are presented in Table 7-9.

The Demand Side Management Cost Recovery Rider rate subclass is assumed to be Municipal. The power factor (relationship between active and reactive power – kW to kVA) is assumed to be equal to 0.9.

The maintenance of BEBs is typically in the range 0.25-0.40 USD/mile, while the maintenance of diesel buses is typically within the range 0.60-0.90 USD/mile.¹¹ This study assumes the middle point of the intervals above, which results in \$0.27/km for all BEBs and \$0.63/km for all diesel buses after converting from American to Canadian dollars and from miles to kilometers.

¹⁰ Monthly Average Retail Prices for Diesel in 2026 | Natural Resources Canada

¹¹ buscmms.com

All cost calculation results are shown without the inclusion of sales taxes.

A USD/CAD exchange ratio of 1.35 is used in the calculations. Only current price points are considered in this preliminary analysis. A more detailed study including inflationary pressures and a discounted cash-flow analysis is recommended in a refinement of the current study.

8.3.2 Operational Cost (OPEX)

Table 8-8 summarizes the yearly distance travelled, the fuel and energy consumed and the required power demand for each scenario with a summer/winter breakdown.

Table 8-8: Fixed-Route Yearly Distance, Fuel, Energy and Power Demand

Scenario	Diesel Bus Distance (km)	BEB Distance (km)	Diesel Fuel (L)	Electricity (kWh)	Peak Power Demand (kW)	Peak Power Demand (kVA)
Baseline (Summer)	36,071	0	20,561	0	0.0	0.0
Baseline (Winter)	36,071	0	20,561	0	0.0	0.0
Scenario 1 (Summer)	0	36,071	0	54,989	40.5	45.0
Scenario 1 (Winter)	5,772	30,563	3,290	57,419	35.5	39.4
Scenario 2 (Summer)	0	36,071	0	54,989	40.5	45.0
Scenario 2 (Winter)	0	36,071	0	67,768	49.9	55.4
Scenario 3 (Summer)	3,016	33,319	1,508	45,406	30.5	33.9
Scenario 3 (Winter)	8,528	27,807	4,264	47,745	27.3	30.3
Scenario 4 (Summer)	0	36,075	0	49,162	36.2	40.2
Scenario 4 (Winter)	3,016	33,319	1,508	57,209	38.4	42.7

The fuel energy and power demand for different scenarios as expressed in Table 8-8 translate into operational costs as expressed in Table 8-9.

Table 8-9: Fixed-Route Operational Costs (OPEX)

Cost Item	Fuel (Summer)	Fuel (Winter)	Energy (Summer)	Energy (Winter)	Maintenance (Summer)	Maintenance (Winter)	Total
Baseline	\$39,065	\$39,065	\$0.00	\$0.00	\$22,698	\$22,698	\$123,527
Scenario 1	\$0.00	\$6,251	\$17,215	\$16,290	\$9,836	\$11,966	\$61,557
Scenario 2	\$0.00	\$0.00	\$17,215	\$21,246	\$9,836	\$9,836	\$58,132
Scenario 3	\$2,865	\$8,102	\$13,456	\$12,968	\$10,983	\$12,949	\$61,324
Scenario 4	\$0	\$2,865	\$15,373	\$16,985	\$9,837	\$10,983	\$56,044

The results of Table 8-9 can be visualized in Figure 8-5.

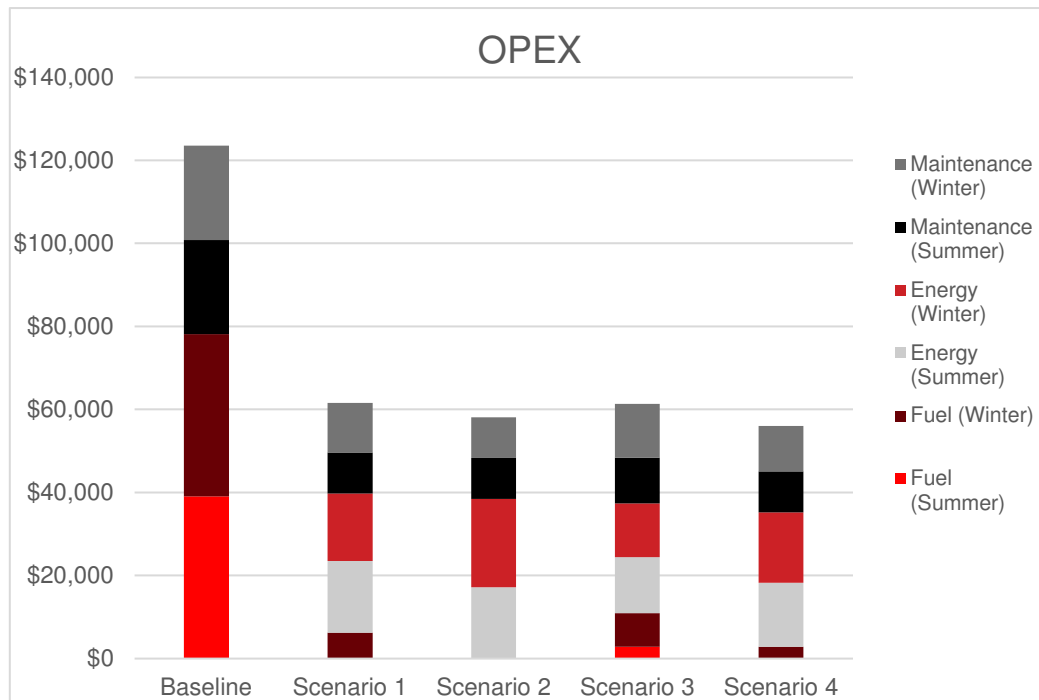


Figure 8-5: Fixed Route Operational Costs (OPEX) Visualization

Regardless of whether the electrification of the fixed-route is pursued with a 40ft or a 35ft BEB, or if the BEB is equipped with 440kWh or a 660kWh battery, the operational costs are reduced by half of those of the Baseline. Therefore, electrification can introduce savings of approximately 60-65 thousand dollars per year.

8.3.3 Capital Cost (CAPEX)

The capital costs associated with the Baseline and the different electrification scenarios are composed of vehicle cost and charging infrastructure cost. The charging infrastructure cost is broken into the cost with the charging equipment and charger installation costs.

Table 8-10 summarizes the capital expenditures for the Baseline and different electrification scenarios.

Table 8-10: Fixed-Route Capital Costs (CAPEX)

	Vehicle Roster	Vehicle cost	Charging Infrastructure	Charging Infrastructure Cost	Total CAPEX
Baseline	One 40ft diesel bus	\$900,000	None	\$0	\$900,000
Scenario 1	One 40ft, 550kWh BEB and one 40ft diesel bus	\$2,500,000	One 60kW charger	\$130,000	\$2,630,000
Scenario 2	One 40ft, 660kWh BEB	\$1,760,000	One 60kW charger	\$130,000	\$1,890,000
Scenario 3	One 35ft 440kWh BEB and one 26ft diesel mini-bus	\$1,570,000	One 60kW charger	\$130,000	\$1,700,000
Scenario 4	One 35ft 550kWh BEB and one 26ft diesel mini-bus	\$1,700,000	One 60kW charger	\$130,000	\$1,830,000

The results of Table 8-10 can be visualized in Figure 8-6.

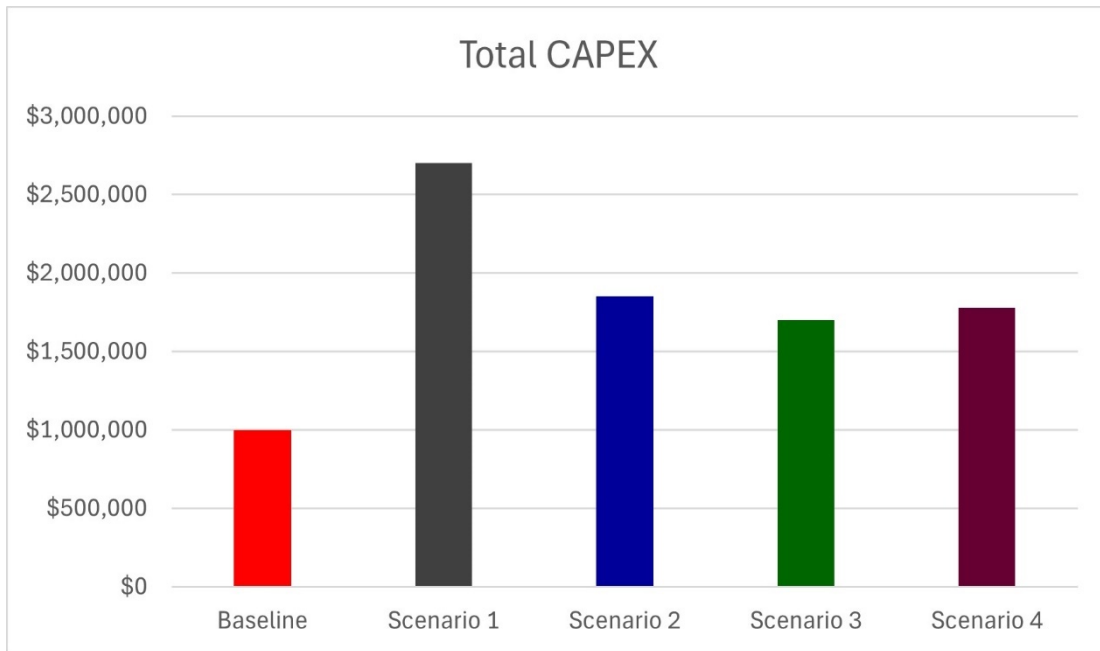


Figure 8-6: Fixed Route Capital Costs (CAPEX) Visualization

8.4 Greenhouse Gas (GHG) Emissions

As discussed in Section 7.7, the lifecycle emissions considering the carbon intensity of the power grid in Nova Scotia are captured in the GHG emission analysis. As in Section 7.7, linear projections of the electricity carbon intensity are made until the year 2035.

Nova Scotia has no mandates for renewable content in diesel, but the actual average blend ratio is approximately 0.4% biogenic. This contribution is negligible when compared to the variances of other parameters. Therefore, diesel was considered to be fully fossil fuel¹². As shown in Table 8-2, the value of 3,648 gCO₂e/L is considered in these calculations.

As in the case of rural routes, the scope of the lifecycle GHG emissions is limited to fuel and electricity. The manufacturing of vehicles and infrastructure is excluded.

Table 8-11 lists the results of the total and relative GHG emissions for each scenario in tonnes of carbon dioxide equivalent (tCO₂e).

¹² [Biofuels in Canada 2023](#)

Table 8-11: Fixed-Route GHG Emissions

GHG emissions (tCO ₂ e)	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Baseline	150	150	150	150	150	150	150	150	150	150
Scenario 1	64	62	59	57	54	52	50	47	45	42
Scenario 2	57	54	52	49	46	44	41	38	36	33
Scenario 3	64	62	60	58	56	54	52	50	48	46
Scenario 4	55	53	50	48	46	43	41	39	36	34
Reduction (Sc 1 - %)	57%	59%	60%	62%	64%	65%	67%	69%	70%	72%
Reduction (Sc 2 - %)	62%	64%	66%	67%	69%	71%	73%	74%	76%	78%
Reduction (Sc 3 - %)	57%	59%	60%	61%	63%	64%	65%	67%	68%	69%
Reduction (Sc 4 - %)	63%	65%	67%	68%	70%	71%	73%	74%	76%	77%

Figure 8-7 visualizes the results displayed in Table 8-11.

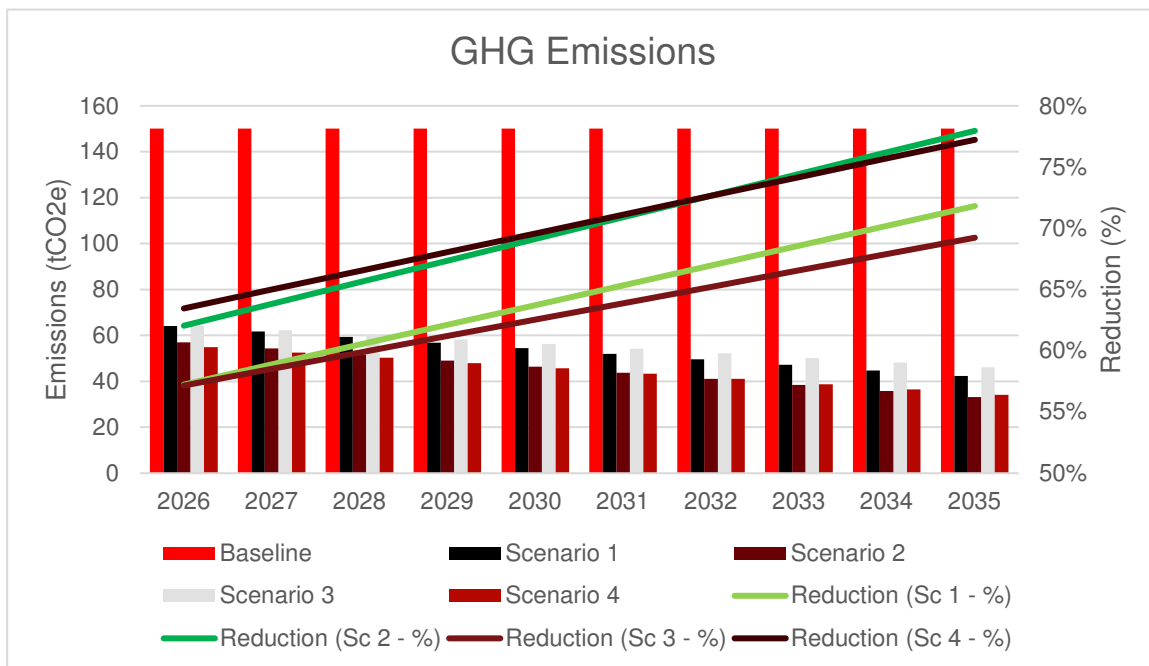


Figure 8-7: Fixed-Route GHG Emissions Visualization



If the electrification of the fixed-route is pursued under Scenarios 1, 3 or 4, some diesel fuel is still being used to power some of the trips. The annual emissions would drop from approximately 150 tCO₂e to approximately 55-64 tCO₂e (-63%,-57%) in 2026 and to approximately 34-46 tCO₂e (-69%,-77%) in 2035.

If the electrification of the fixed-route is pursued under Scenario 2, all trips would be fully propelled by electricity. The annual emissions would drop from approximately 150 tCO₂e to approximately 57 tCO₂e (-62%) in 2026 and to approximately 33 tCO₂e (-78%) in 2035.

9. Ridership Projection and Revenues

9.1 Rural Day-a-Week Service

9.1.1 Fares

Fares for the rural day-a-week service should be higher than fares for the urban fixed-route service in recognition of the higher cost to serve less dense and more geographically dispersed areas. Fares should also be less than those currently charged for dial-a-ride service to encourage the use of the more cost-effective ride-sharing ability of the daily service. For reference Dial-a-Ride adjusts its fares by travel distance, but a base fare (without subsidy) for a one-way trip within WHRM would be about \$20.00.

The recommended one-way fares for the day-a-week service are provided in

Table 9-1. Rates for pick-up and drop-off at the community stop are less than the at-door pickups to encourage customers to use that option when possible. Monthly passes or tickets are not well suited to this type of service.

Table 9-1: Recommended Fares for Rural Service

Pick-up or Drop-off Location	One-way Adult Fare	One-way Senior/Youth Fare
At-door	\$8.00	\$7.00
Community Stop	\$4.00	\$3.50
Flag-Stopping Enroute	\$4.00	\$3.50

9.1.2 Ridership

Ridership is difficult to project from peer services since few examples exist. West Hants Dial-a-Ride data suggests that approximately 18 one-way trips per day are carried by the existing service. We project that half of those trips will be attracted to the daily service instead. Over and above that, we expect the service to generate an equal number of new customers due to the reliability of service and decreased fares. In total, we expect 18 daily one-way trips each service day.

9.1.3 Revenue

Assuming an even split between the three pick-up and drop-off types and an even split between adult and senior/youth fares, we expect an average fare of \$5.00 for the rural service. With approximately 208 days of service per year (four days a week), the total annual revenue is projected at \$19,000.

9.2 Urban Fixed-Route Service

9.2.1 Fares

Adult base fare is recommended at \$3.00 per ride, which is in line with peer Atlantic Canadian communities. Most peer transit systems offer discounts for seniors and/or youth, representing 60-80% of

base fare cost and a discounted fare of \$2.25 is recommended. Additionally, discounted multi-trip tickets or monthly pass offerings are offered to encourage frequent usage. The Municipality is encouraged to explore these fare discount options when determining its pricing structure. Antigonish Transit provides free transfers for passengers on their demand-responsive service who transfer to the fixed-route service and this should be considered for the WHRM service with transfers from West Hants Dial-a-Ride. Passengers boarding the rural day-a-week service would receive a free transfer to the fixed-route service. Passengers transferring from the fixed-route service to the rural day-a-week service would request a transfer when they board the fixed-route bus and pay the incremental fare for the rural service when boarding.

9.2.2 Ridership

Annual ridership projections are estimated based on hourly utilization averages from peer community systems. This data comes from the Canadian Urban Transit Fact Book, last published in 2023. Projections for WHRM are provided in Table 9-2 and represent stable state conditions.

Between 55 and 88 rides are anticipated each weekday, resulting in an annual ridership projection of between 13,900 and 22,200. Stable ridership will take time to build as potential clientele become familiar with the new transit offering and adjust their travel behaviors accordingly, which may take a period of up to 1 to 2 years.

9.2.3 Revenue

In calculating revenue, we have assumed a blended fare of \$2.60. This includes discounted fares for seniors/youth and monthly passes as well as full adult fares. This results in an annual revenue from fares of \$36,000 to \$58,000.

Some transit systems are able to generate revenue from other sources such as advertising. That may also be a potential revenue source for the WHRM service, although we have not included it in our projections.

Table 9-2: Ridership Projections Fixed-Route

	Low	High
Rides per Service Hour (average)	5.0	8.0
Rides per Weekday	55	88
Annual Ridership Projection	13,900	22,200

10. Strategic Approach to Implementation

10.1 Phasing

In discussion with the WHRM Project Team it was agreed that, while both the fixed-route service and the rural day-a-week service showed potential value to the community, the fiscal capacity of the Municipality dictated that the two services could only be implemented in phases. It was clear that the fixed-route service would be the first priority since it would provide a necessary framework for a future day-a-week service.

10.2 Vehicle Deployment for Urban Fixed-Route Service

Scenario 4, described in Chapter 8, provides the most effective approach to delivering urban fixed-route service. For the most part, the 35ft – 550kWh urban BEB can provide a full day of service on a single charge. Some days during the winter months, however, may require the deployment of the backup bus. The back-up bus should be used during mid-day when passenger loads are expected to be lighter and the full capacity of the 35ft bus is not required. As the backup bus will provide minimal service over the year, primarily during times when the primary bus requires maintenance, a BEB is not justified. A 26ft diesel mini-bus is recommended for this task.

10.3 Vehicle Deployment for Rural Day-a-Week Service

The Day-a-Week service plan includes four round trips to most rural areas during the service day for that area. For the two areas requiring longer travel times (Areas 5 and 8) only three round trips occur during the service day. One mid-day break period (of approximately one hour in length) is provided in each daily plan to allow for bus recharging. Even with the mid-day recharge, our modelling has shown that on some days (particularly in winter months), the buses are unable to complete all of their round trips. There are three potential solutions to deal with this:

- Employ the backup bus to complete the final round trips of the day, as needed.
- Reduce the service schedule to allow for only two or three round trips per area. Service could be initially operated as planned (using the option above) until it was learned which of the daily round trips were being utilized least. The lesser-used round trips could be considered for cutting.
- Use a diesel/gas bus instead of a BEB

We believe that employing the backup bus (shared with the fixed-route service), when needed, is the most suitable approach. Once operational, monitoring of ridership will determine whether a reduced schedule is warranted instead.

10.4 Alternative Deployment for Lower-Cost Start-Up

When transit systems are introduced to an area, it may take some time to build up ridership. An alternative to purchasing the desired 35ft urban BEB may be to start off the fixed-route service with the 26ft mini BEB proposed for the rural day-a-week. Should a decision be made to implement the rural day-

a-week service at a later date, the 35ft urban bus could be purchased for the fixed-route service and the 26ft mini BEB could be transferred to the rural service.

Should response to the new service be lower than projected and the Municipality decides to discontinue the service, cost of purchasing the buses can be partially recovered through the sale of assets. The investment in bus stop infrastructure, however, will be lost. For this reason, WHRM may consider delaying the installation of bus stop infrastructure until there is confidence in the viability of the service. It must be recognized, however, that some bus stops will not provide adequate service for wheelchairs and others with mobility challenges without the added infrastructure. At a minimum, bus stop signs will need to be installed at all stops prior to the start of service.

Figure 10-1 provides a diagrammatic view of the proposed deployment. The recommended urban BEB is purchased for the fixed-route service and all bus stop infrastructure is constructed. The alternative lower start-up approach is shown in Figure 10-2. In this scenario, the mini BEB recommended for the eventual rural service is purchased and deployed on the fixed route as an interim measure. When a decision is made to initiate the rural service, the urban BEB is purchased for the fixed route and the mini BEB is transferred to the rural service. Pads and shelters recommended for the fixed-route service are delayed until the fixed-route service becomes established.

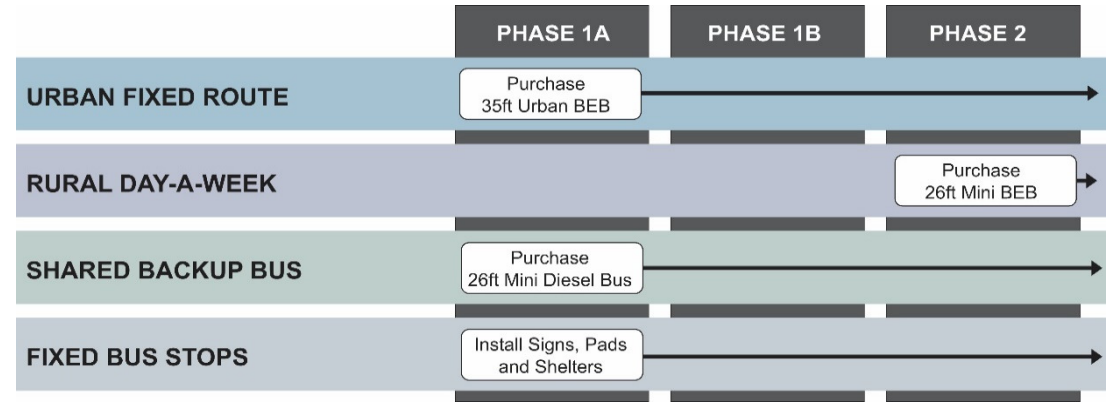


Figure 10-1: Recommended Deployment in Phases

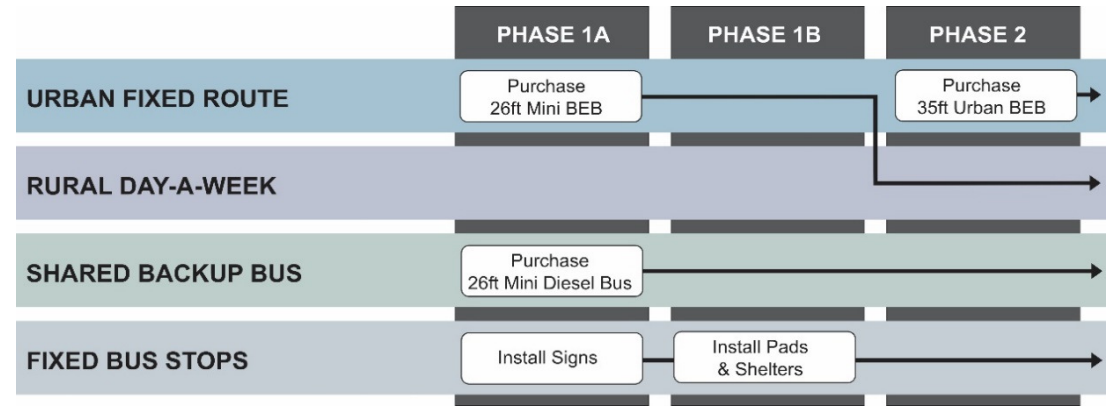


Figure 10-2: Lower Start-Up Cost Deployment in Phases

11. Elements of Fixed-Route Operation

In this section, we discuss various elements of operating the fixed-route transit service described in the Preferred Service Plan. We will describe these elements as though the Municipality were operating the service within its organizational structure. Should the Municipality choose to work towards one of the other operating models discussed later in section 13.4, these figures can be used as a basis for negotiation of a funding agreement.

11.1 Route

The recommended routing was chosen from a range of options and assessed and fine-tuned through the process described in Chapter 4. The final routing, along with a recommended schedule and bus stop locations, is shown in Appendix E.

11.2 Service Specifications

Key service specifications for the preferred local route are summarized in Table 11-1. It is recommended that service be operated hourly on weekdays between 7:00 am and 8:00 pm. Weekday evening and weekend service can be evaluated in future phases and would not require any additional vehicles. The recommended periods of operation correspond to the primary stated intentions of survey respondents including access to groceries / shopping, recreational amenities, medical appointments, work and school, visiting family or friends, and accessing social services. Periods of operation align with service provided in peer municipalities.

