HALIFAX REGIONAL MUNICIPALITY FUTURE SERVICED COMMUNITIES – SANDY LAKE TRANSPORTATION PLAN

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Final Report

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1 Introduction

The Halifax Regional Municipal Planning Strategy (Regional Plan) provides direction on how future settlement should take place in the Halifax Regional Municipality (HRM). The Regional Plan outlines the Urban Service Area boundary identifying areas that would be considered as potential Future Serviced Communities; Sandy Lake, Highway 102 West Corridor, Morris Lake Expansion, and the Westphal (Akoma) area.

The scope of work for each study area includes compiling detailed background information needed to inform future decisions about potential development, encompassing transportation infrastructure assets and constraints using multi-modal analysis. Analysis results in recommendations for each study area based on suitability of the study area for development and the feasibility of transportation network upgrades that are required to connect the study area to surrounding communities.

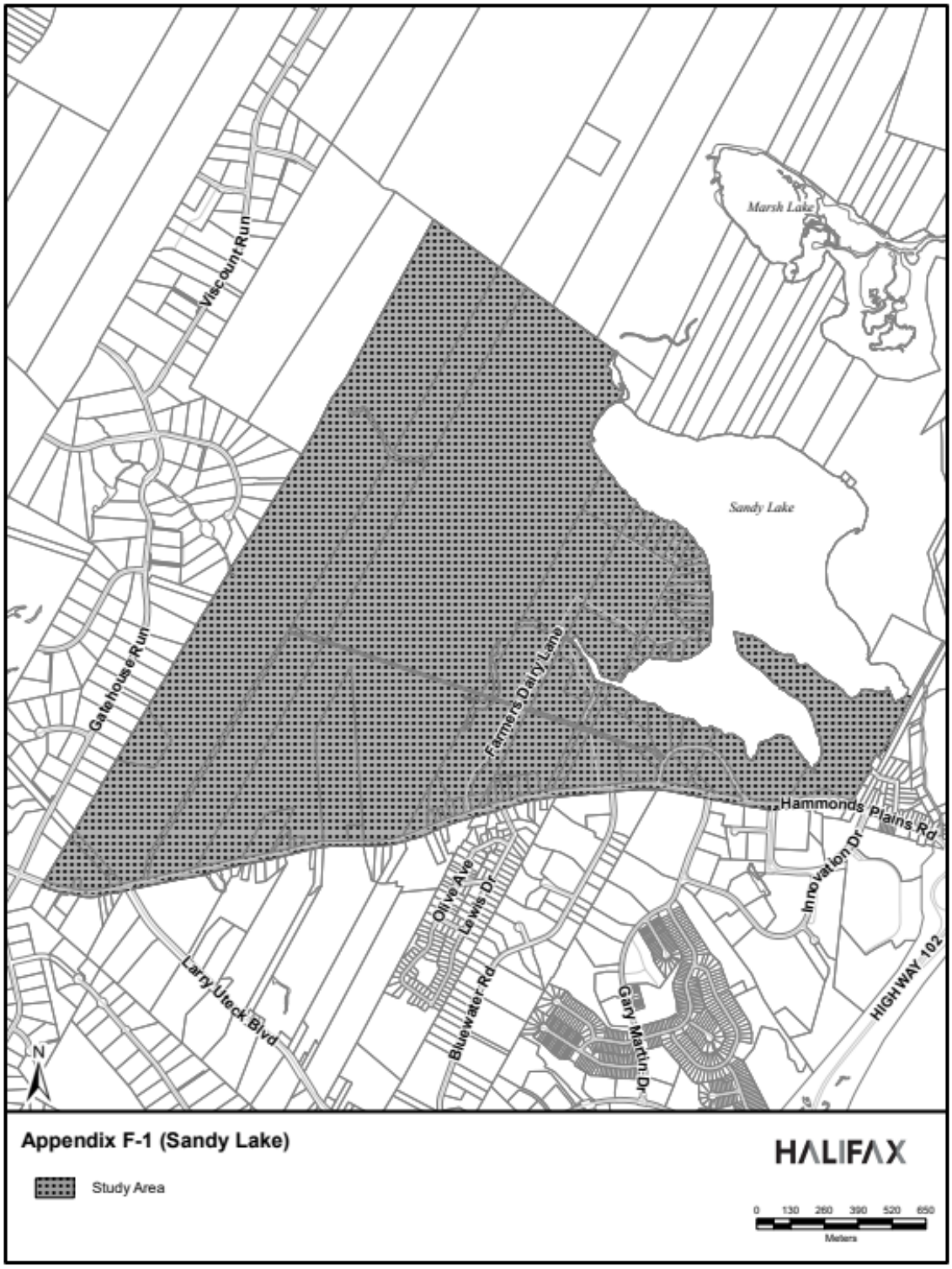
The Sandy Lake study area focuses on lands owned by Clayton Developments Limited, the largest landholding. The company declared its intention to undertake major development on its property before Halifax Regional Municipality issued the Request for Proposals for the Future Serviced Communities project. The developer-requested scenario also considers input from additional landowners who have indicated development intentions ranging from interest in possibly rezoning of their properties to specific subdivision and development proposals expressed in formal plans.

