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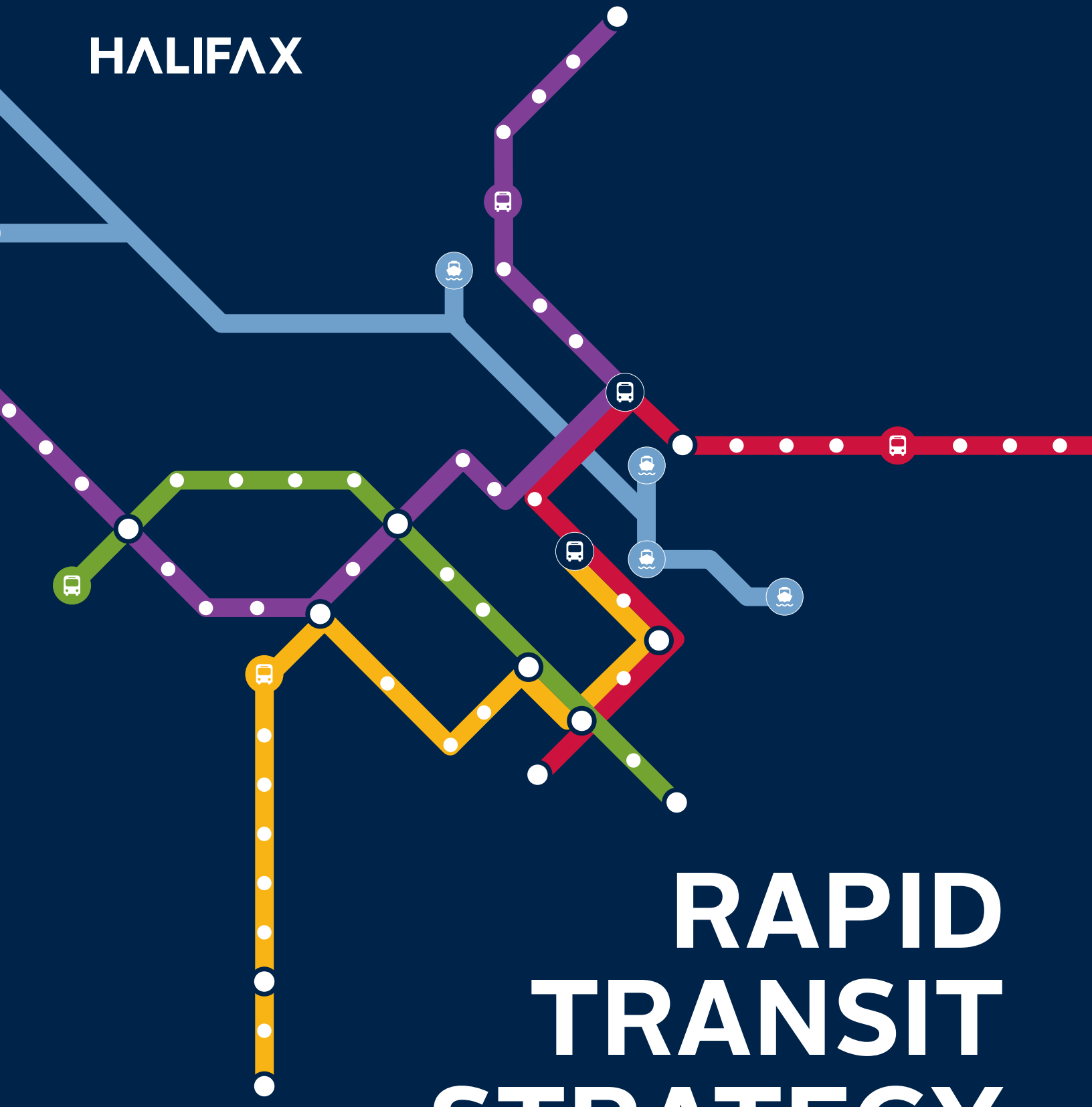


RAPID TRANSIT STRATEGY

MAY 2020

Executive Summary

The Rapid Transit Strategy is Halifax Regional Municipality's (HRM) plan to build a Rapid Transit system by 2030.

The Strategy builds on the vision of the *Integrated Mobility Plan (IMP)*, aiming to improve sustainable transportation options and better support population growth. It invests in high-quality transit service and infrastructure, a key to improving residents' mobility and building more sustainable, affordable, and equitable communities.

Rapid Transit is fast and reliable transit service that typically operates in a dedicated right of way and can shape land use patterns by attracting development near stations and terminals. It gets you where you want to go, when you want to go, faster and more frequently—seven days a week.

The Strategy establishes a Bus Rapid Transit (BRT) Network, proposes new ferry service, and sets a direction for land use policy to align with Rapid Transit.

APPROACH

The Strategy is a collaboration across HRM, led by Planning & Development and Halifax Transit. The approach integrated best practices in transportation and land use planning, transit design and analysis, and an intensive engagement program.

The proposed network is strategically aligned to serve the areas in Halifax most suitable for Rapid Transit and to align with other sustainable transportation priorities such as active transportation.

Benefits of Rapid Transit

IMPROVES MOBILITY OPTIONS

- Provides more reliable, frequent, faster, connected, and easier to use transit service.
- Makes many types of trips possible, not just downtown commutes.
- Costs significantly less to passengers than driving.

ORIENTS LAND USE TOWARD TRANSIT

- Encourages development around stations and terminals, bringing more prospective riders and starting a transit-supportive cycle of development.
- Promotes complete communities where residents can live, work, shop, learn, and play within the community.
- Reduces the need to invest in road infrastructure to support demand for auto travel.

MAKES TRANSPORTATION MORE SUSTAINABLE AND EQUITABLE

- Helps residents reduce vehicle use or forgo vehicle ownership, decreasing greenhouse gas emissions.
- Supports sustainable shifts toward more compact development patterns.
- Builds more equitable communities by providing mobility options for those unable to access private vehicles.

BUS RAPID TRANSIT

The proposed BRT Network consists of four fixed-route bus lines which will provide all-day service, including 10-minute frequency from 6am to 10pm. Lines will have fewer stops than local routes to reduce travel times. Extensive transit priority measures are proposed to ensure BRT can reliably compete with driving. Approximately 60% of the network is proposed to have transit priority lanes.

BRT will improve freedom of movement around the municipality, complementing local and express bus routes and increasing access to employment for many residents. Over 120,000 people and 100,000 jobs are within a short walk or roll of the BRT Network.

FERRIES

The Strategy proposes three new ferry routes, each connecting a new terminal to downtown Halifax. The routes will provide 15-min service at peak hours, with travel times generally better than driving. Single-deck catamaran ferries with a capacity of 150 passengers are recommended to provide safe and comfortable higher-speed operation.

The ferries will give commuters and other travelers in communities around the terminals a reliably faster way to get to and from downtown.

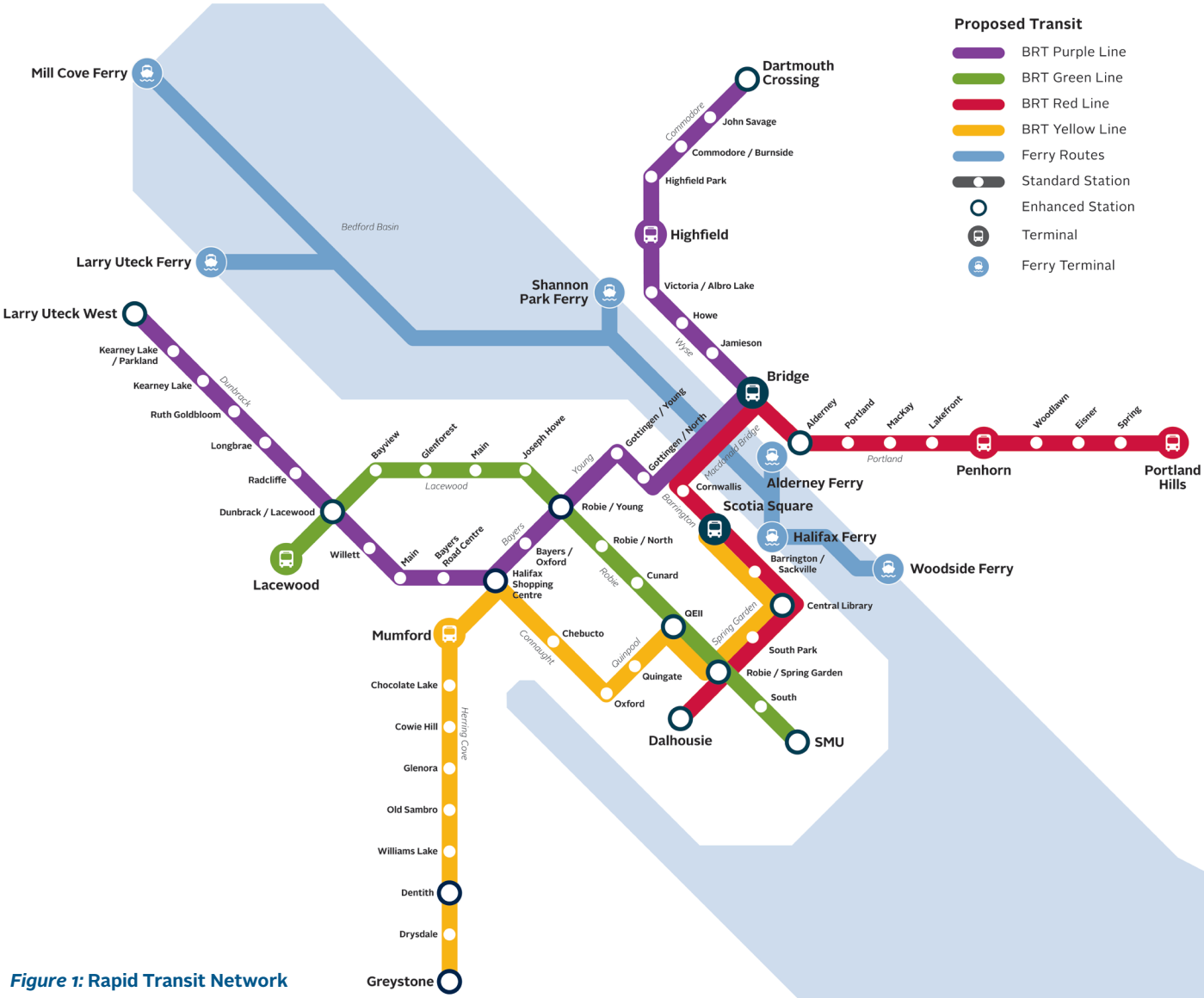


Figure 1: **Rapid Transit Network**

LAND USE

To create sustainable, transit-oriented neighbourhoods, land use policy and Rapid Transit must align. To achieve this, the Municipality will:

- Plan for higher-density mixed use development around Rapid Transit.
- Work to ensure that affordable housing and amenities are available near Rapid Transit.
- Improve the connectivity of local streets and the quality of active transportation infrastructure near stations and terminals.
- Pursue a long-term vision for Rapid Transit together with a long-term vision for land use.

IMPLEMENTATION

Delivering on Rapid Transit will be a large undertaking. It will involve several complex and interdependent activity streams, including creating transit priority lanes, purchasing new buses and ferries, and building BRT stations and ferry terminals.

BRT and ferry service are anticipated to be fully implemented in seven to eight years once funding is confirmed, with the first BRT line and ferry route launched in year three or four.

HIGH-LEVEL COST ESTIMATES

Like most transformative projects, the Rapid Transit Strategy will require substantial financial investment. Funding the Strategy will require partnering with other levels of government.

	CAPITAL INVESTMENT	ANNUAL NET OPERATIONAL COST
BRT	$189–217 million	$6–7 million
FERRY	$108–125 million	$9–15 million
NET TOTAL	$297–342 million	$15–22 million

NEXT STEPS

- Secure the necessary resourcing and funding from key partners to implement the Strategy.
- Initiate functional plans for BRT corridors and additional analysis for ferry service.
- Continue to aggressively pursue transit priority lanes on key corridors.
- Strengthen the relationship between Rapid Transit and land use planning through the *Regional Plan* review.
- Establish transportation reserve zones to preserve the right of way for strategic Rapid Transit projects.

1 INTRODUCTION

Transportation and land use decisions shape the lives of everyone across the Halifax region. Where we live and how we move are central to our quality of life and the social, economic, and environmental health of the municipality and its residents. Traditional patterns of land use and transportation decisions in Halifax, like most North American municipalities since the mid 1900s, have been focused on private vehicles.

In 2017, Halifax Regional Council endorsed a progressive new vision for the Municipality in the *Integrated Mobility Plan (IMP)*. This vision focuses on the movement of people rather than vehicles, strengthens the relationship between transportation and land use decisions, and provides an opportunity to rethink and redesign our transportation system and communities. Rapid Transit is a critical step in making this vision a reality.

The Strategy is the culmination of years of strategic planning and efforts to improve sustainable transportation options and increase mobility for residents. It aims to support population growth in a way that is more compact and less car-oriented, and ultimately more affordable and sustainable.

The Strategy:

- Establishes a Bus Rapid Transit Network, including four lines, station types and approximate locations, and a desired network of transit priority lanes (**Section 3**).
- Proposes new ferry service, including routes, approximate terminal locations and features, and vessel type (**Section 4**).
- Establishes policy direction for long-term land use patterns to support growth near Rapid Transit and for a future Rapid Transit vision coordinated with land use planning (**Section 5**).

Rapid Transit Project Goals

The Rapid Transit project set out three goals. This Strategy achieves two of the three and lays out a clear plan to achieve the third.

1. **Design a Rapid Transit Network to meet or exceed *Regional Plan* mode share targets**
2. **Encourage supportive land use patterns aligned with the Rapid Transit Network**
3. **Establish a long-term strategic vision for Rapid Transit**

   To continue through the Regional Plan review (see **Section 5***)*

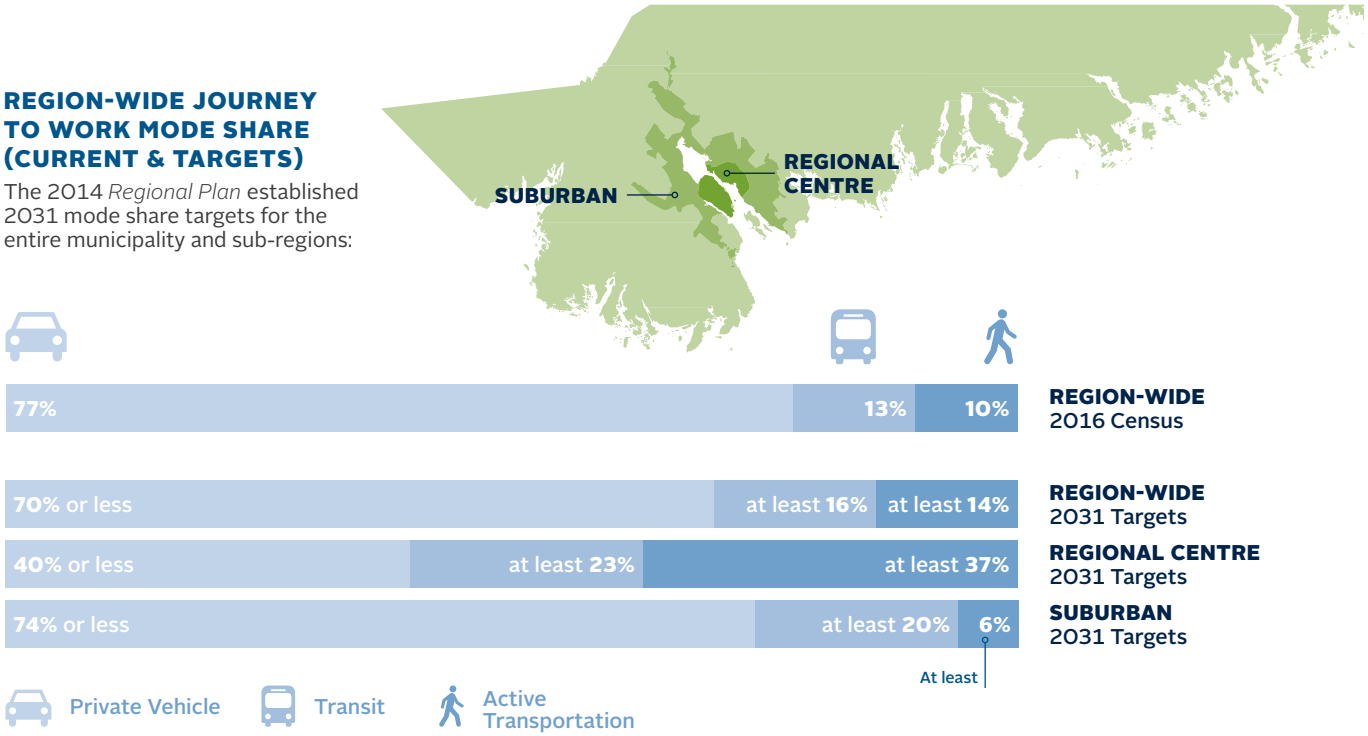


***Figure 2: Regional Plan* journey to work mode share targets**

1.1 What is Rapid Transit?

Rapid Transit is a fast and reliable transit service that typically operates in a dedicated right of way and can shape land use patterns by attracting development near stations and terminals. Examples of a dedicated right of way include transit priority lanes for buses and the Halifax Harbour for ferries.

The modes of transit included in this strategy are Bus Rapid Transit (BRT) and new ferry service. Rapid Transit services will complement other types of transit service, each serving different purposes.

BUS RAPID TRANSIT

BRT is fast, frequent, all-day bus service which allows people to move around the municipality easily and reliably. BRT lines will make a limited number of stops at major destinations and intersections, allowing buses to move people around more quickly than regular transit service. These lines will operate in transit priority lanes wherever possible to avoid congestion and improve travel times and reliability.

FERRIES

The proposed ferries will offer fast, direct connections across the Bedford Basin to downtown Halifax and between Shannon Park and downtown Halifax using vessels capable of higher speeds than current Halifax Transit ferries. The new ferry service is intended to initially be focused on peak commuting hours, but could evolve over time subject to demand.

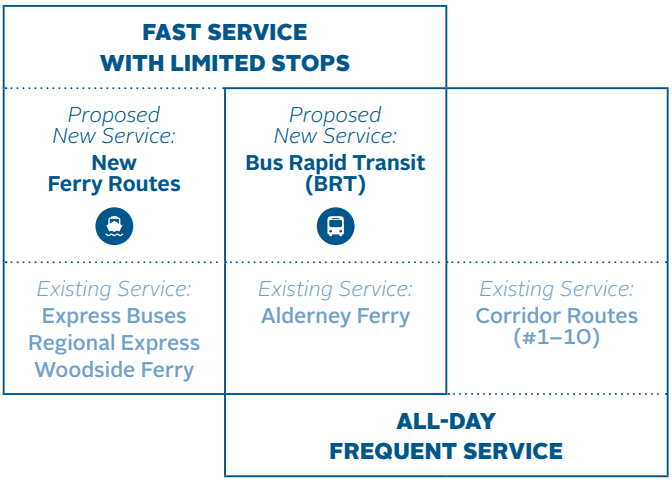


***Figure 3:* Existing and proposed service types**

	BUS RAPID TRANSIT	PROPOSED FERRIES	EXPRESS ROUTES	CONVENTIONAL BUS SERVICE
PURPOSE	Provide high-quality, frequent service to dense urban and suburban areas	Serve commuters traveling between downtown and areas around the harbour	Serve commuters traveling between downtown and suburban and rural areas	Provide transit service to many areas across the municipality
SCHEDULE FREQUENCY	High frequency all-day	High frequency at peak hours Some off-peak service	Peak hours only (possibly some off-peak service)	Moderate to high
STOPS	At major destinations and intersections (500m–1km spacing)	Direct downtown service from terminals	Limited, typically at origins, terminals and destinations	Every few blocks (200m spacing)
LANES	Dedicated bus lanes where possible	Halifax Harbour	Usually mixed traffic	Usually mixed traffic

Figure 4: **Comparison of Rapid Transit to other transit service types**

1.2 Why is Rapid Transit important?

IMPROVES MOBILITY OPTIONS

Rapid Transit means public transit that gets you where you want to go, when you want to go, faster and more frequently—seven days a week. Rapid Transit is built on five core transit characteristics: reliability, frequency, lower travel times, connectivity, and legibility. The Rapid Transit Network will improve on current service in all five of these characteristics.

In addition to typical commuting trips, the Rapid Transit Network can be easily used for more complex travel patterns including recreational and social trips, running errands, and work trips that fall outside of peak hours and on weekends.

How the Rapid Transit Network will improve mobility:

Reliability

- Using transit priority lanes and the harbour to avoid congestion helps keep service on time.
- High frequency buses provide more opportunity to make connections.

Frequency

- Frequency of the BRT service means people do not have to rely on a schedule—they can just show up at a station and catch the next available bus.
- Frequency also means people can easily transfer to another line or route, providing access to more destinations.

Lower Travel Times

- Transit priority lanes and fewer stops mean that BRT is more competitive with auto driving times, especially in peak hours.
- The ferry service will offer a faster commute to downtown than driving for many residents.

Connectivity

- The BRT lines are connected to each other in many places, meaning easy one-transfer trips are possible to many destinations.
- The BRT and ferry will connect with local routes to serve additional areas.
- All BRT stations and terminals will be accessible and provide shelter, seating, and amenities for passenger comfort.

Legibility

- A simple network helps riders understand and fully utilize Rapid Transit.
- Named, colour-coded lines and named stations (e.g. Halifax Central Library) help riders understand how to use the network.

ORIENTS LAND USE TOWARD TRANSIT

Traditional patterns of suburban development and transportation planning reinforce a cycle of auto dependency. Approximately 81% of suburban Halifax residents drive to work, largely because their communities have been designed primarily around private vehicle use. Auto dependency leads to traffic congestion, mobility challenges for those without vehicles, and unsustainably dispersed patterns of development. As the municipality continues to grow, it must manage its growth to avoid compounding these issues.

Breaking the cycle of auto dependency and replacing it with a transit-supportive cycle helps communities become more financially and environmentally sustainable. Rapid Transit is the key. Building Rapid Transit stations and transit priority infrastructure highlights the Municipality's commitment to providing permanent, high-quality service on the network, giving developers confidence to invest in surrounding neighbourhoods.

In turn, development near a station provides more opportunities for people to live or work near Rapid Transit. This leads to new transit riders, driving up demand for transit and continuing the cycle of transit-supportive land use.

This investment in Rapid Transit must also be coordinated with land use policy to enable and encourage growth around stations and terminals. **Section 5** discusses how the Strategy will shape land use policy to emphasize walking, biking, and transit to create healthier and more attractive Rapid Transit-oriented neighbourhoods.

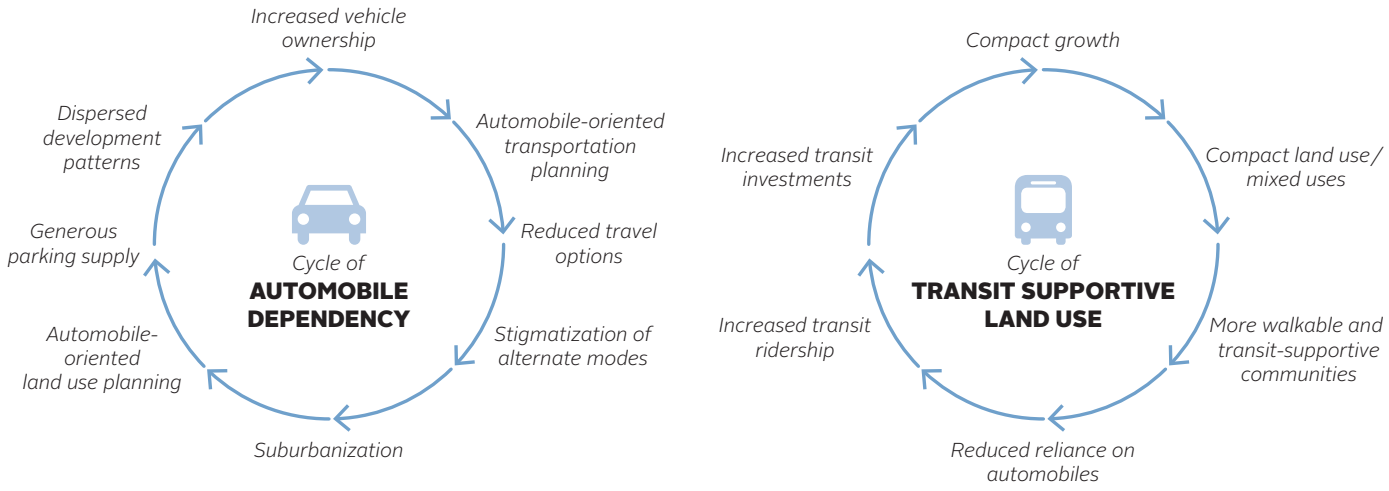


Figure 5: **Cycles of auto-dependent and transit-supportive land use**

Ridership vs coverage in transit planning

There are two key drivers of transit service design: ridership and coverage. There is a tradeoff between these goals. The more resources that are directed towards one goal, the less can be directed to the other.