Table 11-1: Fixed-Route Service Specifications

Start / End Point	Sports Complex
Service Design	One-way loop (counter-clockwise)
Route Distance	21.3 km
In-Service Travel Time	53 minutes
Recovery Time	7 minutes
Cycle Time	60 minutes
Period of Operation	<u>Weekdays only</u> First Trip departs at 7:00 am / Last trip departs at 7:00 pm
Route Frequency	60 minutes
Active Vehicles Required	1 active vehicle
400m Population Coverage (estimate)	2,900 people

11.3 Fare Collection

For many years, dropping coins in a fare box has been the basis for transit fare collection. The sale of tickets and monthly passes is one way to avoid the nuisance of the single fare cash payment. More and more, people are expecting the ability to make transactions through digital means (such as a smart card or a smart phone).

Equipping buses with a secure fare box and arranging for the sale of tickets and passes will be the starting point for the WHRM service. Opportunities should be explored, however, to supplement this with newer technologies for fare collection including:

- Using the HotSpot app which is currently in use by Bridgewater Transit as a fare collection option
- Negotiating with Halifax Transit to use their HFXGo app
- Pushing the Province of Nova Scotia to adopt Action Strategy 1.3.6 from its Regional Transportation Plan (2026) which proposes “a common user interface to manage fares”

11.4 Staffing and Administration

The system, as described, would require two operators, one administrator, and one manager. Each operator would work five days a week with a shift of about seven hours (including vehicle preparation time). The Administrator would be responsible for marketing, issue/complaint resolution, and coordination at 0.75 FTE (full time equivalent). A management position (0.4 FTE) within the Municipality (regardless of whether the service is operated by the Municipality or not) would be required for coordination and oversight. These FTE's could be new hires or be covered by reassignment of workload from existing positions within the Municipality.

Provision would need to be made to have a back-up driver ready to cover for illness or time off.

Staffing costs are summarized in Table 11-2.

Table 11-2: Staffing Requirements

Position	Number Required	Hourly Cost (incl. benefits)	Hours Per Week	Cost per Year
Driver	2	\$32	35	\$116,000
Administrator	1	\$40	28	\$58,000
Manager	1	\$52	15	\$41,000
Total Cost				\$215,000

11.5 Bus Stops

Bus stops are normally located every 350-450 metres along the route in urban areas. Spacing the stops too far apart adds to walking distance, but stops too closely spaced add stopping time to the route. The routing map provided in Appendix E shows recommended locations for bus stops.

When considering a new fixed-route service as a trial implementation, investment in vehicles can be partially recovered if the service is discontinued. Investment in transit stop infrastructure can not. For this reason, we recommend minimizing the design of bus stop until confidence is gained in the longer-term viability of the service.

At a minimum, every bus stop must have a sign. For consistency with other services in Nova Scotia, the sign should be predominantly white with a bus logo on it. Some service-specific branding can also be added. The bus stop signs used by Yarmouth Transit provides a good example to follow (see Photo 11-1).



Photo 11-1: Bus Stop Sign (Yarmouth)

A bus can only properly deploy its ramp to allow a wheelchair to board or deboard when there is a hard (preferably raised) surface. It is beneficial to have a sidewalk on the side of the street that the bus travels. When the sidewalk is separated from the street, a

concrete pad (with tactile walking surface indicators) should be constructed between the sidewalk and the back of the curb (see Figure 11-1). Some portions of the route in Windsor have no sidewalk or the sidewalk is on the opposite side of the street that the bus travels. None of the route in Falmouth has sidewalks. Over time, consideration should be given to building new sidewalk connecting to the bus stop.

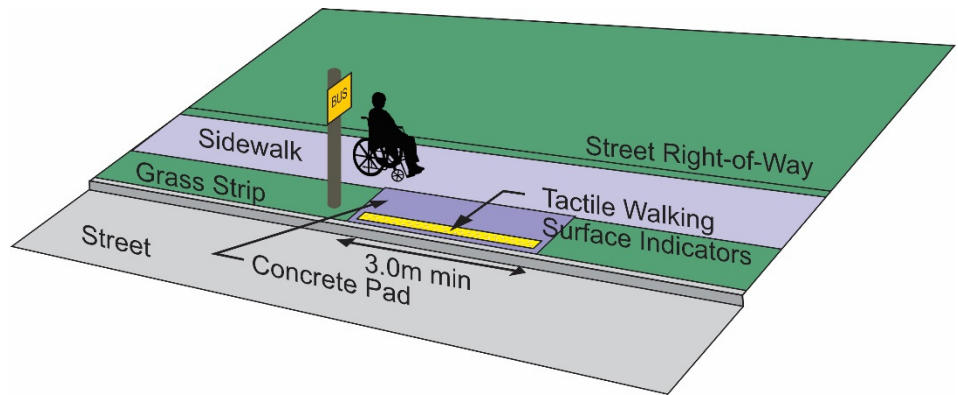


Figure 11-1: Concrete Bus Stop Pad

Transit shelters provide protection from weather for clients waiting for the bus. At a cost of approximately \$10,000 per installation, transit shelters should be used sparingly at first. It would be prudent to approach commercial properties and institutions to encourage them to fund the installation and maintenance of transit shelters on their property. For the Municipality, bus shelters and benches should be prioritized at the Sports Complex and Downtown.

Some stops are located where parking lots are abutting the roadway. While locating a stop here takes advantage of a surfaced area for waiting and bus ramp deployment, it may expose those waiting for a

bus to parking lot traffic. A raised concrete pad separating the road from the parking area can address this exposure. An example of such a pad is shown in Photo 11-2. In locations where there is a curb but no sidewalk, a concrete pad should be installed (see Photo 11-3). All pads should be designed with an accessible ramp.



Photo 11-2: Concrete Pad Between Parking Lot and Road (Newport Corner)



Photo 11-3: Concrete Pad at Location with Curb but No Sidewalk (Middle Sackville)

Installing supportive customer infrastructure at locations on roadside shoulders with ditch drainage is impractical due to the limited roadway and shoulder width. For that reason, only the installation of a sign is recommended. It should be recognized that these stops will not be accessible in the way that other stops are. The limited width and unevenness of the terrain will not allow the bus to deploy its ramp to board a wheelchair. Nevertheless, for much of the route, wheelchair users will find an accessible stop nearby, even if the closest stop is not accessible.

A summary of infrastructure needed at bus stops is shown in Table 11-3. Unit costs for infrastructure construction are provided, but since actual cost will be site-specific, they should be viewed as only very high level estimates.

Table 11-3: Recommended Bus Stop Infrastructure

Bus Stop Type	Number of Locations	Recommended Infrastructure	Unit Cost per Location
Sidewalk and curb (abutting)	14	Sign	\$200
Sidewalk and curb (separated)	8	Sign, concrete (or asphalt) pad connecting sidewalk to curb	\$3,000
Curb but no sidewalk	5	Sign, concrete pad abutting sidewalk	\$6,000
Shoulder with ditch drainage	12	Sign	\$200
Within parking lot	5	Sign, concrete pad ¹	\$8,000
Existing pad	2	Sign	\$400
Total Cost			\$100,000

¹ A concrete pad will require the agreement of the affected property owner

11.6 Bus Tracking Apps

Apps that track and display the real-time location of transit vehicles on their routes have been a welcome addition to customer support. Transit users gain confidence in using the service when they know where the bus is at all times, even when its running behind schedule. There are several third-party apps on the market that do a good job of providing tracking data, but their cost can only be justified for larger multi-route systems. Some third-party apps will track buses at no cost to the system operator, but typically do so only for larger transit networks.

A more simple approach is the ‘home-grown’ one used by Bridgewater Transit. Using a local company (Digital Fusion) they are able to display the location of their bus in real time on their municipal website. The cost of doing this would be approximately \$8,000 for initial setup and \$2,000 per year in licensing fees. An image of the product on the Town of Bridgewater website is shown in Figure 11-2.

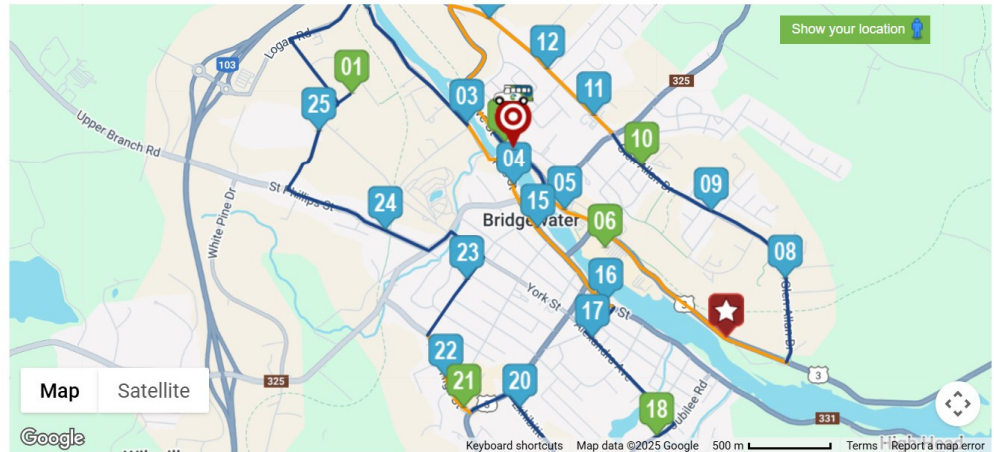


Figure 11-2: Simple Bus Tracking App (Bridgewater Transit)

11.7 Linkage to Active Transportation

Multi-modal trip-making can be an important element of good mobility within WHRM and can be greatly supported by the integration of public transit and active transportation. One challenge that fixed-route public transit faces is that not everyone is going to be picked up or dropped off right at their door. While we note in our analysis that a 400 meter walking distance from a transit stop is an acknowledged service area for fixed-route transit, well-maintained sidewalks or walking paths are an important element of that assumption. Bicycling can extend that 400 meter service distance for some if measures are taken to support bicycling (multi-mode paths, wide shoulders, bike lanes, etc.). Locating bus stops at locations where the Municipality's active transportation network intersects with the fixed transit route is important. Including a bike rack on the bus helps to accommodate those who combine a bicycling trip with transit.

11.8 Underwood Drive Barrier

Underwood Drive is currently severed by a lockable gate across the roadway (see Photo 11-4). The Preferred Route Plan relies on travelling through this section of roadway.

The barrier separates an established residential neighbourhood from a newly developing residential community. While barriers like this are helpful to manage construction traffic during residential construction, the two neighbourhoods should ultimately be connected. If, however, the Municipality deems the keeping these two neighbourhoods separated is desirable, the gate can be converted to one that a bus can activate remotely (see for Photo 11-5 for an example).



Photo 11-4: Underwood Drive Barrier



Photo 11-5: Transit-Activated Gate (Dartmouth)

11.9 Flag Stopping

Some transit systems employ flag stopping in rural or suburban areas instead of using designated stops. Flag stopping means that the bus will stop at any location along its route (provided it is safe to do so at that location) when requested by an onboard passenger or when someone is waiting on the side of the road and waves at the approaching bus. The fixed-route service plan described in this document uses fixed stops throughout with no flag stopping. We believe this is beneficial for three reasons:

- Provides consistency and understandability of operation
- Ensures pick-up and drop-off locations are located for optimal safety
- Allows for supporting infrastructure (benches, pads, etc.) to be built
- Adds to the “visibility” of the service

The benefit of flag stopping in rural areas is that the distance between homes and where the bus stops can be reduced. Although we do not recommend flag stopping for the fixed-route service, the Municipality may wish to consider it on a trial basis only in the Falmouth section of the route. For the rural day-a-week service, flag stopping is recommended along the section of the route between the fixed community stop and the Sports Complex.

11.10 Maintenance and Overnight Storage of Buses

The most appropriate location to store buses overnight is the existing Public Works Depot on Park Drive. It is close to the route terminus point at the Sport Complex and capable of providing routine maintenance, servicing and cleaning. Although there is currently no ability to store the buses indoors, this is a “nice-to-have” as opposed to a necessity. Major maintenance tasks, particularly those that require lifting of an urban transit bus, will have to be done in Halifax or at the Kings Transit garage in New Minas. BEB charging infrastructure will be installed at the Depot for the buses to be recharged overnight.

11.11 Marketing and Education

Successful implementation of a new transit system will require strong communication and ongoing evaluation to ensure it meets community needs. Marketing and public education helps residents understand how to use the system, the routing and schedule, as well as benefits of using public transit.

When first introducing a public transit system to the Municipality, clear communication and outreach are essential to build awareness and encourage ridership. The Municipality should develop a focused marketing and education plan that explains the service, schedule, fare structure and accessibility features in simple terms. Steps may include the creation of a dedicated webpage, posting updates on social media and distributing printed materials such as brochures and posters at key community locations. Additionally, providing pop-ups at community events and festivals can help reach a broader audience.

Public education should include guidance on how to plan trips, pay fares, and access the service safely. Outreach efforts should target seniors, students, people with disabilities, and the vulnerable population to ensure equitable access. These activities should begin before the service launch and continue during initial months to support adoption.

11.12 Ongoing Monitoring

Monitoring is essential to assess the performance of the new transit system and to determine whether adjustments or service changes are needed. The Municipality should establish a structured monitoring framework that includes both quantitative and qualitative measures. Key indicators should include:

- **Ridership Levels:** Track daily and weekly passenger counts and boarding locations to understand demand patterns and identify peak activity times.
- **On-Time Performance:** Measure schedule adherence to ensure reliability and identify operational issues.
- **Customer Feedback:** Collect input through surveys to gauge the satisfaction of the community, identify areas for improvement, and evaluate additional prospective periods of operation.
- **Cost and Revenue Analysis:** Monitor operating costs against fare revenue to evaluate financial sustainability.
- **Safety and Accessibility Compliance:** Review safety performance and accessibility standards to ensure all riders can use the service comfortably.

Steps to implement monitoring include installing data collection systems that count boardings and setting up regular reporting. Findings should be used to guide adjustments such as potential route changes, schedule modifications or service expansion. If ridership remains low or costs exceed projections, the Municipality can consider scaling back the service. On the other hand, strong demand may justify adding stops, increasing frequency or expanding the route. Continuous monitoring ensures the service remains responsive to community needs while remaining financially viable.

Monitoring should be conducted after a ramp-up period of at least one year to allow time for travel patterns to adjust to the new service.

11.13 Financing Operating Cost Through Taxation

Although some funding can be secured through fares and advertising, the bulk of the cost of the transit service will need to be funded through municipal taxation. Federal and Provincial funding programs to support transit operating costs are rare.

There are two general approaches to taxation. One is through the general tax rate and the other is through an area rate. The rationale for using an area rate is that it applies only to those residents and businesses that stand to benefit directly from the service. Using the general tax rate can also be justified by recognizing that public transit provides a benefit to all through reduction of emissions, noise, traffic and parking demand, and promotion of social equity and climate change goals.

Setting the geographic bounds for an area rate typically involves measuring either the walking or “crow-flies” distance from each bus stop or drawing lines parallel to the route irrespective of stop locations. The distance used for either measurement can be anywhere from 400m to 1000m.

Taxation can also be based on a blend of these two approaches. Halifax Transit, for example, funds its transit service partly from an area rate set at a 1000m crow-flies distance parallel to the nearest transit route and partly from the general rate.

11.14 Evolving the Network

As growth in the Municipality evolves, demands for transit in unserved areas may emerge. Extending the route into new areas, however, is difficult to do without increasing the route cycle length from the ideal sixty minutes. Ongoing monitoring of transit usage may identify served areas that are not generating many trips and these sections of the route could be “trimmed” to allow for offsetting extensions into new area. Also, the proposed route has been designed to be completed comfortably in sixty minutes. Over time, operating experience may provide enough confidence to extend the routing while retaining sufficient buffer time at the end of the route cycle.

12. Funding Opportunities

Securing necessary funding is essential for implementing and sustaining a public transit service. Municipalities have the potential to draw on various funding sources to cover capital and ongoing operation costs. There are potential funding sources provided by federal and provincial programs. Leveraging these resources could aid in supporting both the implementation and long-term viability of public transit in the Municipality.

12.1 Canada Public Transit Fund

The Canada Public Transit Fund (CPTF) is a major federal program introduced in 2024 to enhance public transit and active transportation infrastructure nationwide. Starting 2026-2027, the CPTF will deliver \$3 billion annually in stable, predictable funding, enabling municipalities to plan and implement long-term transit projects with confidence. It will address diverse needs of communities across the country including large metropolitan areas, smaller municipalities, and rural, remote, northern and indigenous communities. CPTF funding will be allocated through three different streams as outlined in Table 12-1.

Table 12-1: Summary of CPTF Funding Streams

Funding Stream	Purpose of Stream	Process and Eligibility
Metro-Region Agreements (MRAS)	- Targets large urban areas with high transit demand and cross-boundary travel - Promotes integrated regional planning linking transit, housing and land use. - Supports major projects such as subway expansions, dedicated bus lanes and system maintenance	Process: - Expression of interest (EOI): Metro-regions signal readiness - Integrated Regional Plan (IRP): Outlines 10-year investment strategy - Metro-Region Agreement: Formal long-term funding commitment - Project Funding Applications and Contribution Agreements: For specific projects Eligibility: - Must include provincial governments and regional entities responsible for transit, housing and land use

Funding Stream	Purpose of Stream	Process and Eligibility
Baseline Funding	• Support communities with existing public transit systems • Provides \$500 million annually for communities with existing transit systems • Focuses on routine investments, system expansion, rehabilitation, and planning	Eligibility: • Provide three to five years of historical ridership, population served and capital investment data • Existing public transit system includes fixed-route service • Have a minimum average historical investment of \$100,000 annually • Have a minimum annual ridership of 30,000 (likely below what WHRM could produce)
Targeted Funding	• Provides regular opportunities for specific public transit and active transportation projects. • Supports initiatives such as rural transit, school transportation and active travel infrastructure	Process: • Different programming offered under this stream with varying requirements. • Current programming includes: Rural Transit Solutions Fund, Zero Emissions Transit Fund and Active Transportation Fund

Communities seeking CPTF funding must implement measures to unlock housing supply near transit, enabling faster and more affordable home construction.

12.2 Rural Transit Solutions Fund

The Rural Transit Solutions Fund (RTSF) provides financial support to develop and expand locally driven transit services in rural, remote, indigenous and Northern communities. Its goal is to improve access to essential services, employment, education and social connections.

The RTSF supports a range of transit models including:

- Fixed-route services
- OnDemand transit
- Micromobility options (e.g. e-bikes)

Under the Capital Stream, applicants may receive up to \$10 million for eligible capital assets such as vehicles and infrastructure. Eligible capital costs include:

- Vehicles (buses, vans, zero-emission vehicles)
- Infrastructure (shelter, signage)
- Accessibility features
- Professional service fees
- Active transportation components (e.g. short walking/bike paths, bike racks, lighting)
- Micromobility (e-bikes, charging stations as part of larger transit projects)
- Start-up costs

To qualify, applicants must complete a feasibility study analysing community characteristics such as geography, population, and economic conditions to ensure the project is realistic and financially sustainable. **The feasibility study you are reading satisfies this objective.** Projects must also meet at least one of the following objectives:

1. Increase transit use relative to car travel
2. Contribute to climate change mitigation and resilience
3. Improve transit options for all, especially equity deserving groups

Additional application requirements are outlined in Table 12-2.



Table 12-2: Summary of RTSF Application Requirements

Requirements for Applications	Details Required
Project details	• Project rationale explaining how the project is supporting the objective of the RTSF and why the project is needed • List of the type and quantity of assets that will be purchased • Explanation of if/how the project will include reducing green house gas emissions and/or mitigate impacts of climate change • Estimates on how the project will improve public transit, notably ridership
Project finances	• The federal funding being requested • The organization's financial contribution • Other sources of funding, including in-kind contributions and partner funding
Cost estimates on assets applicants plan to acquire	• Quantity and type of each asset • Cost for acquiring assets • Cost to meet regulatory requirements • Cost of operations and maintenance • Cost relating to consulting or engagement with Indigenous peoples

Table 12-3: Examples of Approved RTSF Applications

Program Name	Municipality	Federal Contribution (\$)	Program Contribution (% of Est. Total Project Cost)
Purchase of vehicles and charging stations for the on-demand service in Tecumseh, Ontario.	Tecumseh	1,050,550	80%
Installation of transit infrastructure to support T:GO transit system for the Town of Tillsonburg, Ontario	Tillsonburg	153,436	71%
Purchase of an accessible vehicle to provide on demand transit services in Red Rock, Ontario	Red Rock	60,480	80%
Purchase of hybrid vehicles to support an existing transit service for rural regions surrounding City of Ottawa, Ontario	Russell	92,000	80%

12.3 Provincial Funding

In 2023, the Government of Nova Scotia announced an investment of \$5.1 million "to help municipalities and community organizations purchase vehicles, support operations and planning and make transportation more accessible." With the recent adoption of the JRTA's Regional Transportation Plan, there is optimism that further investment will be made in municipal public transit in support of the Plan's objectives.

Currently, the Public Transportation Assistance Program (PTAP) provides funding to municipalities and community organizations operating a fixed-route service for capital assets like vehicles, bus terminals and shelters. Funding is for capital purchases that support the long-term sustainability of the fixed-route transit service. Alternatively, the funds can be placed in a capital reserve until they're required. The funding is not for offsetting the cost of operating the transit service.

13. Summary and Recommendations

13.1 Service Options

This study has used public engagement and interaction with Municipal staff to examine a variety of approaches to introducing transit service within WHRM. A range of service types has been considered under the lens of what we heard regarding the needs and desires of the community and supported by analysis. A summary of the service types and our conclusions regarding each is provided in Table 13-1.

Table 13-1: Transit Service Types and Their Role in WHRM

Service Type	Description	Conclusion
Urban Fixed-Route	Bus that travels on a daily fixed route/schedule and stops at fixed stops. See Section 3.2	The most appropriate first step in implementing public transit in WHRM.
Rural/Suburban Fixed-Route	Bus travels on a daily fixed route/schedule with flag stopping. See Section 3.1	The nature of this service is inefficient and was previously unsuccessfully implemented in WHRM.
Rural “Hybrid” Service	Bus travels on fixed routes on certain days with one community hub pick-up stop and at-door pickups when booked in advance. See Section 3.5	A viable means of delivering service to rural areas with a level of service reduced from urban service. Should be considered as a follow-up phase to urban fixed-route service.
Inter-Regional Routes	Bus travels between towns (including Windsor) and metro Halifax on a fixed route/schedule. See Section 3.7	Service that meets a market need, but is beyond the capability of WHRM to deliver on its own.
Demand-Responsive Service	Bus provides at-door service when booked in advance. See Section 3.3	Currently provided by West Hants Dial-a-Ride and merits continued support from WHRM.

From our examination, routing patterns and schedules were developed for a Phase One urban fixed-route service and for a Phase Two rural day-a-week service.

13.2 Urban Fixed-Route Service

For the urban fixed-route service, a route was selected that provides service every hour during weekdays with coverage that reaches nearly every resident within the Windsor-Falmouth Area. Using a robust modeling process that examines a wide range of service frequencies and geographic coverage helps us to ensure that the recommended service plan has been optimized to best meet the key needs and expressed desires of the community.

The proposed urban fixed-route service is described in Chapter 7 and Appendix E. The annual operating costs for the urban fixed-route, comparing the recommended BEB to an equivalent diesel bus, are provided in Table 13-2.

Table 13-2: Operating Cost Summary

Item	Annual Cost (Diesel Bus)	Annual Cost (BEB)	Assumptions/Notes
Fuel/Electricity	\$78,000	\$38,000	The estimated fuel cost for diesel bus is the combined total of summer and winter in Baseline (Table 8-9). The estimated electricity cost for BEBs is the combined total of summer and winter in scenario 2 (Table 8-9).
Maintenance	\$45,000	\$20,000	See Table 8-9
Vehicle Replacement Reserve	\$46,000	\$46,000	Replacement will be BEB; 50% of replacement value recovered from government grants; 16-year service life urban transit. No replacement reserve for back-up bus.
Drivers	\$116,000	\$116,000	See section 11.4
Administration Salaries	\$99,000	\$99,000	See section 11.4
Administration Costs	\$8,000	\$8,000	Marketing, printing, monthly pass and ticket sales
Insurance	\$7,000	\$9,000	
Bus Stop Maintenance	\$6,000	\$6,000	Primary cost is snow clearing
Vehicle Tracking	\$2,000	\$2,000	See section 11.6
DIRECT OPERATING COST	\$353,000	\$290,000	For peer comparison, cost vehicle replacement reserve, bus stop maintenance and vehicle tracking have been excluded
TOTAL OPERATING COST	\$407,000	\$344,000	



Initial capital costs are summarized in Table 13-5. This summary includes the baseline scenario, the recommended approach of purchasing a 35ft BEB, and the lower up-front cost scenario described in Section 10.4. Although operating costs associated with the lower up-front cost scenario have not been specifically modelled, they will be nearly identical to those modelled for the recommended scenario. While the smaller vehicle may see slightly reduced energy costs, all other costs will remain the same.