2 Study Area Overview

2.1 Location

Sandy Lake is in northwest Bedford at the northwest edge of HRM's urban core. The Sandy Lake study area defined by HRM covers roughly 400 hectares west of Sandy Lake and north of Hammonds Plains Road within Bedford/Hammonds Plains (**Figure 1**). The area borders on Hammonds Plains Road, Sandy Lake, and the property lines of residential lots on the east side of Gatehouse Run.

The study area is primarily served by a pair of two-lane arterial roadways. Hammonds Plains Road travels from east to west and forms the southern boundary of the study area. Larry Uteck Boulevard meets Hammonds Plains Road near the southwest corner of the study area. Speed limits range from 50 to 70 km/h on each road.



Source: Halifax Regional Municipality

Figure 1: Sandy Lake Study Area

2.2 Existing Land Use

While much of land within the study area is undeveloped, there is a mix of residential and commercial uses on the Hammonds Plains Road frontage, a large dairy processing plant on the southwest edge of Sandy Lake, and homes in the same area that are accessed through the industrial property. Land uses fronting on the north side of Hammonds Plain Road include single-detached homes and highway commercial/light industrial uses with direct access to the road.

Halifax Towing's operation consists of a network of driveways extending more than 500 metres from Hammonds Plains Road to access multiple buildings and storage areas. From Hammonds Plains Road, Giles Drive provides a short loop used to access several homes to the east of Halifax Towing. Four properties on the north side of Giles Drive have water frontage on Sandy Lake. Remaining water frontage is occupied by Sandy Lake Academy, a private school and church operated by Seventh Day Adventists that is accessed from a driveway on Hammonds Plains Road as well as via Killarney Road. To the west of Halifax Towing are additional homes and small businesses fronting on Hammonds Plains Road.

The most significant land use in the study area is the Agropur dairy plant. The gated plant is accessed via Farmers Dairy Lane, which meets Hammonds Plains Road immediately west of Halifax Towing. Farmers Dairy Lane extends nearly 500 metres from Hammonds Plains Road crossing Johnson's Brook, a substantial watercourse that feeds into Sandy Lake. A lagoon used to treat plant effluent is located on the north side of Farmers Dairy Lane. Roads built in conjunction with the dairy plant allow property owners to access homes, seasonal properties, and undeveloped lots on the west side of Sandy Lake by crossing the edges of the plant property. Additional lakefront lots have been subdivided but do not have road frontage. A limited road network behind the plant similarly accesses a small number of homes and seasonal residences to the north but does not reach several vacant and forested lots.

Lands to the west of the dairy plant to Gatehouse Run include large vacant tracts owned by Clayton Developments Limited. The properties owned by Clayton extend to the northern edge of the Study Area and have extensive frontage on Hammonds Plains Road.