- Aiming for **ridership** means serving the most people in a cost-effective and efficient manner. To do this, agencies put routes directly through the most populated areas, connect important commercial areas, and provide frequent service.
- Aiming for **coverage** means providing access to as many households in a given area that are within a certain distance (usually 500 metres) of a transit stop. Coverage routes often meander through lower-density residential neighbourhoods where an increase in service will not attract many more riders.

Halifax Transit aims to balance both of these goals with its service; however, **this strategy is about ridership.** Rapid Transit is a service model that is used to achieve ridership goals, and is not an effective tool in areas being served to meet coverage goals.

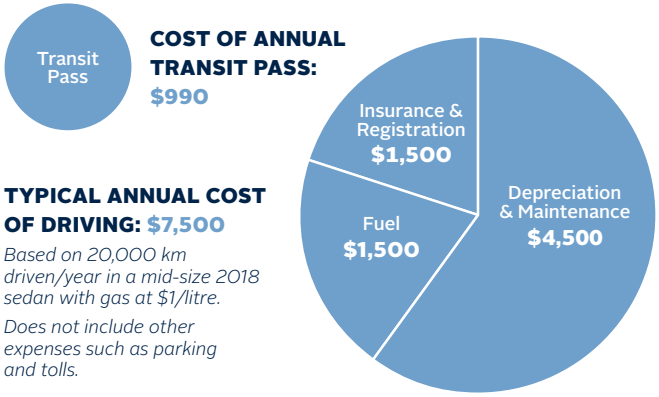
MAKES TRANSPORTATION MORE SUSTAINABLE AND EQUITABLE

In 2019, the Municipality declared a climate emergency. Urgent and profound action is required across multiple sectors including transportation to address the crisis. *HalifACT 2050*, the Municipality's proposed long-term plan to reduce emissions and help communities adapt to a changing climate, recognizes that along with transitioning to electric vehicles and renewable energy sources, shifting travel to transit and active transportation is necessary to tackle the climate crisis. The Rapid Transit Strategy, along with the *IMP* and the *Active Transportation Priorities Plan*, will play a key part in creating a more sustainable transportation system and achieving the Municipality's goals for climate change mitigation.

Over-reliance on private vehicles is a significant source of greenhouse gas emissions in the municipality. Transportation generates approximately 19% of all GHG emissions in HRM, with most coming from non-commercial vehicles. By providing a competitive travel option, Rapid Transit will help many residents reduce their auto use or forgo vehicle ownership, decreasing energy consumption and greenhouse gas emissions. Halifax Transit is also developing a fleet electrification strategy to transition to electric buses, further helping reduce emissions.

Changing land use patterns to emphasize transit-oriented development is also a move toward sustainability. More compact neighbourhoods require less road, water and sewer infrastructure, cost less to service, and generate lower greenhouse gas emissions per person than sprawling suburbs. The increased density and commercial options in transit-oriented communities will make it easier for residents to walk or roll to local amenities and destinations, further supporting a shift toward sustainable modes of travel.

Rapid Transit and the shift from car dependence also helps build more equitable communities. Auto-dependent communities typically have limited mobility options for those that are unable to access private vehicles, particularly youth, the elderly, residents living with financial strain, persons with disabilities, those who are new to the country, and other marginalized populations. Creating walkable, transit-friendly communities provides greater freedom and mobility to all residents. More mobility and lower transportation costs increase communities' connectivity and resilience to adverse events.



SOURCE: *CAA Driving Costs Calculator*

Figure 6: **Cost of transit vs. owning a vehicle**

Common questions about Rapid Transit

Why not build more roads?

The traditional approach to transportation planning aims to reduce congestion by building more roads and widening existing ones to meet demand.

However, as road capacity is increased to accommodate more vehicles, additional drivers choose to use the road, creating more traffic. This is commonly referred to as **induced demand**. Evidence from cities around the world shows that providing more space for vehicles does not ultimately reduce congestion.

The Municipality's approach, as outlined in the *IMP*, emphasizes improving mobility through more sustainable travel modes such as transit and active transportation. This approach helps manage congestion, and more importantly provides residents with more options to move around.

Why BRT and not light rail transit (LRT)?

The capital cost to build LRT is substantially higher (as much as ten times) and requires more high-density neighbourhoods than Halifax currently has to be cost-effective. BRT is much faster to build and can be deployed across more corridors, so benefits will be seen sooner and by more residents.

Well designed, efficient BRT can offer many of the same benefits of LRT and can even be a precursor to rail-based transit in the future.

1.3 Where does Rapid Transit make sense?

Transit agencies offer a variety of transit service models, including Rapid Transit, express routes, local routes, and on-demand service, each appropriate for serving different land use and travel patterns. Rapid Transit is best suited to connect high density, mixed-use areas: locations where there are many people, jobs, and activities to support all-day frequent service.

The Strategy recommends Rapid Transit in areas where it can be most efficient and cost effective. It focuses on areas with immediate high anticipated ridership to support the proposed service levels and infrastructure investments.

High ridership and reliable, low travel times lead to a cost-effective service.

Parts of the municipality not well suited for Rapid Transit may still be served well by frequent corridor routes, commuter-focused service, local routes, community-based transit, ridesharing, or a combination of these options. The Rapid Transit Network can still benefit these communities indirectly, as residents can connect to BRT or ferry routes through local bus routes or Park & Ride lots. As well, local routes or express commuter service may use the transit priority lanes created for BRT to reduce travel time and increase reliability.

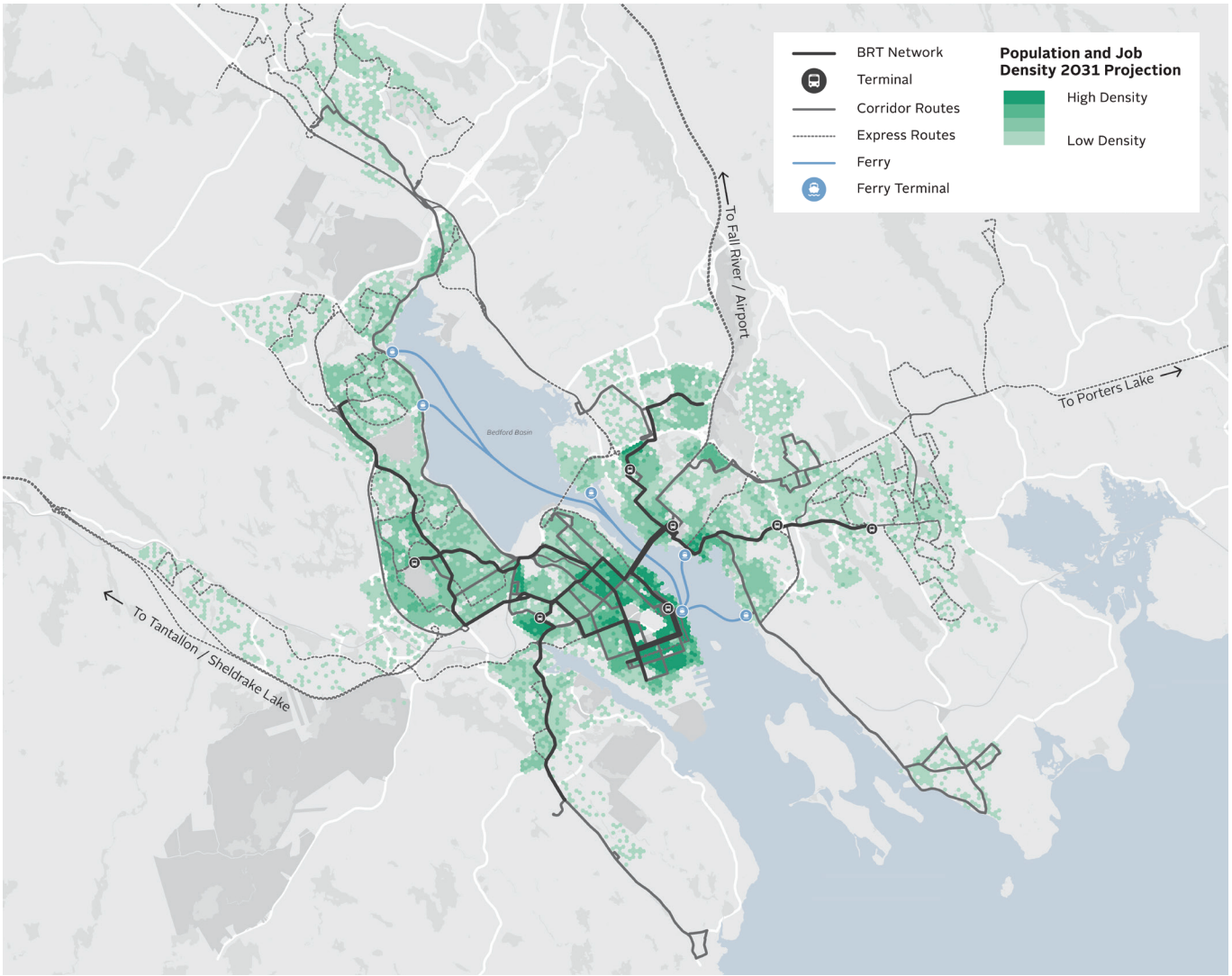


Figure 7: **Types of transit service across suburban HRM**

2 APPROACH

The Rapid Transit Strategy is the result of a collaborative project across municipal departments led by Planning & Development and Halifax Transit. It builds on a foundation of transportation and land use plans and studies completed over the last two decades. The project team's approach integrates best practices in transportation and land use planning, transit design and analysis, and an intensive engagement program.

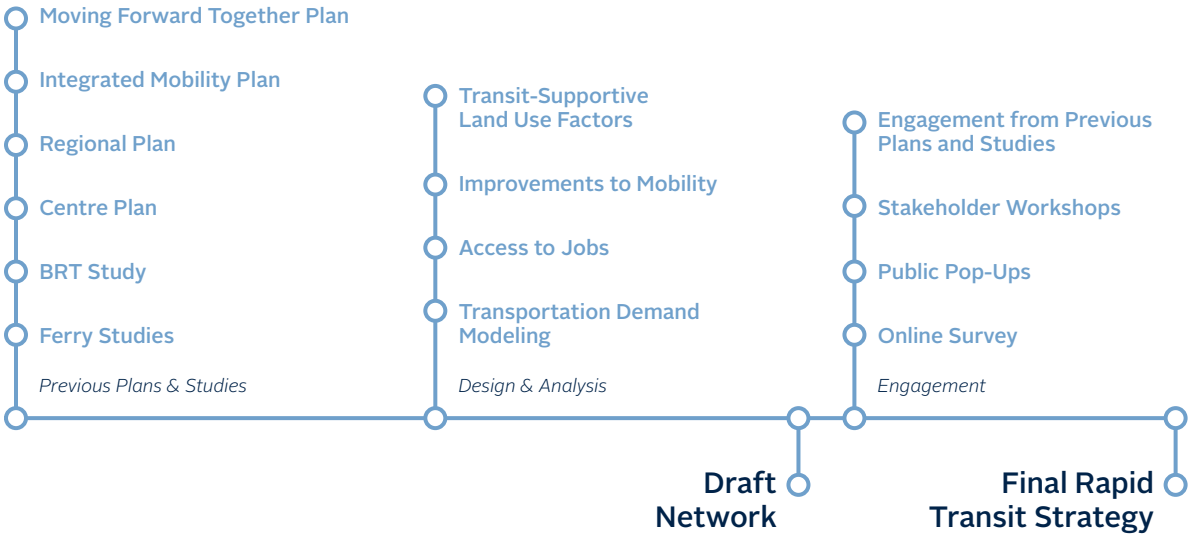


Figure 8: **Rapid Transit Strategy development process**

2.1 Previous Plans and Studies

The Strategy supports the objectives and builds on the achievements of key transportation and land use initiatives within the municipality. It is also supported by the knowledge gained from almost twenty years of studies exploring options for Rapid Transit in the Halifax region.

Moving Forward Together Plan

The *Moving Forward Together Plan (MFTP)*, guided by four transit principles, established a plan for frequent service on key corridors by creating Corridor routes 1 through 10. Though its implementation is not yet complete, the *MFTP* has been effective at promoting increased transit ridership, including an overall increase of 5% in 2018/19 and another 8% increase through the first half of 2019/20. The Strategy builds on the success of the *MFTP* and follows its principles by establishing faster, more reliable service on four high-demand lines.

Integrated Mobility Plan

The Strategy also builds on the *Integrated Mobility Plan (IMP)*, which aims to provide residents with integrated and connected travel options through a sustainable transportation network. The Strategy aligns with the *IMP's* pillars of integrated mobility, which are intended to guide transportation decision making. It also supports the *IMP's* emphasis on prioritizing alternatives to private vehicles. In addition to the primary focus of improving transit service, the Strategy supports multimodal trips through connections to active transportation. All-day frequent service on BRT lines also supports transportation demand management objectives by making it easier for people to travel outside of peak hours.

MFTP Principle	Increase the proportion of resources allocated towards high-ridership services	Build a simplified transfer-based network	Invest in service quality and reliability	Give transit increased priority in the transportation network
MFTP Actions	» Established corridor routes » Expanded express service	» Facilitated transfers on local/corridor routes » Made the overall network easier to understand	» Addressed capacity, frequency, and service span issues on existing routes » Planned for more reliable new local routes	» Invested in transit priority measures
Rapid Transit	» Upgrades the frequent service along key corridors, providing high ridership options in appropriate areas	» Improves network legibility and transfer options » Frequency allows easy transfers throughout the wider network	» Invests in highly reliable and high quality (fast, frequent) Rapid Transit lines	» Builds connected network of transit priority lanes for BRT Network » Establishes new ferry service to greater utilize the harbour

Figure 9: **Strategy's relationship to *Moving Forward Together Plan* principles**

IMP Pillar	CONNECTED	HEALTHY	AFFORDABLE	SUSTAINABLE
	Connects people, places, goods, and services	Safe, comfortable, and convenient for all ages and abilities	Investment is strategic and travel is affordable	Environmentally, socially, and economically responsible
Role of Rapid Transit	**Provide a frequent and reliable option for mobility**	**Provide safe and convenient access to amenities**	**Reduce reliance on private vehicles**	**Reduce transportation GHG emissions and enhance community resilience**
Ways to Achieve	» Serve high density population and employment corridors and nodes » Serve corridors with the capacity for sufficient land use intensification » Serve existing high ridership corridors » Serve corridors with suitable right of way to maintain speed and reliability » Locate stations to align with existing development patterns or support transit-oriented development	» Facilitate trips along the network between major trip generators with at most one transfer » Facilitate connections to stations and terminals by walking, rolling, and cycling for people of all ages and abilities	» Maximize the use of existing or planned transit priority lanes » Make targeted, cost-effective investments in the road network to improve transit travel time and reliability » Serve vulnerable populations where possible to reduce household expenses	» Align Rapid Transit with existing density and anticipated growth areas » Align long-term plans for growth with the Rapid Transit Network » Align the Rapid Transit Network with corporate climate change mitigation and adaptation initiatives

Figure 10: **Strategy's relationship to *Integrated Mobility Plan* pillars**

Land Use Plans

The *Regional Municipal Planning Strategy* (the *Regional Plan*) sets out a common vision, principles, and long-range region-wide planning policies outlining where, when, and how future growth and development should take place. Originally adopted in 2006, the *Regional Plan* provided the first comprehensive guide for future growth for the entire Municipality following amalgamation.

The *Regional Plan* established policy for a 25-year horizon, from 2006-2031, with minor reviews expected every 5 years. The first *Regional Plan* review was initiated in 2011 to make sure it still reflected the Municipality's goals for growth and development. The *Regional Plan* was readopted in 2014. The second five-year review is underway and work will continue over the next two to three years.

The *Regional Plan* is implemented through secondary municipal planning strategies and land use by-laws that apply to communities across HRM. The *Regional Centre Secondary Municipal Planning Strategy* (the *Centre Plan*) was designed to achieve the vision and guiding principles for the Regional Centre as set out in the *Regional Plan*. Based on further community engagement, the vision was refined and supported by four key core concepts of strategic growth, complete communities, pedestrians first, and human scale development.

The Rapid Transit Strategy responds to these plans and provides direction to upcoming planning efforts such as the *Regional Plan* review. By establishing where Rapid Transit will operate, land use planning can better direct growth to the areas it serves, which then reinforces the cycle of transit-supportive land use. **Section 5** explores the relationship between land use planning and Rapid Transit in more depth.

Previous Rapid Transit Studies

Previous municipal studies on Rapid Transit have explored ferry, BRT, and commuter rail.

- The idea of creating a ferry from the Bedford waterfront has been explored since at least 2003 and has been the subject of much analysis and discussion since.
- BRT has been considered since 2003, with a BRT-like MetroLink service introduced in 2005. A full BRT system including transit priority lanes has more recently been studied in depth.
- The feasibility of commuter rail was studied most recently in 2015. In 2019, Regional Council decided not to pursue commuter rail in the short term.

Two major studies provided the technical basis for the recommendations in this Strategy: the *Bus Rapid Transit Study* (2018) and the *Harbour Ferry Technical Feasibility Review* (2020). These studies provided options for each type of service along with technical analysis of their feasibility and impacts. The Strategy presents the Municipality's recommended approach based on these studies and work completed by staff.

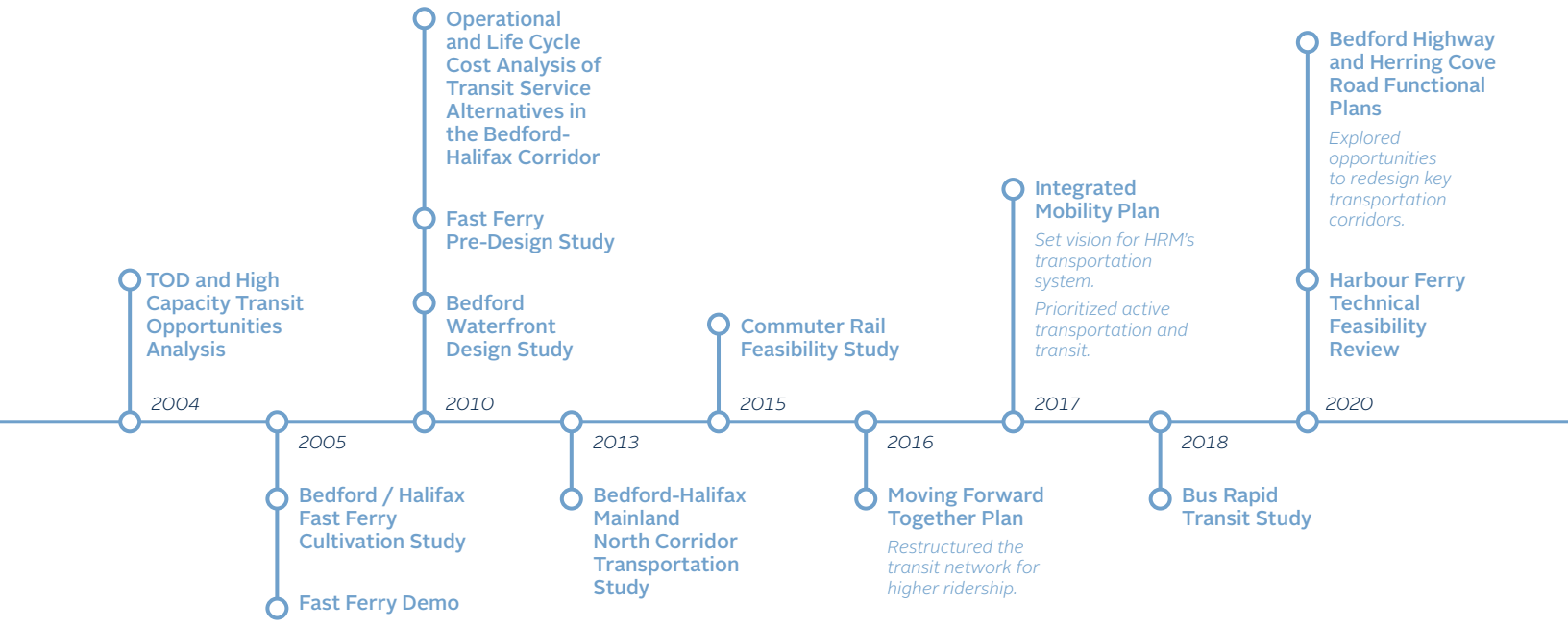


Figure 11: **Timeline of previous studies and strategies**

2.2 Design and Analysis

The project team developed draft Rapid Transit networks through an intensive design approach which took into account:

- Previous studies on BRT and ferry;
- The extensive public and stakeholder feedback collected by previous projects; and
- Factors relevant to the success of Rapid Transit, including those described below in **Figure 12**.

To create a final recommended network, the draft networks were compared to each other across these factors.

ANALYSIS OF IMPACTS

The project team analysed the potential impacts of the Rapid Transit Network compared to conventional Halifax Transit service (as per the *MFTP*). The results of these analyses are presented throughout the Strategy to explain the benefits of Rapid Transit.

This analysis considered impacts on:

- Residents' mobility: how effectively people can move around using the Rapid Transit Network.
- Access to jobs: how many jobs can be reached within a fixed time-frame by transit from any starting point.
- Mode share: the potential for Rapid Transit to change transit ridership and the proportion of travelers using transit.
- Climate change mitigation: the reduction in greenhouse gas emissions due to increased transit mode share.

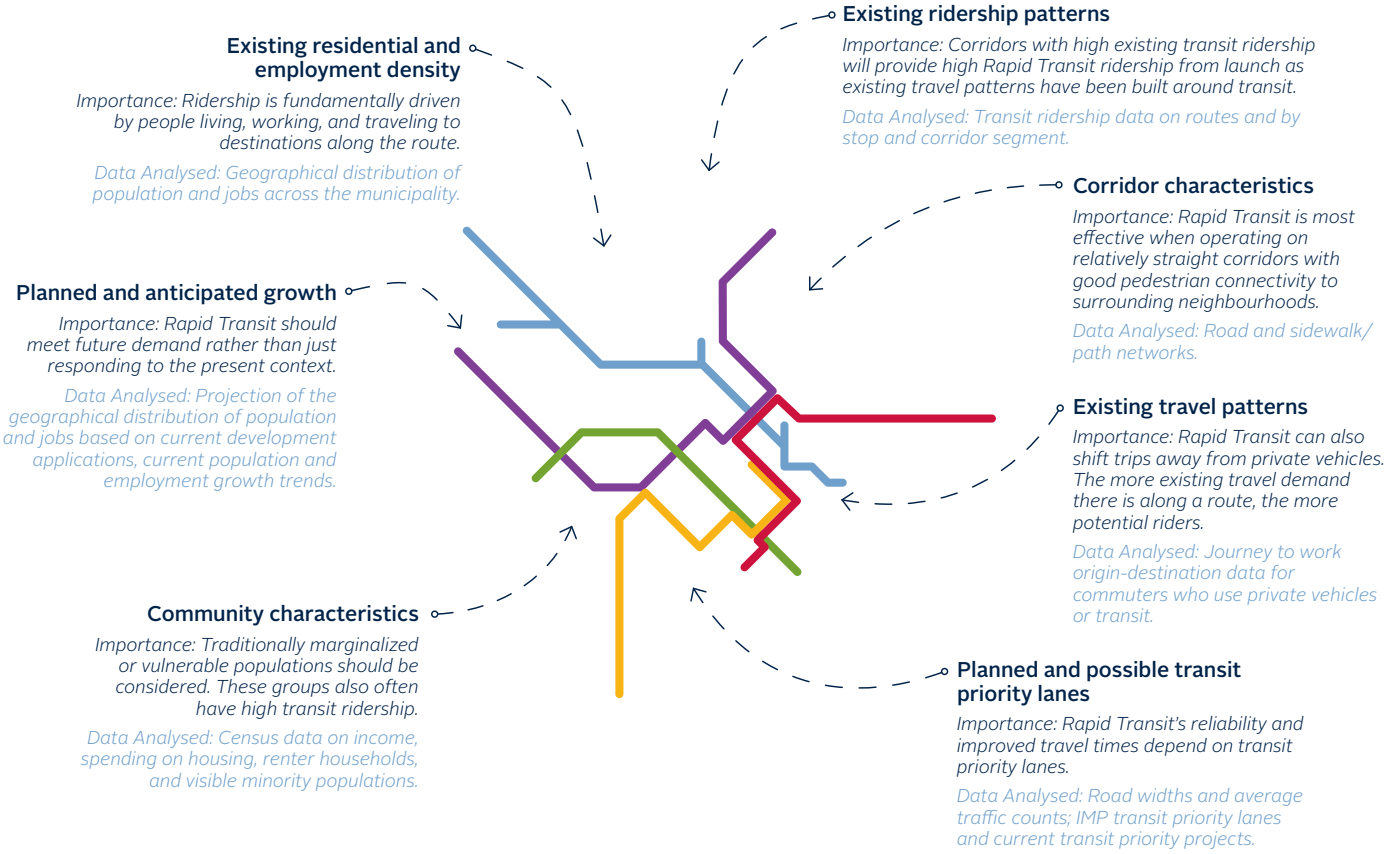


Figure 12: **Factors for Rapid Transit Network design**

INTEGRATION WITH ACTIVE TRANSPORTATION

The *IMP* recognizes the need to create multimodal transportation options with barrier-free connections to make a greater range of trips possible and convenient. For Rapid Transit, integration with other modes such as walking, rolling, and cycling are crucial as they bring passengers to and from stations.