Table 13-3: Operating Cost Recovery

	Diesel		Battery Electric	
	Low	High	Low	High
Ridership Projection	13,900	22,200	13,900	22,200
Total Annual Revenue*	\$38,000	\$58,000	\$38,000	\$58,000
Total Direct Operating Cost	\$353,000	\$353,000	\$290,000	\$290,000
Net Operating Cost (Direct)	\$315,000	\$295,000	\$252,000	\$232,000
Recovery of Direct Costs	11%	16%	13%	20%
Net Cost per Trip	\$22.66	\$13.29	\$18.13	\$10.45

Table 13-4: Operating Cost Per Capital

	Diesel		Battery Electric	
	Low	High	Low	High
Total Annual Revenue	\$38,000	\$58,000	\$38,000	\$58,000
Total Operating Cost	\$407,000	\$407,000	\$344,000	\$344,000
Net Operating Cost (Total)	\$369,000	\$349,000	\$306,000	\$286,000
Net Cost Per Capita	\$20.30	\$17.90	\$15.70	\$14.67

Table 13-5: Initial Capital Cost Summary

	Baseline Scenario 35ft Urban Diesel Bus	Recommended Scenario 35ft Urban BEB	Low Up-Front Cost Scenario 26ft Mini BEB
Primary Bus	\$950,000	\$1,480,000	\$300,000
Back-up Bus	\$220,000	\$220,000	\$220,000
Charger (incl. installation)	\$0	\$130,000	\$130,000
Start-up Engineering/Marketing	\$50,000	\$50,000	\$50,000
Bus Stop Infrastructure	\$100,000	\$100,000	\$100,000
Total Capital Cost	\$1,320,000	\$1,980,000	\$800,000

13.3 Rural Day-a-Week Service

Once the fixed route service is established, consideration may be given to expanding service to rural areas of the Municipality. The inherent inefficiencies of operating transit service in lower density rural areas can be mitigated by concentrating service on a single day of the week. The service proposed provides buses to eight defined rural zones with one of four weekdays assigned to a pair of zones. For each of the zones, a bus will make either three or four scheduled round trips each day between the Sports Complex in Windsor and a central community hub. Once the bus is in the community, there will be a window of 20-35 minutes within which at-door pickups can be reserved.

The rural day-a-week service is described in Chapter 7 and Appendix D. A projection of annual operating costs is provided in Table 13-6 and start-up capital costs are shown in Table 13-7.

Table 13-6: Rural Service Operating Costs

Item	Annual Cost	Assumptions/Notes
Electricity	\$78,000	See Table 7-10
Maintenance	\$45,000	See Table 7-10
Vehicle Replacement Reserve	\$25,000	50% of replacement value recovered from government grants; 6-year service life. No replacement reserve for back-up bus.
Driver	\$63,000	43 hours per week, \$28 per hour including benefits
Dispatcher*	\$51,000	35 hours per week, \$28 per hour including benefits
Insurance	\$3,000	
TOTAL OPERATING COST	\$265,000	

* Dispatcher may be replaced with dispatch software

Table 13-7: Rural Service Capital Costs

Item	Cost
26ft Mini BEB	\$300,000
Charger (including installation)	\$130,000
TOTAL CAPITAL COST	\$430,000

13.4 Operating Agreement

There are significant ‘economies of scale’ in transit service delivery. Operating a single-vehicle service brings significant challenges in providing back-up vehicles and drivers and in keeping abreast of best practices and emerging technologies. Essentially, adding transit vehicles to an existing transit service operation will have less impact than adding new transit vehicles to an existing municipal fleet without transit vehicles.

It is recommended that the Municipality enter into negotiation with a third-party contractor to operate and manage transit services. The third-party contractor would be responsible for staffing, ongoing vehicle maintenance, and management of daily operations including fare collection, monitoring cleanliness and state-of-good-repair of vehicles in operation, as well as responding to issues to support drivers and customers. While the Municipality would not be required to operate or maintain fleet vehicles under this model, it is advised that the Municipality assign an employee as a primary point of contact with the contractor to streamline communications and management. This delivery method leverages contractor knowledge and expertise and minimizes Municipal responsibilities for staffing and maintenance. We believe Kings Transit and West Hants Dial-a-Ride are both potential candidates to operate the service.

To leverage available capital grants, it is recommended that the Municipality own the vehicles, thereby lowering ongoing contractor fees. Alternately, if transit is trialed as a pilot project, consideration could be given to additionally contracting vehicle provision to a third-party operator, which reduces upfront costs and risk to the Municipality.

Provision of supporting infrastructure such as sidewalks and shelters would remain the responsibility of the Municipality.

13.5 Alternatives to Fixed-Route Service

Chapter 3 of this report discusses alternatives to fixed-route service. If the Municipality deems that operation of a fixed-route service is beyond its means, we believe the most viable alternative would be to increase funding to West Hants Dial-a-Ride allowing it to build additional capacity. This would allow them to better market the service to all residents of the Municipality and allow them to reduce the fees charged. Increased funding to Dial-a-Ride would be a fraction of the cost of operating a municipal fixed-route service, although it is beyond the scope of this study to project the comparative value of this service in terms of ridership.

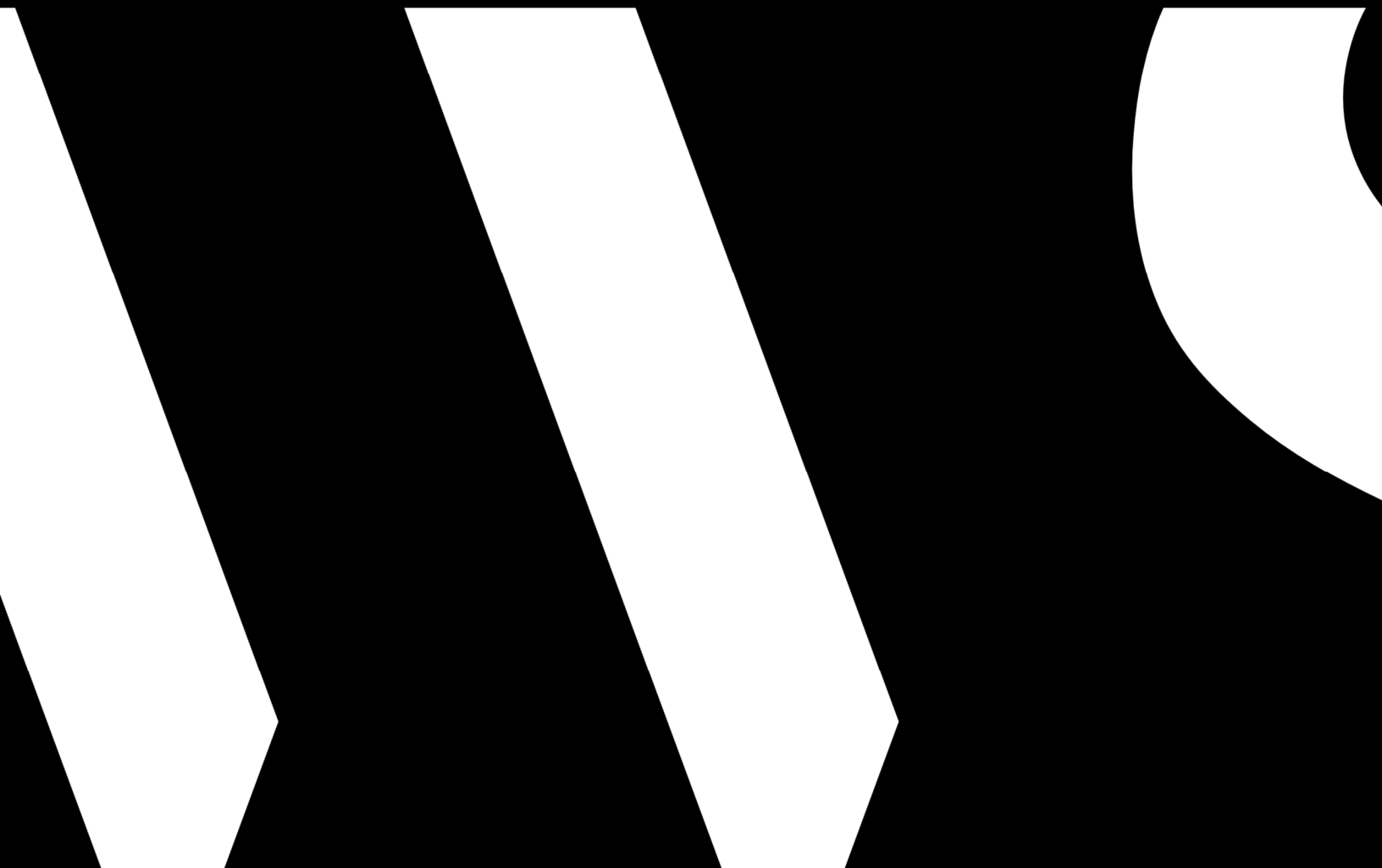
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Appendix A: Street Classification Maps



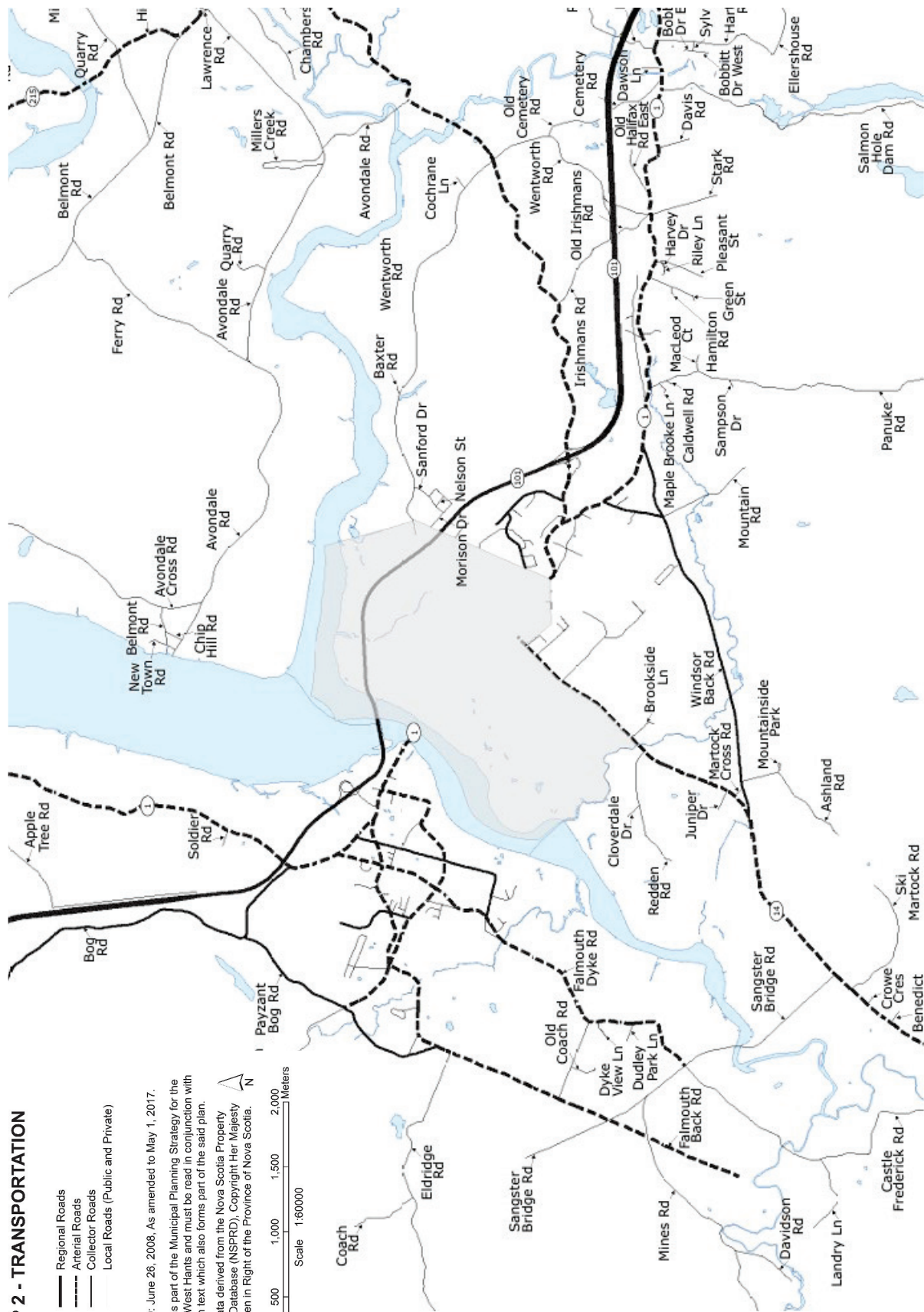
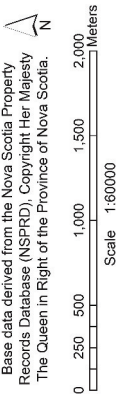
Appendix A – Street Classification Maps

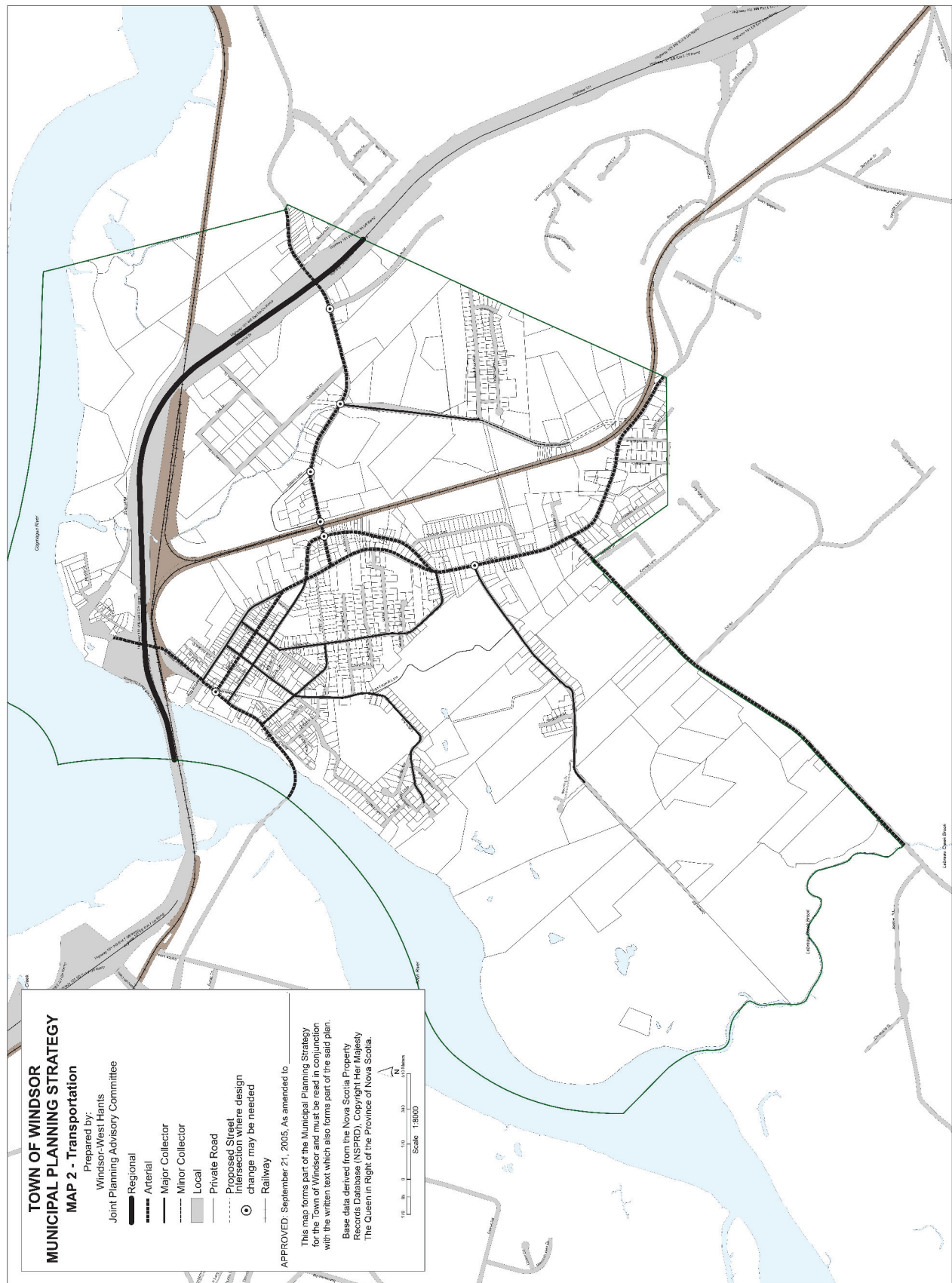
Street classification is used to determine which streets are appropriate for urban transit buses to use as part of a fixed route plan. Street classification for the urban Windsor-Falmouth area was taken from Municipal Planning Strategy maps available on the municipal website and shown on the following pages.

(EXCERPT FROM)
MUNICIPALITY OF THE
DISTRICT OF WEST HANTS
MUNICIPAL PLANNING STRATEGY
MAP 2 - TRANSPORTATION

- Regional Roads
- Arterial Roads
- Collector Roads
- Local Roads (Public and Private)

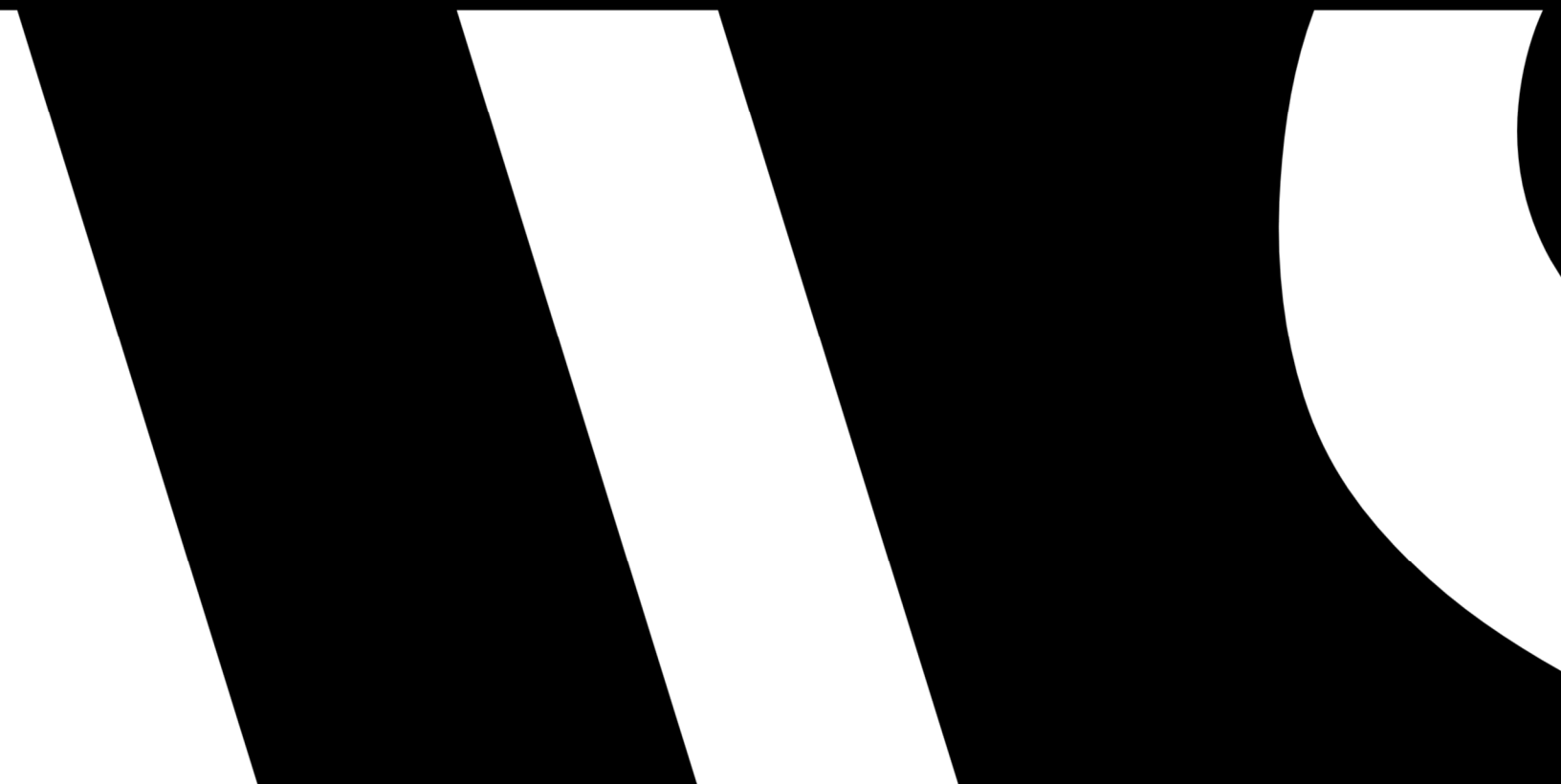
APPROVED: June 26, 2008, As amended to May 1, 2017.
 This map forms part of the Municipal Planning Strategy for the Municipality of West Hants and must be read in conjunction with the written text which also forms part of the said plan.
 Base data derived from the Nova Scotia Property Records Database (NSPRD), Copyright Her Majesty The Queen in Right of the Province of Nova Scotia.







Appendix B: What We Heard Report



Appendix B – What We Heard Report

This appendix includes our What We Heard report. This document describes the process undertaken to engage with the public and key stakeholders and summarizes what we heard from those discussions.



West Hants
something inspiring awaits



Zero Emission Transportation Study

What We Heard Report

West Hants Regional Municipality
February 2026

TABLE OF CONTENTS

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APPENDICES

Appendix A – Open House Display Boards

Appendix B – Community Survey Results

1 INTRODUCTION

The West Hants Regional Municipality (the “Municipality”), in collaboration with WSP Canada Inc., is undertaking a Zero Emission Transportation Feasibility Study (the “Study”) to assess the potential or creating a zero-emissions transportation service that is reliable and affordable to better meet the needs of residents, workers, students, and visitors. As part of this process, the project team carried out a comprehensive public engagement program designed to gather meaningful input from residents and stakeholders.

To promote the engagement opportunities, the Municipality used both digital and direct outreach methods. Event and online survey information was shared across municipal social media channels to notify residents of upcoming opportunities to get involved.

A variety of engagement events was offered throughout the process, including:

- Eleven (11) Stakeholder Interviews;
- Two (2) Staff Workshop Sessions;
- Six (6) Public Open Houses; and
- One (1) Online Community Survey.

Together, the communication efforts and engagement events helped ensure broad participation and provided valuable insight into the community’s existing challenges, opportunities and aspirations of a transit service within the Municipality. The sections that follow summarize the engagement events completed and what we heard.



2 PUBLIC STAKEHOLDER & COMMUNITY ENGAGEMENT

This section provides an overview of the stakeholder and community engagement activities conducted to inform the development of the Study.

2.1 MUNICIPAL STAFF INPUT

Interaction with Municipal staff included personal interviews and team workshop sessions. Staff involved represented the following Departments as well as the Chief Administrative Officer:

- 1 Planning & Development
- 2 Public Works
- 3 Economic Development

An overview of the **key insights** from the interviews include:

- Zero-emission technology is assumed but analysis should include other fueling options for comparison
- Service to areas of population is important, but particular populations (i.e. seniors, low income) are critical
- No technical concerns with flag stopping or buses stopping in traffic lanes to do loading.
- Overnight storage and servicing of vehicles will be at the Municipal site on Park Drive.
- Need to understand why service provided previously by Kings Transit had low ridership.
- Can't travel on King's Edgehill property but connections from Wiley Avenue are possible .
- The Town has a growing population of newcomers.
- Service to the Superstore and Sobey's should be on-site and equitable for both.
- Growth in the Crossing develop will be higher density and an important area to service.
- Seniors residences, particularly McLeod House, Dykeland Lodge, Windsor Elms and Gladys Manning Home should be well-served.
- Although some seniors' residences have their own buses for resident travel, connecting employees to the site is important
- Prefer to use Gerrish Street more than King Street
- Service to the Community Centre and the Sport Complex is important
- Service along College Road will be important due to future growth planned
- Food bank may be an important destination but may be moving from Morison Drive

2.2 STAKEHOLDER INTERVIEWS

Businesses and institutions that will most likely hold an important role or interest in the implementation of public transit were identified and interviewed. The interviews were conducted virtually and in some cases, follow-up information was exchanged through e-mail. A total of eleven (11) interviews were conducted and summarized below.

- 1 West Hants Dial-a-Ride
- 2 West Hants Community Health Board
- 3 NS Health
- 4 Windsor Township Business Association
- 5 Avon Chamber of Commerce
- 6 King's-Edgehill School
- 7 Windsor Adult High School/West Hants Education Centre
- 8 Senior Bus Society
- 9 King's Transit Authority
- 10 Atlantic Superstore
- 11 Sobeys

An overview of the **key insights** from the interviews include:

- Many students would benefit from a transit system, particularly one travelling Wentworth Road
- Students require transit to employment more than they do to school
- Transit buses would be permitted onto the West Hants Education Centre lands but not the King's-Edgehill School lands
- Important destinations for transit are family resource centres, food banks, recreation centres, and libraries
- Many services (like the courthouse) have left Windsor and moved to Kentville or elsewhere
- Trips for non-emergency medical trips are subsidized by NS Health
- Transportation is a big barrier in rural areas
- Any transit service must be fully accessible
- Large employers like Biovectra and CKF should realize a benefit and assist in funding
- Existing demand-responsive service uses four wheelchair vans and two EV SUVs
- Demand-responsive service reservations require 24 hours notice
- King's Transit extended service (2 hour frequency) to Windsor and Brooklyn, but discontinued due to low ridership
- King's Transit would be open to considering providing transit service again

2.3 COMMITTEE MEETINGS

Three (3) Committees of Council were identified as having interest in the study. The prompting questions listed below were sent to each committee as a catalyst to generate input.

1 Accessibility Committee

- How well are the needs of residents with accessibility challenges served by the current demand responsive transit system (West Hants Dial-a-Ride)?
- What benefits might be realized with a fixed route service as a companion to the demand-responsive service?
- What destinations within West Hants are most important to reach?
- What accessibility features are important and what features are critical for a transit bus?
- What other thoughts do you have regarding the future of public transit in West Hants?