2.3 Adjacent Land Use

Lands to the north of the Study Area are currently undeveloped to Highway 101 and the community of Lower Sackville. The lands are largely publicly owned and have been discussed for many years as the potential site of a Sandy Lake Regional Park. The remaining three sides of the Study Area, by contrast, are well-developed. Between the eastern edge of the Study Area and the Highway 102 interchange that accesses Hammonds Plains Road are subdivisions comprised largely of single-detached homes fronting on Killarney Drive and Smiths Road. Smiths Road, furthermore, accesses Sandy Lake Park, which consists of 100 acres of municipally owned land on the western shore of Sandy Lake. The Park provides trails and a supervised beach with other amenities.

To the west of the Study Area, Gatehouse Run provides access to an estate lot subdivision largely comprised of single-detached homes. Gatehouse Run extends roughly 2 kilometres parallel to the western edge of the Study Area. At its northern end, it branches into several shorter roads that are either

planned cul-de-sacs or temporary dead-end roads awaiting connection to streets serving currently undeveloped lands to its west.

Development south of the Hammonds Plains Road is more intense. The most prominent land use near the study area lands is a regional recreation centre that includes multiple ice surfaces. Beyond the recreation centre and other commercial uses on the Hammonds Plains Road frontage is a mixture of residential uses ranging from single-detached houses to medium and high-rise apartment structures, as well as a seniors housing complex and a high school with associated recreational amenities, including the Bedford-Hammonds Plains Community Centre.

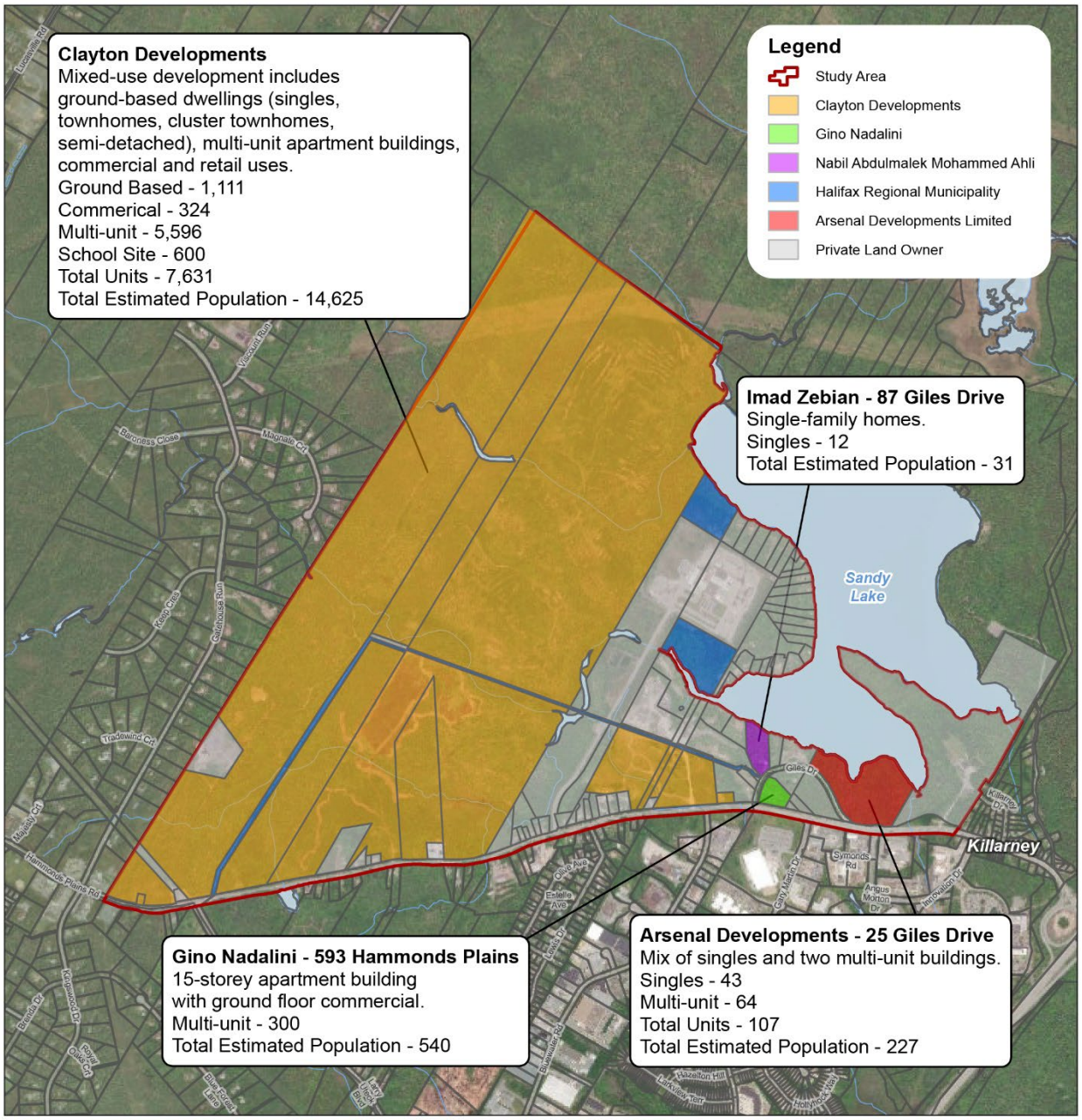
Bluewater Road and Larry Uteck Boulevard terminate on the south side Hammonds Plains Road where it abuts the Study Area. Bluewater Road is the primary collector road for the nearby Atlantic Acres Industrial Park connecting to Kearney Lake Road. The intersection with Larry Uteck Boulevard is east of Gatehouse Run and provides direct access to two separate interchanges on Highway 102.