The Rapid Transit Network aligns conveniently with the Municipality's existing and proposed bicycle network. Most stations across all four BRT lines will be located on or near the bicycle network, providing convenient and comfortable transfers across the Regional Centre. The Mill Cove and Larry Uteck Ferry Terminals would connect to a proposed multi-use path along the Bedford Highway, providing an active transportation connection for ferry commuters to reach different parts of Bedford.

The Municipality is studying shared micro-mobility options, such as bike sharing or scooter sharing, which could be installed at stations to make it even easier to combine other sustainable modes of transportation with Rapid Transit.

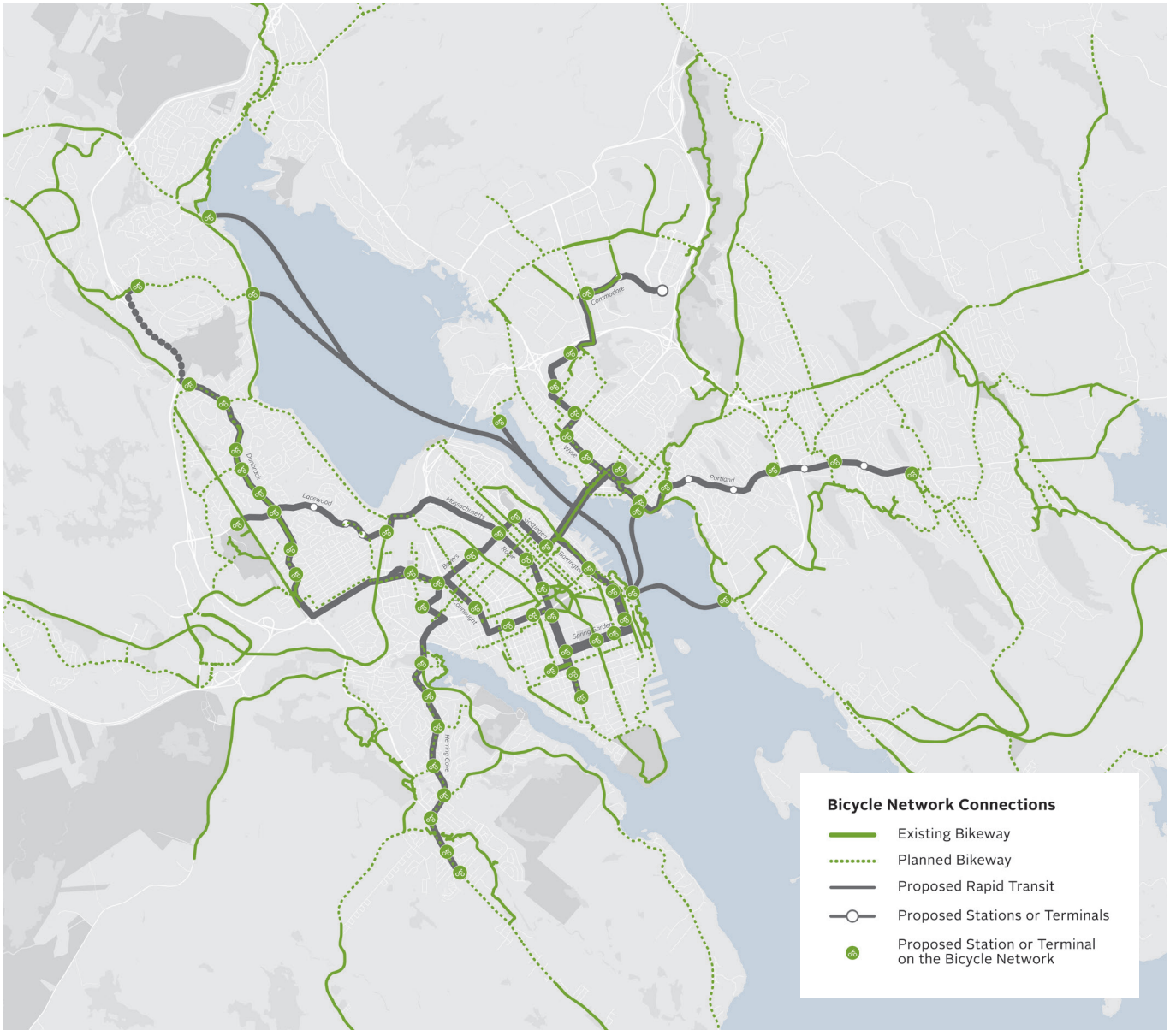


Figure 13: **Rapid Transit Network connections to bicycle network**

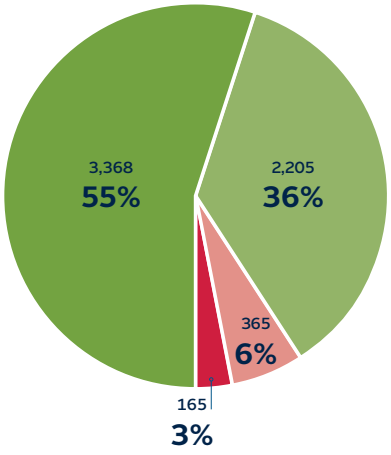
2.3 Engagement

The creation of the Rapid Transit Strategy included an intensive engagement process with stakeholders and the public. As the Strategy builds on significant work to date, the primary purpose of consultation was to identify gaps and areas of concern with the network and to gauge support for Rapid Transit. The engagement activities garnered a large amount of participation and broad support for the proposal.

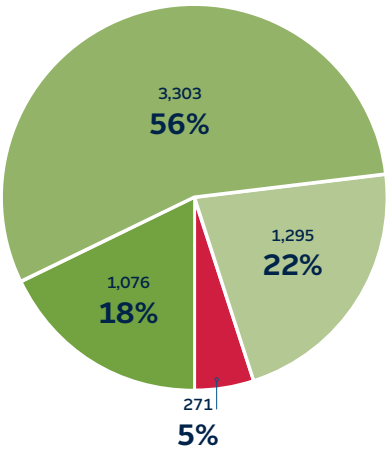
As part of the engagement process, community stakeholders were invited to two workshops in February 2020. Participants included representatives from business groups, institutions, advocacy groups, and other levels of government. A broader group of stakeholders were also invited to respond directly with suggestions or concerns by email.

The project team held nine public pop-up sessions in March 2020 in the different communities that would be served by the Rapid Transit network, and conducted an online survey in February and March 2020. The pop-ups reached over 900 people and the survey received 6,125 responses. A large amount of valuable feedback was collected, which was predominantly supportive of the project and proposed network.

Do you support the idea of creating this BRT Network?



How important do you think each ferry route is to the region?



"I believe this would be a great project fitting the size of our city. This project would help improve the commutes of everyone around HRM, as even residents of communities further away could take advantage of the bus lanes for the last portion of their trip into town. I am looking forward to seeing this plan come to life!"

– Survey respondent

Figure 14: **Public engagement insights**

Feedback from the survey, pop-ups, and stakeholder workshops contributed to an improved final network. Changes made as a result of feedback include:

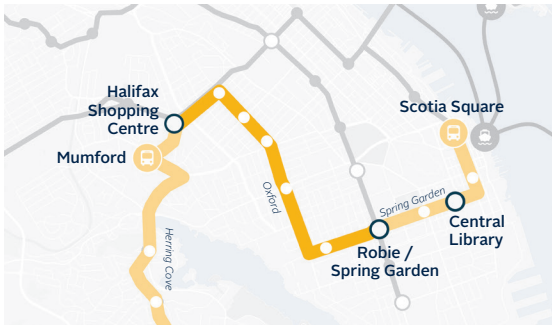
- **Yellow Line:** The draft network had two routing options for the Yellow Line between the Halifax Shopping Centre and Spring Garden Road: via Oxford and Coburg, or via Connaught and Quinpool. Approximately two thirds of survey respondents with a preference selected the Connaught-Quinpool routing, identifying factors such as access to hospitals, serving the Quinpool commercial corridor and concerns around the residential nature of Oxford Street. This routing is reflected in the final proposed network (pg 22).

- **Red Line:** As a response to the desire for Rapid Transit service to the institutional district west of Robie Street, the end of the Red Line was extended from Robie/ Spring Garden to Dalhousie University (pg 23). This route provides a direct connection between Dalhousie's Halifax campuses and to downtown Halifax and Dartmouth.

- **Purple Line:** Many respondents indicated a desire to serve areas of Bedford with BRT as well as a ferry. While the distance and disconnected road networks make it difficult to serve the entire area, the end of the Purple Line has been extended from Kearney Lake/ Parkland up to Larry Uteck Boulevard, where it will connect with Route 90 and serve residents of Bedford South (pg 20). Whether this extension will use Highway 102 or Kearney Lake Road will require further study.

- **Ferry Routes:** There was strong support for all three proposed ferry routes. Respondents supported the idea of using the harbour to reduce travel times and provide a reliable connection to downtown. The Strategy therefore recommends a phased implementation of all three routes (pg 31).

Oxford-Coburg Routing



Connaught-Quinpool Routing

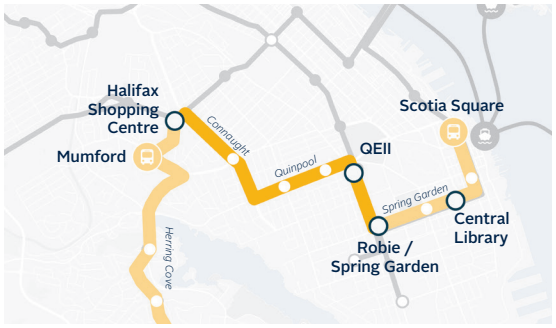
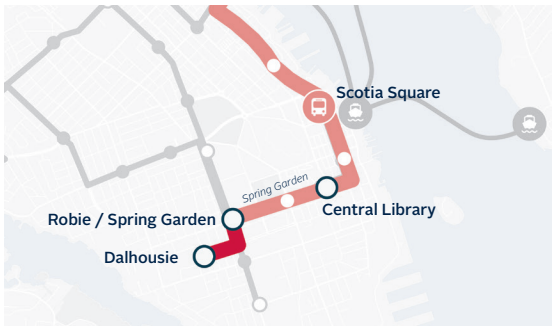


Figure 15: **Yellow line route options**

Dalhousie Extension



Larry Uteck Extension

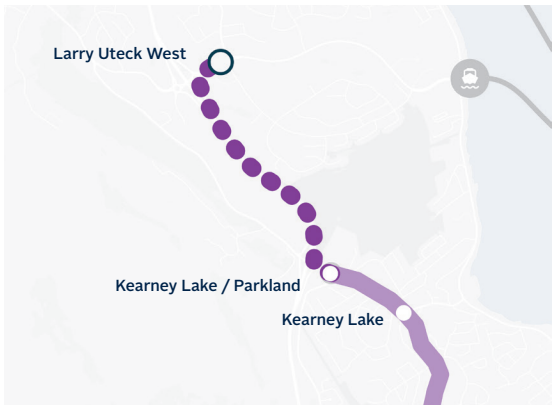
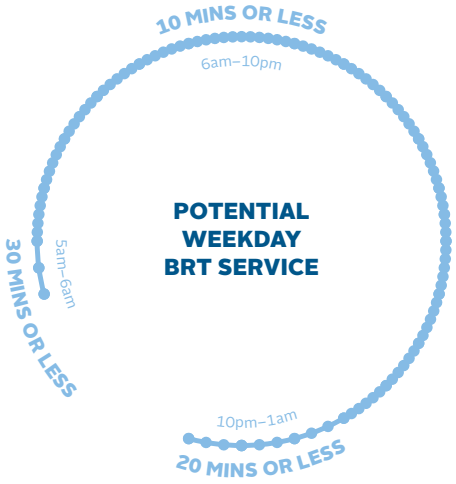


Figure 16: **Route revisions from engagement feedback**

3 BUS RAPID TRANSIT

Bus Rapid Transit (BRT) is an enhanced form of bus service that provides a fast, reliable, and convenient way to travel. BRT runs at high frequency throughout the day, and typically incorporates extensive transit priority measures (e.g. bus lanes, signal priority) that allow buses to avoid traffic congestion during busy periods.

Halifax's BRT Network will provide all-day service, including 10-minute frequency from 6am to 10pm. It will have convenient routing and transfers, and will include extensive transit priority measures and limited stops to make transit travel times more competitive with driving, especially at peak hours. The Strategy envisions that fares will be the same as conventional transit.



SATURDAYS	SUNDAYS/HOLIDAYS
30 MINS or less 5am–8am	**30 MINS** or less 6am–9am
10 MINS or less 8am–10pm	**10 MINS** or less 9am–8pm
30 MINS or less 10pm–1am	**30 MINS** or less 8pm–1am

Figure 17: **Proposed BRT schedule**

Vehicle requirements align with Halifax Transit's current buses. In alignment with the proposed fleet electrification strategy, the goal is to operate BRT with electric buses.

The simplicity of using BRT is a major strength. Passengers won't need a schedule in most instances, just the location of the nearest station and the direction of their trip. With ten minute frequencies, a bus will never be more than a few minutes from arriving.

The BRT passenger experience also benefits riders through:

- Comfort (e.g. enhanced bus shelters)
- Efficiency (e.g. off-board fare collection)
- Access (e.g. bus-level platform boarding)
- Information (e.g. real-time bus arrival signage)

BRT has been successful in cities around the world and is particularly suited to medium-sized cities like Halifax. It provides the benefits of Rapid Transit while being considerably more affordable than other forms such as light rail.

The proposed BRT Network has the potential to transform transportation in Halifax, better positioning the Municipality to achieve its mode share goals and sustainably accommodate future growth.

IMAGE *Ontario Ministry of Municipal Affairs*

3.1 The BRT Network

The proposed BRT Network consists of four lines that cover approximately 50 km, connecting peninsular Halifax and downtown Dartmouth with dense and developing suburbs on both sides of the harbour.

The network is accessible within a short distance from the homes of over 120,000 people and over 100,000 jobs. The vast majority of trips within this area are connected by at most one transfer.

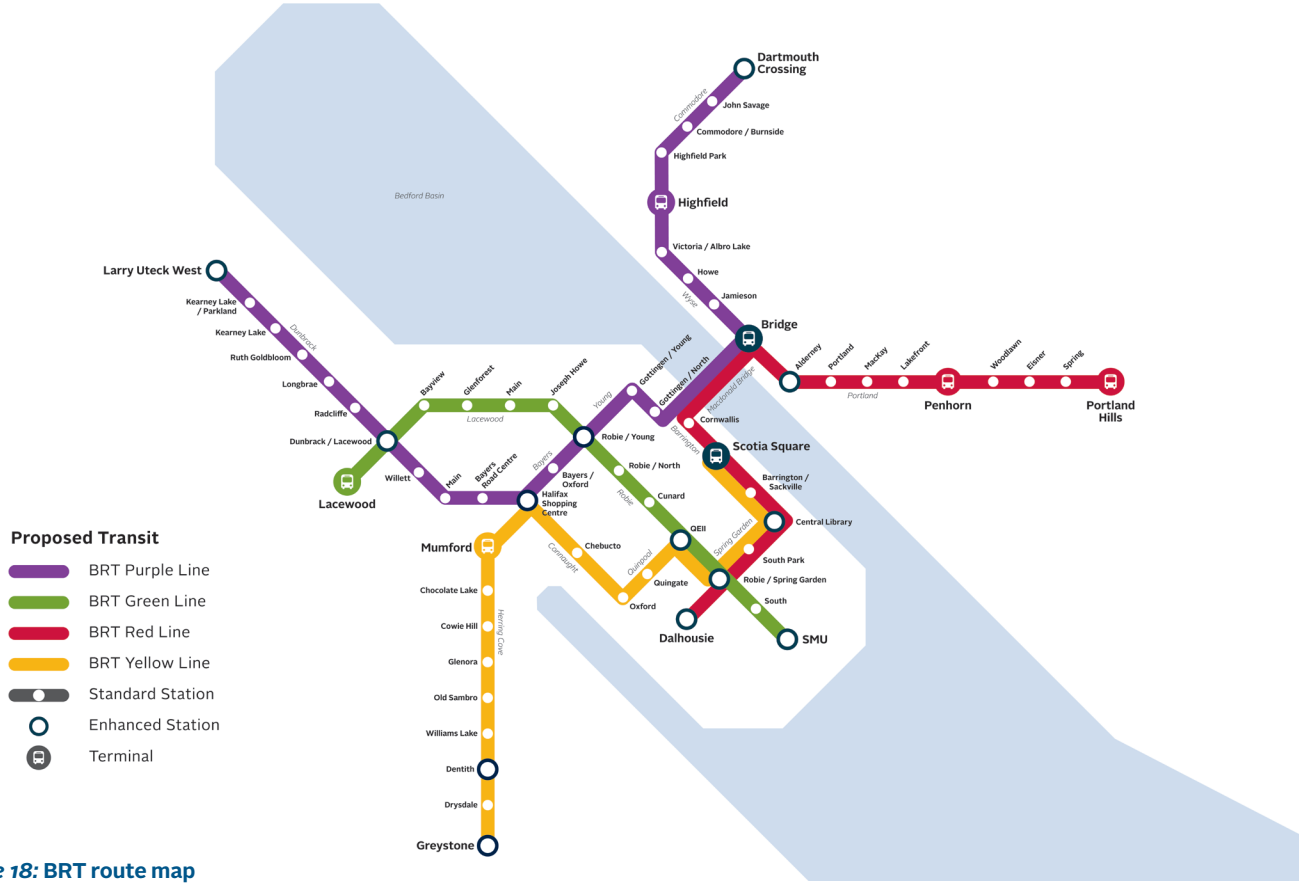


Figure 18: **BRT route map**

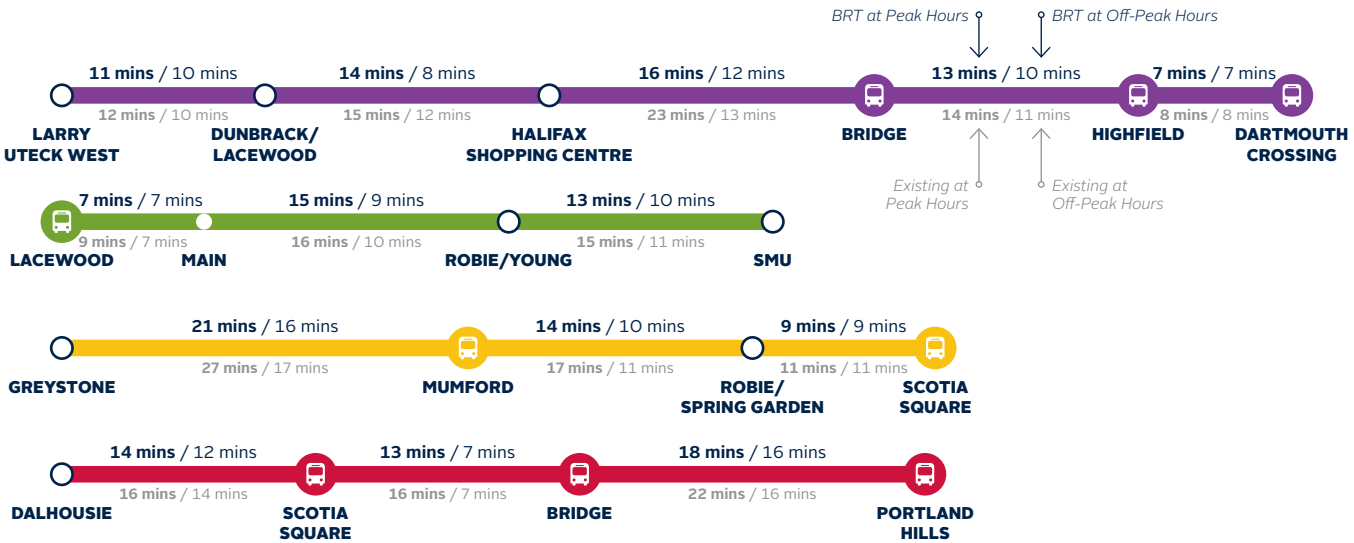
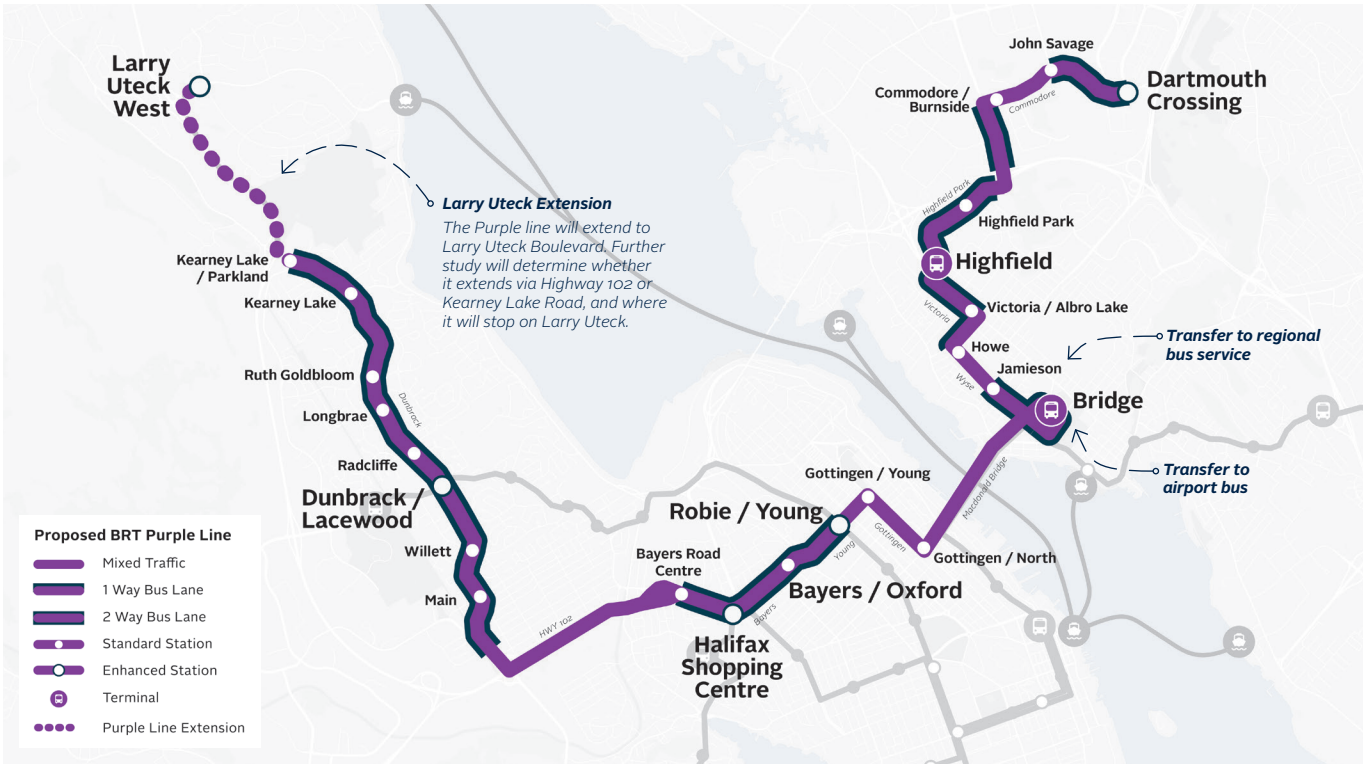


Figure 19: **Estimated BRT travel times**

PURPLE LINE

The Purple Line connects Clayton Park and Larry Uteck Boulevard with North Dartmouth and Dartmouth Crossing. It provides connections to the Yellow and Green lines for easy one-transfer rides to downtown Halifax and a connection at Bridge Terminal for a one-transfer ride to destinations throughout Dartmouth.