2 Climate Action Committee

- How well are the needs of residents served by the current demand responsive transit system (West Hants Dial-a-Ride)?
- What benefits might be realized with a fixed route service as a companion to the demand-responsive service?
- What destinations within West Hants are most important to reach?
- What is the plan for electrification of the municipal fleet?
- Where will fleet charging infrastructure be located?
- What is your feeling on the future of battery-electric technology in public transit vehicles?
- How can a public transit help meet the Municipality's Climate Action Goals?
- What other thoughts do you have regarding the future of public transit in West Hants?

3 Diverse & Inclusive Committee

- Are there specific segments of the West Hants community that have a higher reliance on public transit?
- How well are the needs of residents served by the current demand responsive transit system (West Hants Dial-a-Ride)?
- What benefits might be realized with a fixed route service as a companion to the demand-responsive service?
- What destinations within West Hants are most important to reach?
- What other thoughts do you have regarding the future of public transit in West Hants?

To date, no response has been received from these committees.

2.4 PUBLIC OPEN HOUSE

Six (6) open houses were held across the municipality on November 19 and November 24, 2025. Two (2) open houses were conducted in Windsor, and one (1) open house each was conducted in Vaughan, Ardoise, Hantsport, and Brooklyn, respectively.

The Public Open Houses were conducted to provide an opportunity for the public to provide input on the vision, aspirations, opportunities and challenges with transit in West Hants. The questions asked at the Open House were similar to many of those in the online survey, providing both in-person and virtual

opportunities for the community to share feedback. The Public Open Houses used interactive displays to gather feedback.

The Public Open House was promoted on the Municipality's webpage (<https://www.westhants.ca/zero-emissions-transportation-feasibility-study.html>) and social media platforms. A total of 35 participants attended the Public Open Houses. A copy of the Public Open House display boards can be found in **Appendix A**.

2.5 COMMUNITY SURVEY SUMMARY

A Community Survey was available on SurveyMonkey from November 18 to December 12, 2025. The survey included multiple choice, ranking questions, open-ended questions, as well as a general comments section, to gather information and feedback on a proposed transit system in the West Hants Regional Municipality. The information received will be used to inform the development of the Study.

The survey was promoted on the Town's webpage (<https://www.westhants.ca/zero-emissions-transportation-feasibility-study.html>) and social media channels. **The survey received a total of 87 responses.** A detailed summary of the survey feedback is presented in **Appendix B**.

3 WHAT WE HEARD

The findings from the stakeholder and community engagement activities conducted have been summarized into a series of “Key Themes”. The input collected through internal and external stakeholder interviews, the community survey, and open houses provided valuable insight into the barriers, opportunities, and aspirations to help inform the development of the Zero Emission Transportation Study.

While the feedback received varies, several key themes were identified, which will support the development of the Study’s recommendations. This section provides an overview of key themes heard throughout these engagement efforts, which have been categorized into four (4) “Key Themes” which are outlined below:

- 1 Transit That Works for Real Life
- 2 Access for All: Affordable, Inclusive, Easy & Safe to Use
- 3 Connect Us, Locally and Regionally
- 4 Sustainable by Design: A Transit System that Supports a Greener Future

3.1 KEY THEMES

1

TRANSIT THAT WORKS FOR REAL LIFE

The engagement feedback emphasized the importance of reliability, convenience, and good routing. Overall, respondents are open to using transit, as long as it aligns with their actual daily patterns. There was interest in having buses that run at times when they travel most (morning, midday, late afternoon) and on weekends when demand remains strong. Convenient routes and stops, reliable schedules, and short walking distances to bus stops drive interest. Transit will attract riders only if it is dependable, accessible, and built around real travel behaviour, not hypothetical patterns.

Participants also highlighted that public transit can play a vital role in promoting independence, reducing social isolation and enhancing overall quality of life, especially for those who rely on it as their primary mode of travel.

The Study should consider:

- Reliability & Convenience

- Prioritise reliable, convenient transit operations with schedules that align to actual resident travel patterns, including peak morning, midday, and late afternoon times as well as weekends.
- Ensure that transit routing and scheduling respond to real-world demand, focusing on popular travel periods (7–10 a.m., 10 a.m.–4 p.m., 4–6 p.m. on weekdays) and high weekend demand (particularly Saturday mornings and afternoons).

62% of survey respondents indicated they would use transit, and 28% say “maybe” depending on how well it fits their needs.

- Accessibility & Infrastructure

- Design routes and stops to minimise walking distances, aiming for most residents to be within a 5-minute walk of a stop, as longer walks significantly reduce willingness to use transit.
- Locate stops strategically near major destinations, workplaces, and community hubs to maximise utility and accessibility for users. The most common locations identified by survey respondents included, Downtown Windsor (83%), Atlantic Superstore on Cole Drive (77%) and Sobeys on Wentworth Road (74%).
- Address operational barriers identified in the community, such as the need for reliable service during severe weather and on rural roads, and ensure stops are safe and well-designed.

- Community Feedback & Personal Routines

- Incorporate public feedback on motivators for transit use, such as routes and schedules that fit with personal routines, identified by 70% of survey respondents, and offer direct access to key destinations identified by 55% of survey respondents.



2

ACCESS FOR ALL: AFFORDABLE, INCLUSIVE, EASY & SAFE TO USE

From the feedback received, affordability emerged as a defining theme. WHRM residents want a transit system everyone can use with confidence. That means barrier-free vehicles and stops, short and comfortable walks to bus stops, simple and flexible ways to pay, and clear information so riders always know where to go and how to ride. The desire for low to moderate fares is matched by a strong emphasis on keeping costs manageable for both individual households and the municipality as a whole. In developing recommendations, the study should consider a balanced approach that ensures financial sustainability, addresses resident preferences, and mitigates potential risks associated with funding and ridership.

The Study should consider:

- Fare Structure & Payment Options

- Exploring opportunities to provide affordable fare options that maintain long-term financial sustainability while ensuring accessibility for all users. Most respondents prefer one-way fares in the range of \$2.01–\$3 (29%), with a significant portion favouring \$3.01–\$4 (27%).
- Consider multi-faceted payment methods, including electronic payment (e.g., app or tap cards), prepaid tickets or passes, and cash options to accommodate diverse user preferences and needs. 72% survey respondents prefer electronic payment methods, while 54% favour cash fares and approximately 50% would use prepaid passes.

- Importance of Affordability and Accessibility

- Affordable fares can not only drive ridership, but provide access for youth, seniors, and low-income community members to essential daily services. 63% of survey respondents say affordable cost is “very important” when choosing to use transit.
- Design stops to be safe, comfortable, and accessible, considering mobility, age-friendly features, and shelter needs.

57% of survey respondents rated accessibility as ‘very important’.

- Public Understanding, Safety & Perception

- Improve public awareness and communication about services, schedules, and how to use transit.
- Build a positive public perception of transit, especially given the community’s car-dependent baseline and skepticism of re-introducing a transit system

- Fiscal Responsibility & Sustainability

- Use realistic service design principles to calibrate expectations and build toward ridership growth over time.
- 49% of survey respondents express concern about the potential tax impact of launching and maintaining transit services.
- Open-ended feedback highlights concerns about high per-ride costs, overall funding challenges, and ensuring a worthwhile return on investment.

3

CONNECT US, LOCALLY AND REGIONALLY

Participants emphasized that a future transit system should prioritize connections to key WHRM destinations like Downtown Windsor, major grocery stores, the hospital, and the Sports Complex. Beyond municipal borders, there was also strong interest for access to Halifax (via Sackville Terminal), New Minas, Acadia University, the airport, and other regional hubs. Transit isn't just about getting around the municipality, it's about enabling work, education, healthcare, and shopping access across the region. Connectivity is a core community expectation.

The Study should consider:

- **Local Mobility and Access**
 - Ensure strong connections to key local destinations such as Downtown Windsor, major grocery stores, Hants Community Hospital, and the Sports Complex to address the most frequently cited travel needs within WHRM.
 - Prioritize service reliability, consistency, and availability beyond peak hours to increase resident confidence and encourage greater ridership.
 - Design services that are responsive to rural density and dispersed community patterns, ensuring accessibility for all neighbourhoods.
- **Regional Connectivity**
 - Consider exploring convenient links to regional hubs including New Minas, Sackville Terminal (for Halifax Transit), Halifax Airport, Wolfville/Acadia, and Kings Transit connections to support work, education, healthcare, and shopping needs across the region.
- **Flexibility and Demand-Responsiveness**
 - Incorporate flexible, demand-responsive service options to accommodate varying trip purposes and times, especially for those with limited transportation alternatives.
 - Consider innovative approaches (e.g., on-demand transit, smaller vehicles, dynamic routes) tailored to rural realities and changing demand patterns.
- **Equity and Community Impact**
 - Recognize transit as a community lifeline, giving special attention to the needs of seniors, youth, low-income residents, and people requiring access to medical or essential services.
 - Frame transit as a tool for social inclusion, independence, and community wellbeing, not solely as a zero-emissions initiative.
- **Lessons from Past Experience**
 - Draw on learnings from previous transit attempts, focusing on right-sizing, sustainability, and strategies to avoid repeating past shortcomings related to low ridership and service unreliability.

4

SUSTAINABLE BY DESIGN: A TRANSIT SYSTEM THAT SUPPORTS A GREENER FUTURE

A sustainable transit system is more than just cleaner vehicles, it's a long-term investment in reducing emissions, supporting climate goals, and offering residents practical alternatives to car dependency. While environmental factors ranked lower than convenience and affordability for many respondents, the survey still shows meaningful interest in low-emission travel, especially when paired with reliable service and strong connectivity. A sustainability theme signals that WHRM can grow transit thoughtfully: reducing environmental impact while improving day-to-day quality of life.

The Study should consider:

- **Balancing Emissions Reduction with Practicality**
 - o Only 18% of respondents identified zero-emission vehicles as a top motivator, suggesting environmental choices should be paired with convenience and reliability to attract riders.
 - o As most residents rely on personal vehicles, even small shifts to transit can yield meaningful environmental benefits, reduce roadway demand, and support healthier, more resilient communities.
 - o Respondents raised concerns about charging infrastructure, electric vehicle reliability, and how severe weather could impact operations, indicating the need for realistic implementation strategies.
- **Supporting Broader Climate and Sustainability Goals:**
 - o Design a transit system that is right-sized for rural realities to avoid underused services, ensuring resources, energy, and municipal investment are used efficiently.
 - o Integrating transit with active transportation, compact land-use patterns, and multimodal connections helps reduce greenhouse gas emissions, vehicle dependency, and traffic impacts.



4 NEXT STEPS

West Hants Regional Municipality and the Project Team will use the feedback presented in this report as inputs to support the development and evaluation in the Zero Emission Transportation Study.

Thank you to all that have provided input throughout this process, so far. It is invaluable for the Project Team to develop a better understanding of the transit needs, wants, and challenges throughout the community. Your continued input and participation is crucial in the success of the project overall. For more information and to stay up to date on the project, please visit: <https://www.westhants.ca/zero-emissions-transportation-feasibility-study.html>.



APPENDIX A

Open House Display Boards



APPENDIX A – OPEN HOUSE DISPLAY BOARDS

Study Purpose

West Hants Regional Municipality (WHRM) has initiated a **Zero Emission Transportation Feasibility Study** to investigate creating a zero-emissions transportation service that is reliable and affordable within WHRM.

The Study will explore **potential population served, demographic needs, potential routes and stops, necessary infrastructure, vehicle size/type, and integration with existing services within and beyond West Hants.**



This Study will support WHRM's goal to reduce **annual greenhouse gas (GHG) emissions by 45% by 2030**, by exploring a localized transportation service that can enable access to services without reliance on a single occupant vehicle.

Study Timeline



Why Public Transit?

Social Equity: Providing more employment and social opportunities for low income and mobility-challenged residents.

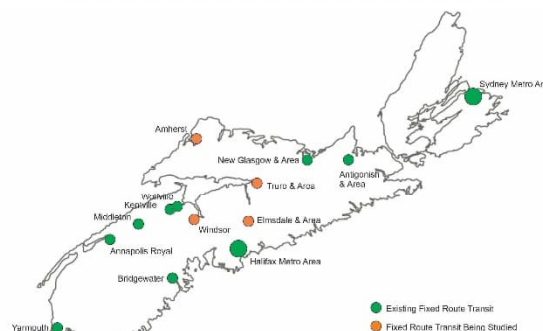
Economic: Opening up a larger potential worker pool for employers.

Transportation Demand Management: Reducing parking space requirements and congestion impacts of private vehicles.

Environmental: Reducing emissions and noise impacts of private vehicles, creating greater efficiency by attracting trips away from private vehicle travel, and creating opportunities to employ electric vehicle technology.



Public Transit in Nova Scotia



Zero Emission Transportation Feasibility Study



How Electric Buses Power a Cleaner Future

Battery-Electric Buses (BEBs)



What are the benefits of BEBs?



Cost about half as much to operate per kilometre as diesel buses



Less maintenance, fewer moving parts and no oil changes



Improve air quality and community health by reducing greenhouse gas emissions



Support a cleaner, quieter, and more livable community

Do BEBs have enough range to do a full day of service?

- Not yet, most need a **mid-day charge or battery swap** to complete a full-service day.
- In-route charging stations (like the one shown) help keep them on the road longer.

Are BEBs safe?

- Yes, electric buses have **far fewer fire** incidents (about 1 per 10,000 vehicles vs. 7 per 10,000 diesel vehicles)
- In the rare cases of a fire, special response is needed due to battery materials.



References:
Analysis of Electric Bus Deployments at Transit Agencies, TxDOT Research Project 0-9907-20
Electric School Buses May Yield Significant Health and Climate Benefits; Harvard T.H. Chan School of Public Health

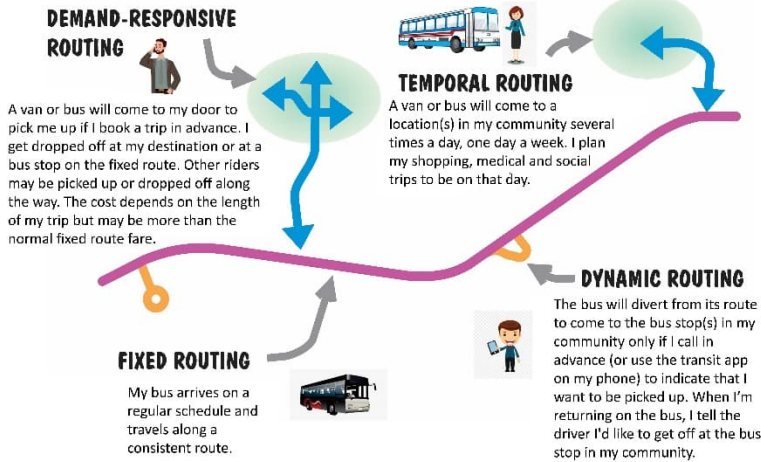
Zero Emission Transportation Feasibility Study



Transit Service Needs



Different ways **Public Transit Service** can be delivered



Which Transit Service would you be **most likely** to use in WHRM?

Use a sticky note to share your thoughts below!

Zero Emission Transportation Feasibility Study

wsp

Understanding Transit Service Needs



What is your current **primary** means of transportation?

Place a **dot** underneath your choice!

Personal Vehicle (Driver)	Personal Vehicle (Passenger)
Carpool	Walking/Cycling
West Hants Dial-a-Ride	Other (Please Specify)

What would make you **more likely** to use a future transit service?

Place a **dot** underneath your **top choice**!

Schedules & routes that work with my schedule	Stops close to where I work/travel	Ability to track buses in real time	Reliability & Accessibility	Other (please specify)

Zero Emission Transportation Feasibility Study

wsp



Exploring the Future

Where would you be most likely to take transit to/from?

 Use a sticky note to share your thoughts!

Example Locations

- West Hants Sports Complex
- Downtown Windsor
- Hants Community Hospital
- Hants Aquatic Centre
- Ski Martock
- Hantsport (near Main St.)
- Brooklyn

Which Zero Emission Transportation Priorities are most important to you?

Place a dot underneath **all** that apply.

Improved Transportation Network Connectivity and Infrastructure	Zero-Emission Public Transit Vehicles
Reduction to Overall Greenhouse Gas (GHG) Emissions	Increase Uptake of Electric Vehicles through Incentives (e.g. more EV charging stations)
Reduce Reliance of Personal Vehicles	Improved Public Health

Zero Emission Transportation Feasibility Study





Thank you for Participating!

Next Steps

- Service Plan Development – **December 2025**
- Financial & Impact Analysis – **December 2025**
- Implementation Plan – **January 2026**
- Final Report & Presentation – **February 2026**

Contact Information:

If you have comments or questions:

jogilvie@westhants.ca | 902-798-8391 ext. 147

We Want to Hear From You!

Please take the community survey at:
<https://www.surveymonkey.com/r/WHRM-transit> or scan the QR code below!



The survey closes December 5, 2025.

Zero Emission Transportation Feasibility Study



Zero Emissions Transportation Study - What We Heard Report

West Hants Regional Municipality



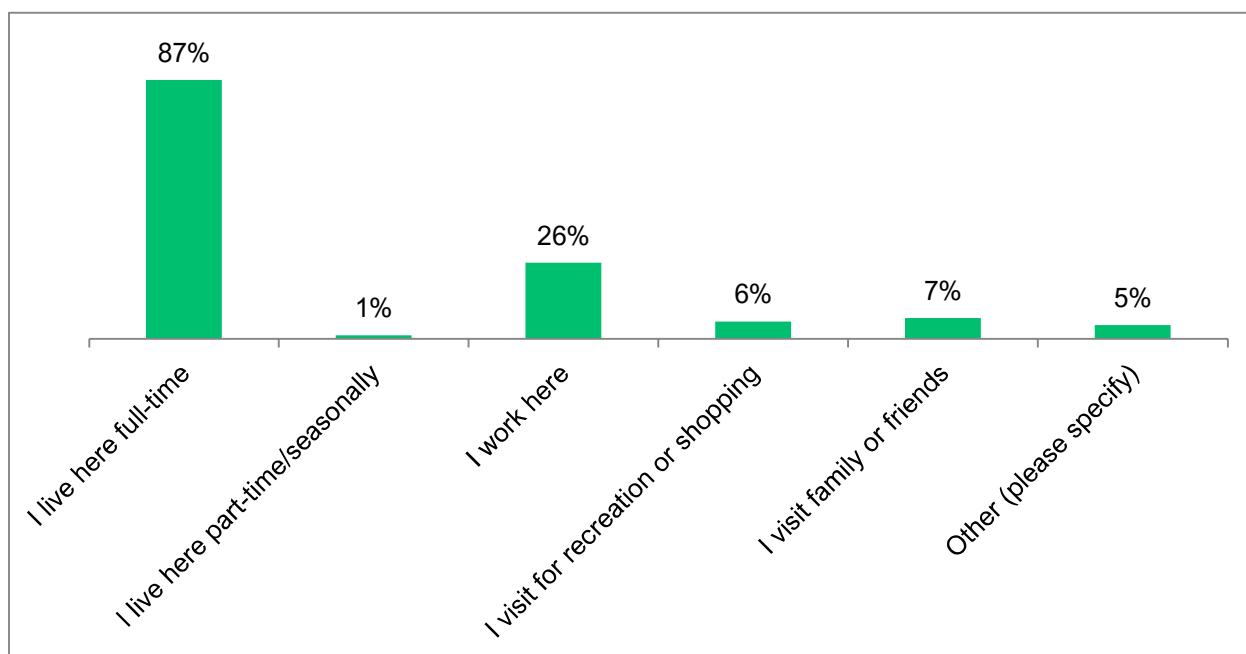
APPENDIX B

Community Survey Results

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APPENDIX B – COMMUNITY SURVEY RESULTS

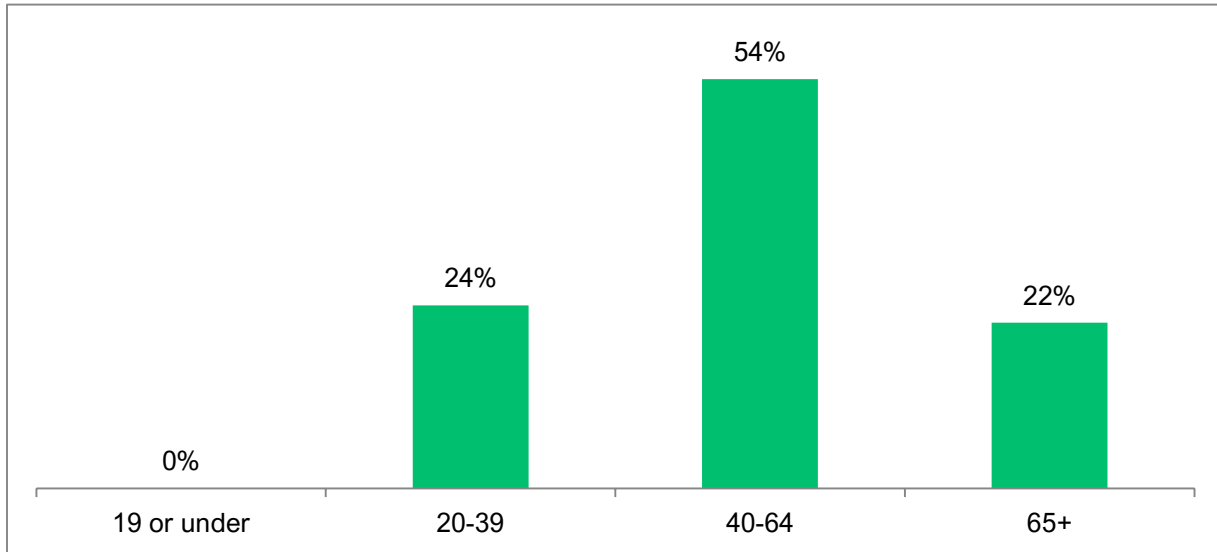
Question: Select which best describes you? Select all that apply.



Survey respondents were asked to identify which best describes their connection to the Municipality. Based on responses provided, nearly 9 in 10 (87%) respondents live in the Municipality full-time. Just over one-quarter (26%) work in the Municipality, while 6% visit for recreation or shopping, and 1% live in the Municipality time/seasonally. Approximately 5% of survey respondents indicated “other”. ‘Other’ responses included:

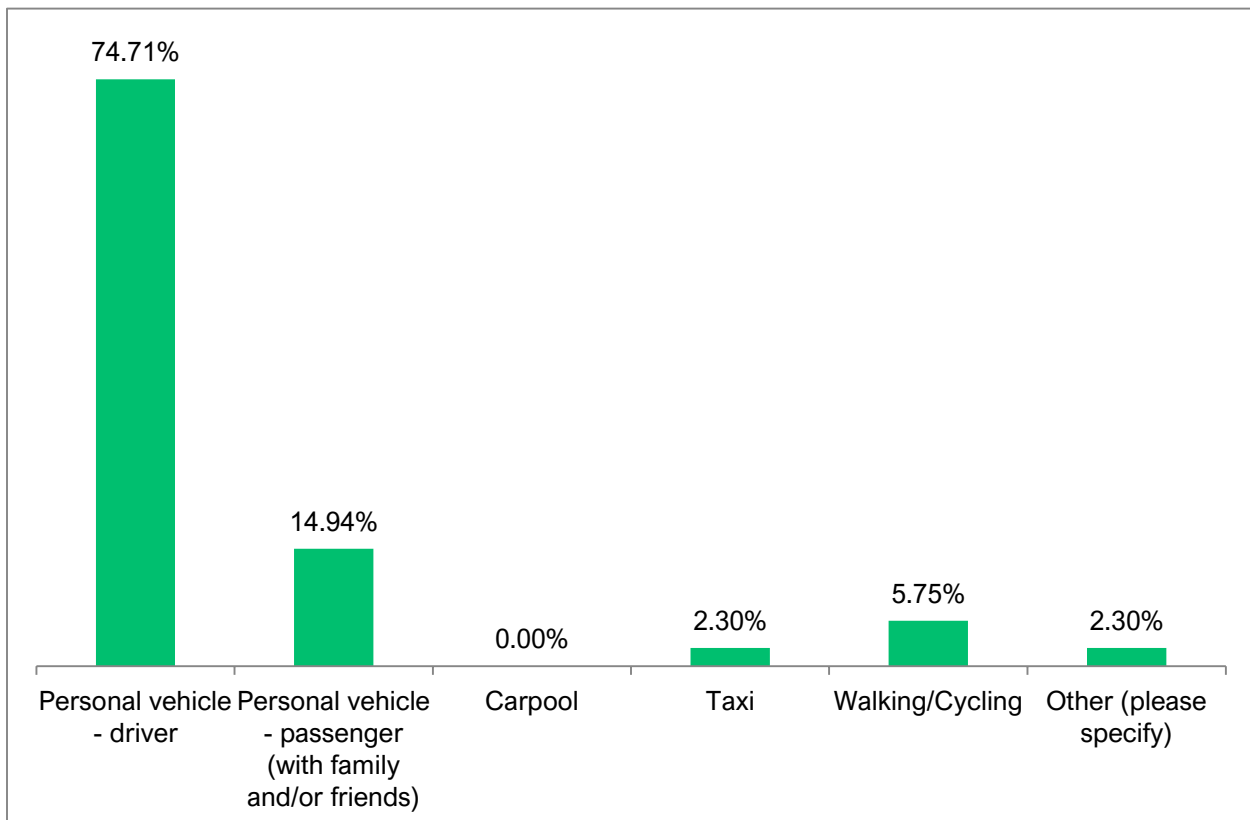
- Attend a place of worship in West Hants
- Previously lived in West Hants and plan on moving back

Question: What is your age?