2.4 Development Proposals

Proposed development plans aim to transform the Sandy Lake study area into a mix of residential and commercial spaces, with each development contributing to a broader vision for the region (**Figure 2**). Among the proposals, Clayton Developments' plan stands out as the largest, incorporating a wide range of housing types, commercial areas, and community amenities. The proposals provide important context for the anticipated development at Sandy Lake, illustrating the scale and diversity of what is being proposed for the area.

The Clayton Developments Concept Plan for their 670-acre holding incorporates a mixture of residential and commercial development (**Figure 3**). Their concept plan includes housing types ranging from single-detached homes to high-rise apartment structures. The remaining units would be ground-access oriented, including single-detached homes, semis, and townhouses in row and cluster arrangements.

The plan includes a property set aside for a school. If the land is not used for a school, Clayton proposes to develop apartment buildings accommodating 600 additional units on the property. Overall, the concept as depicted in Clayton’s plan would incorporate a maximum of 7,631 dwelling units of all types expected to be occupied by 14,625 people. If a school is built, dwelling units would total 7,031 to house an expected population of 13,545.



Source: Halifax Regional Municipality

Figure 2: Sandy Lake Study Area – Land Ownership and Anticipated Development

The Clayton Developments Concept describes site access as a crescent roadway intersecting Hammonds Plains Road at its current intersection with Larry Uteck Boulevard as well as another location to the east prior to Farmers Dairy Lane. A proposed extension of Bluewater Road would join a second Clayton-owned parcel with the main development (**Figure 3**). This extension crosses land currently owned by Agropur, operators of the nearby dairy processing plant. A large collector loop joins the proposed crescent road and Bluewater Road extension while providing access for the majority of uses to be located on the parcel. The larger loop collects traffic from a secondary street network, which provides access to additional low-density residential units in addition to a proposed commercial centre. A further loop in the northeast corner of the site provides access to additional low-density units. The area served by this loop is surrounded by lands Clayton is offering to sell to HRM for expected parkland expansion.