- Up to 26% improvement in travel time versus comparable bus routes
- 24 stations in each direction (35% fewer stops to improve travel time)
- Over 56,000 people and 35,000 jobs within 800m of Purple Line stations



Halifax Shopping Centre

Jamieson

Highfield

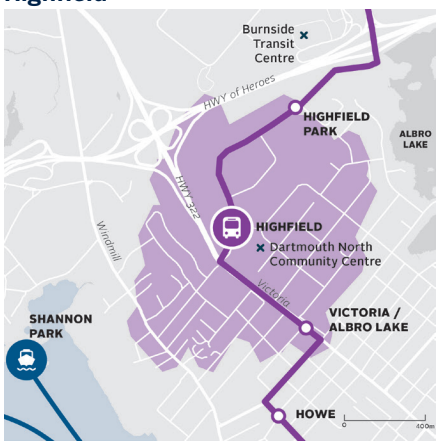
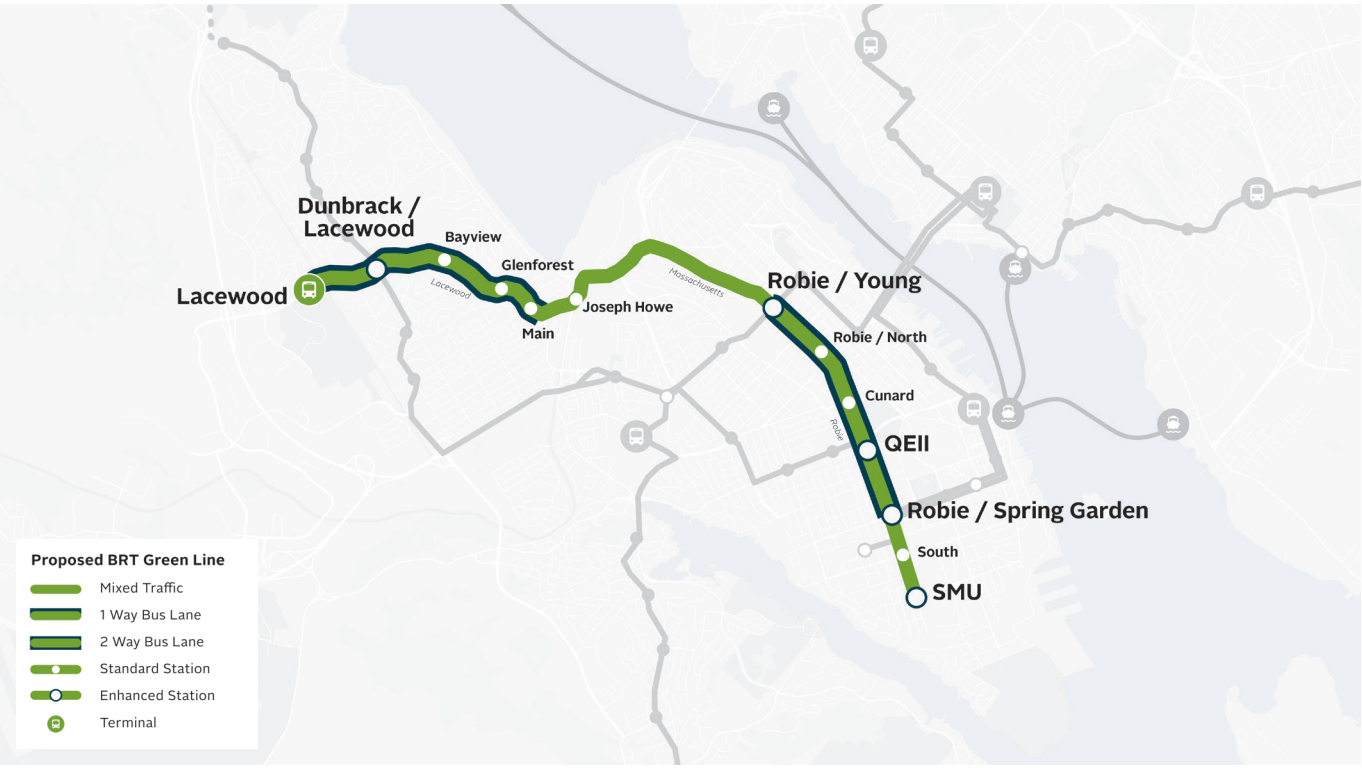


Figure 20: **Purple BRT line and 800 metre walk or roll around sample stations**

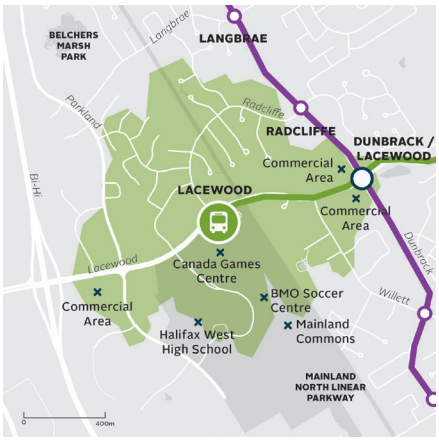
GREEN LINE

The Green Line connects Clayton Park with the southern peninsula via Lacewood Drive and Robie Street. It offers a direct connection between Lacewood Terminal and the many hospitals and universities on the peninsula, and an easy one-transfer ride to destinations via the Purple and Red Lines.

- Up to 13% improvement in travel time versus comparable bus routes
- 13 stations in each direction (52% fewer stops to improve travel time)
- Over 44,000 people and 40,000 jobs within 800m of Green Line stations



Lacewood



Robie / Young

SMU

Figure 21: **Green BRT line and 800 metre walk or roll around sample stations**

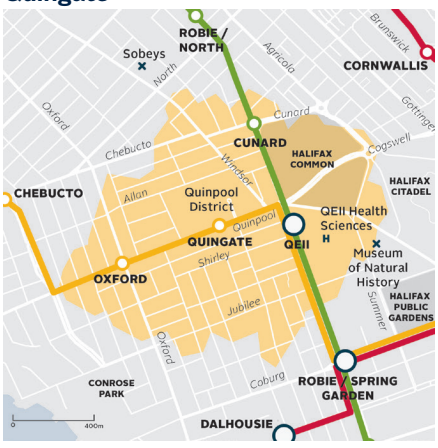
YELLOW LINE

The Yellow Line connects Armdale and Spryfield with downtown Halifax. It links many destinations on the peninsula, including the Halifax Shopping Centre, Quinpool Road, Spring Garden Road, and downtown Halifax. It also offers easy one-transfer connections to Dartmouth via the Red and Purple Lines.

- Up to 22% improvement in travel time versus comparable bus routes
- 19 stations in each direction (42% fewer stops to improve travel time)
- Over 47,000 people and 62,000 jobs within 800m of Yellow Line stations

Dentith

Quingate



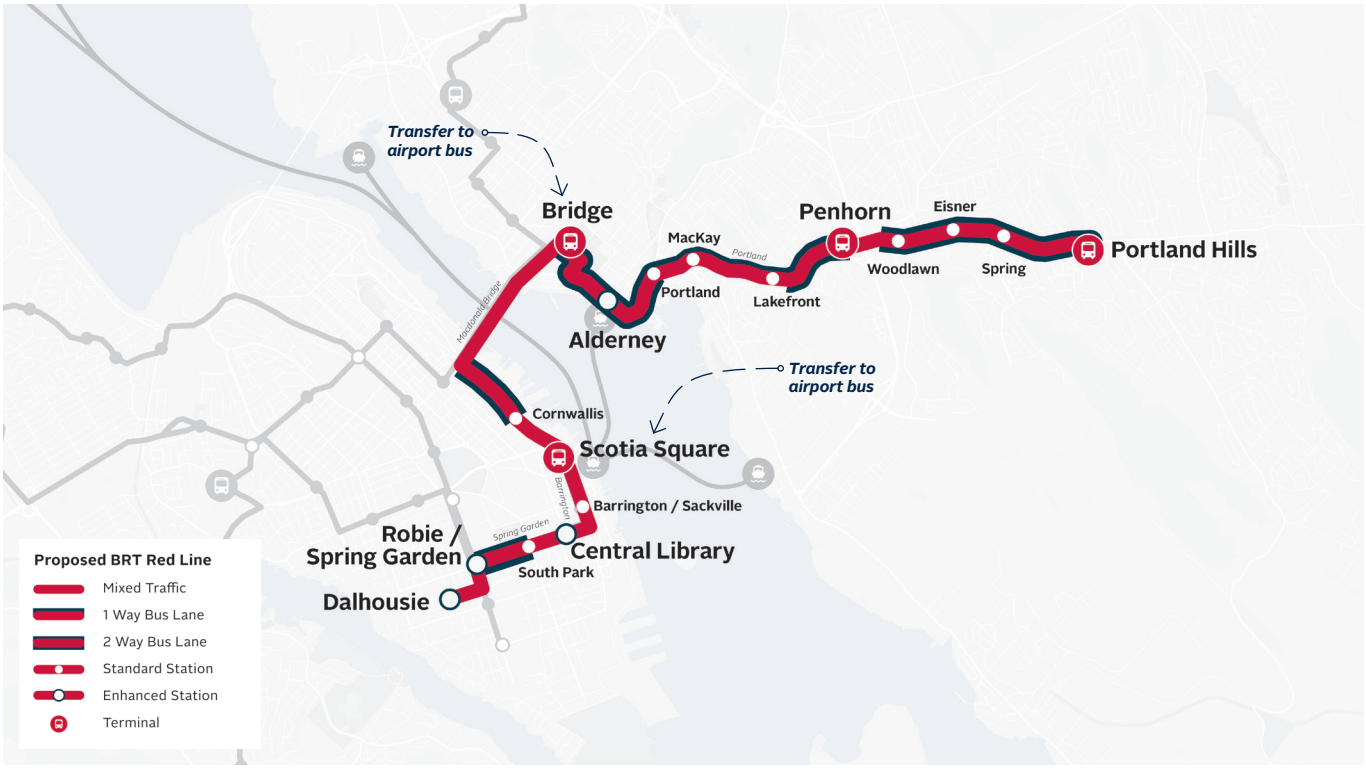
Central Library

Figure 22: **Yellow BRT line and 800 metre walk or roll around sample stations**

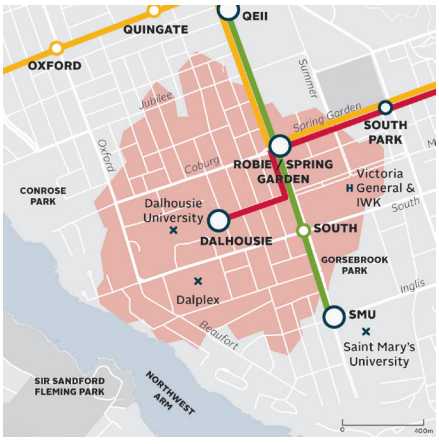
RED LINE

The Red Line connects Portland Street with downtown Dartmouth and downtown Halifax. It offers a direct connection between the Portland Hills Terminal and the downtown areas and Dalhousie, and provides an easy one-transfer connection to North Dartmouth via the Purple Line.

- Up to 17% improvement in travel time versus comparable bus routes
- 17 stations in each direction (50% fewer stops to improve travel time)
- Over 37,000 people and 61,000 jobs within 800m of Red Line stations



Dalhousie



Scotia Square

Alderney

Figure 23: **Red BRT line and 800 metre walk or roll around sample stations**

3.2 BRT Stations

A key feature of BRT service is the location and configuration of stations. BRT service makes fewer stops than regular bus routes, which improves travel time and allows for more investment in stations.

BRT stations will be designed for passenger comfort, ease of use, and visibility. Safety will be prioritized at all BRT stations and terminals. Safety measures will include lighting and may include security cameras and emergency contact systems.

All stations will be universally accessible, with safe connections for all users between sidewalks and the station. Additional features will include travel information in accessible formats and bus floor-level boarding platforms so riders with mobility assistance devices or strollers can easily board.

The BRT Network may implement all-door boarding, which can improve travel times by reducing the time a bus spends at each station. Halifax Transit is in the process of switching to the electronic fare collection necessary for all-door boarding.

The locations and designs of proposed BRT stations shown are approximate, and the exact locations and station designs will be determined through further planning and detailed design. Some stations may not be able to accommodate all features shown due to space constraints.

Standard BRT station

The standard BRT station will be a significant improvement over the current standard bus stop. While the basic design will be similar across the BRT network, each station will integrate into and connect with its surrounding area.

Enhanced BRT station

BRT stations with high ridership and at transfer points will be larger and provide more amenities than standard stations. They are also intended to become multi-use destinations rather than just places to wait. For example, stations may include small shops or a small park or plaza, they may be integrated into surrounding buildings, or they may emphasize a nearby attraction through their design.

Transit terminals

The BRT lines will also stop at Halifax Transit terminals, offering convenient transfers to many local routes. Current amenities at the terminals, such as indoor or sheltered areas and washrooms, will also serve BRT passengers. Terminals will be modified to include BRT-specific elements such as bus-level platform boarding, distinct visual signage, and real-time arrival information.

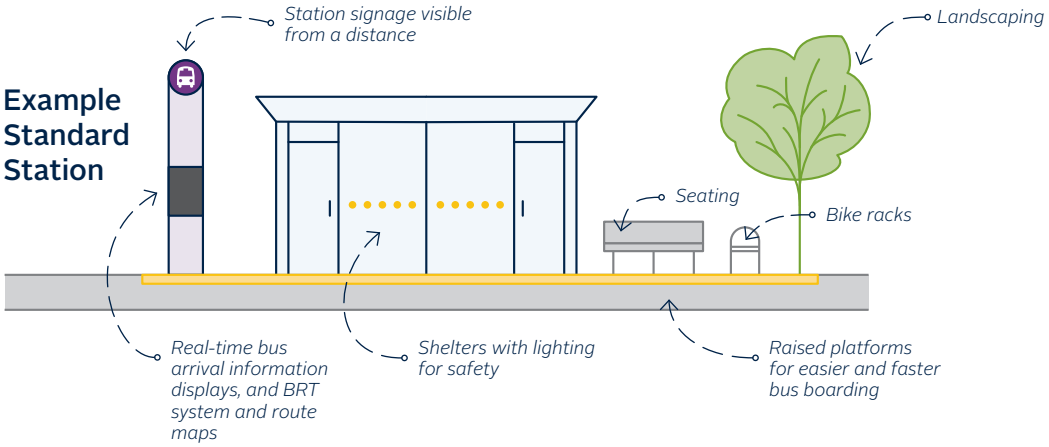


Figure 24: **BRT standard station design example**

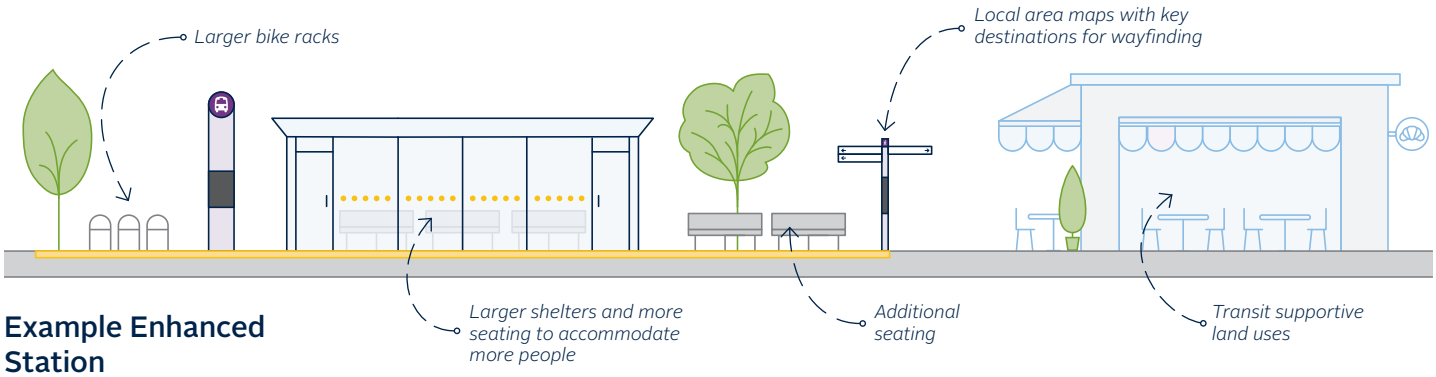


Figure 25: **BRT enhanced station design example**

3.3 Transit Priority Measures

BRT requires transit priority within the road network. This gives buses an advantage over vehicular traffic, which improves travel times and reliability. Transit priority is a core component of making BRT competitive with private vehicles and encouraging more people to use transit.

- **Transit priority lanes** are travel lanes dedicated for transit operation. Transit priority lanes enable buses to move more freely and reliably through the road network, bypassing traffic congestion that is usually at its worst during peak travel hours. Priority lanes are the most effective measure to improve bus speed and reliability during peak hours.

- **Transit signal priority** uses features including queue jump lanes and transit signal phases to reduce the amount of time buses spend waiting at intersections. Transit signal priority can give buses the ability to bypass traffic at an intersection via queue jump lanes, and proceed through an intersection before general traffic. It can also be used to detect the presence of a bus, providing a quicker or longer green light as the bus approaches. Transit signal priority is particularly important on parts of the BRT Network where buses will operate in mixed traffic.

The Strategy identifies a network of transit priority lanes to be created as part of the BRT Network. Many of these lanes are located at key pinch points in the road network that are the primary sources of delay for bus and vehicular traffic, particularly during peak hours. The aim is to provide full-time transit priority, though some lanes may permit other uses (e.g. on-street parking/loading) when overall congestion is reduced in a corridor.

Some streets that form part of the BRT Network either have too many physical constraints to implement transit priority lanes at this time or are not owned by the Municipality. On these segments, BRT will operate in mixed traffic. However, all BRT corridors should be pursued as opportunities arise for future improvements in transit priority.

Section 6.1 presents the Strategy's recommendations for the implementation of transit priority measures. Final decisions around transit priority lanes will require additional functional planning and detailed design work, and further study will be required to determine which intersections would benefit from the installation of transit signal priority.

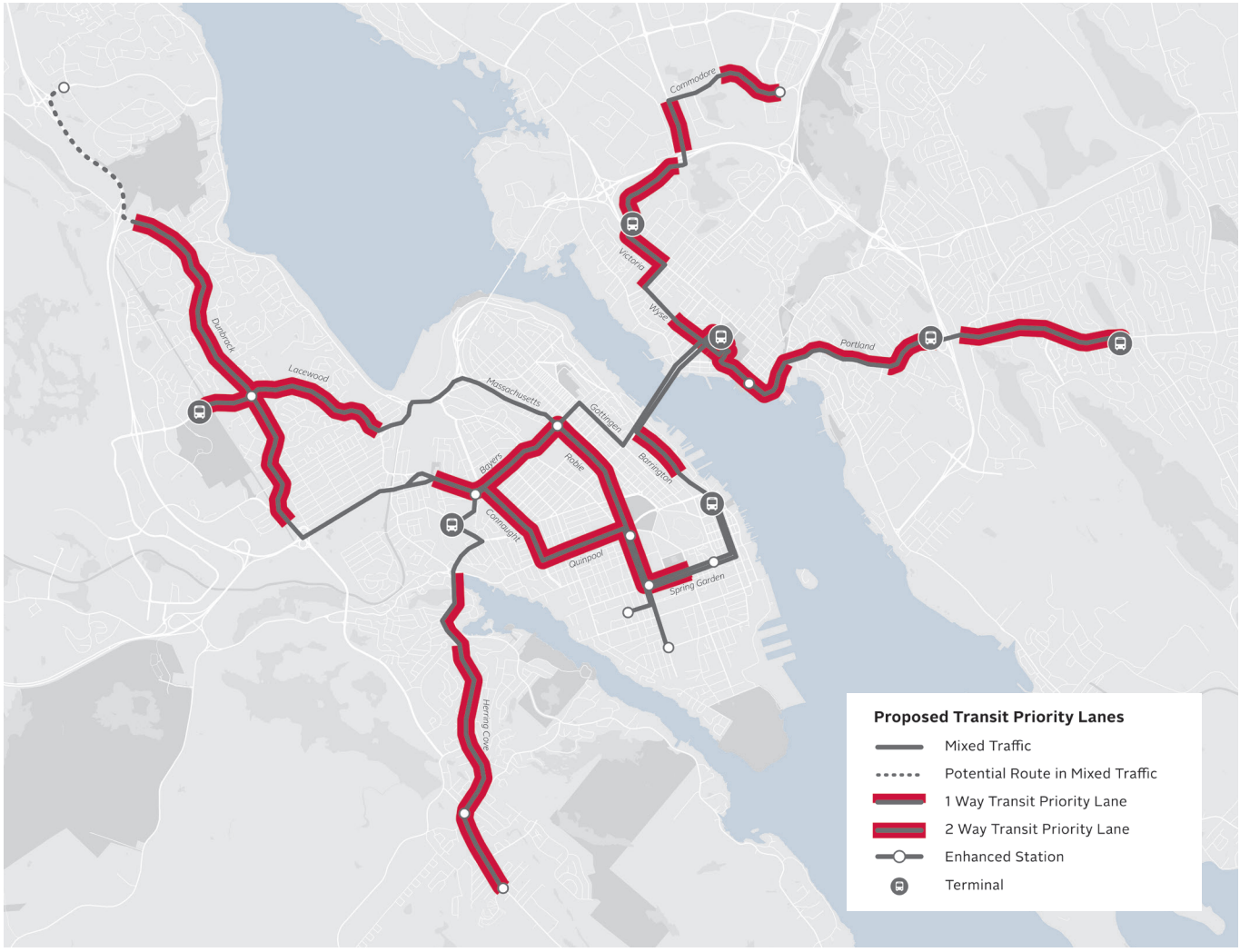


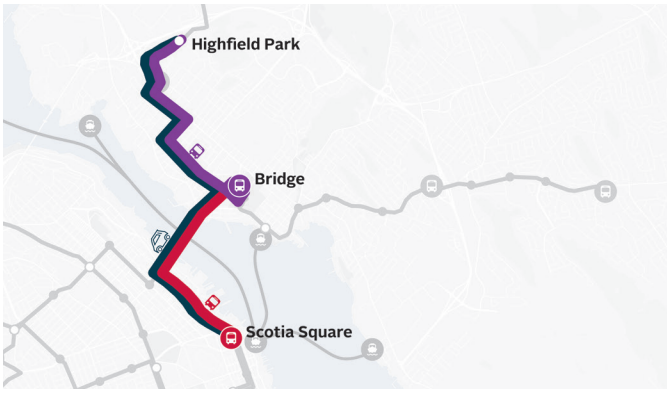
Figure 26: **Transit priority lanes**

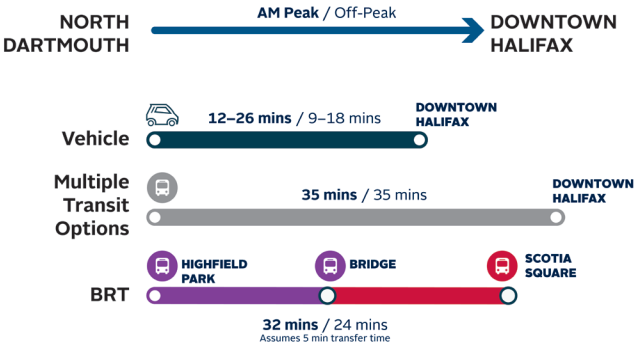
3.4 How BRT Improves Mobility

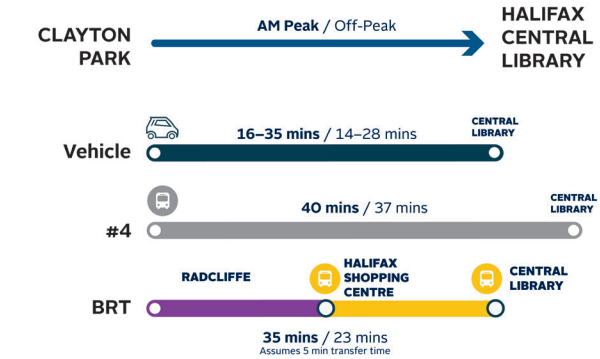
BRT improves freedom of movement around the municipality by being more reliable and more frequent, getting to destinations more quickly, and connecting to other routes more easily. More importantly, it does this all day, not just during peak hours.