Participants were asked to identify their age to better understand survey demographics. The responses indicate a broad range of survey respondents. Among the age categories shown, the most common age groups of participants were 40-64 years old (54%), 20-39 years old (24%), and 65+ (22%). There were no participants within the 19 or under category.

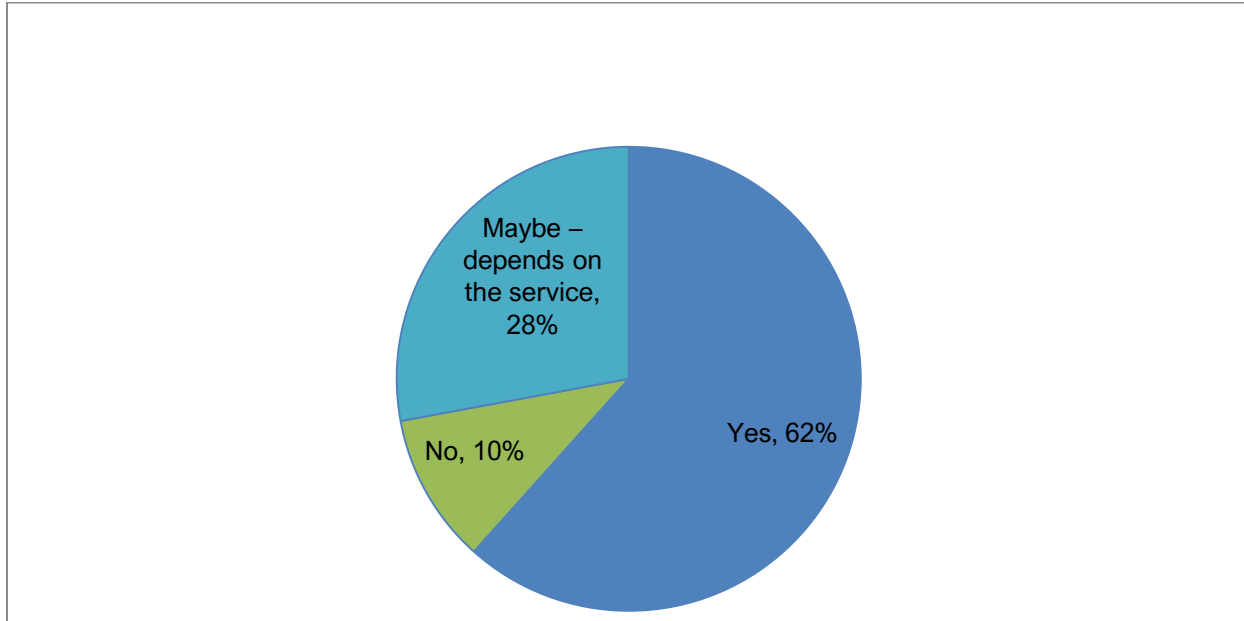
Question: What is your current primary means of transportation?



Appendix B – Community Survey Results

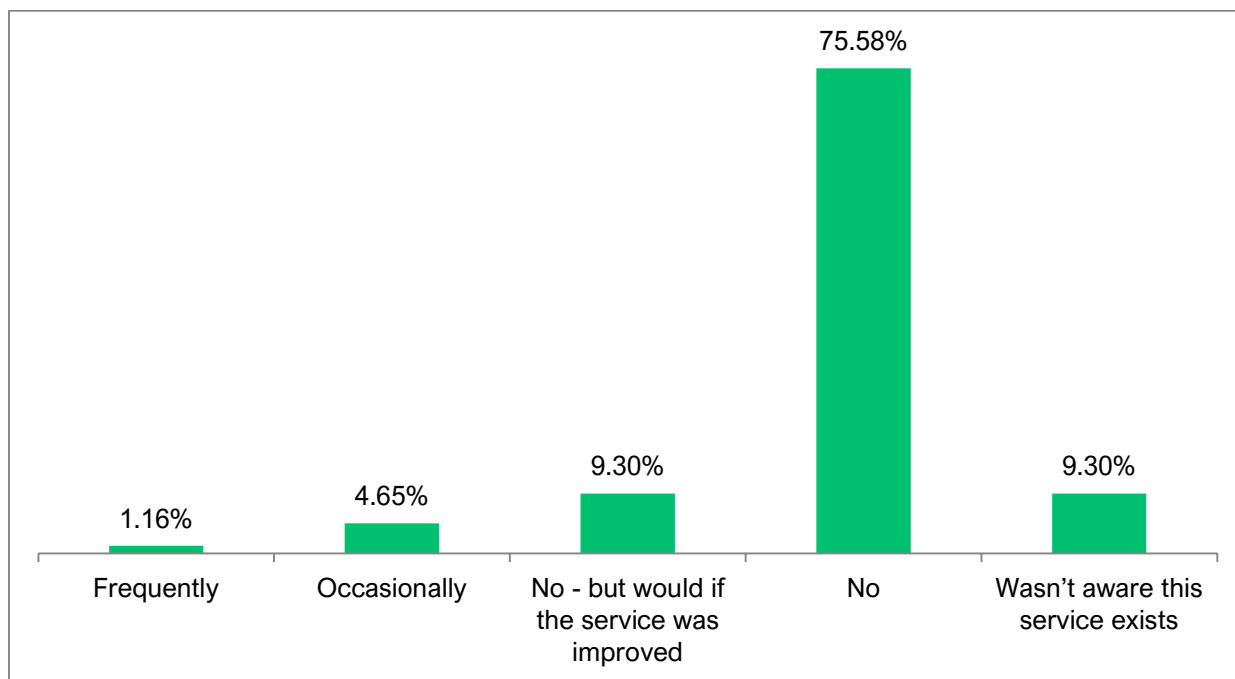
Survey respondents were asked to identify their primary means of transportation. Three quarters (75%) indicated they primarily drive a personal vehicle. A smaller portion of respondents reported being passengers in person vehicles (15%), using taxis (2%), or walking/cycling (6%) as their main mode of travel, each representing just under a quarter of responses.

Question: Would you consider using a public transit system if it were available?



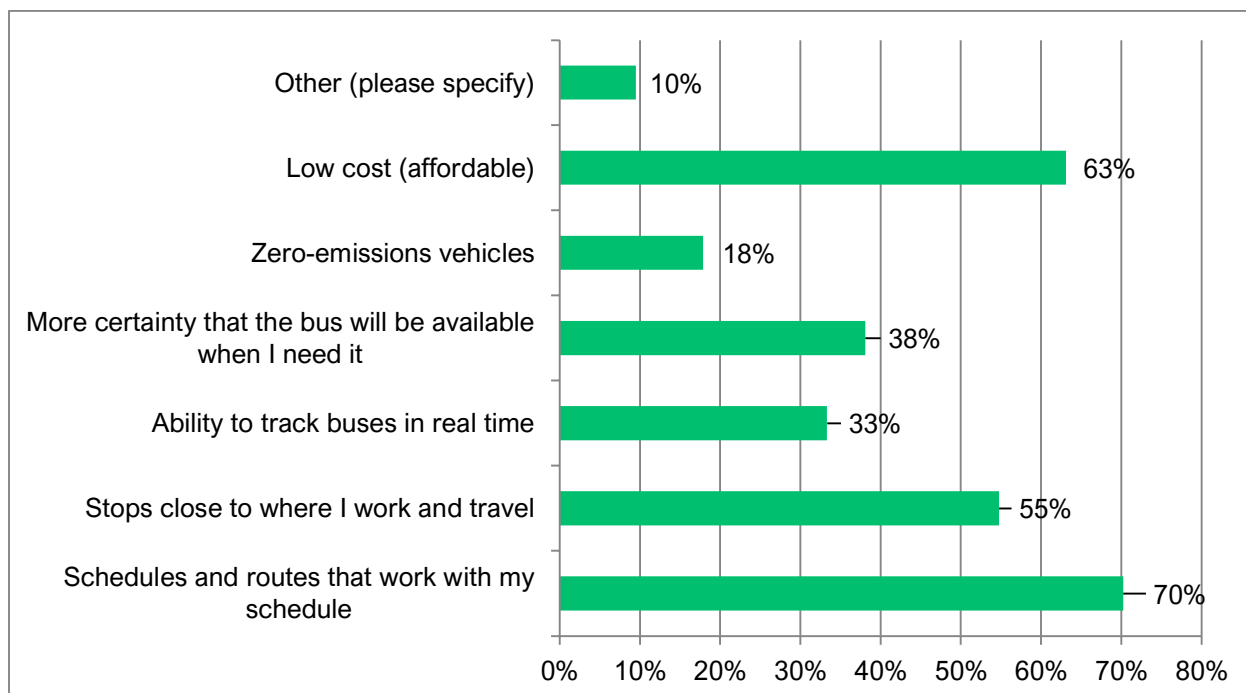
Survey respondents were asked whether they would consider using a public transit system if one was available. Nearly two-thirds (62%) indicated they would use public transit, while over one quarter (28%) said they might, depending on the service. A small portion of respondents (10%) indicated they would not consider using it.

Question: Do you use the existing West Hants Dial-a-Ride service?



Participants were asked to identify if they use the existing West Hants Dial-a-Ride service. Approximately three-quarters (76%) indicated they have never used the service. 9% of survey respondents indicated that they do not use the service but would use it if the service was improved. Another 9% of survey respondents were not aware that the service existed. 5% of survey respondents indicated they use the service occasionally, while just 1% of respondents indicated they use the service on a regular basis.

Question: What would make you more likely to use a transit service in WHRM? (Select your top three)

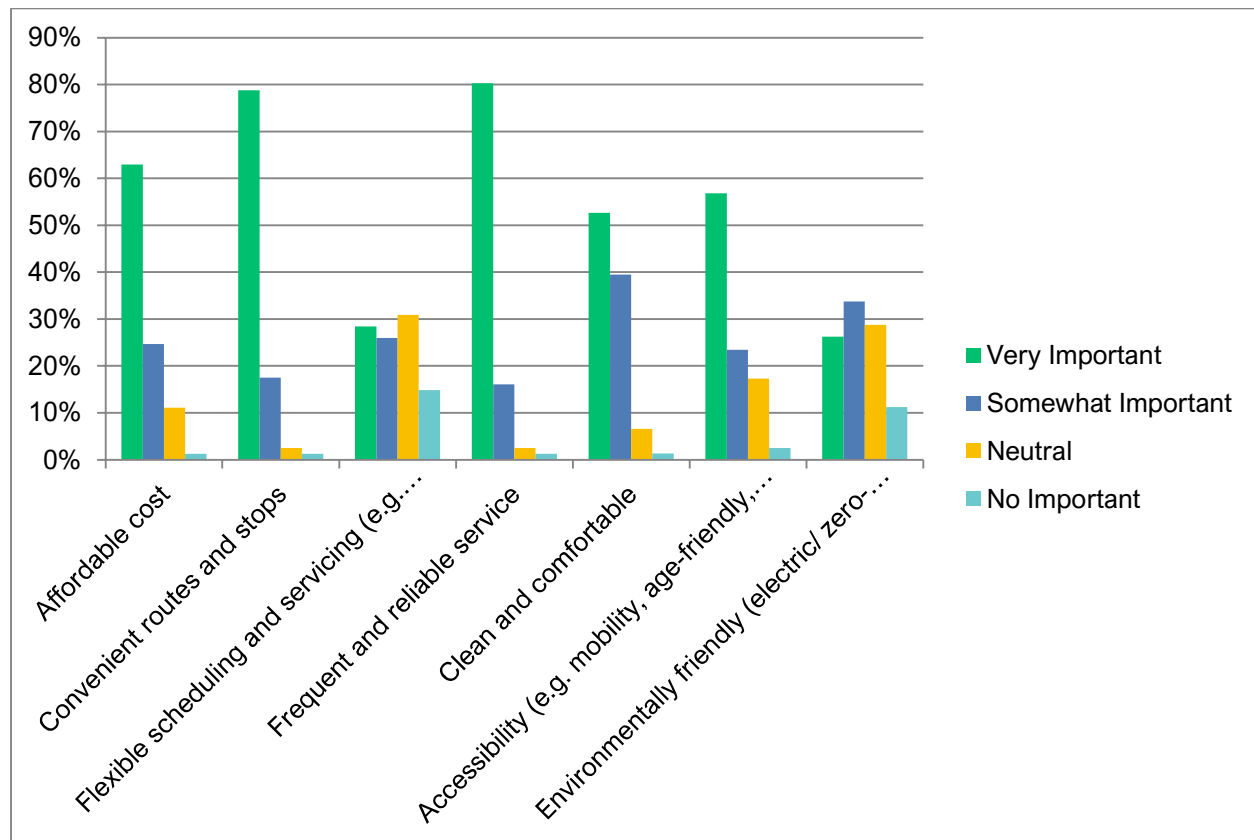


Appendix B – Community Survey Results

Participants were asked to identify what factors would make them more likely to use a transit service in the Municipality. The most common response with seven out of ten respondents citing as a factor (70%), was having schedules and routes that align with their personal schedules, followed by an affordable cost (63%). Over half of the respondents (55%) also indicated the importance of having stops located nearby their place of work and travel. Over one-third of respondents indicated the importance of having greater certainty that a bus would be available when needed (38%) and one third of respondents cited the importance of being able to track buses in real time (33%). Just 18% of respondents cited the importance of a potential service having zero-emissions vehicles, while 10% of survey respondents indicated “other”. Common ‘other’ responses included:

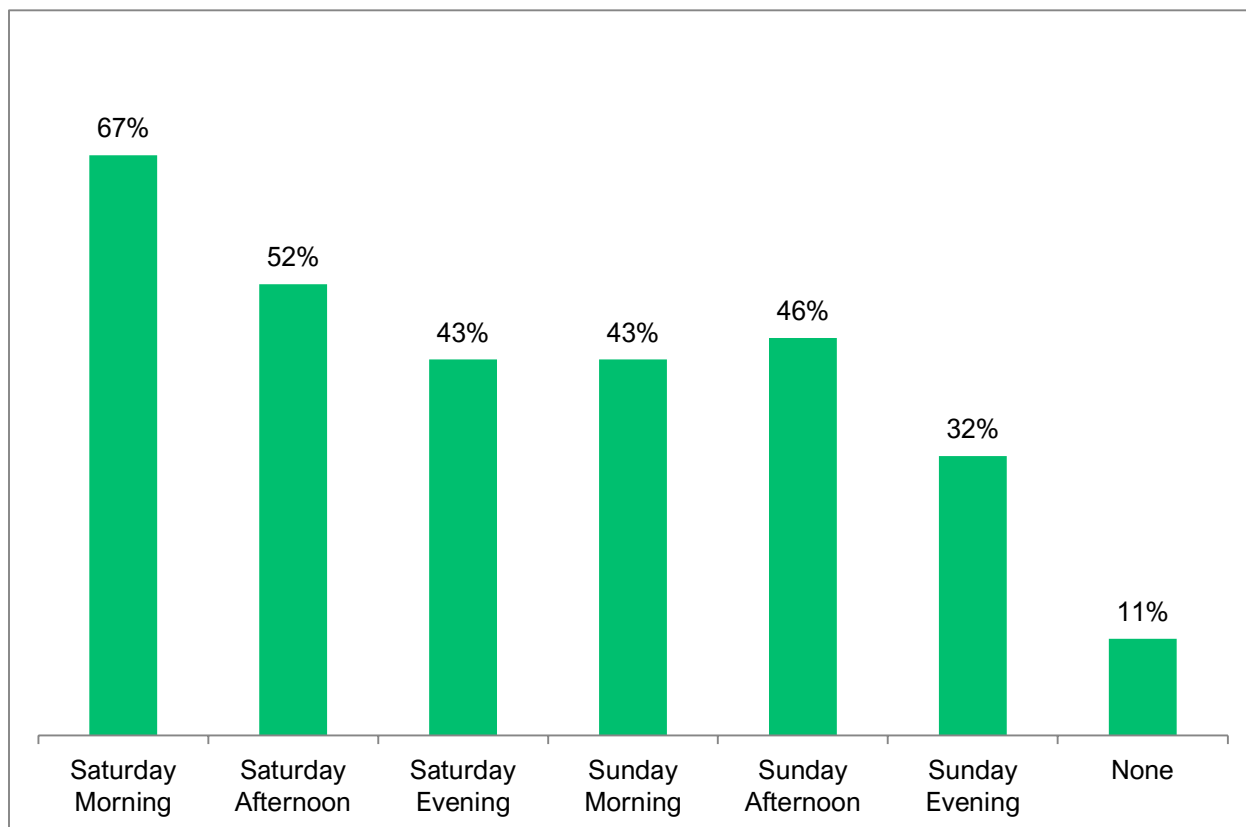
- Service to grocery stores, banking, and medical services
- Connectivity outside of West Hants

Question: Please indicate how important the following factors are to you when considering using a transit service in WHRM?



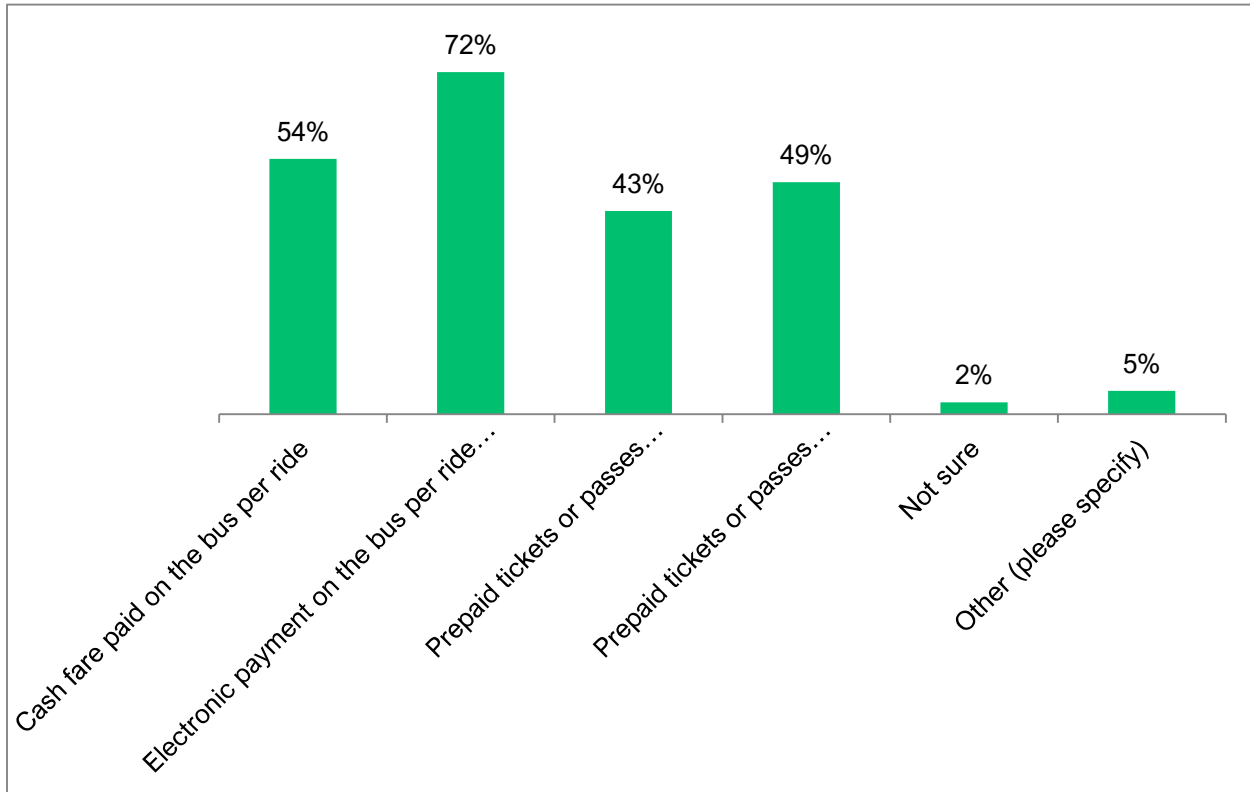
Participants were asked to rank the importance of each factor to them when considering using a transit service in the Municipality. Eight in ten respondents stated that frequent and reliable as well as convenient routes and stops were very important, while approximately six in ten respondents stated that affordable cost and accessibility were very important. Just over half of respondents cited cleanliness as very important, while flexible scheduling (i.e., on demand or door to door service) and environmentally friendly service were cited as lesser priorities.

Question: If a service was available on weekends, during which times of the day would you be most likely to use it? Select all that apply.



Respondents were asked to identify when they would be most likely to use a transit service on weekends. The highest service interest was shown on Saturday, particularly in the morning (67%) and afternoon (52%). Just under half of the respondents also indicated interest in Sunday afternoon (46%), Sunday morning (43%), and Saturday evening service (53%), while fewer identified Sunday evening (32%) as a preferred time. A small portion (11%) of respondents indicated they would not use weekend transit service.

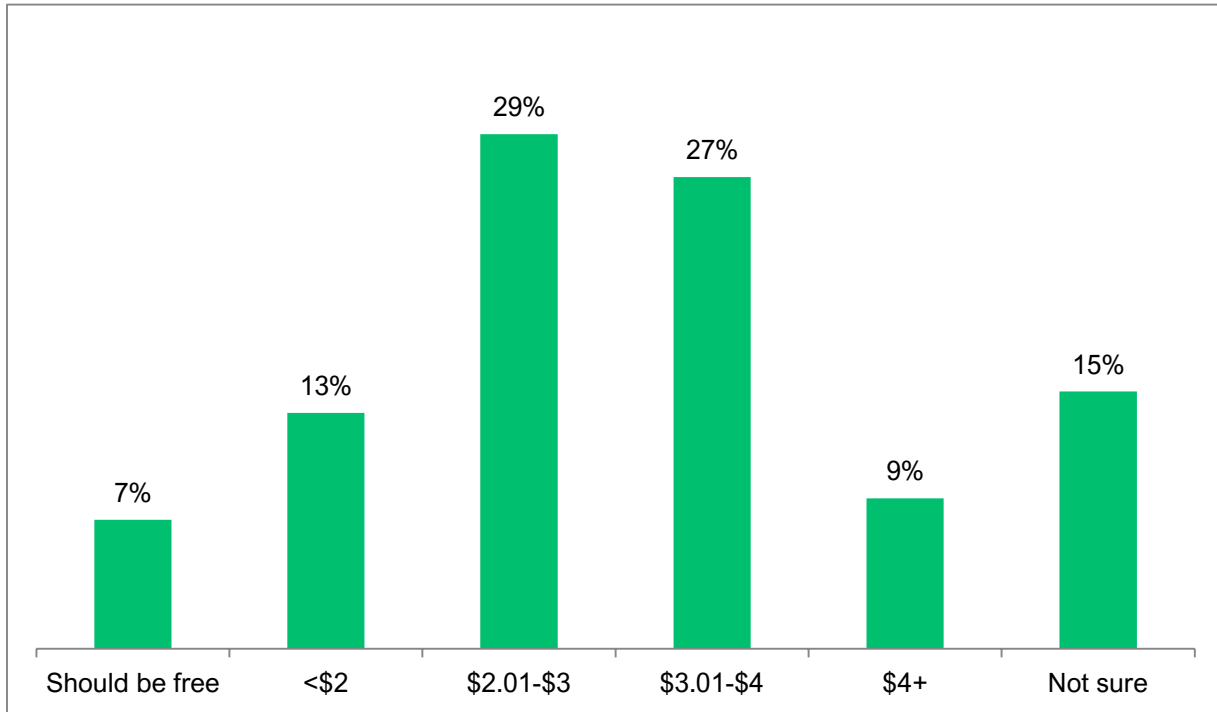
Question: How would you prefer to pay for your transit trips? Select all that apply.