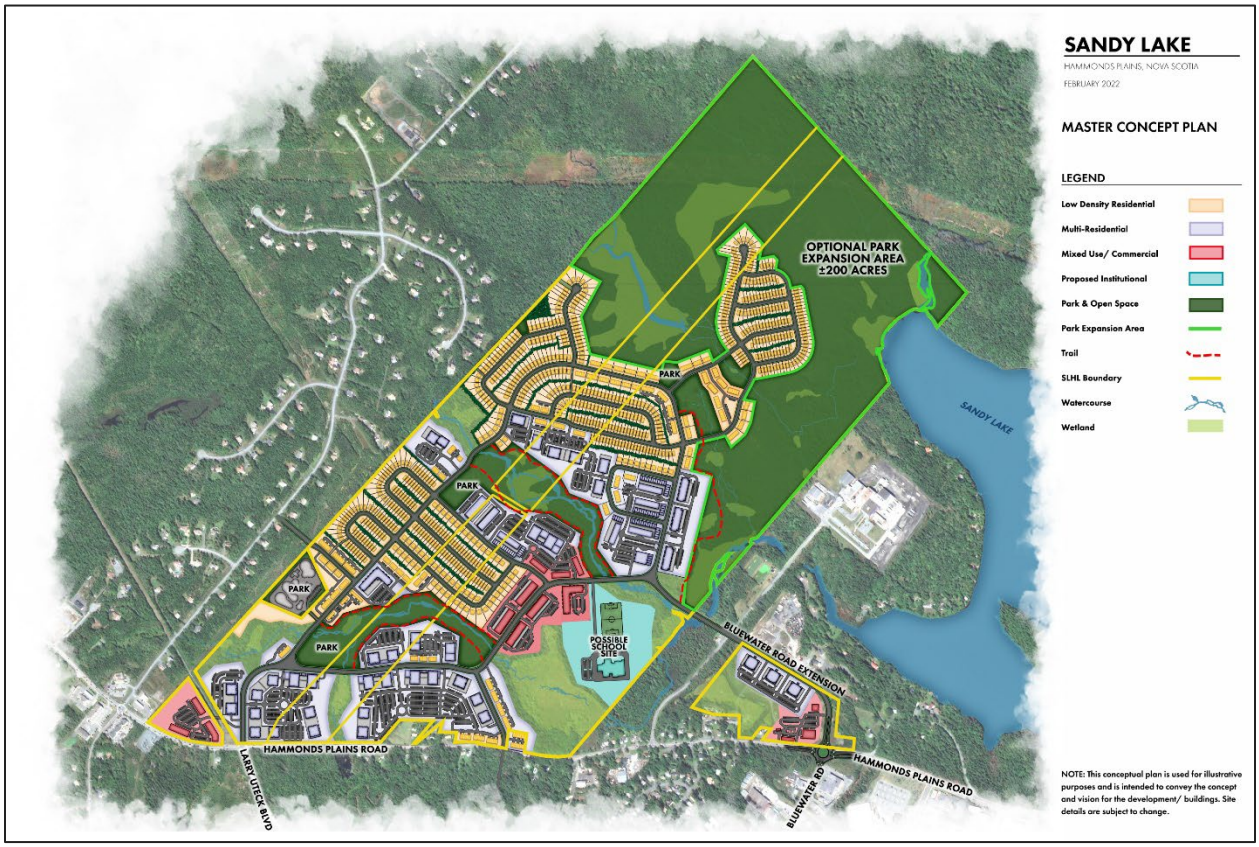


Figure 3: Clayton Developments Concept Plan

Plans for two smaller developments along Giles Drive have also been submitted. The Arsenal development would create a new road joining Hammonds Plains Road and Giles Drive as well as a dead-end street closer to Sandy Lake (**Figure 4**). The vacant 15-acre property has frontage on both Hammonds Plains Road and Giles Drive. The north edge of the property is on the shore of Sandy Lake while the southern edge faces several light industrial and commercial properties opposite it on Hammonds Plains Road. The Sandy Lake Academy property abuts the eastern boundary. The plan incorporates single unit, low-rise multi-unit and/or townhouse building typologies" while displaying 45 lots. Two of the lots are designated multi-unit buildings, each of a 15,000-square foot footprint.