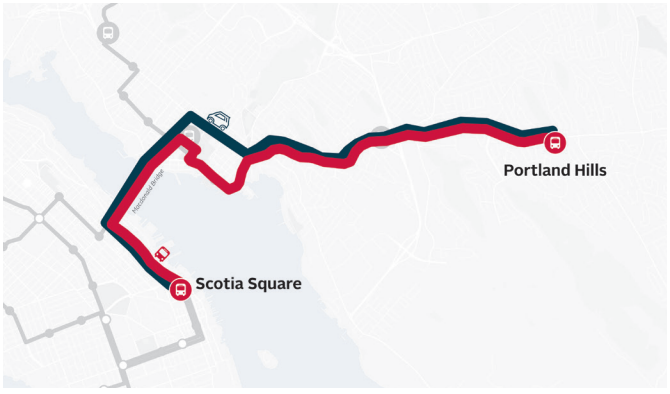
REDUCED TRAVEL TIMES

The BRT network will reduce travel times compared to current transit routes, so that traveling by BRT is more competitive with traveling by private vehicle.









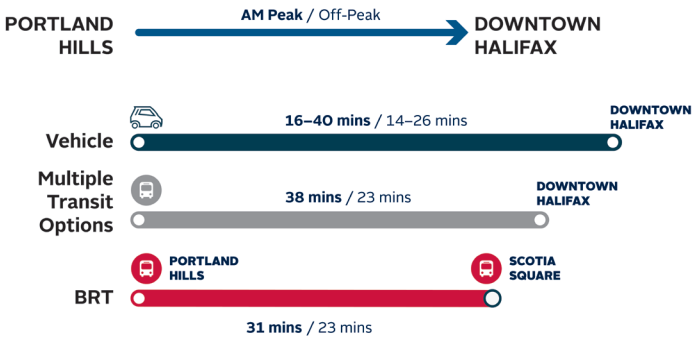
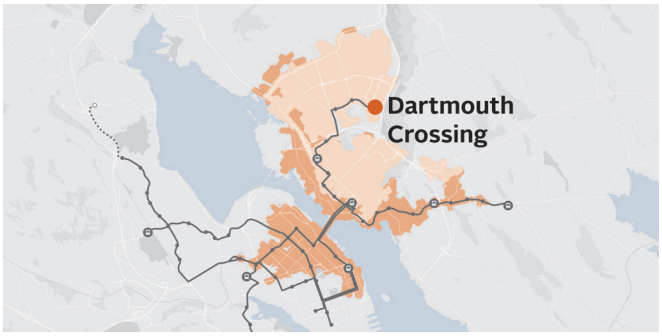


Figure 27: **BRT travel time comparisons**

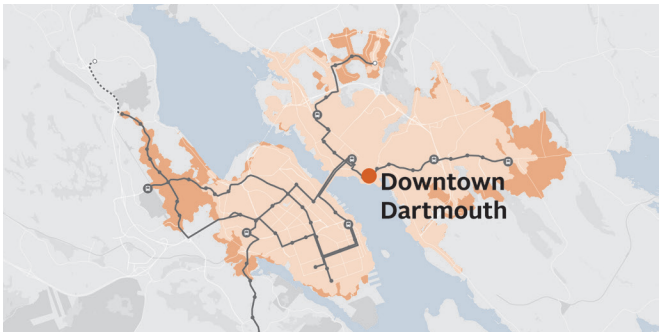
IMPROVED ACCESS

Reduced travel times and frequent service in the network increases the distance a passenger can travel by transit within the same amount of time. This can be illustrated by selecting a point in the municipality and mapping the locations that a passenger at that location can travel to within a certain timeframe.

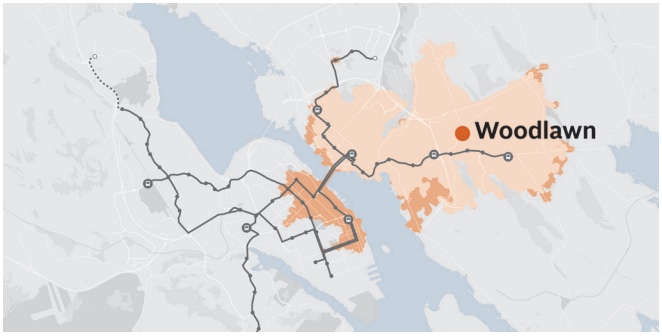
To illustrate this expansion, **Figure 28** shows the areas a passenger can access within 45 minutes by transit. This includes time spent walking or rolling, waiting at a station, and transferring. Areas are only included if the person can get there consistently between 6am and 9pm.



37,000 more people can access jobs at this location.

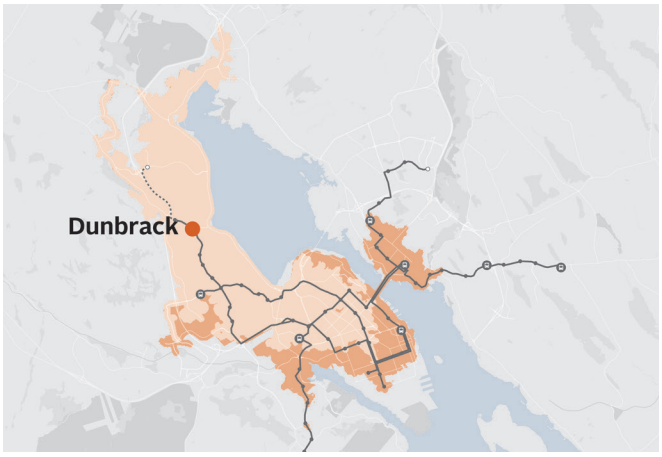


29,000 more people can access jobs at this location.

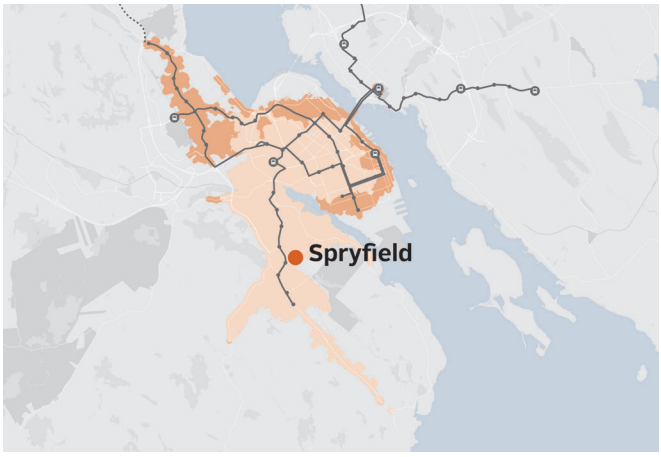


People living at this location can access 44,000 more jobs.

36,000 more people can access jobs at this location.



People living at this location can access 60,000 more jobs.



People living at this location can access 39,000 more jobs.

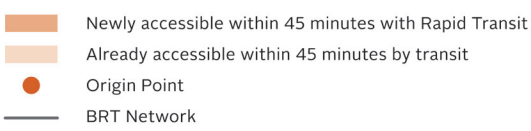
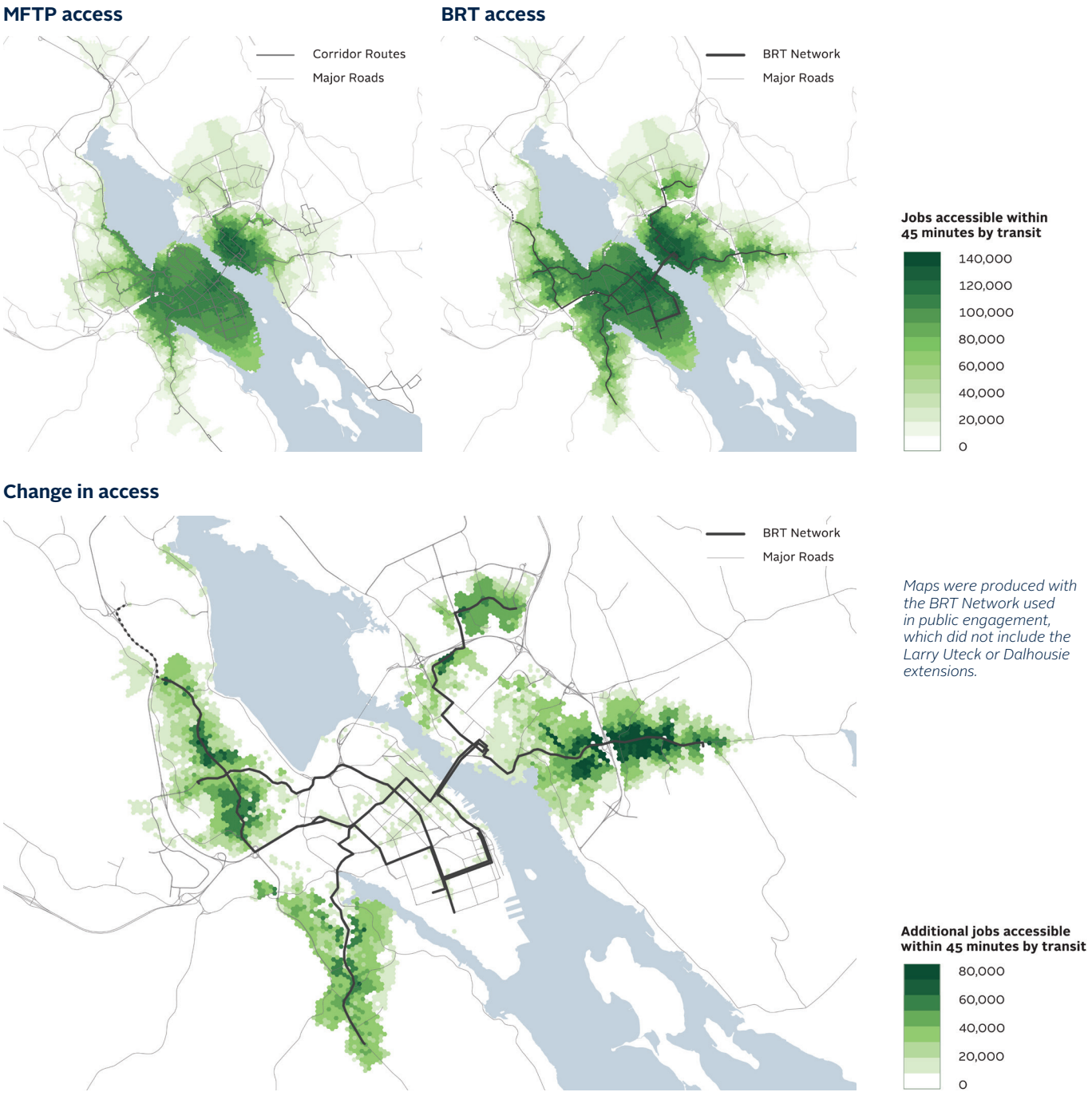


Figure 28: **Expanded access from selected origin points**

EMPLOYMENT OPTIONS

Figure 29 shows how the BRT Network improves access to jobs across urban and suburban areas. Each point on the map is shaded according to how many jobs are accessible all day within 45 minutes from that point. In some areas, the increase in employment options is dramatic: some households will see the number of jobs they can get to by transit in this time more than double.

The Halifax peninsula does not show a substantial increase in jobs accessible within 45 minutes since residents there can already get to major employment centres (e.g. downtown Halifax) by transit within that time frame. However, residents on the peninsula will also benefit from reduced travel times by being able to access more jobs within 20 or 30 minutes than they can now.



Maps were produced with the BRT Network used in public engagement, which did not include the Larry Uteck or Dalhousie extensions.

Figure 29: **Change to number of jobs accessible within 45 minutes by transit with BRT**

4 FERRIES

The Halifax region has always had a strong connection to its harbour. Ferries have linked Dartmouth and Halifax since the 1700s, and the modern ferry system was established in the 1970s by the City of Dartmouth. Given the success of existing ferry service, the high level of satisfaction among riders, and the natural advantages provided by the harbour, adding new ferry routes has been a popular idea for decades.

The Municipality has studied ferry service expansion several times in the past two decades. Investigations have revealed operational limitations including an inability to compete with driving times while maintaining safe operations and minimizing wake impacts. Recent advances in vessel design and technology have mitigated these limitations: smaller catamaran-type vessels, which can operate efficiently and safely at higher speeds, improve the feasibility of longer distance ferry routes and provide a promising service option.

The proposed ferry service offers rapid end-to-end travel for commuters and other travelers between origin terminals around the harbour and downtown Halifax. Frequency of service on the new ferry routes will be highest at peak, sailing every 15 minutes during weekday morning and afternoon peak hours. Between those times, the routes will run every 30 to 60 minutes depending on travel demand. Fares may have an added premium to reflect higher operating costs.

Expanding ferry service into the Bedford Basin could transform the way commuters from rapidly growing communities including Bedford and Sackville get to downtown, reducing pressure on the Bedford Highway and providing thousands of residents with a fast, comfortable, and sustainable way to reach their jobs, classes, or entertainment venues.

Figure 30: **Proposed ferry schedule**

IMAGE *Eric Kilby*

4.1 Proposed Ferry Routes

The Strategy proposes new ferry routes from three new terminals: Mill Cove, Larry Uteck, and Shannon Park. Routes from each of these terminals would connect directly to the Halifax Ferry Terminal in downtown Halifax. Locations shown for proposed terminals are approximate; exact locations will be determined through the implementation process.

The ferries are able to provide short travel times because they follow a direct route through the harbour and are not subject to traffic congestion. Travel times may be slightly higher on foggy days, but preliminary analysis suggests that the ferries' ability to stay on schedule will only be impacted in extremely low visibility conditions.

Mill Cove Ferry	Larry Uteck Ferry	Shannon Park Ferry
Mill Cove ↔ Downtown Halifax *around 18 minutes*	Larry Uteck ↔ Downtown Halifax *around 16 minutes*	Shannon Park ↔ Downtown Halifax *around 10 minutes*
Ferry service from Mill Cove has been proposed since the early 2000s. This route would serve existing travel demand from Bedford and Sackville and future development on the Bedford Waterfront. The terminal may have a Park & Ride facility to support ridership from a larger area.	*This route would serve the densely developed Larry Uteck area, which has grown significantly in recent years. As the waterfront area is constrained, the terminal would likely provide vehicle passenger drop-off but not parking.*	*The Shannon Park area is planned for redevelopment into a mixed residential and commercial neighbourhood. The substantial new density would create the opportunity for a transit-oriented community and provide significant ferry ridership. The route would be conditional upon and aligned with the timing of this development.*

Figure 31: **Proposed ferry routes**

4.2 Vessels

A new fleet of vessels will be required to support the three proposed ferry routes and will represent a significant capital investment in the service. Through the technical feasibility review, the Strategy has identified high-level characteristics of vessels which can provide the proposed service. Further work will establish specific procurement requirements that may vary from these descriptions.

The vessels are proposed to have a capacity of 150 passengers. They will have one enclosed deck to ensure faster loading and unloading, making ferry operations more efficient while improving passenger comfort and safety. The ferries will be universally accessible. Some space will also be provided for passengers to stow bicycles and strollers, encouraging active transportation options and family ferry travel.

VESSEL TYPE AND SPEED

Multi-hull catamaran ferries are used on most similar ferry routes around the world, and are recommended for the proposed service. Catamaran vessels can run at high speeds with low wakes, potentially traveling at 25 knots (46 km/h) in the Bedford Basin and 20 knots (37 km/h) in the Halifax Harbour. These speeds are key to short travel times and high peak-hour service frequency.

The ferries will comply with the operational regulations of the Halifax Port Authority and the Canada Shipping Act, including limits on safe speed of operation. The vessel procurement process will ensure that the vessel design will mitigate wake impact from higher-speed operation.

Different propulsion options, including electric vessels, will be considered through the implementation process. Halifax Transit will review evolving best practices and technology options to make new ferry service as sustainable as possible.

4.3 Ferry Terminals

A major investment required for the success of the new ferry routes will be the construction of new terminals and the renewal of the Halifax Ferry Terminal to accommodate additional service.

New terminals will have a similar design to existing Halifax Transit terminals, with secure passenger waiting areas, sheltered gangways, and staff to count passengers and ensure facility security. They will be universally accessible. Due to the lower vessel capacity, new terminals may be smaller than existing ones.

DEVELOPMENT AROUND TERMINALS

Mill Cove and Shannon Park offer development opportunities around the proposed terminal sites. Residential and mixed-use development around terminals would increase the potential ridership by providing homes and businesses nearby. **Section 5** further discusses the Strategy's recommendations for land use near Rapid Transit.

The Municipality will also explore opportunities to integrate terminals with public buildings in alignment with the ongoing assessment of needs for public facilities. A mixed-use municipal building like Alderney Landing could be a hub for the local community, increasing the activity in the area and making the terminal a destination.

GETTING TO THE FERRY

Active transportation and transit connections to the terminals will be prioritized to ensure potential riders can easily access the ferry. For example, terminals at Mill Cove and Larry Uteck will require active transportation connections over the CN Rail line. The terminals will become hubs for transit, served by local and express buses to bring people to and from the ferry.

The Municipality will also consider Park & Ride options at ferry terminals where there is space for parking, allowing more residents to utilize the service. Park & Ride will be considered both as an interim option as neighbourhoods around terminals are developed, and as a permanent feature. However, the priority will be to encourage ridership through transit-oriented development and connections to bus routes and active transportation.

HALIFAX FERRY TERMINAL

To accommodate an increase in ferry traffic and newly designed ferries, the downtown Halifax Ferry Terminal will require a redesign to improve accessibility, user comfort, capacity, safety, and security.

4.4 How Ferry Service Improves Mobility

The ferries will give commuters and other travelers in communities around the terminals a faster way to get around. Since the harbour effectively provides a dedicated travel way, ferry travel times will be reliably faster than using a private vehicle at peak hours.

Experience in Halifax and other harbour cities demonstrates that ferries are often a preferred mode of travel. The combination of the mode itself and the short, reliable travel times is expected to attract many people to commute via ferry.

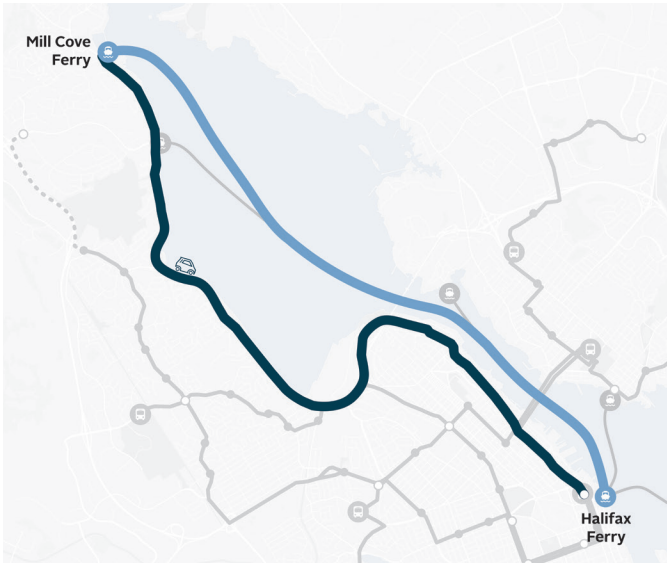
POTENTIAL RIDERSHIP

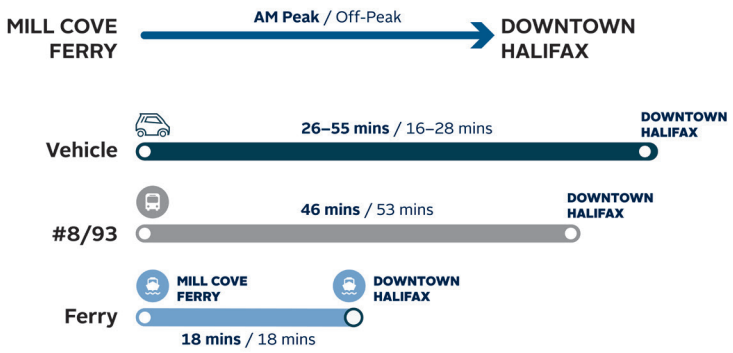
Each new ferry route could have ridership competitive with Halifax Transit's existing ferry service (2,200–3,500 boardings per day). The preliminary feasibility study's ridership projection model predicted over 2,000 boardings per day on both the Mill Cove and Larry Uteck routes, though this did not account for the additional density anticipated for the Mill Cove area nor Park & Ride, passenger drop off, or bus transfer passengers. Shannon Park will also have the potential for high daily ridership if it develops into a mixed-use community as currently proposed.

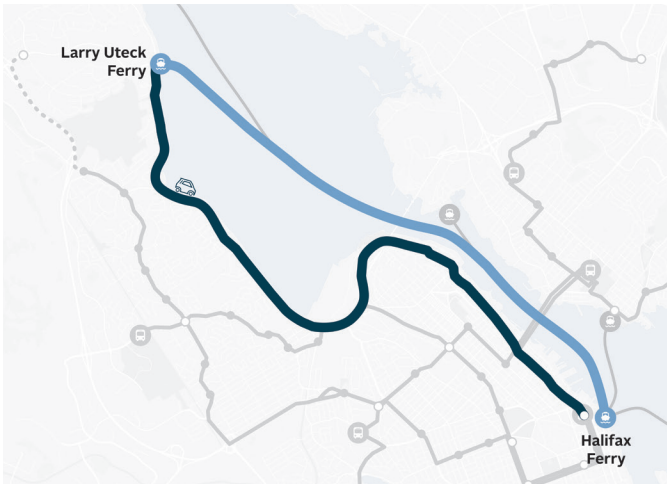
BEDFORD HIGHWAY

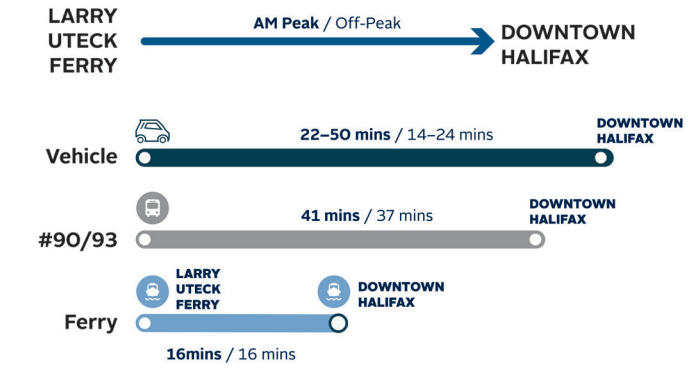
Most potential passengers of the Mill Cove and Larry Uteck ferry routes are expected to be commuters traveling between the Bedford area and downtown Halifax. For these residents, the main alternative is a trip by car or bus along the Bedford Highway, which is typically congested during weekday peak hours. The *Bedford Highway Functional Plan* (2020), which considered options to reconfigure the Bedford Highway corridor to better serve regional transportation needs, did not identify any viable solutions to increase its capacity by enough to meet current and future demand.

Unless alternatives are provided, population growth in Bedford and surrounding areas will increase congestion on the Bedford Highway, making commutes longer, increasing pollution, and impacting economic productivity. While ferries are not expected to solve congestion issues on the Bedford Highway, they will help mitigate the impact of future growth in Bedford by providing a viable travel alternative.









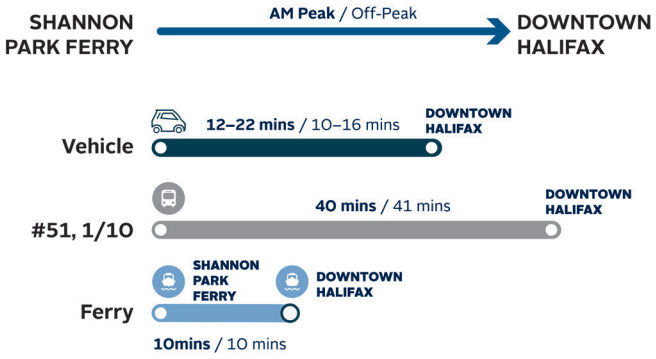


Figure 32: **Ferry travel time comparisons**

5 LAND USE

Land use and transportation are fundamentally related. Where people live and how they move about for their daily activities affects their personal finances, influences their work-life balance, and helps determine their carbon footprint. These factors are important for access to physical activity, social interaction, access to nature, and other aspects of health and well-being. At a regional scale, land use and transportation affect economic growth opportunities, environmental sustainability, and municipal finances.

The Halifax region is experiencing a period of relatively rapid population growth which is anticipated to continue in the near future. The *Regional Plan* projects that by 2031 HRM will gain over 69,000 people and 46,000 jobs. The Municipality is faced with the challenge of accommodating this growth in a financially, environmentally, and socially sustainable way.

The Regional Centre is already oriented toward transit: it is relatively dense, mixed-use, and walkable, and destinations are often close to each other along corridors. As a result, nearly half of its residents use active transportation or transit to get to work. As the municipality grows, the Regional Centre will be home to many new residents and jobs. The Rapid Transit Network aligns with the Municipality's *Centre Plan*, locating BRT stations in or near strategic growth Centres, Corridors, and Future Growth Nodes.