Survey respondents were asked how they would prefer to pay for their transit trips. The most common preference was for electronic payment on the bus using an app or tap card (72%), followed by over half (54%) respondents indicated interest in paying cash fares on the bus. Nearly half of the respondents stated interest in buying prepaid tickets or passes in person (49%) or online (43%). A small portion (7%) of respondents were unsure or selected “other”. Of the respondents who indicated other, common responses included:

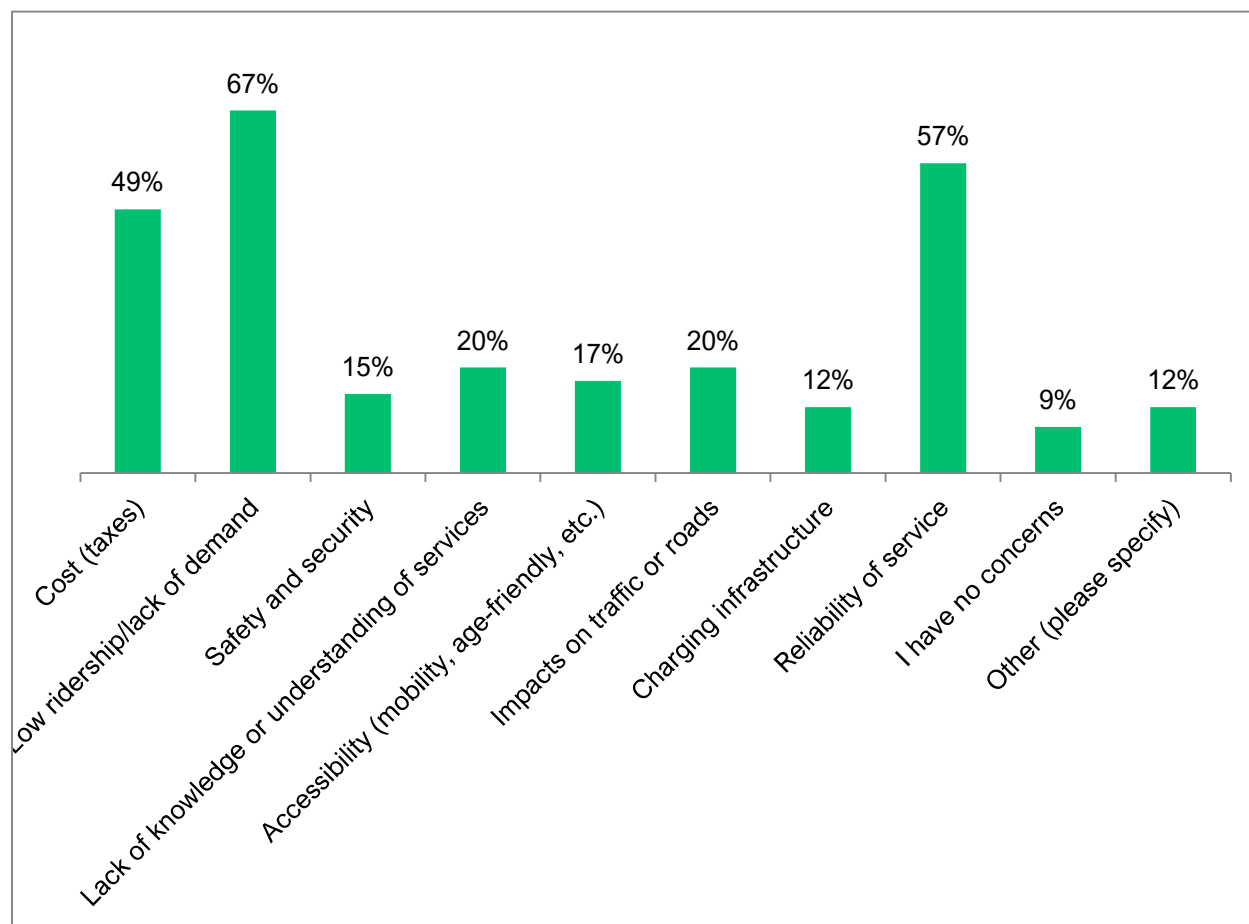
- Resident rate annual pass paid yearly
- Transit should be free, paid by local taxes
- Fare-capping enabled tap cards (i.e., after a certain number of rides where a weekly/monthly pass would have been more cost effective, subsequent rides throughout the fare term are free)

Question: What is the maximum one-way fare you would consider paying for a trip?



Participants asked what the maximum amount for a one-way fare they would consider paying for a trip would be. The largest share (29%) indicated a preferred fare between \$2.01 and \$3, while just over one-quarter (27%) were willing to pay between \$3.01 and \$4. 13% of respondents were willing to pay less than \$2, and 9% were willing to pay more than \$4. A few respondents (7%) felt transit should be free, while 15% of respondents were unsure the maximum amount they would be willing to spend for a trip.

Question: What concerns do you have about introducing transit in WHRM? Select all that apply.



Respondents were asked what concerns they have about introducing public transit in the Municipality. The most common concern identified by two-thirds of respondents (67%) was low ridership or lack of demand, followed by the reliability of service (57%). Just under half of respondents (49%) were concerned by the cost to taxpayers. One in five (20%) or respondents were concerned about traffic impact on roads and a lack of knowledge or understanding of the services offered. Other concerns included accessibility (17%), safety and security (15%), infrastructure impact (12%), while 9% identifying no concerns. Of the respondents who indicated “other” (12%), common responses included:

- Ensuring there is sufficient demand to provide the service at affordable fares
- Serving the entire Municipality and into Halifax
- The decision to prioritize zero-emissions transit rather than prioritizing transit as an environmental good in the first place
- Availability outside of peak hours
- Success and sustainability of the service, considering that Kings Transit was unsustainable due to low ridership

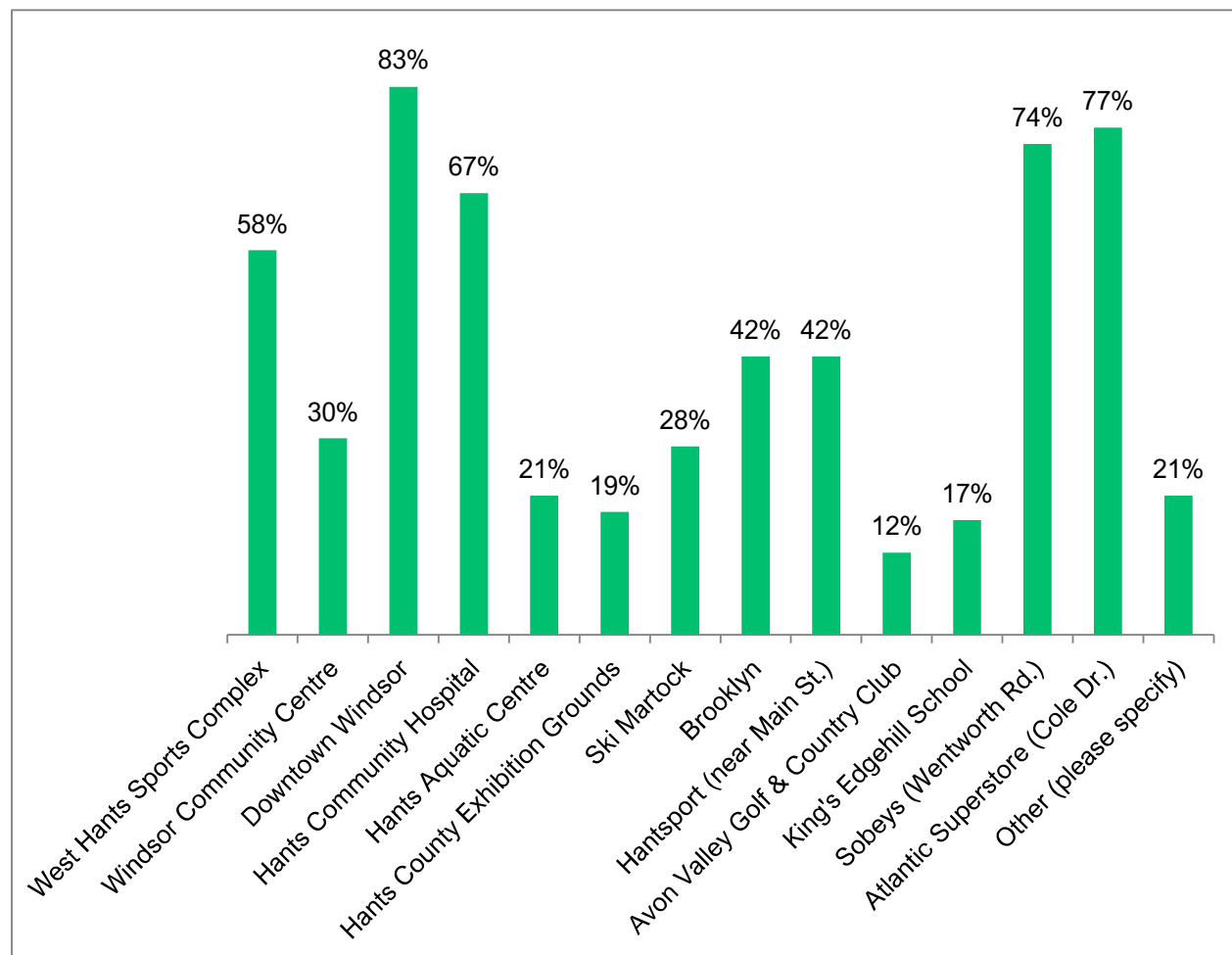
Question: What do you see as the biggest challenge to implementing zero-emission transportation in WHRM?

All participants were given the opportunity to provide their perspectives to the Project Team regarding challenges facing the implementation of transit in the Municipality. 66 survey respondents chose to provide their comments. Their comments provided have been summarized into key themes in **Table 1** below:

Table 1: Summary of Responses

Topic	Feedback Received
Cost	• High cost per-ride could be a barrier for many • Difficulty in funding the service through fare revenues • High tax burden on residents • Low return on investment
Demand	• Ridership could too low to run a viable service • Lack of interest • Status-quo of auto-dependency • Difficult to run a service reliably to attract riders with private vehicles • Difficult to get people comfortable with using transit
Infrastructure	• Lack of charging stations for zero-emissions vehicles • Small and narrow roads could be troublesome for vehicles to navigate • Severe weather events could pose challenges to vehicles • Selecting routes that make sense • Reliability of electric vehicles
Public Perception	• Opposition to increased public costs • Lack of community buy-in • Poor perception of public transit • Poor perception of electric vehicles
Density	• Rural population patterns would make running a viable service difficult due to density requirements • Difficulty serving areas outside of the town centres
Accessibility	• Difficulty navigating transit for those with mobility challenges or other accessibility needs (vision)

Question: Thinking about where you travel within WHRM, where would you most benefit from a transit service travelling to/from? Select all that apply.



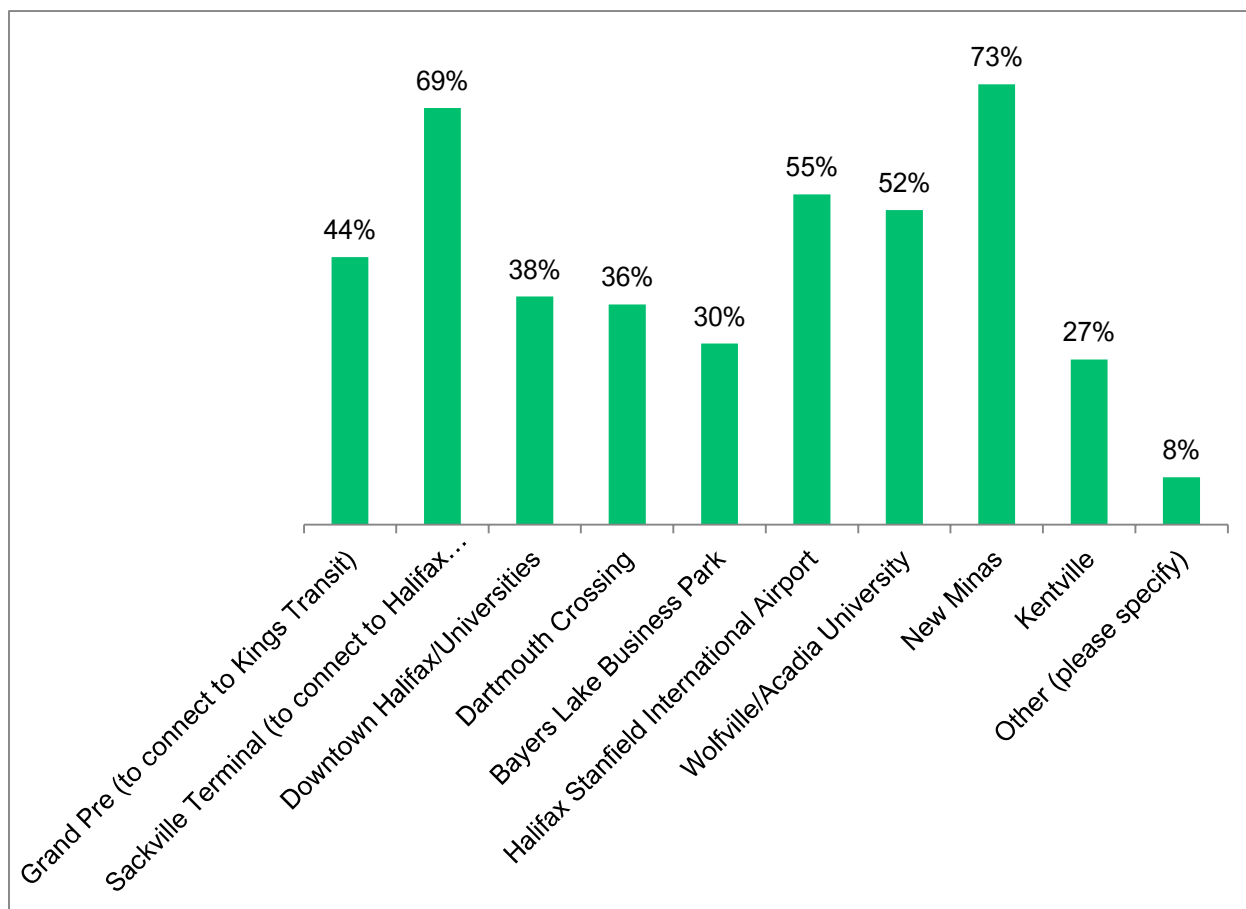
Respondents were asked to identify where they would most benefit from a transit service provided to and from within the Municipality. The most predominant response with over four in five respondents was Downtown Windsor (83%). Approximately three-quarters of respondents cited large supermarkets such as the Atlantic Superstore on Cole Drive (77%) and Sobeys on Wentworth Road (74%) as beneficial destinations. Two-thirds of respondents cited the Hants Community Hospital (67%), and over half of respondents cited the West Hants Sports Complex (58%). Other commonly-cited destinations included Brooklyn (42%), Hantsport near Main Street (42%), the Windsor Community Centre (30%), Ski Martock (28%), the Hants Aquatic Centre (21%), the Hants County Exhibition Grounds (19%), King's Edgehill School (17%), and the Avon Valley Golf & Country Club (12%). Of the respondents who indicated other (21%), the most common responses included:

- Falmouth
- Vaughan
- Ellershoushe
- Three Mile Plains

Appendix B – Community Survey Results

- Garlands Crossing
- West Hants Family Resource Centre and Food Bank
- Local Schools
- Industrial Park
- Along the highways

Question: Thinking about where you travel outside the WHRM, where would you most benefit from a transit service travelling to/from? Select all that apply.

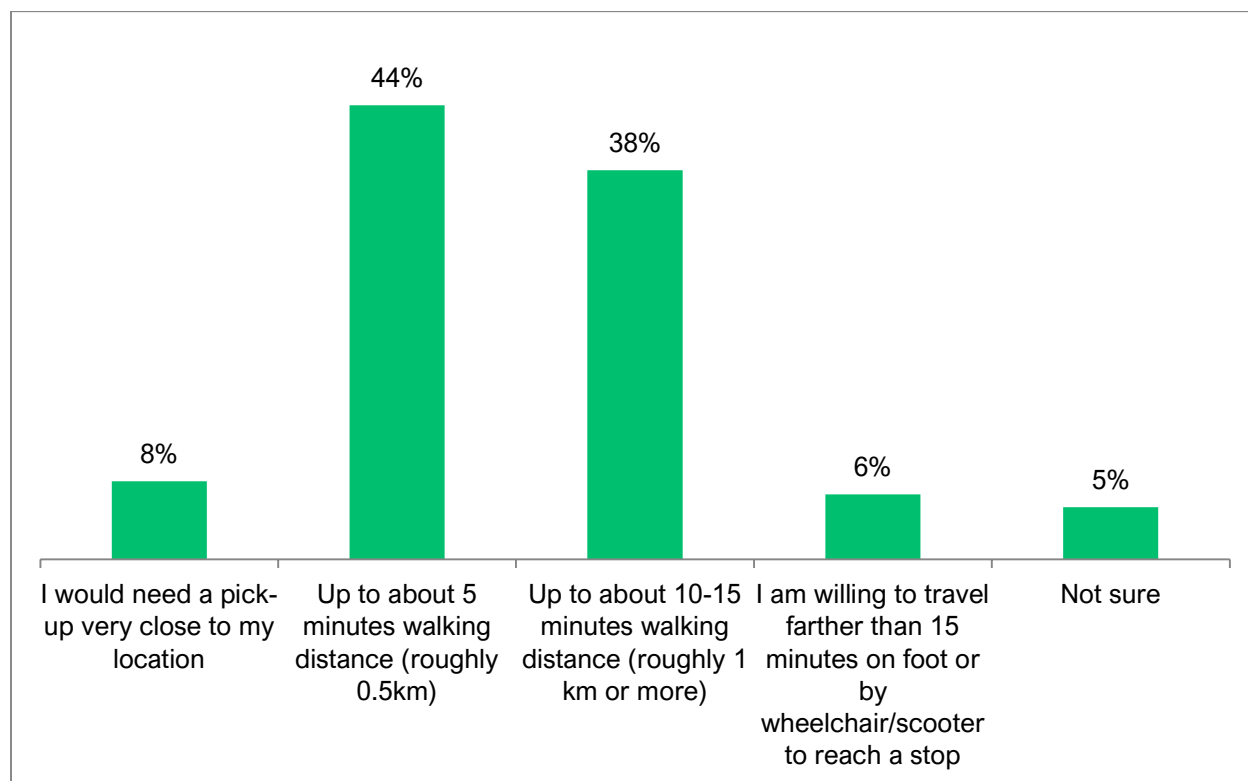


Respondents were asked to identify where they would most benefit from a transit service provided to and from outside of the Municipality. The most predominant response with nearly three-quarters of respondents was New Minas (73%). Large percentages of respondents cited connection points to other transit services, such as Sackville Terminal to connect with Halifax Transit (69%), Halifax Stanfield International Airport (55%), and Grand Pre to connect to King's Transit (44%). Higher education centres including Wolfville's Acadia University (52%) and the universities in Downtown Halifax (38%) received many responses. Other commonly-cited destinations included Dartmouth Crossing (36%), Bayers Lake Business Park (30%), and Kentville (27%). Of the respondents who indicated other (8%), the most common responses included:

Appendix B – Community Survey Results

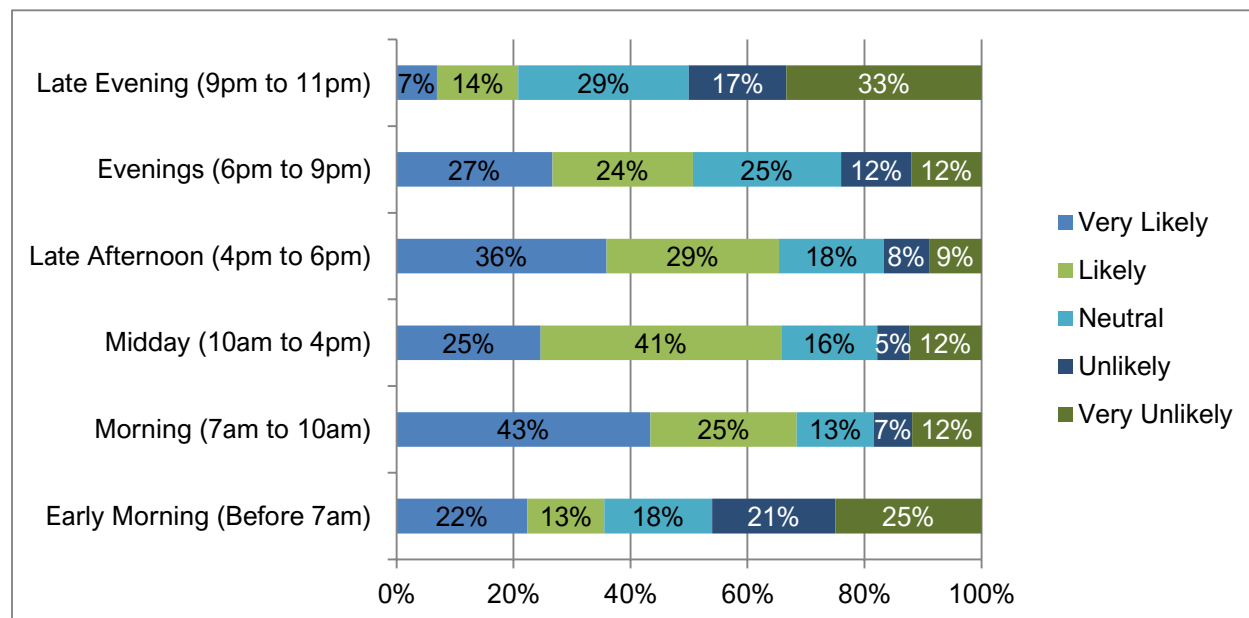
- Downtown Dartmouth and the Ferry Terminal
- Nearby towns such as Summerville and Coldbrook
- Further destinations in Nova Scotia such as Sackville, Bridgewater, Truro, and Yarmouth

Question: How far would you be willing to walk from your location to reach a bus stop?



Participants were asked how far they would be willing to walk to reach a bus stop. Nearly half (44%) indicated they would walk up to about five minutes, or roughly 0.5 km. Just under two-fifths of respondents (38%) indicated they would walk up to 10-15 minutes, while few (6%) were willing to travel farther than that. Some respondents (8%) noted they would need a pickup very close to their location, and a small number (5%) were unsure.

Question: From “Very Unlikely” to “Very Likely” select when you would be most likely to use a transit service. (Weekdays only)



Survey respondents were asked to identify what time they would be most likely to use a fixed-route transit service on weekdays. Responses show that the highest interest in using transit would be in the late afternoon (4-6pm), morning (7-10am), and midday (10am-4pm) periods, with 25-41% of respondents indicating that they would be “likely” and 25-43% indicating they would be “very likely” to use transit at these times. Evening (6-9pm) and early morning (before 7am) service received moderate interest, while late evening (9-11pm) had the lowest likelihood of use. Overall, week day transit demand appears to be strongest during traditional commuting and daytime hours.

*ADDITIONAL SURVEY COMMENTS***Question: Are there any additional comments or suggestions you would like to share with the project team regarding future transit in West Hants Regional Municipality?**

All participants were given the opportunity to provide additional comments to the Project Team. 34 survey respondents chose to add their own input. The comments provided have been summarized into key themes in **Table 2** below:

Table 2: Summary of Additional Survey Feedback

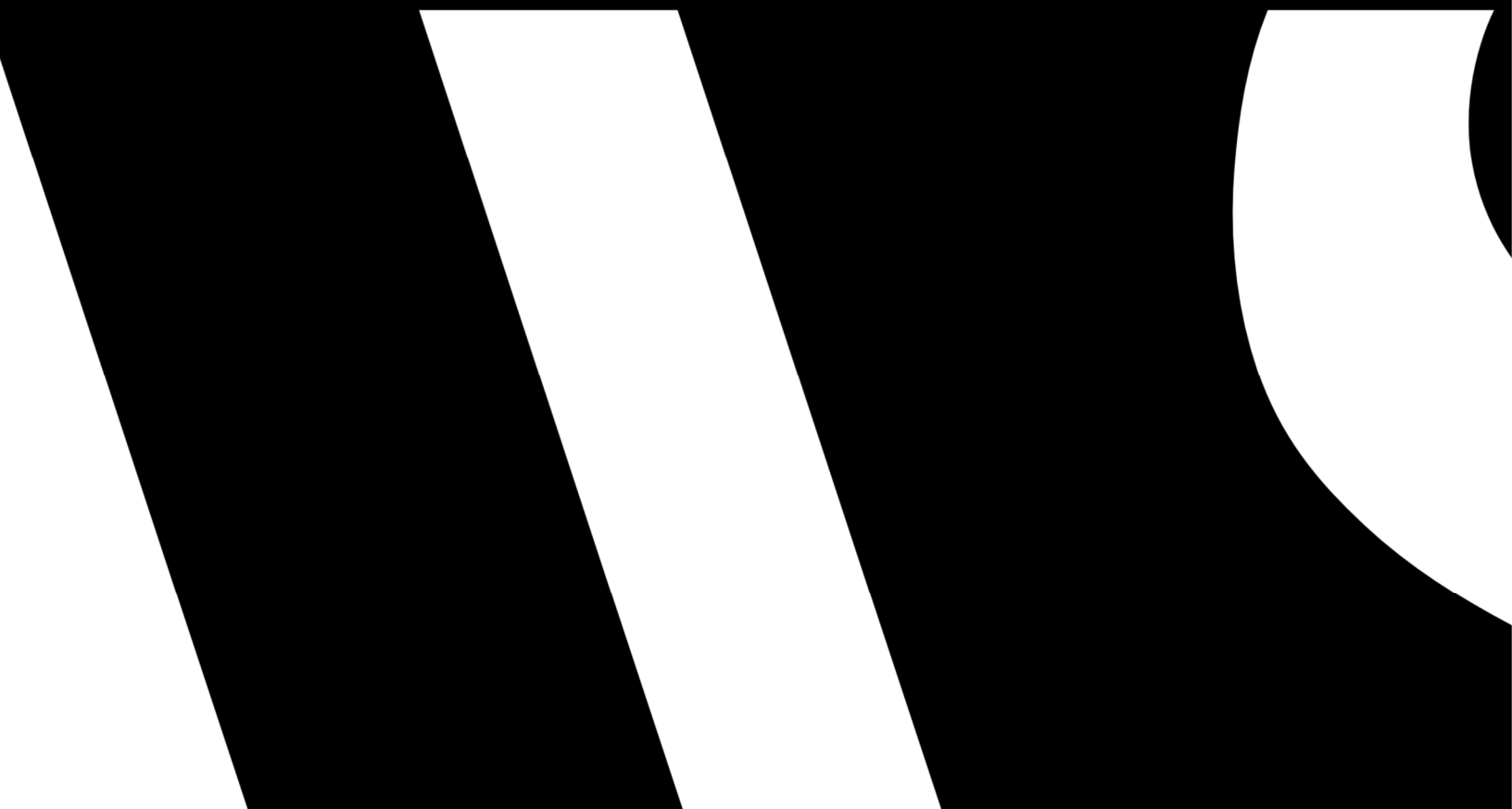
Topic	Feedback Received
Transit Service & Route Design	• A fast shuttle would be advantageous over private vehicles • Transit fails when service is limited to peak demand. Transit works best when it is reliably available all day. A generous service provision could induce riders beyond initial expectations
Cost and Financial Sustainability of a Transit Service	• Previous attempts at transit in West Hants have failed due to low ridership • Significant funding has been spent on studying the feasibility • Transit is a high-cost initiative when considering low potential ridership
Community Preferences	• The Municipality should prioritize transit as a good itself, rather than focusing on zero-emission transit • Electric vehicles are viewed as less reliable • Bikes should be accommodated on vehicles (bike racks) to improve last-mile connectivity • A transit service would be appreciated
Accessibility and Support for Mobility-Challenged/Senior/Underserved Populations	• A transit service would be particularly impactful for seniors in the community • Transportation is a barrier to health access, a transit service would be meaningful for underserved populations needed medical care • A transit service would expand opportunities for youth • A transit service could be life changing for low-income community members
Regional Connectivity and Infrastructure	• Transportation to Halifax is essential. There are fears that many work-from-home jobs with Halifax offices might return to in-office, requiring all-season transport options • Establishing service to Kings County (under Kings Transit) should be prioritized