In comparison, suburban development in HRM has been oriented towards private vehicles. In order to safeguard the tranquility of residential neighbourhoods and optimize vehicle access, land uses were segregated, traffic was funneled onto a few wide arterial streets, and front yard parking dominated commercial streets. This development pattern discourages walking and cycling and makes public transit inefficient. That 81% of suburban residents commute by driving is not simply a result of individual preferences, but rather a consequence of years of planning for vehicles.

The region's anticipated growth offers an opportunity to create walkable, mixed-use suburban communities linked to the Regional Centre and each other by Rapid Transit. Rather than continuing with segregated land uses in widely dispersed communities, density can be integrated with supportive uses and focused around transit terminals and along strategic corridors, to help create more sustainable, transit-supportive land use patterns. To make this happen, transit investments must be coordinated with land use planning.

This section describes how the Rapid Transit Network will influence future land use planning as the Municipality moves towards its next *Regional Plan* review and develops a new plan for suburban areas.

5.1 Factors for Transit-Supportive Land Use

Understanding the relationship between settlement patterns and transit service is an important first step to achieving the high transit ridership needed to support Rapid Transit. Transit planners recognize several neighbourhood characteristics that are conducive to high ridership and efficient transit service: density, walkability, proximity, and linearity.

DENSITY

There is an obvious relationship between density and transit ridership. The more people live, work, or do activities around a transit stop, the more potential transit riders there are. This is because when more people live in dense neighbourhoods, they are also more likely to take transit, due to lower car ownership, increased traffic, or lifestyle choices. To achieve high ridership, transit needs to travel through dense neighbourhoods.

WALKABILITY

Getting to a transit stop requires walking or rolling on sidewalks, paths, or streets. While the limit to how far people will travel to access transit is different for each person, transit planners generally assume people will walk or roll up to 400–500 metres to a local bus stop and up to 800 metres to Rapid Transit.

The directness of the path to get to a station matters. Better-connected streets and pedestrian networks give people shorter paths to transit stops, encouraging higher ridership. Areas with grid-like streets, shorter blocks, and more intersections are usually better connected. As well, accessible street crossings (e.g. crosswalks, stops in close proximity to traffic signals) are important since riders must be able to access both directions of transit routes for return trips.

PROXIMITY AND LINEARITY

The more efficiently a transit route can connect neighbourhoods and destinations, the more riders it will attract and the more service it will warrant. The key elements to this efficiency are how close destinations are along the route (proximity) and how straight the route is (linearity). Connecting nearby destinations along a linear corridor takes less travel time, is less expensive and will draw more riders. To support transit ridership and efficiency, land use planning must encourage closely-spaced destinations along straight corridors.

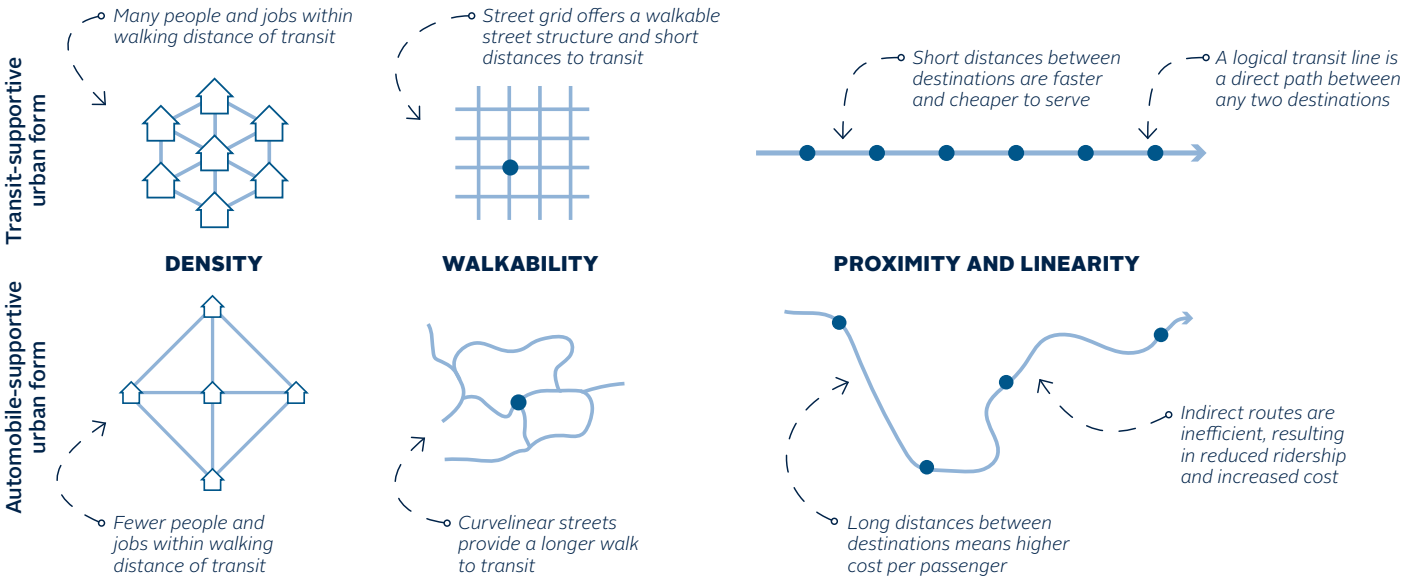


Figure 33: **Transit-supportive urban form: density, walkability, proximity, and linearity**

Human Transit. 2011. Jarrett Walker. Island Press.

How dense do neighbourhoods need to be to support Rapid Transit?

Transit ridership is the result of many factors, therefore there is not a single density threshold that will suffice for all neighbourhoods.

As a guideline, however, neighbourhoods with a density of 100 people and/or jobs per hectare can generally support Bus Rapid Transit lines.

Areas in Halifax and Dartmouth with around 100 people and/or jobs per hectare include:

- Robie Street between North and Almon
- South Park Street between South and Inglis
- Downtown Dartmouth
- Highfield Park
- Some parts of Dunbrack Street

Other areas around the Rapid Transit Network where supportive zoning is put in place are expected to gradually develop toward similar densities.

5.2 Transit-Oriented Complete Communities

The *IMP* encourages the development of complete communities. As the name suggests, a complete community is one that allows residents to live, work, shop, learn, and play within the community without depending on a private vehicle. This means the community must have a mixed range of housing options and other land uses of interest to residents (e.g., shops, services, schools, jobs, and recreation), and development must be compact enough to allow people to walk or roll to these destinations.

The benefits of a more complete approach to community design are considerable. Properly realized, complete communities accommodate people in all stages of life, with a range of abilities, and at a variety of income levels. Inviting, pedestrian-oriented buildings, spaces, and connections make active transportation comfortable and easy. Reducing the need for private vehicle use is more sustainable and affordable and reduces the land and investment required for roads and parking.

Rapid Transit and complete communities are mutually beneficial. The density and walkability of complete communities supports transit ridership. For residents, Rapid Transit provides a high-quality mobility option for longer trips, whether for work, recreation, entertainment, or visiting friends. The combination of comfortable active transportation links and convenient transit makes it easier for residents to reduce their vehicle use.

HOUSING

Many people find living in complete communities attractive whether or not they use transit, so it is important to ensure a wide mix of housing is available and affordable. For example, including larger apartments means that families can realize the benefits of complete communities. These communities must also offer housing options for lower- and moderate-income residents, so that Rapid Transit does not become accessible only to the more affluent.

COMPLETE STREETS

Complementing the mix and density of land uses, the design of streets is critical for encouraging walking, rolling, cycling, and use of transit. Streets serve both as links to facilitate movement and as places where people shop, stroll, and socialize. A complete streets approach supports people's mobility, complements adjacent land uses, and reflects the character, scale, and needs of neighbourhoods.

There is no fixed recipe for a 'complete' street. As each street differs in its role in the road network and the space available, enabling safe, convenient, and comfortable travel and access for users of all ages and abilities will look different in varying contexts.

Tools that can be employed in a complete streets approach include:

- Matching street capacity with demand
- Curb extensions
- Continuous, accessible sidewalks
- Resting places
- Street lighting
- Accessible crosswalks
- Bicycle lanes
- Accessible bus stops or BRT stations
- Transit priority lanes
- Appropriate and clear signage
- Attractive landscaping and tree planting
- Shared streets (e.g. Argyle Street)
- Well-maintained vehicle space
- Measures to slow traffic

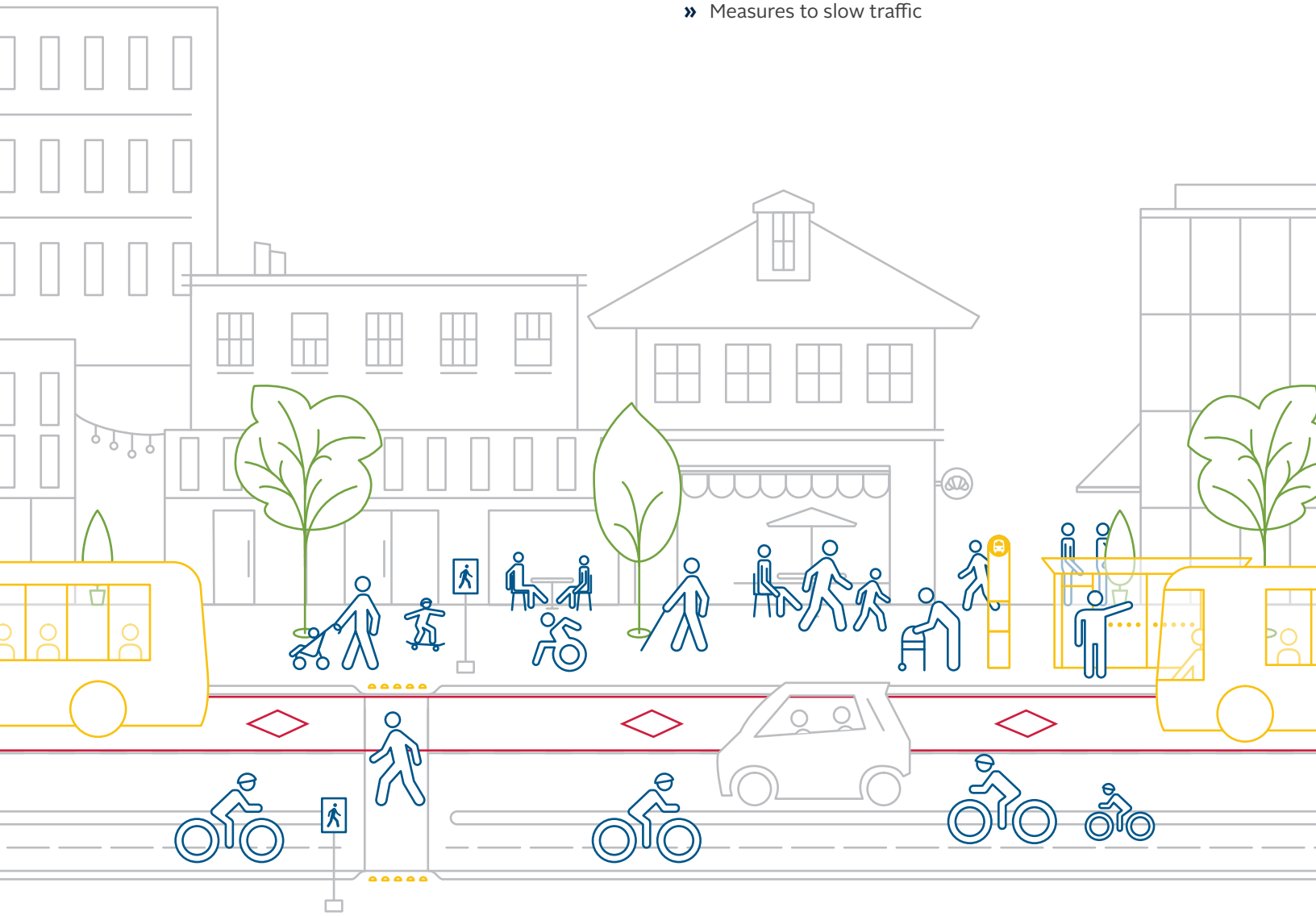


Figure 34: **Designing streets for complete, transit-oriented communities**

5.3 Aligning Growth with Rapid Transit

Promoting transit use goes beyond neighbourhood and street design. Indeed, as transit exists to serve people moving around the city, how communities are organized within the region is also crucial.

The Municipality's transportation demand model is a tool used to explore how the transportation network and settlement and employment patterns may work together to influence travel. The model simulates residents' daily travel and can estimate how different land use and transportation scenarios will impact various factors, such as transit ridership.

Three scenarios for 2031 were created and explored using the model. The scenarios, summarized in **Figure 35** and **Figure 36,** do not predict exact futures, but illustrate the potential impacts of key trends and policy choices.

- **Scenario 1 and 2**: the annual population growth rate is assumed to be 1%. New housing is distributed in the Regional Centre in accordance with the *Centre Plan*, and in the suburbs according to current development approvals and anticipated growth in high-demand areas.
- **Scenario 1:** represents a potential future where employment shifts from the Regional Centre to the suburbs, matching the overall trends between 2006 and 2016.
- **Scenario 2:** assumes the same amount of overall employment growth as Scenario 1, but shows a future where job growth is more evenly distributed between the Regional Centre and suburban areas.
- **Scenario 3:** explores a future with higher population and job growth than the other scenarios, where the extra growth is concentrated in areas near Rapid Transit.

Each land use scenario was modelled with the final network of the *Moving Forward Together Plan* and the Rapid Transit Network. In all scenarios, Rapid Transit significantly increases the transit mode share, generating hundreds of thousands more transit trips annually. The model estimates that by 2031, Rapid Transit may represent a mode shift toward transit of up to 2% of all commutes and a reduction of greenhouse gas emissions by up to 5,200 tonnes annually, without considering the impacts of different settlement patterns.

		Growth Scenario 1: **EMPLOYMENT SHIFTS FROM CENTRE TO SUBURBS**	Growth Scenario 2: **EMPLOYMENT GROWTH MORE EVENLY DISTRIBUTED**	Growth Scenario 3: **MORE GROWTH, WITH NEW GROWTH FOCUSED ON BRT**
	Annual growth rate 2020–2031	~ 1%	~ 1%	~ 1.5%
Population 414,000 in 2016	**Population growth 2016–2031**	+ 69,000	+ 69,000	+ 113,000
	New settlement patterns	» Centre Plan targets in Regional Centre » Development approvals and anticipated growth in suburbs		» Same as Scenario 1 & 2 plus new growth near BRT
Employment 227,000 in 2016	**Employment growth 2016–2031**	+ 46,000	+ 46,000	+ 58,000
	Distribution of new jobs	» Job loss in downtown Halifax » High suburban job growth	» Moderate job growth in downtown Halifax » Moderate suburban job growth	» Moderate job growth in downtown Halifax » Suburban job growth focused near BRT
	Percent of jobs in Regional Centre	42% (-7% from 2016)	47% (-2% from 2016)	47% (-2% from 2016)
	Percent of jobs in suburbs	46% (+5% from 2016)	42% (+1% from 2016)	42% (+1% from 2016)

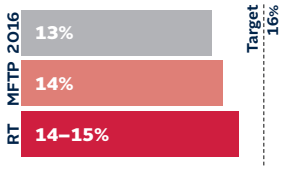
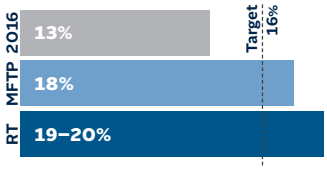
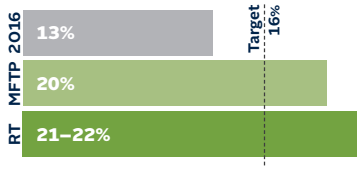
Figure 35: **Scenarios for future growth**

The results also bear out the importance of the land use–transit relationship. A future with higher growth will lead to more travel and higher overall emissions. However, increased intensification in the Regional Centre and key suburban transit corridors, as seen in Scenario 3, results in substantially higher transit use and lower per capita distance travelled in private vehicles than scenarios with less focused growth, helping mitigate environmental impacts.

Where jobs are created may also play a role. In Scenario 2, new employment is more focused in current employment nodes, many of which would be connected to Rapid Transit. This scenario results in higher transit use and lower emissions in the model than Scenario 1, in which some jobs move from the Regional Centre to suburban areas not aligned with Rapid Transit.

Implementing Rapid Transit alone will not be enough to meet or exceed HRM's mode share targets and climate change mitigation goals. In the scenarios modelled, land use has a much larger impact on mode share and emissions than the transit network changes. The Municipality must plan to align growth and employment with the factors that support transit ridership and active transportation.

Rapid Transit is the key to achieving more intensive land use and settlement patterns. Investing in Rapid Transit gives developers the confidence to invest in neighbourhoods around stations and terminals, bringing more compact growth into these areas and resulting in higher impacts to mode share and greenhouse gas emissions.

		Growth Scenario 1: **EMPLOYMENT SHIFTS FROM CENTRE TO SUBURBS**	Growth Scenario 2: **EMPLOYMENT GROWTH MORE EVENLY DISTRIBUTED**	Growth Scenario 3: **MORE GROWTH, WITH NEW GROWTH FOCUSED ON BRT**
Transit Mode Share	**Halifax region mode share**			
	Regional Centre 2016: 20% **Target: 23%**	MFTP: 21% RT: 21–23%	MFTP: 25% RT: 26–27%	MFTP: 27% RT: 27–28%
	Suburbs 2016: 13% **Target: 20%**	MFTP: 14% RT: 15%	MFTP: 20% RT: 22%	MFTP: 23% RT: 25–26%
	Comparison to *Regional Plan* targets	**FAILS**	**MEETS/EXCEEDS**	**EXCEEDS**
Private Vehicle Kilometres Travelled (VKT)	**VKT per capita, 2031 baseline**	27.7 km/day	27.5 km/day	26.2 km/day
	VKT per capita, 2031 with Rapid Transit	27.4 km/day	27.0–27.1 km/day	25.8–25.9 km/day
	Annual total VKT reduction with Rapid Transit, vs. 2031 baseline	38–45 million km/year	49–62 million km/year	36–50 million km/year
GHG Emissions	**Reduction in greenhouse gas emissions vs. 2031 baseline for scenario**	1,500–2,800 tonnes/year	3,400–5,200 tonnes/year	1,400–3,500 tonnes/year

1 *Estimates for Rapid Transit impacts are shown as a range. The lower end of the range uses a conservative version of the model that does not account for service quality improvements such as more reliable travel times, real-time arrival information, and station amenities. The higher end modifies some model parameters to try to account for some of these improvements. The model also does not account for a preference for ferries and may underestimate ferry ridership.*

Figure 36: **Model results for future growth scenarios**

5.4 Policy Directions

To address the importance of coordinating land use and transportation planning around Rapid Transit, the municipality will:

1. Plan for higher-density mixed use development around Rapid Transit.
2. Work to ensure that affordable housing and amenities are available near Rapid Transit.
3. Improve the connectivity of local streets and the quality of active transportation infrastructure near stations and terminals.
4. Pursue a long-term vision for Rapid Transit together with a long-term vision for land use.

1. PLAN FOR HIGHER-DENSITY MIXED USE DEVELOPMENT AROUND RAPID TRANSIT

To support walkable, affordable, transit-oriented communities, land use policy should designate areas for high residential and employment density along frequent transit corridors and around transit stations and terminals. The highest mixed-use densities should be directed to areas within 400 metres of Rapid Transit stations, with moderate densities up to 800 metres. This approach will support the Rapid Transit Network by encouraging the development of compact, complete communities served by frequent transit, allowing people to work, shop, and play close to where they live.

In the second *Regional Plan* review, started in 2020, the Municipality will refine its outlook on settlement patterns and infrastructure and servicing needs to accommodate growth. The review offers an opportunity to align land use policy with major infrastructure investments such as Rapid Transit.

In 2006, the *Regional Plan* designated several growth centres where development was expected to occur, some of which are now communities that will be served by Rapid Transit. The *Regional Plan* review will reexamine these growth centres and adjust intensification of development and settlement patterns to emphasize alignment with the Rapid Transit Network.

Outside the Regional Centre, key areas near Rapid Transit stations and terminals where there may be significant opportunities for development have been identified as Potential Transit-Oriented Communities (**Figure 37**). These places have the capacity to become destinations and hubs of activity, similar to the Centres, Corridors and Future Growth Nodes identified in the *Centre Plan*. The *Regional Plan* review will take into account the Potential Transit-Oriented Communities shown here as well as those indicated in Figure 10 of the *IMP*.

In existing communities around Rapid Transit stations and terminals, it is expected that change will occur incrementally as opportunities to renovate, expand, or adapt existing buildings and sites arise. Sites such as underutilized parking lots, shopping plazas, and institutional properties should be encouraged to be redeveloped following transit-oriented principles and best practices. Pedestrian supportive, mixed-use redevelopment should be encouraged through as-of-right development where possible.

The *Regional Plan* review will also identify strategic transit priority corridors to direct future infrastructure investments. These corridors will update those identified in the *IMP* to include the Rapid Transit Network. The review should also identify corridors of importance for the transit network outside of the areas served by Rapid Transit, and may establish transportation reserve zones to retain space for transit priority on these corridors.

2. WORK TO ENSURE THAT AFFORDABLE HOUSING AND AMENITIES ARE AVAILABLE NEAR RAPID TRANSIT

As proximity to frequent transit can increase the market value of land, introducing the Rapid Transit Network could exacerbate housing unaffordability and social inequity in surrounding neighbourhoods as they develop or redevelop around the network. As transit-oriented areas become more desirable and older housing stock redevelops, residents may experience financial strain from rising rents,

land values, and house prices. To mitigate these issues, the Municipality will need to consider ways to ensure that affordable housing continues to be available near Rapid Transit.

Focusing affordable housing efforts on neighbourhoods well served by transit can magnify the impact of housing investments. As shelter and transportation are the two largest household expenditures, aligning affordable housing and Rapid Transit can increase affordability for residents. This can in turn support sustainable mode-share gains, as lower-income households are able to access and use transit, and help build stronger and more resilient communities.

Affordable housing strategies include regulatory incentives and financial tools, land access and acquisition, and planning and coordination among agencies. Many of these strategies are already underway, including density bonusing through the *Centre Plan* and the coordinated efforts of the Housing and Homelessness Partnership. These efforts, as well as additional strategies such as

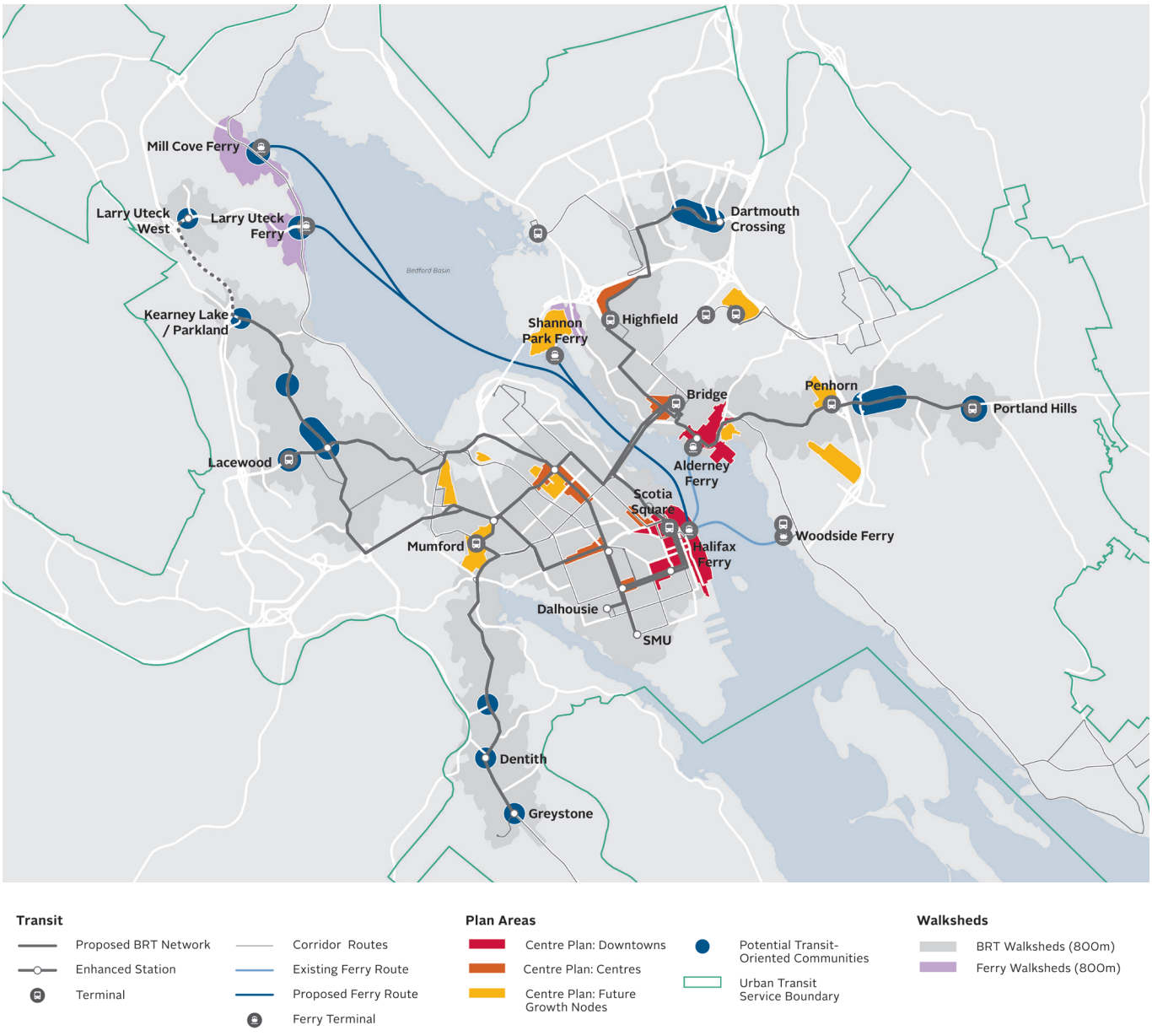


Figure 37: **Rapid Transit walksheds with Regional Centre growth areas and potential transit-oriented communities**

inclusionary zoning, new funding mechanisms, or the use of public lands, should aim to align affordable housing with the Rapid Transit Network.

Ensuring that key urban amenities such as grocery stores, drug stores, hospitals and clinics, schools, libraries, parks, and recreation centres are accessible by transit is also important for affordability, both for the public and for employees. The Rapid Transit Network has been designed with existing public and private amenities in mind. The Municipality should work with the Province, hospitals, school boards, and other institutions to locate new public facilities near Rapid Transit stations and terminals. Land use policy and regulations should also encourage privately-owned amenities to locate near Rapid Transit.

3. IMPROVE THE CONNECTIVITY OF LOCAL STREETS AND THE QUALITY OF ACTIVE TRANSPORTATION INFRASTRUCTURE NEAR STATIONS AND TERMINALS

Connecting Rapid Transit stations and terminals to pedestrian and bicycle infrastructure and well-connected local streets will help people access the network. Local street and active transportation networks with better connectivity give riders shorter paths to walk, roll, or bicycle to stations and terminals. The Municipality should take advantage of opportunities to create new connections and improve existing ones in areas around stations and terminals.

Supportive street design and high-quality active transportation infrastructure is also critical to make it safe, comfortable, and convenient to walk, roll, or bicycle to a transit station. Local streets near Rapid Transit stations should be reviewed and improved through the Municipality's Streetscaping program and other infrastructure renewal projects.

Retrofits of streets near stations should take a complete streets approach and should prioritize active transportation. Designs for streets should be sensitive to the context of the surrounding neighbourhoods and should positively contribute to the long-term vision for communities.

4. PURSUE A LONG-TERM VISION FOR TRANSIT TOGETHER WITH A LONG-TERM VISION FOR LAND USE

Momentous social and technological changes, from telecommuting to autonomous vehicles, are transforming how people move around cities. The long-term implications of these changes for transit and land use patterns are uncertain. The Municipality must plan to ensure the transportation system continues to work efficiently for people's changing travel behaviours while becoming more sustainable and equitable. The Strategy is a step in this direction.

In this context, it is vital that a long-term vision for transit, including Rapid Transit, be considered together with a long-term vision for land use. Integrated transportation and land use planning must take an iterative approach which both aligns significant future growth with Rapid Transit, and responds to changing settlement, employment, and travel patterns with appropriate transit service.

The *Regional Plan* review offers an opportunity to set up future study of additional corridors or areas that may be suitable for Rapid Transit expansion once the proposed network is implemented. The consideration of any potential service expansion should follow the factors outlined in **Section 2** of this document, based on the most up-to-date understanding of growth and land use change.

The *Regional Plan* review will also establish the framework for a long-term study and visioning process for land use and transportation beyond 2031. This process will feed into the creation of the next *Regional Plan*, intended to replace the current one at the end of its planning horizon in 2031. That plan should include a long-term vision for transit, including the next generation of Rapid Transit. The Municipality may also create a separate visioning document for the future of transit.

6 IMPLEMENTATION

The Rapid Transit Strategy is a transformative plan for more sustainable, affordable, and equitable communities. Delivering it will require a significant financial commitment, the coordination of multiple stakeholders, and the management of many project variables. Implementation will require work on numerous activity streams shared across several HRM business units and by external stakeholders, consultants, and vendors. This work will build toward a future of enhanced mobility, increased transit ridership, reduced reliance on private vehicles, reduced greenhouse gas emissions, and reduced household expenditures.

The BRT Network and the proposed ferry routes will have different challenges and opportunities throughout their implementation. BRT depends on a number of existing infrastructure projects which will benefit the network but introduce implementation constraints. The implementation of the proposed ferry routes interacts with fewer projects, but there are more unknowns around timelines and development near terminals. Due to their differing dependencies, the BRT and ferry implementation plans will be discussed separately.

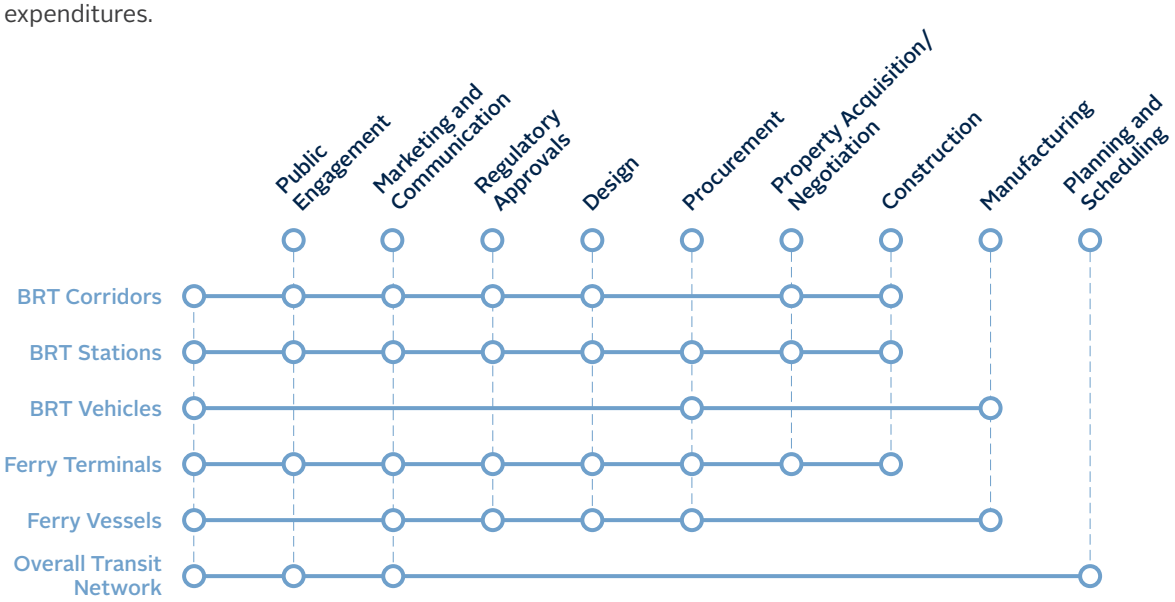


Figure 38: **Activity streams**

6.1 Bus Rapid Transit

Implementation of BRT will require vehicle procurement, station design and construction, transit scheduling and network adjustments, and infrastructure projects on BRT corridors. The Strategy anticipates BRT service to be fully operational in seven to eight years after funding is confirmed, with the first BRT line introduced in year three or four.

The BRT lines are anticipated to launch one or two at a time, with specifics to be determined as the timing of projects on BRT corridors is confirmed. As the lines are designed to work as a network, the benefit of the system will not be completely realized until all four lines are implemented.

VEHICLE PROCUREMENT

The proposed BRT service will require an estimated 33 new buses. Purchases will be handled through Halifax Transit's standard procurement process. In alignment with the proposed fleet electrification strategy, the goal is to operate BRT with electric buses.

STATION DESIGN AND CONSTRUCTION

The process of station design will start with a generalized design for the shelter and features to be included in each station. The layout then may be tweaked for individual stations to better connect them to their surroundings or respond to site constraints. Stations may require land acquisition if they cannot fit into the existing street right of way.

TRANSIT SCHEDULING AND NETWORK ADJUSTMENTS

Work to schedule the BRT lines and determine how other routes will change will begin once implementation of the *Moving Forward Together Plan* is complete. This will include engagement with the communities involved, as discussed in **Section 6.4**.

TRANSIT PRIORITY PROJECTS

As **Section 3** notes, the success of BRT is dependent on transit priority to enable the service to maintain speed and reliability. The Strategy therefore includes several transit priority corridors, designated as underway, primary, or secondary projects and shown in **Figure 39**.

As part of the direction from the *IMP*, transit priority projects for several corridors included in the Strategy are underway. Transit priority lanes on Bayers Road, Young Street, and Robie Street have been designed and are scheduled for construction starting in 2020. Existing transit routes will benefit from these lanes while BRT service is being implemented.

Primary BRT corridor projects will significantly impact transit operations in the near future, providing priority through pinch points in the network. Ideally, these projects will be completed before BRT service is launched. However, due to the size and complexity of these projects, it is anticipated that BRT service may be launched before all components of the primary transit priority network are complete.

Secondary projects are anticipated to have a smaller impact on BRT operations in the short term and may be implemented while BRT is operational. The benefits of these measures will be seen in the longer term as areas around BRT gain population and travel demand intensifies.

OTHER INFRASTRUCTURE PROJECTS

Four other major infrastructure projects on BRT corridors are planned for construction within the timeframe of the Strategy: the Cogswell Interchange Redevelopment, the Windsor Street Exchange Reconfiguration, the Spring Garden Road Streetscape Project, and the Macdonald Bridge Bikeway Connector Project.

Individual BRT lines are anticipated to launch after projects on their route are completed. If this is not feasible, projects will be coordinated to maintain the reliability of BRT service through the corridors during construction as best as possible.

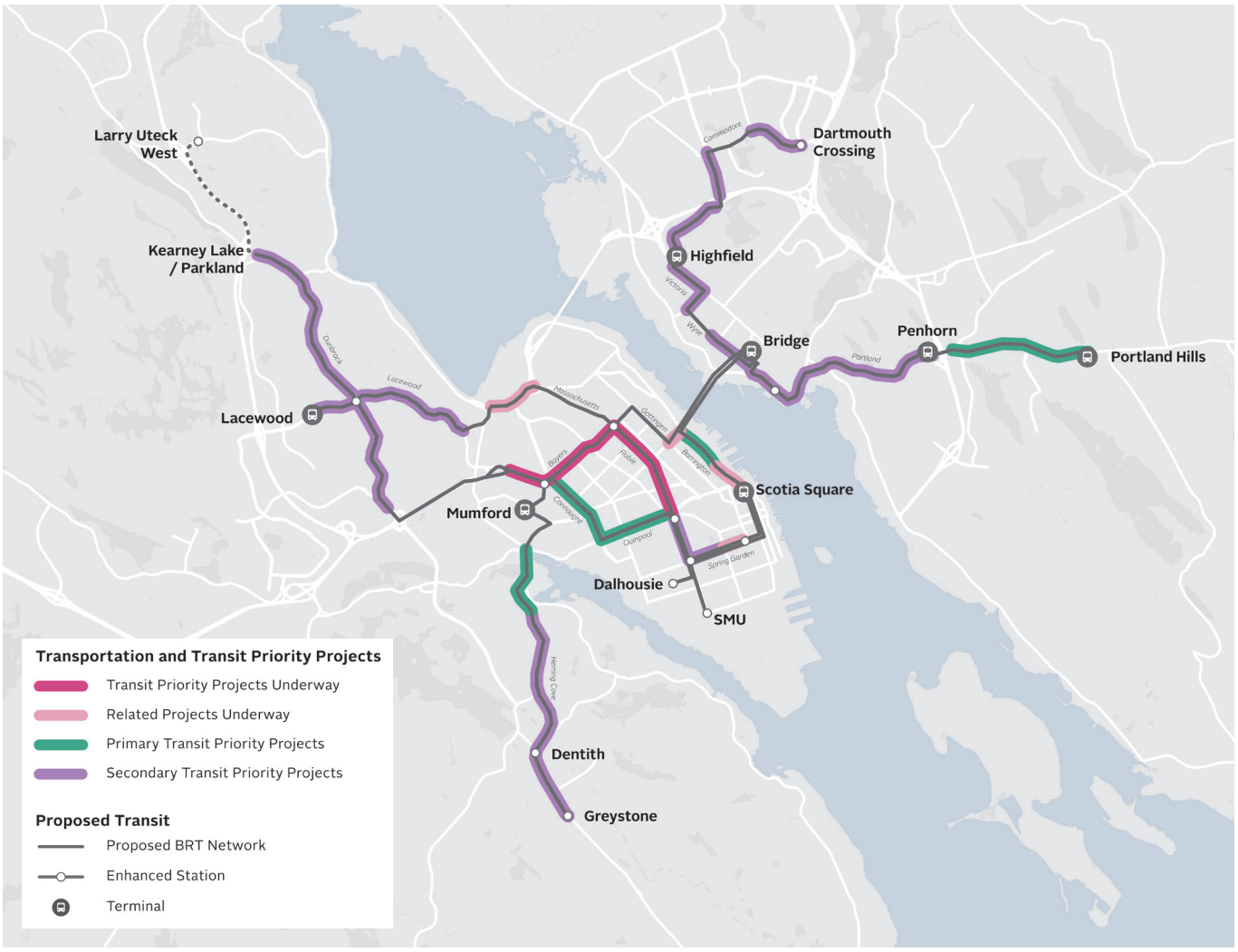


Figure 39: **Transportation and transit priority projects by category**

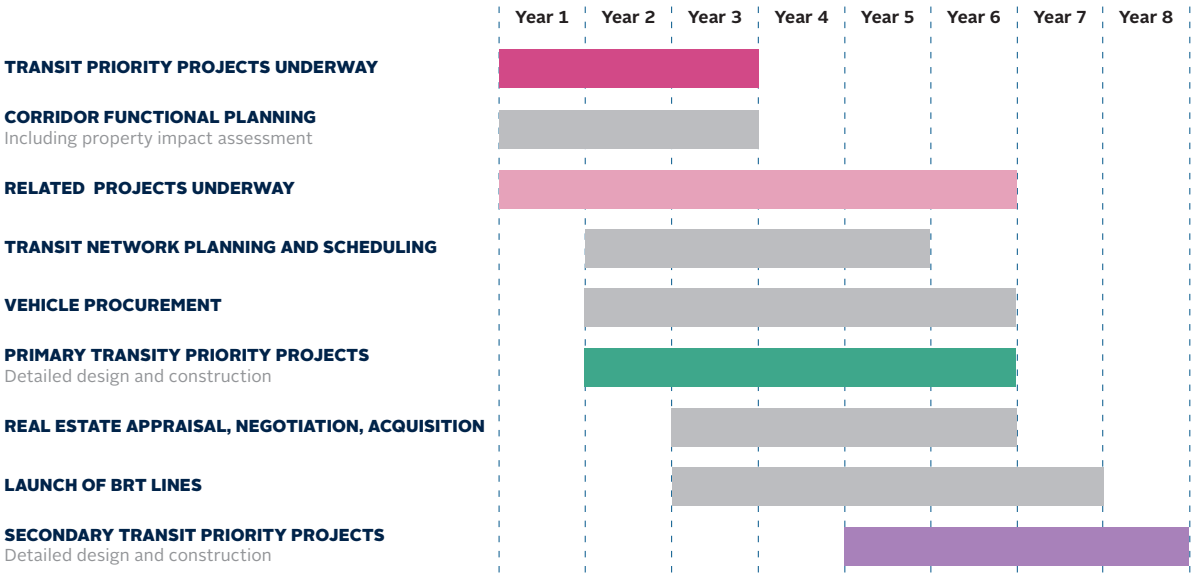


Figure 40: **Phasing for BRT implementation and related projects**

	CORRIDOR	RECOMMENDATION		RIGHT OF WAY CONSTRAINTS	POTENTIAL ROADWAY IMPACTS
		Lanes	Implementation Approach		
UNDERWAY	**Bayers** *Romans to Windsor*	Inbound & Outbound	↔ ⟳	High	Loss of one outbound traffic lane (Connaught to Windsor)
UNDERWAY	**Young** *Windsor to Robie*	Inbound & Outbound	↔ ⟳	Moderate	Loss of one inbound and one outbound traffic lane [1]
UNDERWAY	**Robie** *Young to Quinpool*	Inbound & Outbound	↔ ⟳	High	Loss of one inbound and one outbound traffic lane [1]
PRIMARY	**Connaught** *Bayers to Quinpool*	Inbound & Outbound	↔	Limited	Limited impact
PRIMARY	**Quinpool** *Connaught to Robie*	Inbound & Outbound	⟳	High	Loss of one inbound and one outbound traffic lane
PRIMARY	**Herring Cove** *Roundabout to Cowie Hill*	Inbound	↔	High	Limited impact
PRIMARY	**Barrington** *Macdonald Bridge to Cornwallis* [2]	Inbound & Outbound	↔	Moderate	Limited impact
PRIMARY	**Portland** *Baker to Portland Hills Terminal*	Inbound & Outbound	↔	Moderate	Limited impact
SECONDARY	**Robie** *Quinpool to Spring Garden*	Inbound & Outbound	↔	Limited	Limited impact
SECONDARY	**Spring Garden** *Robie to South Park*	Inbound & Outbound	⟳	Limited	Narrowing of existing traffic lanes and loss of on-street parking
SECONDARY	**Dunbrack & Kearney Lake** *Hwy 102 Exit 1 to Exit 2*	Inbound & Outbound	⟳	Limited	Loss of one inbound and one outbound traffic lane
SECONDARY	**Lacewood** *Lacewood Terminal to Dutch Village*	Inbound & Outbound	⟳	Limited	Loss of one inbound and one outbound traffic lane
SECONDARY	**Herring Cove** *Cowie Hill to Greystone*	Intermittent Inbound & Outbound	↔ ⟳	Limited-Moderate	Intermittent loss of inbound/ outbound traffic lanes
SECONDARY	**Wyse** *Albro Lake to Alderney*	Intermittent Inbound & Outbound	⟳	Limited *(east of Boland)* High *(west of Boland)*	Intermittent loss of inbound/ outbound traffic lanes
SECONDARY	**Albro Lake** *Wyse to Victoria*	Inbound	⟳	Limited	Narrowing of existing traffic lanes and loss of on-street parking
SECONDARY	**Victoria** *Albro Lake to Highfield Park*	Inbound & Outbound	⟳	Moderate	Loss of one inbound and one outbound traffic lane
SECONDARY	**Highfield Park**	Inbound & Outbound	⟳	Limited	Narrowing of existing traffic lanes and loss of on-street parking
SECONDARY	**Burnside** *Hwy 111 to Commodore*	Inbound & Outbound	⟳	Limited	Loss of one inbound and one outbound traffic lane
SECONDARY	**Commodore**	Intermittent Inbound & Outbound	⟳	Limited-Moderate	Intermittent loss of inbound/ outbound traffic lanes
SECONDARY	**Alderney**	Inbound & Outbound	⟳	Limited	Loss of one inbound and one outbound traffic lane
SECONDARY	**Portland** *Alderney to Penhorn Terminal*	Inbound	⟳	Limited	Narrowing of existing traffic lanes and loss of on-street parking

Figure 41: **Transit priority projects for the BRT Network**

1 *Robie Street / Young Street Phase 1 includes lane conversion on multiple segments to provide a continuous outbound bus lane and intermittent inbound bus lane. Phase 2 will include widening to accommodate continuous bus lanes in both directions and will be pursued following acquisition of necessary lands.*

2 *The Barrington corridor project will also require partnership with Halifax Harbour Bridges to modify the Macdonald Bridge approach ramp to allow Halifax Transit buses to access the bridge from Barrington Street.*

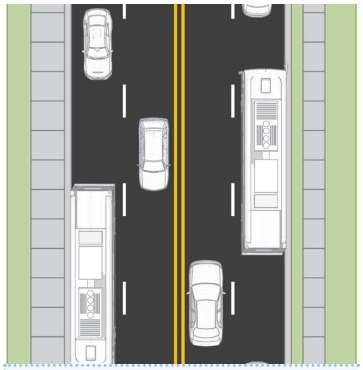
Implementation Approach

⟳ *Lane conversion* ↔ *Road widening*

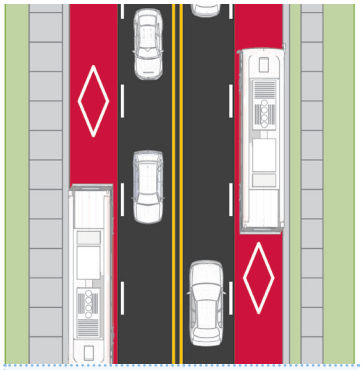
TRANSIT PRIORITY LANE OPTIONS

Transit priority lanes typically can be created by converting existing lanes or by widening streets. For cost estimation, the Strategy makes a preliminary recommendation for each transit priority corridor based on an analysis that considered existing road configuration, right-of-way width, and traffic demand. **Figure 41** shows these recommendations.

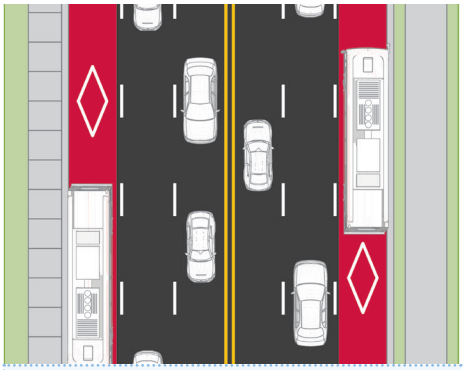
Lane conversion is the preferred approach to adding transit lanes in the BRT Network as it is both cost- and time-effective. However, there are tradeoffs to removing traffic or parking capacity. These tradeoffs will be analysed in more detail through the functional planning process for each BRT corridor. Functional plans will also determine whether transit priority lanes can permit other uses, such as parking, at times when overall congestion is reduced in a corridor.



SHARED TRAFFIC LANES: Buses and private vehicles use the same lanes.



CONVERT EXISTING LANES TO BUS LANES: This is cost effective and does not impact properties along the street, but it does reduce the number of vehicle lanes and can impact on-street parking and loading.



WIDEN THE STREET: Leaving the existing vehicle lanes in place and adding a new bus lane. This is more costly and may impact properties along the street, but reduces the impact on vehicle traffic flow.

Figure 42: **Options for creating transit priority lanes**

Functional planning and design for transportation corridors

Functional planning and design helps to determine how a corridor can be reconfigured to better serve current and future transportation needs. The functional planning process considers the surrounding communities, current and future transportation demand, and physical constraints such as topography and street width.

Functional plans in HRM focus on moving more people by sustainable modes, improving safety, and building complete streets that better connect communities. They consider how features such as transit priority lanes and improved walking and cycling infrastructure can be integrated into a street. Which elements are prioritized depends on the role the street plays in the community and transportation network.

Adding new street features such as transit priority lanes usually impacts existing elements on the street. Developing an understanding of the benefits and tradeoffs of potential changes is an important part of the functional planning process. Commonly considered factors include:

- Intersection and roadway capacity
- Right of way and property impacts
- Land use and future growth patterns
- Curbside loading
- Emergency access
- Goods movement
- Maintenance and operational needs
- Access to transit
- Transit priority
- Pedestrian and bicycle infrastructure and connectivity
- On-street parking, including accessible parking
- Universal accessibility
- Trees and green areas

The Municipality uses functional plans to guide the development of key corridors over time. Functional plans allow for integration with roadway repair and reconstruction projects, as well as projects undertaken on the street by utilities or other agencies.

Functional plans can also help the Municipality preserve or acquire the right of way required to make changes using transportation reserve zones. These zones can be included in Land Use By-laws to prevent development from taking place which would obstruct construction of transportation links.

6.2 Ferries

Implementation of new ferry service will require vessel procurement, terminal design and construction, and service plan calibration, which can be pursued concurrently with some interdependencies.