Appendix B – Community Survey Results

Topic	Feedback Received
Safety and Security	• Transit stop areas or carpool areas should be equipped with security systems such as cameras • Stops should be set back safely from high-speed roads, and crossings at stops should be protected and signalized where necessary

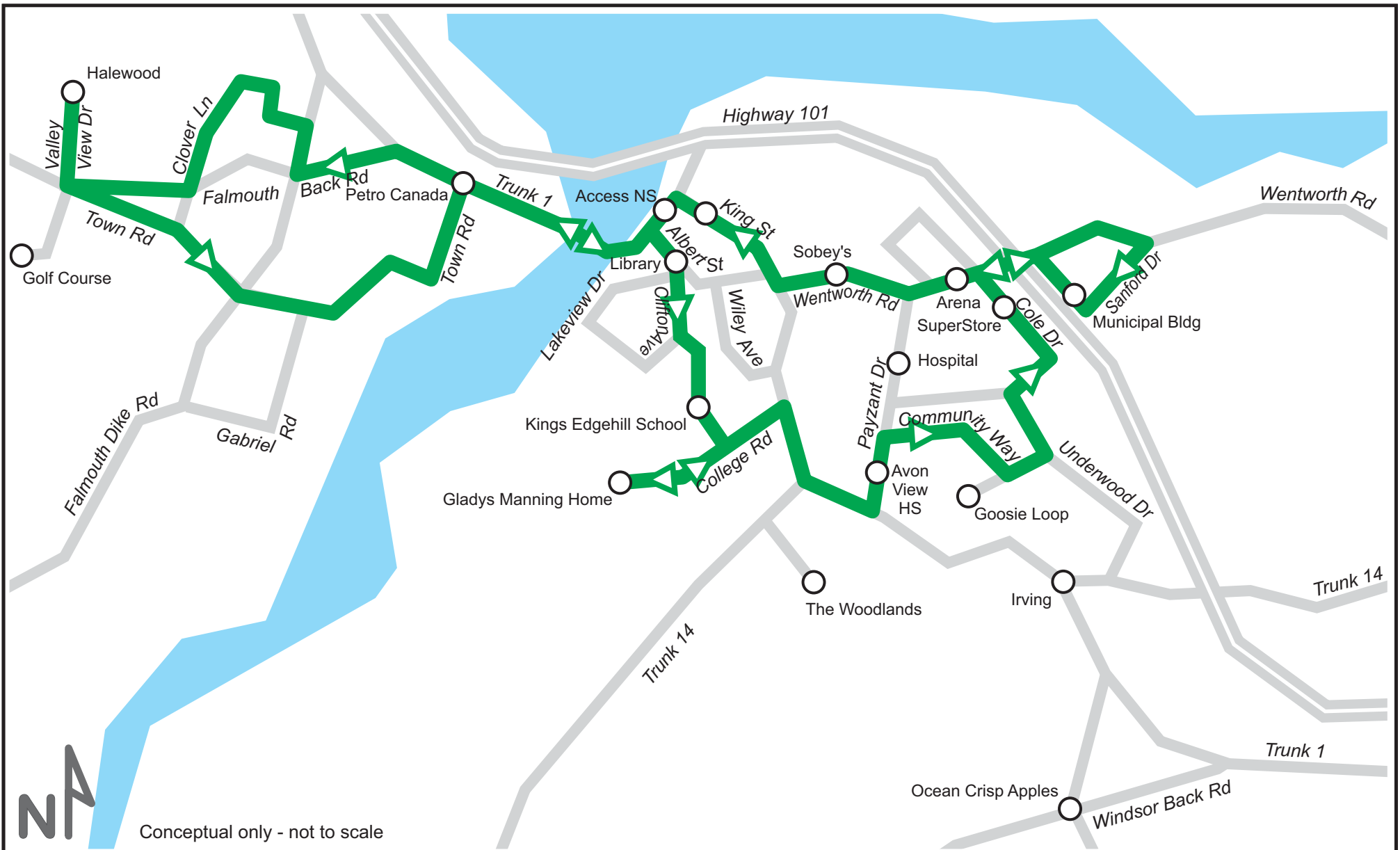


Appendix C: Fixed Route Service Concepts



Appendix C – Fixed Route Service Concepts

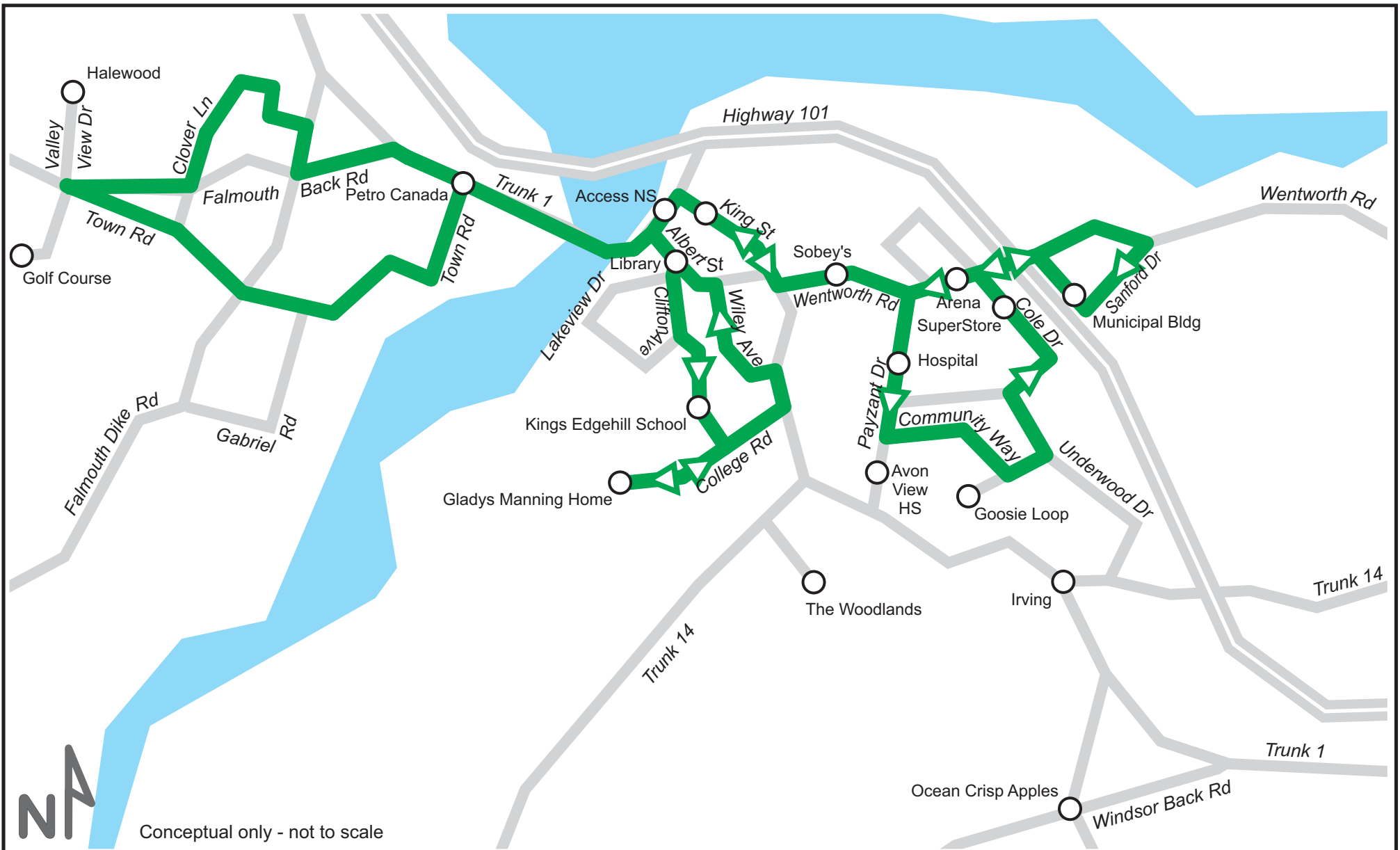
The following maps show the various route layout concepts that were part of the preliminary evaluation of fixed route service. The maps are simple sketches that show the routes only at a conceptual level. Greater detail was added once a preferred plan was selected.



West Hants Regional Municipality
Zero Emission Transportation Feasibility Study

ROUTE CONCEPT A

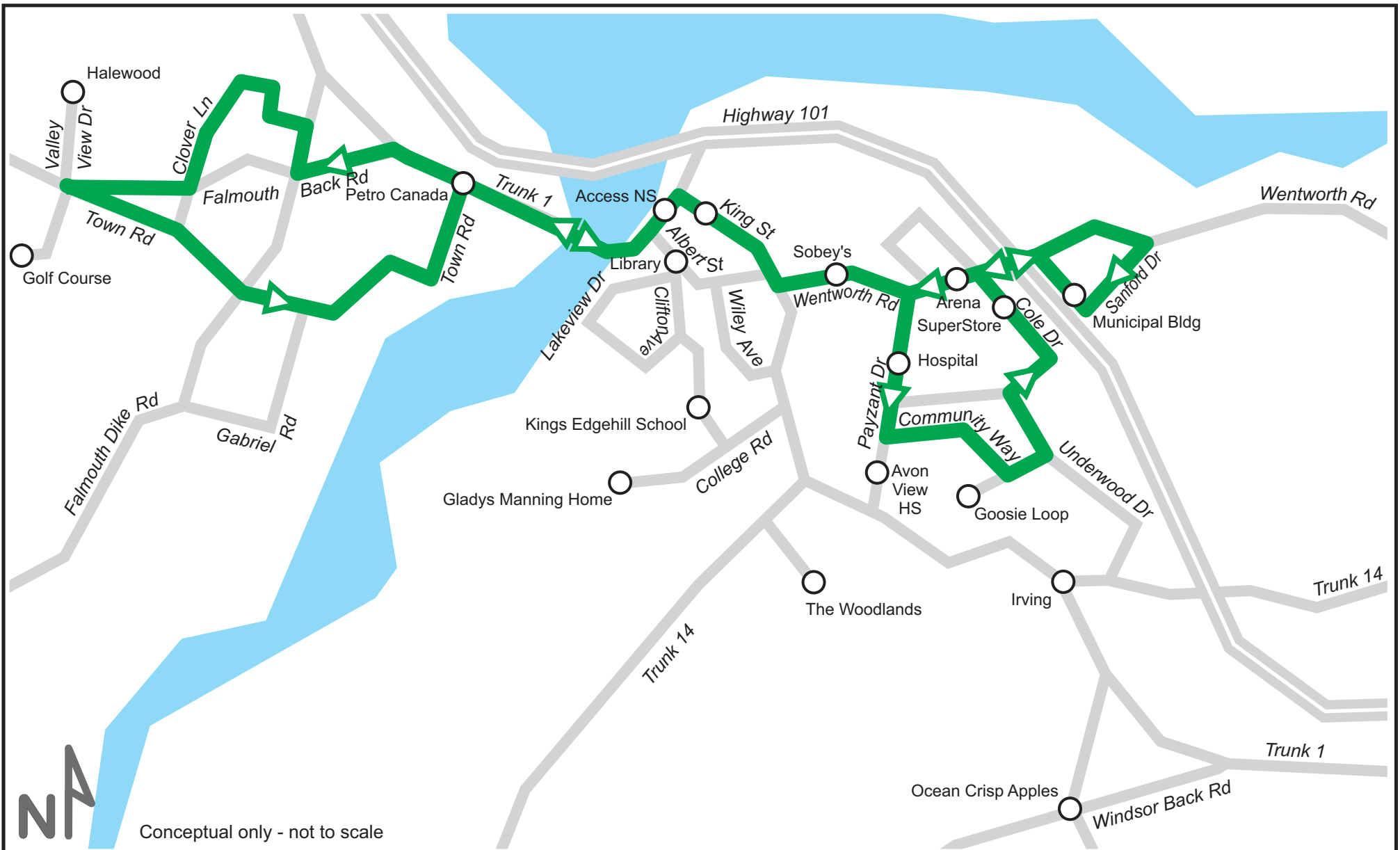
Concept Statistics:	Cycle Time	60 min
	In-Route Time	60 min
	Route Distance	26.7 km
	Destination Points in Service Area	32
	Dwelling Unit in Service Area	3374



West Hants Regional Municipality
Zero Emission Transportation Feasibility Study

ROUTE CONCEPT **B**

Concept Statistics:	Cycle Time	60 min
	In-Route Time	60 min
	Route Distance	27.2 km
	Destination Points in Service Area	36
	Dwelling Unit in Service Area	3278



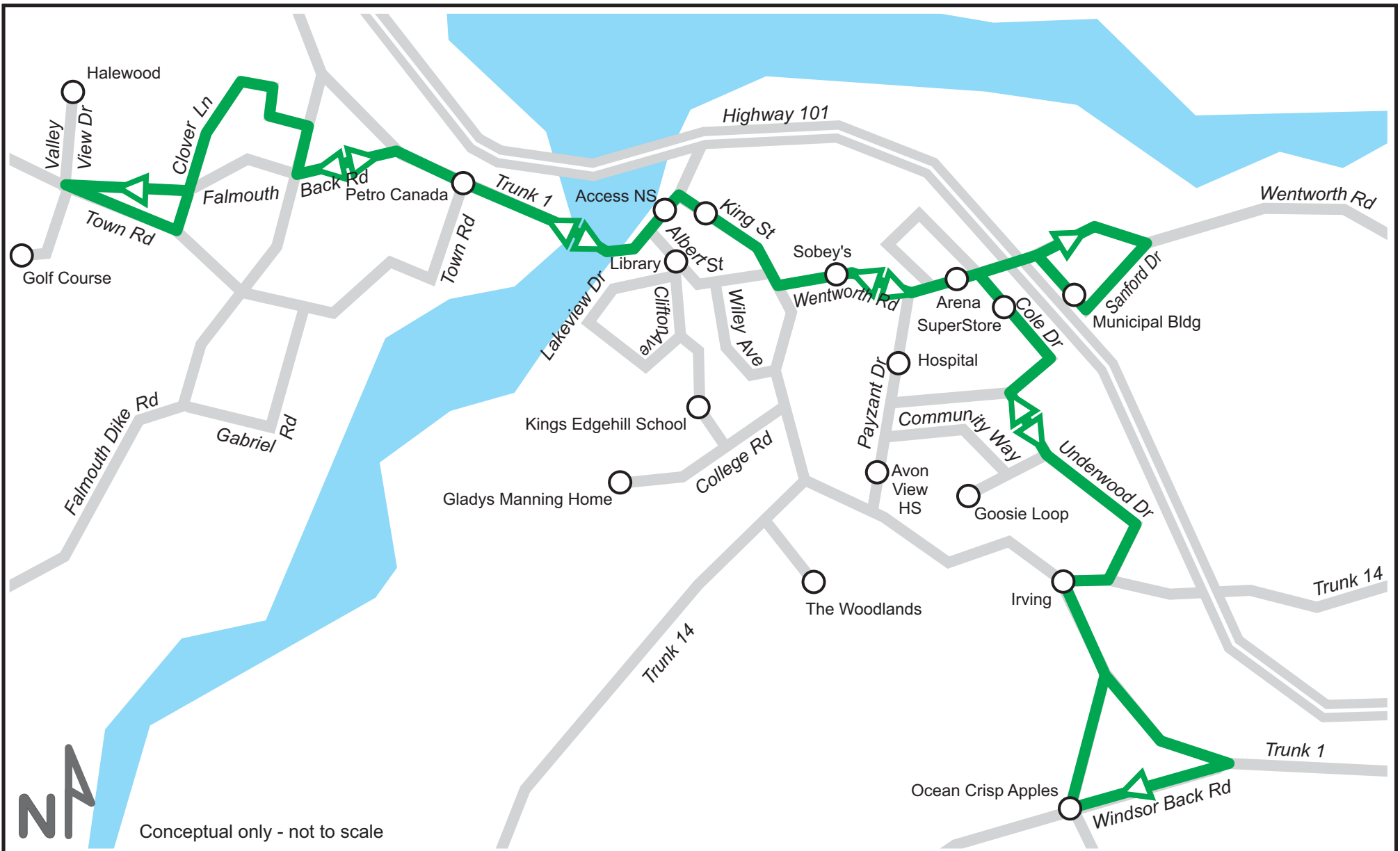
West Hants Regional Municipality
Zero Emission Transportation Feasibility Study

ROUTE CONCEPT C-2

Concept Statistics: Cycle Time	90 min
In-Route Time	84 min
Route Distance	38.0 km
Destination Points in Service Area	35
Dwelling Unit in Service Area	3239

NOTE:
This concept alternates
with Concept C-1

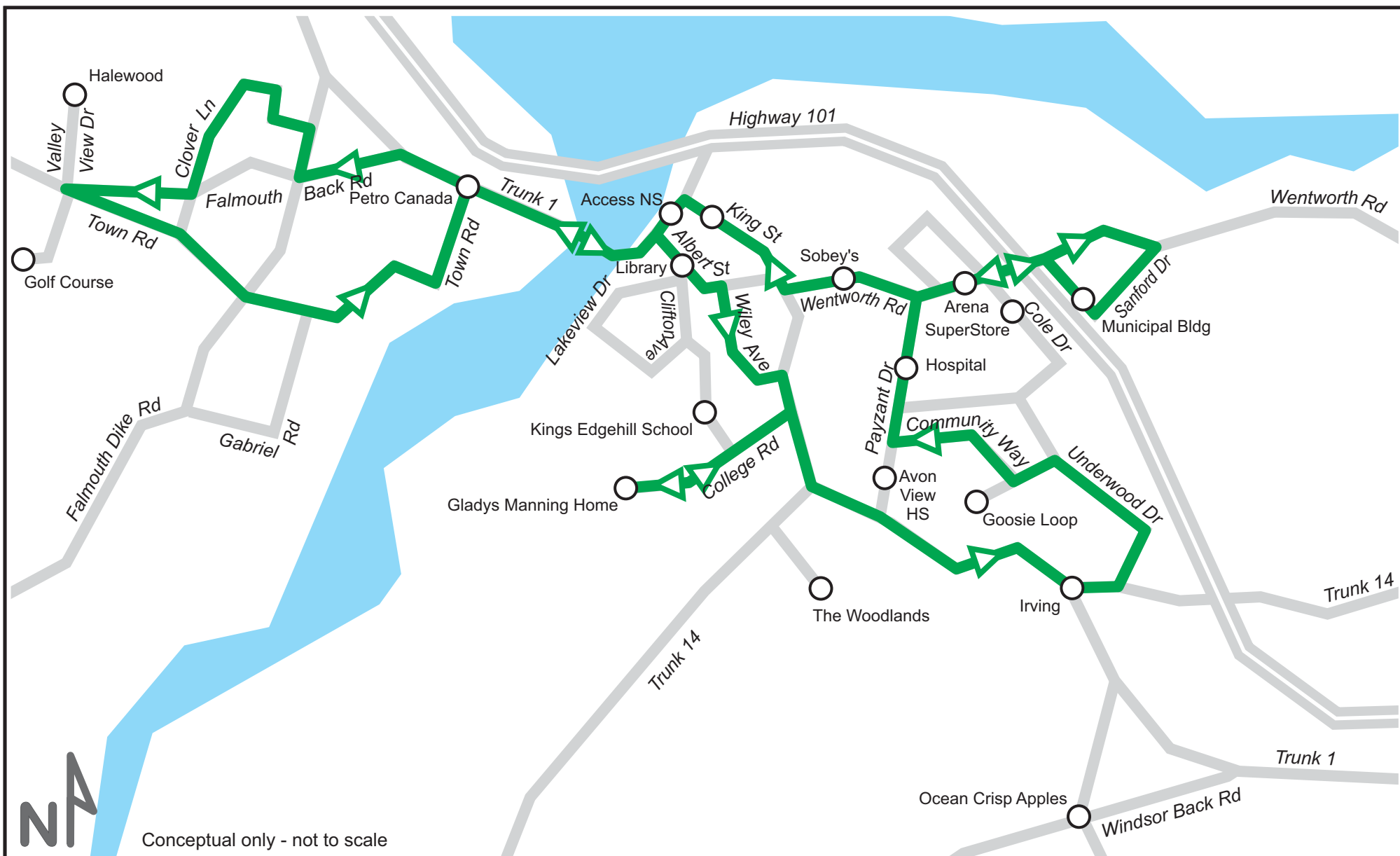
Statistics are for C-1
and C-2 combined



West Hants Regional Municipality
Zero Emission Transportation Feasibility Study

ROUTE CONCEPT D

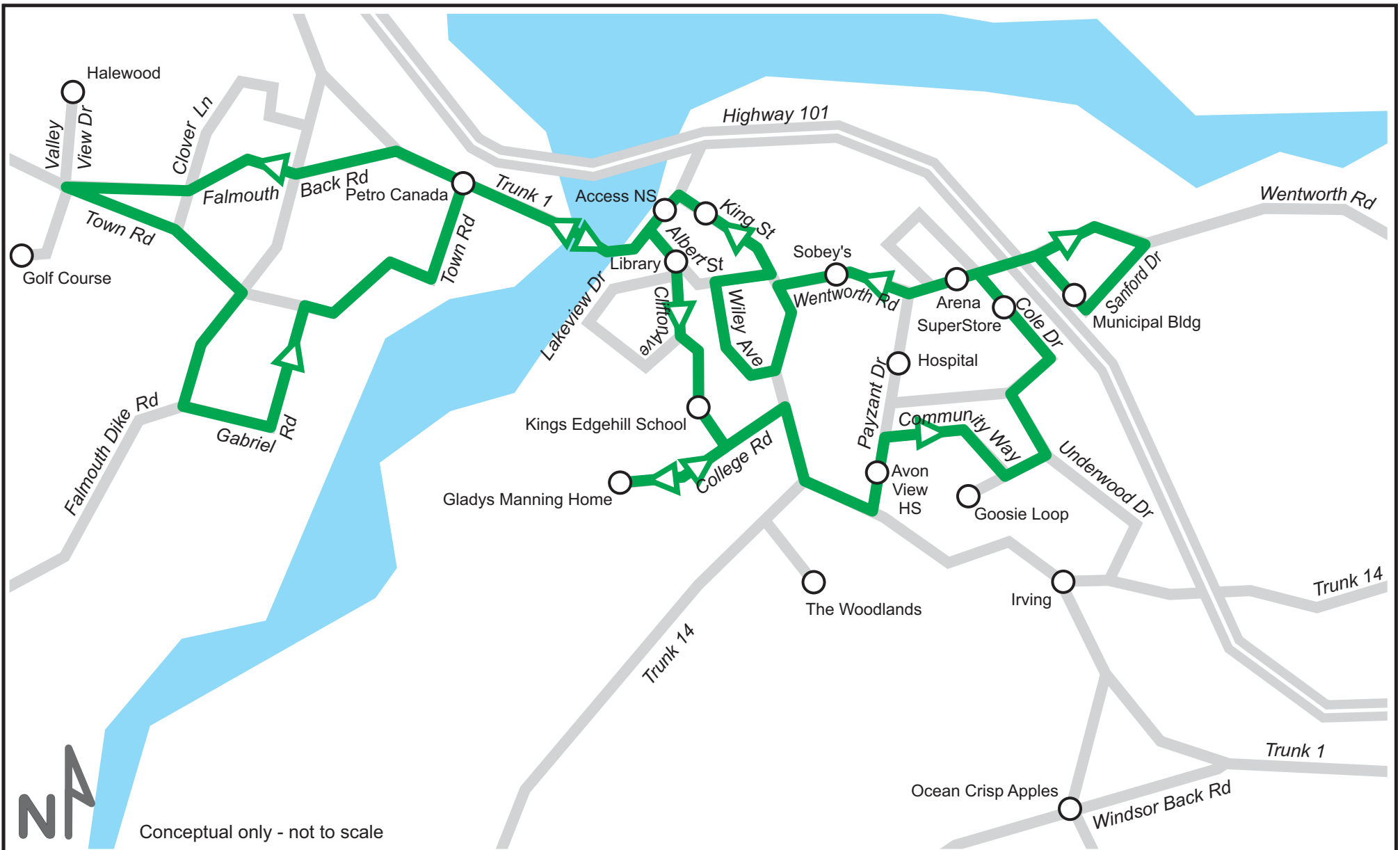
Concept Statistics: Cycle Time	60 min
In-Route Time	60 min
Route Distance	28.6 km
Destination Points in Service Area	36
Dwelling Unit in Service Area	3787



West Hants Regional Municipality
Zero Emission Transportation Feasibility Study

ROUTE CONCEPT E

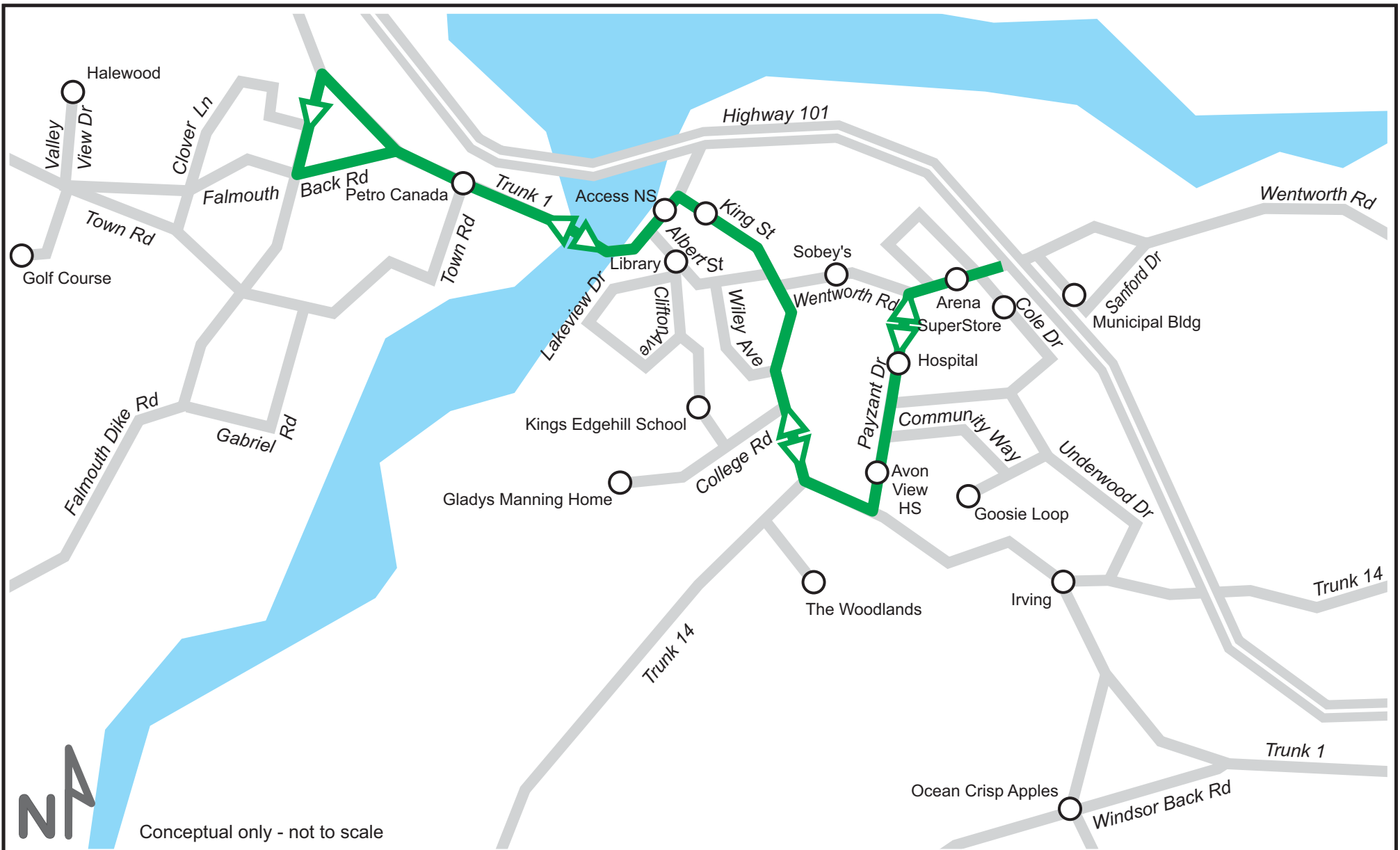
Concept Statistics: Cycle Time	60 min
In-Route Time	59 min
Route Distance	27.3 km
Destination Points in Service Area	36
Dwelling Unit in Service Area	3888



West Hants Regional Municipality
Zero Emission Transportation Feasibility Study

ROUTE CONCEPT F

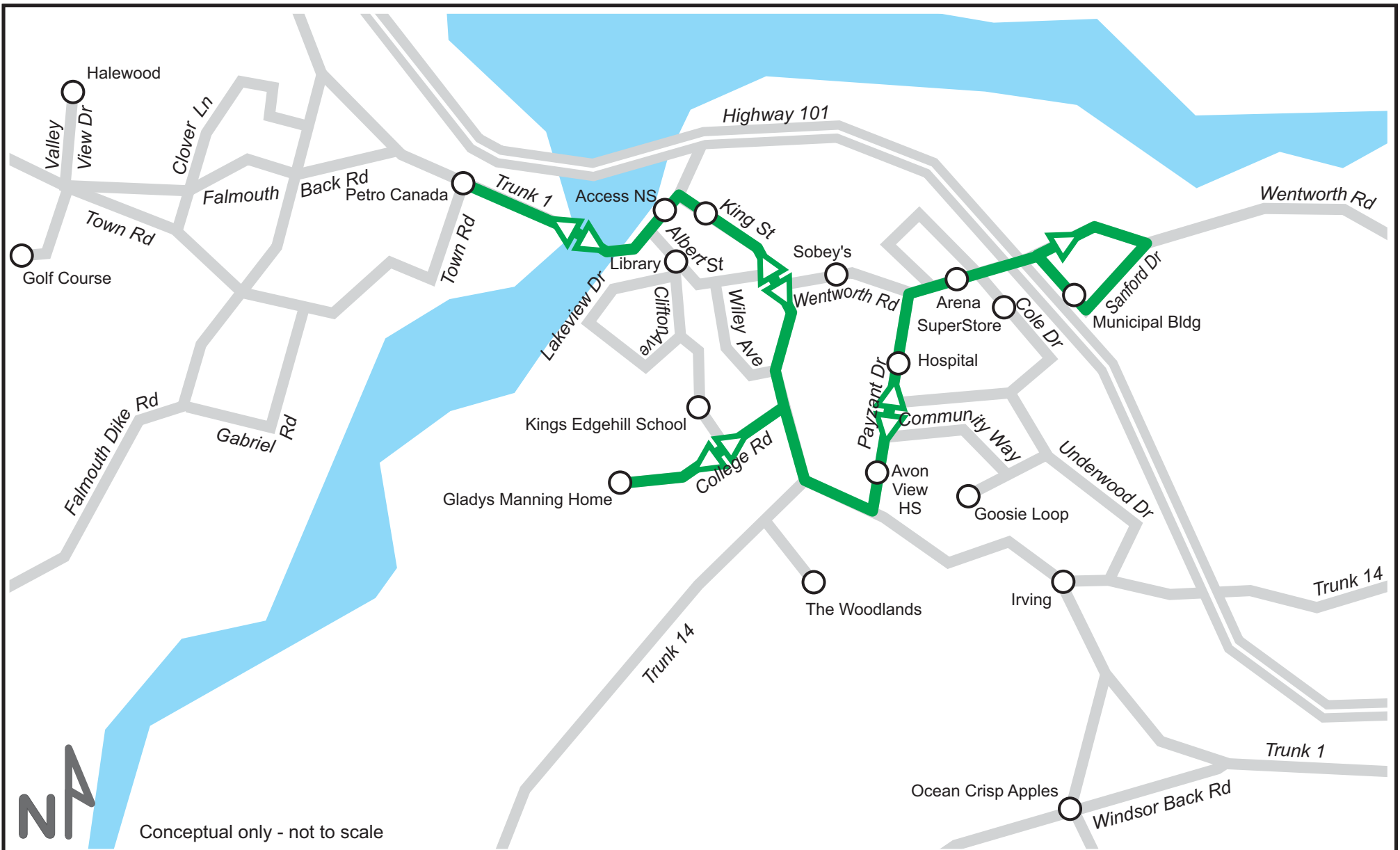
Concept Statistics: Cycle Time	60 min
In-Route Time	57 min
Route Distance	26.0 km
Destination Points in Service Area	32
Dwelling Unit in Service Area	3457



West Hants Regional Municipality
Zero Emission Transportation Feasibility Study

ROUTE CONCEPT G

Concept Statistics: Cycle Time	45 min
In-Route Time	41 min
Route Distance	17.1 km
Destination Points in Service Area	28
Dwelling Unit in Service Area	1651



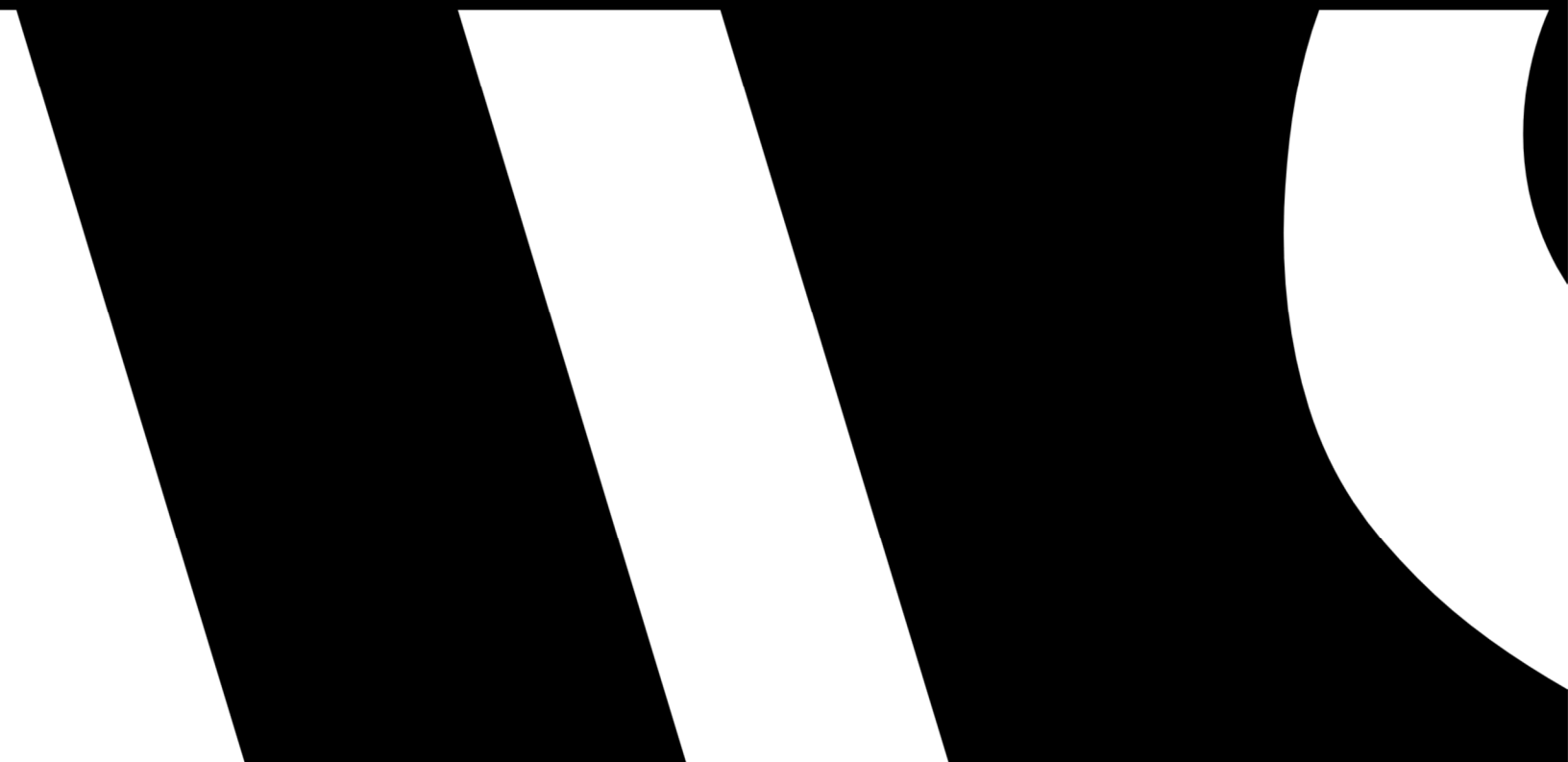
West Hants Regional Municipality
Zero Emission Transportation Feasibility Study

ROUTE CONCEPT K

Concept Statistics:	Cycle Time	60 min
	In-Route Time	48 min
	Route Distance	19.7 km
	Destination Points in Service Area	48
	Dwelling Unit in Service Area	1920

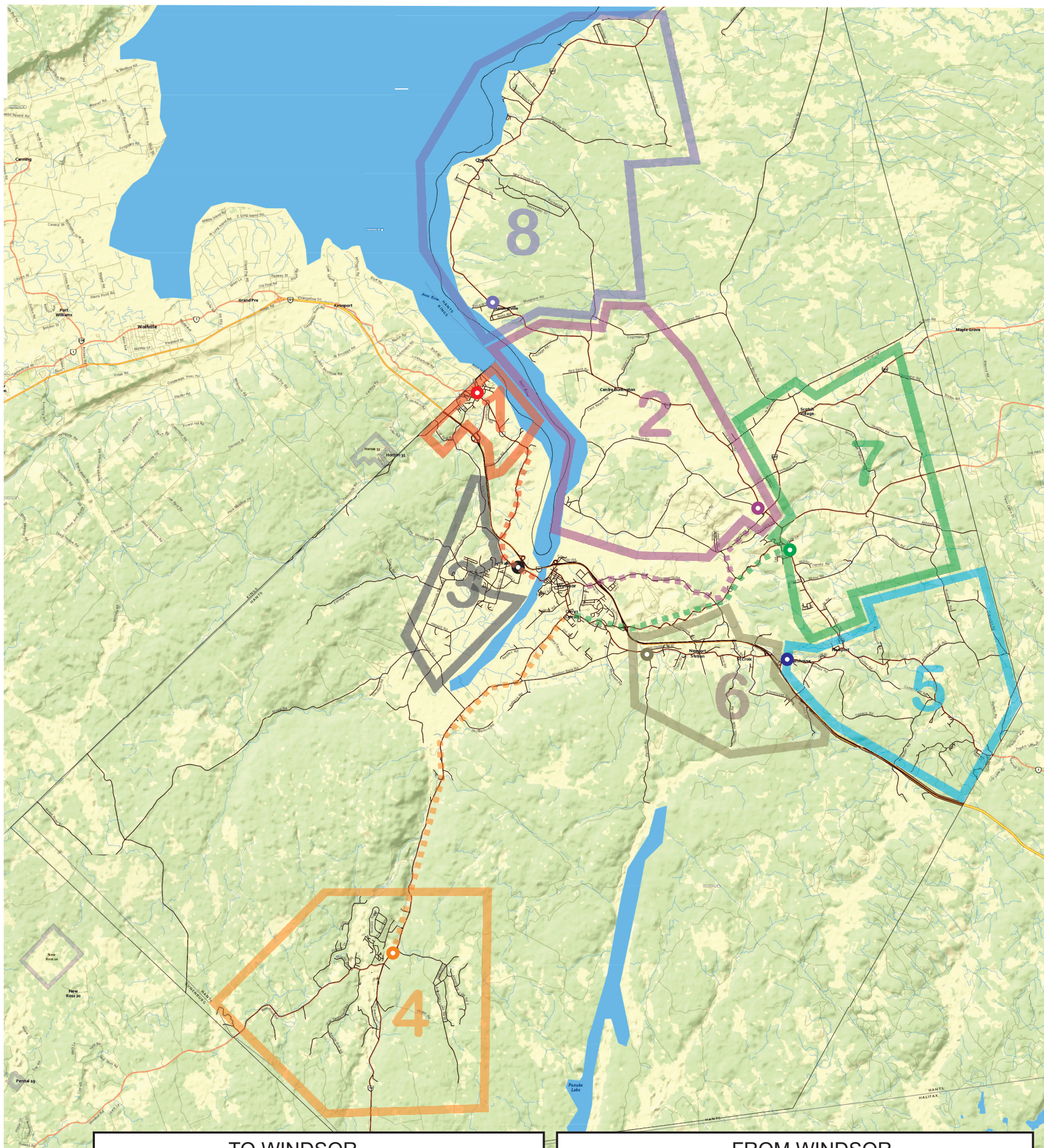


Appendix D: Rural Day-a-Week Service Plan



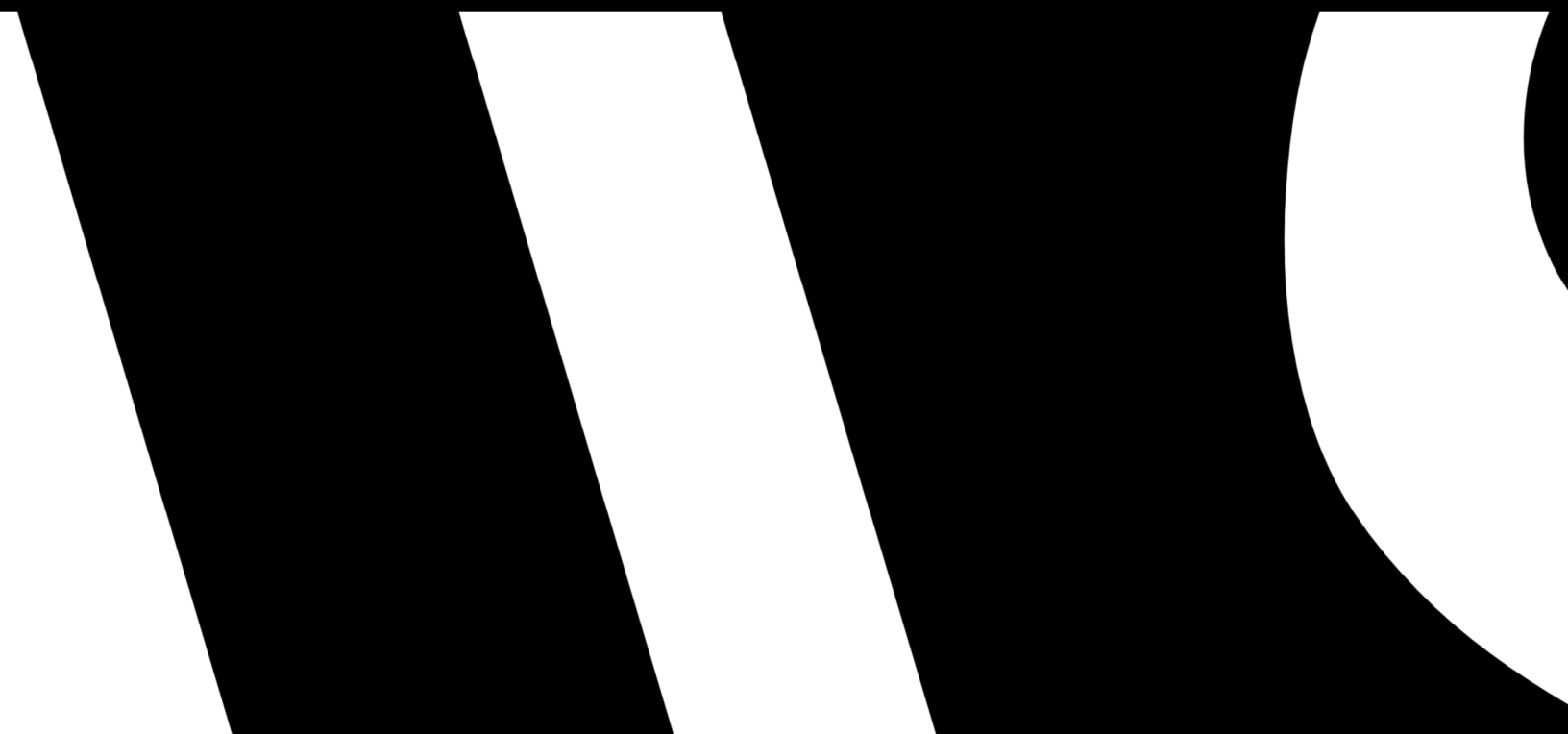
Appendix D – Rural Day-a-Week Service Plan

The proposed Rural Day-a-Week Service Plan is shown in the following diagram. In addition to the layout of the service areas and routing, a proposed schedule is provided.





Appendix E: Urban Fixed Route Detail Map

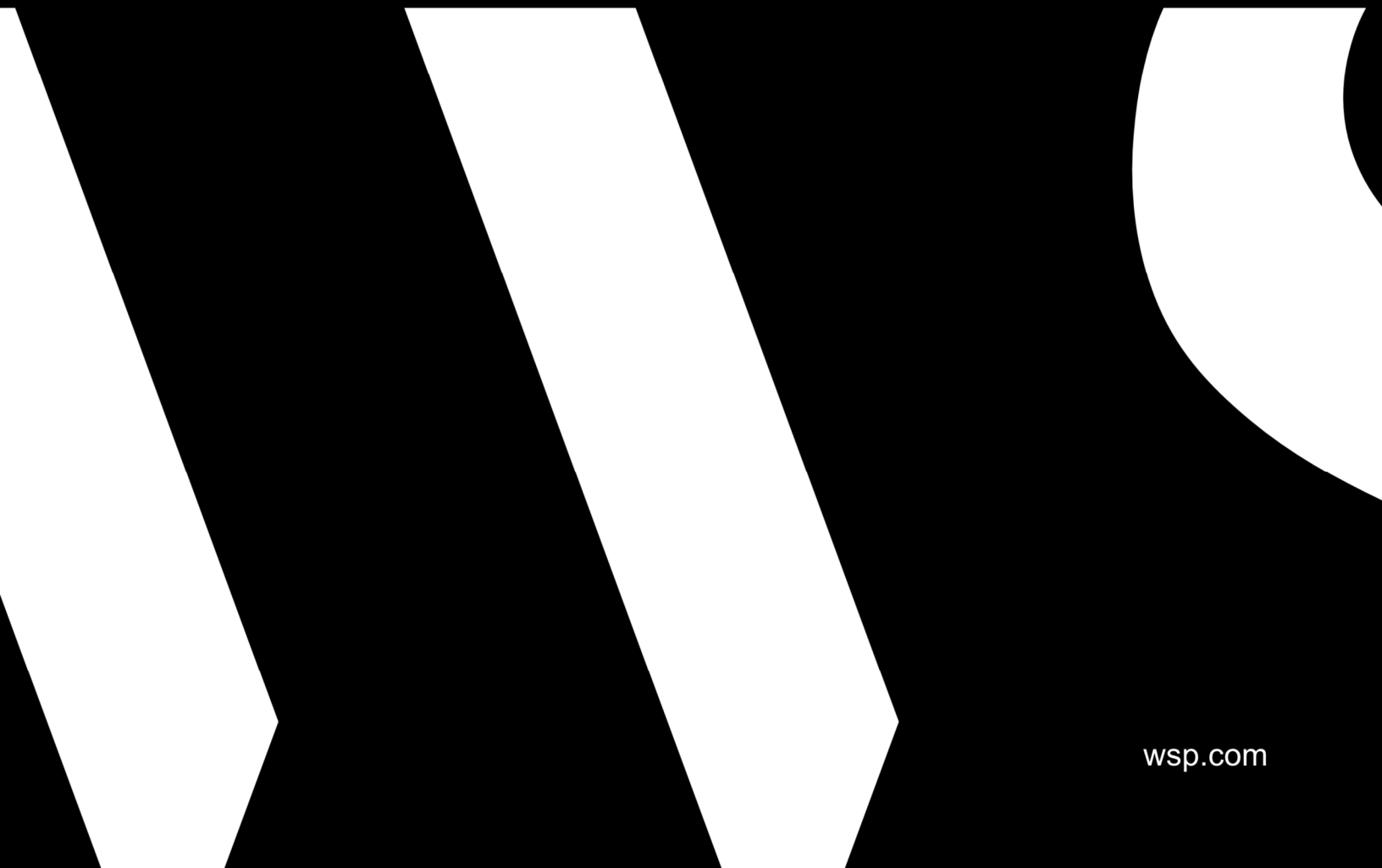


Appendix E – Urban Fixed Route Detailed Map

The following map shows the proposed routing and bus stop locations for the preferred fixed route. Bus stops are coded according to their context within the street network which dictates the treatment they require to make them accessible. A proposed daily schedule is provided below.

Days	Runtime	Sports Complex Fort Edward Mall Downtown Windsor Windsor Elms Falmouth Downtown Windsor Gladys Manning Home Hospital Sports Complex							
		1	2	3	4	5	6	7	1
M-F	53 mi	07:00	07:03	07:06	07:14	07:22	07:38	07:46	07:53
M-F	53 mi	08:00	08:03	08:06	08:14	08:22	08:38	08:46	08:53
M-F	53 mi	09:00	09:03	09:06	09:14	09:22	09:38	09:46	09:53
M-F	53 mi	10:00	10:03	10:06	10:14	10:22	10:38	10:46	10:53
M-F	53 mi	11:00	11:03	11:06	11:14	11:22	11:38	11:46	11:53
M-F	53 mi	12:00	12:03	12:06	12:14	12:22	12:38	12:46	12:53
M-F	53 mi	13:00	13:03	13:06	13:14	13:22	13:38	13:46	13:53
M-F	53 mi	14:00	14:03	14:06	14:14	14:22	14:38	14:46	14:53
M-F	53 mi	15:00	15:03	15:06	15:14	15:22	15:38	15:46	15:53
M-F	53 mi	16:00	16:03	16:06	16:14	16:22	16:38	16:46	16:53
M-F	53 mi	17:00	17:03	17:06	17:14	17:22	17:38	17:46	17:53
M-F	53 mi	18:00	18:03	18:06	18:14	18:22	18:38	18:46	18:53
M-F	53 mi	19:00	19:03	19:06	19:14	19:22	19:38	19:46	19:53

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