The timeline required to complete these activities is less well established than for BRT, and will vary based on the level of complexity and service models. The first ferry route is anticipated to be operational within three to four years after the Strategy is funded.

VESSEL PROCUREMENT

Section 4.3 outlines the basic requirements for ferries on the proposed routes. Halifax Transit's standard process for purchasing ferries would take several years, including determining the specific design requirements and having the vessels manufactured. To streamline the process, opportunities such as evaluating existing vessel models which meet the criteria will be explored.

As part of the determination of vessel requirements, Halifax Transit will evaluate the feasibility, efficiency, and sustainability of different propulsion options, including electric vessels.

TERMINAL DESIGN AND CONSTRUCTION

The proposed terminal areas each present challenges for construction, including access issues and property availability. Concept designs for each terminal will address these challenges. Terminal and vessel design will be coordinated to establish how vessels will dock and load passengers.

Terminal design may consider the integration of new terminals with multi-use facilities to take advantage of cost-sharing opportunities with other projects. The decision to integrate terminals into other building projects will be prioritized due to the increased coordination required and the impacts to the timeline and funding of both projects.

The new routes will also require additional docking capacity in downtown Halifax. Expansion and renovation of the Halifax Ferry Terminal will be a priority. Implementation may also include an interim measure to allow some ferry service to launch before a rebuild of the terminal is completed.

SERVICE PLAN CALIBRATION

There are challenges associated with confirming appropriate service levels (frequency and vessel capacity) for new ferry routes in growing areas with no existing ferry service. Standard modeling and ridership projections tend to underestimate the attractiveness of the service to potential passengers. Further market analysis will be conducted before the routes are launched to confirm that the proposed service plans, fares, and vessel sizes are appropriately matched to demand. After launch, it will be important to monitor ridership levels and development around terminals to refine service levels on each route.

The proposed Shannon Park ferry terminal is located in an area with considerable transit-oriented development potential that is anticipated to drive a large amount of ridership to the ferry. Therefore, the timing of launching this route will depend on the development timeline.

Work will also be done to confirm the Strategy's travel time estimates, especially in low-visibility situations. A study will monitor visibility along the routes to determine how often service will be affected by fog and rain and how this may impact the reliability of the service.

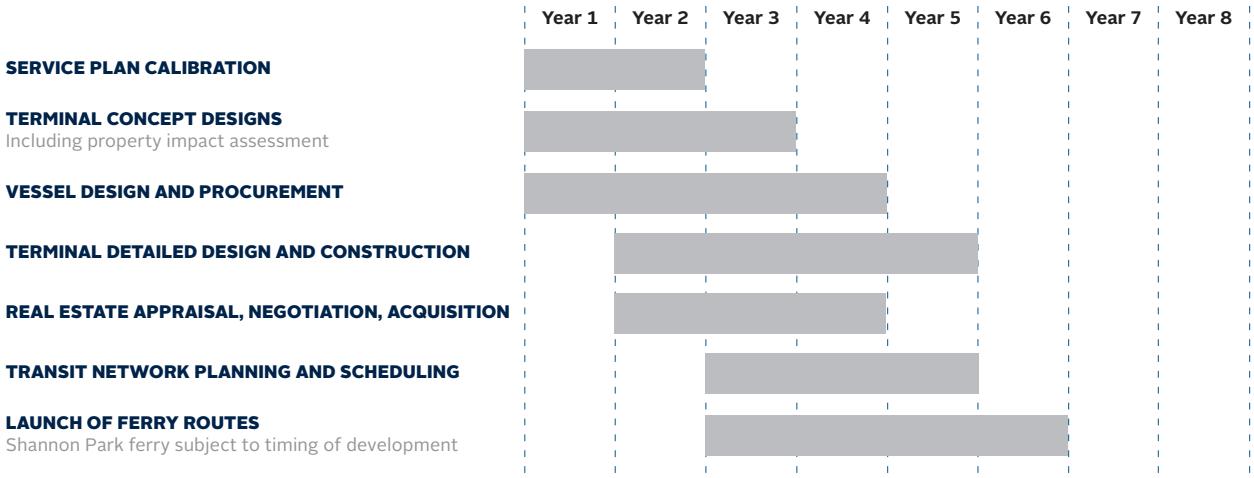


Figure 43: **Preliminary ferry phasing**

6.3 Project Delivery and Integration

The Strategy outlines an aggressive yet realistic implementation timeline that aims to have all elements operational within approximately seven to eight years. However, the implementation will need to be carefully managed to ensure the Municipality and industry has the capacity to deliver the project and to minimize delays and disruptions. Coordination among municipal departments on transportation capital planning will be essential. Special consideration must be given to the following factors.

CAPITAL BUDGET

The Municipality's ten-year capital budget outlook includes funds for street recapitalization and sidewalk renewal. As part of these programs, some of the roadways included in the BRT Network are scheduled and budgeted for renewal over the next decade. Integrating transit priority and asset renewal projects presents opportunities to reduce overall costs, pool resources, and mitigate road disruptions.

STAFF RESOURCES

Building new transit infrastructure will require additional staff and resources across the organization. Planning and implementing this proposed network will involve new responsibilities for municipal departments including Traffic Management, Road Operations and Construction, Halifax Transit, Project Planning and Design, Strategic Transportation Planning, Parks and Recreation, Communications, and Corporate Real Estate. The staffing commitment must be factored into the implementation time frame regardless of how the project is structured.

INDUSTRY CAPACITY

It is anticipated that consulting services will be required to augment municipal staff resources in many aspects of project delivery. In particular, it will be necessary to retain engineering and planning consultants to work with municipal staff on the development of functional plans and designs, detailed designs, and other technical studies. As well, consideration must be given to how the various construction projects in the Strategy will impact the construction industry, as there are a number of large-scale construction projects anticipated in Halifax over the next 10 years.

EXTERNAL PROJECTS AND ORGANIZATIONS

The implementation of the Rapid Transit Strategy needs to be integrated with municipal and external capital and development projects which impact the same parts of the street network. As well, corridor changes which include street widening will require coordination with external organizations to relocate existing utilities (power and telecom poles and wires, underground services, gas lines, and water and wastewater infrastructure). Partners typically include Halifax Water, Nova Scotia Transportation

and Infrastructure Renewal, Heritage Gas, Nova Scotia Power, Halifax Harbour Bridges, and communications companies. Consideration should be given to partner organizations' project timelines, staffing resources, and budget availability.

ROAD DISRUPTIONS

Implementation of the Strategy must take into consideration the potential for road disruption caused by construction projects within and outside the Rapid Transit corridors. A staged approach to construction and consideration for integration with other projects will be necessary to minimize disruptions to the transportation network.

6.4 Transit Network Implications

The Rapid Transit Network builds on the transit network established by the *Moving Forward Together Plan*. The *MFTP* will continue to guide Halifax Transit on the design of the transit network. While the Rapid Transit Strategy does not anticipate a full network redesign, the introduction of BRT and new ferry routes will require routing and service adjustments to improve connectivity and reduce redundancy in the network.

Aligning the transit network with Rapid Transit will require further analysis and engagement. Halifax Transit will ensure that revised routes and schedules continue to provide high quality, cost-effective service. Further engagement with local communities on all proposed changes will also occur to ensure any changes reflect the needs of the communities.

Route type	**CORRIDOR** (1–10)	**LOCAL** (20–99)	**EXPRESS** (100-series)	**REGIONAL EXPRESS/ RURAL** (300/400-series)
Purpose	Frequent, all-day service along high demand routes	All-day service connecting to more frequent routes at terminals	Limited-stop service between residential communities and downtown at peak	Connect rural communities with the urban area
Potential impacts	» The Rapid Transit Network builds on the success of Corridor routes, and they will see the greatest change. » Corridor routes whose routing overlaps most with BRT lines (3, 4, 5, and 9) will likely be replaced by BRT or adjusted to provide less frequent service. » Corridor routes which serve areas not covered by BRT (1, 6, 7, and 8) are unlikely to change routing but the level of service may be adjusted.	» Most Local routes will integrate with the BRT network without much change. » Local routes that serve a crosstown function may be modified to better integrate with the BRT Network. » Local routes running near new ferry terminals will likely be adjusted to serve the new terminals.	» Substantial changes to Express routes are not anticipated in the near term. » Some Express routes may see reduced travel times by taking advantage of the transit priority lanes created for BRT. » In the long term, Halifax Transit will continue to evaluate the utility of Express routes in the context of changing travel patterns and the impacts of Rapid Transit.	» No changes anticipated. » Some routes may see reduced travel times by using new transit priority lanes.

6.5 Costs and Funding

Like most transformative projects, the Rapid Transit Strategy will require substantial financial investment.

- An estimated **$297M to $342M in capital funding** is required to implement all four BRT lines and three ferry routes. The range reflects the degree to which new ferry terminals can be integrated with other development projects and whether the proposed upgrade to electric buses is included.

- The Strategy represents an estimated net increase in Halifax Transit's **annual operational costs of $15M to $22M** depending on the level of service for the ferry routes and how much new revenue is generated through fares.

These are high-level estimates that will be refined as the project advances. The capital cost estimates include contingencies, engineering and project management costs, and taxes. They do not include land acquisition costs, which will be developed as part of the functional planning and detailed design process.

PARTNERSHIP OPPORTUNITIES

The capital investment needed to build the Rapid Transit Network is higher than any previous single investment the Municipality has made in public transit, and will only be possible by partnering with other levels of government for funding.

The federal and provincial governments have both announced meaningful efforts to tackle the climate crisis and are targeting transportation as a key component of those efforts. Canada is working to reduce greenhouse gas emissions to 30% below 2005 levels by 2030 under the Pan-Canadian Framework for Clean Growth and Climate Change. Nova Scotia has recently established the Sustainable Development Goals Act, aiming to make the province net-zero by 2050. The Rapid Transit Strategy is key to achieving these federal and provincial priorities.

One potential source of funding for much of the Rapid Transit Strategy is the Public Transit Infrastructure Fund (PTIF), which the federal government has established to fund transformational transit infrastructure projects like Rapid Transit. The second phase of PTIF is well aligned to potentially fund a large portion of the implementation of the Rapid Transit Strategy.

FUTURE BENEFITS

Section 1.2 details the numerous social, economic and environmental benefits that Rapid Transit will have in HRM as it improves mobility options, orients land use toward transit and makes transportation more sustainable and equitable. The long-term and often indirect nature of these benefits makes it difficult to assign them a dollar value, but they are no less real.

Some of the ways in which the Municipality will see the benefits of Rapid Transit and supportive land use policy include:

- Reduced capital spending on road expansion projects to meet increases in demand for vehicle travel.
- Lower municipal servicing costs due to a more compact development pattern.
- Increased property tax revenue from higher land values around Rapid Transit lines.
- Higher economic productivity from reduced traffic congestion relative to a future with higher auto use.
- Better-distributed economic growth due to increased mobility for all residents.
- Improved public health from higher rates of walking, rolling, and bicycling in conjunction with transit use in complete communities.
- Reduced greenhouse gas emissions leading to some mitigation of the climate crisis.
- Lower household transportation costs.

ESTIMATED CAPITAL COSTS

Bus Rapid Transit (4 Lines)	
New expansion buses (33) [1]	$36–64 M
Stations (130)	$62 M
Transit priority lanes and intersection improvements	$86 M
Property acquisition	TBD
Additional studies, functional plans, and project overhead	$5 M
Subtotal	**$189–217 M**
Ferry (3 Routes)	
Vessels (10)	$71 M
Halifax Ferry Terminal (rebuild)	$17 M
Mill Cove Terminal [2]	$6–18 M
Larry Uteck Ferry Terminal [2]	$6–7 M
Shannon Park Ferry Terminal [2]	$4–8 M
Property acquisition	TBD
Additional studies, concept designs, and project overhead	$4 M
Subtotal	**$108–125 M**
TOTAL CAPITAL COSTS (EXCLUDING PROPERTY)	**$297–342 M**

ESTIMATED ANNUAL OPERATING COSTS

Bus Rapid Transit (4 Lines)	
BRT operating costs	$29 M
Operating costs reassigned from corridor routes	($18 M)
Anticipated new annual fare revenue [3]	($4–5 M)
Net new operating costs	**$6–7 M**
Ferry (3 Routes)	
Ferry operating costs [4]	$14–18 M
Anticipated annual fare revenue [5]	($3–5 M)
Net operating costs	**$9–15 M**
OVERALL NET NEW OPERATING COSTS	**$15–22 M**

1 *Estimate reflects a mix of standard and articulated buses. The range reflects the cost of diesel (lower end) and electric (higher end) buses. In alignment with the proposed fleet electrification strategy, the goal is to procure electric buses; the costs may be reflected in that strategy.*

2 *Ranges reflect cost estimates for a standalone terminal (higher end of range) vs. marginal costs for a terminal integrated into concurrent development (lower end of range). Mill Cove and Shannon Park standalone terminal estimates include the cost of parking facilities.*

3 *Based on cost recovery of 35% to 50%, in line with current corridor routes and assuming BRT charges the conventional transit fare.*

4 *Range reflects different levels of off-peak service (60 minute or 30 minute frequencies).*

5 *Based on cost recovery of 20% to 30%, in line with ridership estimates and assuming ferries charge the conventional transit fare.*

PUTTING THE COST IN PERSPECTIVE

The Rapid Transit Strategy proposes a considerable capital investment. Previous municipal plans have also included large capital investments in the municipality's transportation network to accommodate increases in travel demand associated with projected growth.

- The *Regional Plan* included a list of road network projects with an estimated cost of $750 M. These projects would have been cost-shared between all three orders of government. The *IMP* determined that for an investment of $190 M in alternate transportation modes, some of these infrastructure projects could be postponed or reduced in scope.

- The *IMP* identified approximately $130 M of investments in transit improvements, including $50 M for commuter rail (based on estimates at the time) and $65 M for transit priority corridors. The Strategy represents a shift of this investment from commuter rail to BRT and ferries.

Investing in Rapid Transit and other key projects (e.g. the Regional Centre All Ages and Abilities bike network) can help accommodate new growth while foregoing more costly road infrastructure projects identified in the *Regional Plan*.

As well, some of the proposed capital investments identified in the Strategy are already planned for. The Municipality's multi-year capital budget includes estimated amounts for strategic multimodal corridors aligned with the Strategy's transit priority corridors. The amount of new capital investment proposed is therefore lower than the total estimated in the Strategy.

6.6 Measuring Success

The Rapid Transit Strategy sets ambitious goals for the success and impact of its proposed transit services. The Municipality will measure progress toward these goals by taking advantage of existing monitoring programs established by the *Integrated Mobility Plan* and by Halifax Transit.

- Halifax Transit will monitor the success of the BRT lines and ferry routes through its quarterly and annual performance measures reports, supported by data taken from automated vehicle location (AVL) and passenger counter (APC) systems.
- The Municipality will monitor the impact of Rapid Transit through the ongoing *IMP* evaluation program, which monitors twelve performance indicators relevant to the Rapid Transit Strategy. One additional indicator will be added to measure Rapid Transit-oriented growth.

	GOAL	INDICATOR (from Halifax Transit)
RIDERSHIP	Improve ridership of replaced corridor routes on BRT lines	Average daily boardings on BRT lines and corridor routes
	Meet target of 2,000 daily boardings on each ferry route	Average daily boardings on ferry routes
	Increase overall transit ridership	Annual system ridership
TRAVEL TIMES	Meet travel time targets outlined in the Strategy on the BRT lines	Average round-trip time on BRT lines
	Meet travel time targets outlined in Strategy on ferry routes	Average round-trip time on ferry routes
RELIABILITY	Meet 90% standard for on-time performance on BRT lines	On-time performance on BRT lines
	Meet 90% standard for on-time performance on ferry routes	On-time performance on ferry routes
	Improve overall reliability	Overall system on-time performance

Figure 44: **Halifax Transit reporting goals and indicators**

GOAL	RELATED IMP INDICATORS	MEASURED EVERY:
Exceed IMP mode share targets	» Transit mode share of travel to work by subregion	5 years
Give transit priority in the transportation system	» Kilometres of transit priority corridors (including ferry)	1 year
	» Number of transit vehicles on transit priority corridors	
	» Number of intersections with transit priority measures	
Reduce transit travel times	» Average commute time by [transit] mode	5 years
	» Average network-wide transit operating speed	1 year
Direct growth to areas served by Rapid Transit	» Number of residential units and businesses in transit-oriented communities	1 year
	» **New Indicator:** Percent of residents and jobs within 800m of Rapid Transit stations and terminals	5 years

Figure 45: **Rapid Transit-related *IMP* goals and indicators**

GOAL	RELATED IMP INDICATORS	MEASURED EVERY:
Build connected, complete communities around Rapid Transit stations	» Percent of streets with sidewalks by sub-region	1 year
	» Length and connectivity of new bicycle routes, sidewalks, and greenways	
Build public support for Rapid Transit	» User perception of transportation infrastructure improvements on strategic corridors	1 year
	» User perception of walking, bicycling, and taking transit as a transportation option	2 years
Reduce the need for vehicle ownership	» Vehicle ownership per capita	1 year

Figure 46: **Rapid Transit-related *IMP* goals and indicators (cont.)**

6.7 Next Steps

The Rapid Transit Strategy represents another consequential shift forward for the municipality. It builds on the direction set by the *Integrated Mobility Plan* to provide sustainable transportation options, improve residents' mobility, and create more affordable and equitable communities. To achieve its vision will require a high level of resources, integration with external stakeholders, and significant capital and operating funds.

The critical next steps for the Municipality to take are:

1. **Secure the necessary resources and funding from key partners to implement the Strategy.** The scale, scope, and schedule of the Strategy cannot be achieved with the Municipality's existing budget and staff resources. Prior to starting implementation, external funding must be secured.

2. **Initiate functional plans for BRT corridors and additional analysis for ferry service.** While significant technical analysis was undertaken to develop the Strategy, additional studies are required to refine the service plan. As the timeline is driven by already-planned major construction projects, implementation can focus on additional planning and analysis in the short term.

3. **Continue to aggressively pursue transit priority lanes on key corridors.** In addition to the corridors identified in the Strategy, the Municipality should work with provincial partners to explore the potential for transit priority on the Macdonald Bridge and segments of Highway 102. As well, innovative measures such as transit-only streets should be explored and piloted on highly-constrained corridors which are key to transit reliability.

4. **Strengthen the relationship between Rapid Transit and land use planning through the *Regional Plan* review and the forthcoming *Suburban Plan*.** These planning initiatives should reinforce the Strategy's directions for land use planning. The development of transit-oriented design guidelines could further enhance development outcomes to reinforce sustainable mode share goals.

5. **Establish transportation reserve zones to preserve the right of way for strategic Rapid Transit projects.** The Municipality can use the results from functional plans on transit corridors to develop a land acquisition strategy to ensure there are sufficient space and funds for the transit priority necessary to support the Rapid Transit Network and potential future Rapid Transit.

APPENDIX

GLOSSARY

Accessible: Planning, design, and programming that enables access by people with a variety of physical and mental abilities.

Active Transportation: Human-powered, personal travel chosen as an alternative to motorized travel and includes: walking, running, hiking, the use of a wheelchair, bicycling, cross-country skiing, skateboarding, canoeing, rowing, or kayaking.

All Ages and Abilities (AAA): Planning, design and programming that enables use by people of all ages and with a variety of physical abilities.

Barrier-free: Design that enables access by people with or without a variety of physical and mental abilities.

Bikeway: Routes or paths used for bicycling.

Bus Rapid Transit (BRT): A high-quality bus system that provides transit riders with fast, frequent, comfortable, higher capacity service. Where possible, it uses transit priority lanes. Off-board fare collection and level boarding improve accessibility and reduce time spent at stops.

Commuter Rail: Local train service oriented to peak-hour trips to work or school, usually using existing tracks.

Complete Communities: Communities that include a range of uses and housing options to accommodate people in all stages of life and at a variety of income levels. Complete communities provide a place for residents to live, work, shop, learn, and play. These communities contain mixed uses and compact development that enables people to safely and conveniently access the goods and services they need in their daily lives, all within a short journey and without the need to depend on a personal vehicle.

Complete Streets: An approach to planning, design, operations, and maintenance of roads, sidewalks, landscaping and rights of way that enables safe, convenient, and comfortable travel and access for users of all ages and abilities regardless of transportation mode (e.g. on foot, on a bicycle, using transit, in a private vehicle). It recognizes that public streets are also places that can serve a social, economic, and ecological function.

Curb Extensions: A treatment that increases the width of a sidewalk while also reducing the width of a street to shorten pedestrian crossing distance, improve visibility, reduce traffic speeds, and improve off-street amenities. Curb extensions, which can be located on intersection corners as well as at mid-block, are commonly referred to as 'bump-outs' or 'neck downs'.

Density: A measure of the number of people or housing units occupying a given area of land. The measure may reflect the general character of the housing types in a neighbourhood.

Employment Centre: Concentrated areas of offices and businesses that result in a large number of workers relative to surrounding areas. Ideally, employment centres should resemble traditional downtowns or town centres which are compact and walkable and offer a mix of activities. However, many business parks are also employment centres due to the large number of jobs compared with their surroundings.

Goods Movement: The transportation of freight by road, rail, ship or air, between communities (regional/national/international) or within communities (local/pick-ups/deliveries).

Greenhouse Gasses (GHG): Any gaseous compound in the atmosphere (e.g. carbon dioxide CO_2) that is capable of absorbing infrared radiation, thereby trapping and holding heat in the atmosphere.

Induced demand (on roads): As road capacity is increased to accommodate more vehicles (through widening and expanding roads), additional drivers choose to use the road, creating more traffic and eventually heavier congestion.

Land Use: The classification of the natural and built environment, as it exists or as prescribed by policy or regulation.

Light Rail Transit (LRT): An electric railway system characterized by its ability to operate single vehicles or short trains along exclusive rights of way at ground level, on aerial structures, in subways, roadway medians, or in segregated street lanes. Unlike commuter trains, LRT trains have more frequent stops and normally must be segregated from conventional railway vehicles.

Mixed-use: Different activities and building occupancies that are arranged close to one another. These different uses may be located on the same site, in the same building or along the same street.

Mobility: The ability to travel and move around easily and efficiently.

Mode Share: The proportion of people using a given type of transportation, such as private vehicles or transit.

Mode Shift: A measurement of how many people (usually as a proportion) change their mode of daily travel

Park & Ride: Parking lot located at a transit terminal or stop, enabling people to leave their private vehicles there and continue their journey using transit.

Peak Hours: The times during a weekday when traffic is highest as many people travel to and from work. For transportation modeling and transit service purposes, the AM peak is 6am–9am, and the PM peak is 3pm–6pm.

Rapid Transit (RT): Transit service separated partially or completely from general road traffic and therefore able to maintain higher levels of speed, reliability, and vehicle productivity than can be achieved by transit vehicles operating in mixed traffic.

Right of way: A strip of public land including and bordering a street, road, pathway, or railway.

Shared Street: Streets where the formal distinctions between spaces dedicated to pedestrians, cyclists, and motorized vehicles have been removed, and which is shared by everyone.

Strategic Corridor: Transportation corridors that are important based on their role in the surrounding communities and to traffic operations, transit, goods movement, or active transportation.

Transit-Oriented Development / Transit-Oriented Community: An approach to development that focuses a complete community around a transit terminal or within a transit corridor, with emphasis on higher residential densities, walking distance and a mix of uses, facilities, and activities.

Transit Priority Corridor: A street in the transportation network that features measures to give increased priority to transit vehicles, such as dedicated bus lanes.

Transit Priority Measures (TPM): Tools that municipalities and transit agencies use to reduce delays, improve reliability and increase the average operating speed. There are many different types of TPMs and, in many cases, they are used together to create a city-wide network. Some of the most common TPMs include: traffic signal priority, queue jumps, bus lanes and transitways that are separated from motor vehicles (e.g. busways, railways).

Transportation Demand Management (TDM) : A strategy aimed at reducing peak hour congestion by providing people with choice in how, when, and whether they commute to work.

Transportation Network: All routes and modes of travel throughout the region and how they are connected.

Transportation Reserve Zones: Lands, typically abutting transportation corridors, that are designated in a Municipal Planning Strategy and zoned for long-term street or pathway needs. Reserve zones can enable the establishment and enforcement of development restrictions that avoid encroachment on lands that may be used for future transportation projects.

Walkable: Refers to a single route or a network of routes, between points, that is relatively short, barrier-free, interesting, safe, well-lit, comfortable, and inviting to pedestrian travel.

Walkshed: The area within a short walk or roll of a transit stop, station, or terminal. For conventional bus routes, areas within a 400 or 500 metre walk or roll of a stop are generally considered within the walkshed. For Rapid Transit stations, walksheds include areas within 800 metres.

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