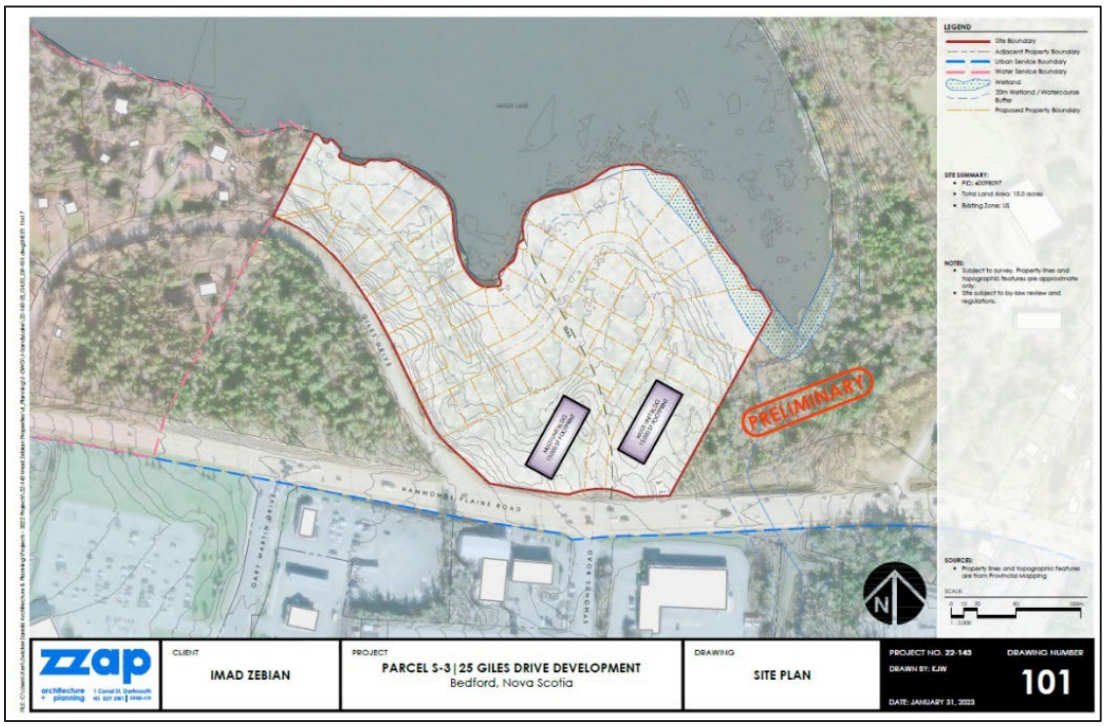


Figure 4: Concept Plan, 25 Giles Drive

A second Arsenal development plan would subdivide the lot at 87 Giles Drive and construct a single street terminating in a cul-de-sac in the north (**Figure 5**). This 3.2-acre property fronts on Giles Drive and backs onto Sandy Lake. There is currently one single-detached dwelling on the site. Large low-density residential lots surround the property. The submitted plan shows 12 lots with frontage on the cul-de-sac based on the RSU (Single Dwelling Unit) Zone contained in the Bedford Land Use Bylaw.

The two smaller development plans would provide 55 lots for single-detached dwellings, although the existing home at 87 Giles Drive would be demolished. Stantec assumes each of the multi-unit buildings at 25 Giles Drive would provide 64 units. In total, the two subdivisions would accommodate a net 107 units, with an estimated additional population of 227.

Figure 5: Concept Plan, 87 Giles Drive

Other landowners of property adjacent to the Clayton lands have indicated a desire to develop their properties. One landowner has express intentions to move a contracting business to a new location and build a 15-storey, 300-unit apartment building with ground floor commercial at 593 Hammonds Plains Road that would house 540 residents.

3 Transportation Policy Context

The 2017 Halifax **Integrated Mobility Plan (IMP)** is the foundation that informs municipal mobility and land-use planning and decision-making until 2031. The IMP provides policies and tools to enable the municipality, transportation authorities, developers, organizations, and community members to build an integrated mobility system that promotes sustainable growth. The IMP's guiding principles are structured into four core elements:

- **Foundational Strategies** provide objectives, policies and actions for integrated planning, land use, Complete Streets and Transportation Demand Management;
- **Mode-Specific Strategies** provide objectives, policies and actions for active transportation, transit, goods movement, the road network, and parking;
- **Monitoring and Evaluation** describes how projects will be evaluated and how the progress of the IMP will be monitored by municipal staff and Council; and
- **Implementation** includes an Action Plan to translate the IMP into practice and describes how the plan will be implemented.

The IMP contains strategic direction to facilitate the integration of mobility options, land use policy, and municipal departments. Its principles and guidelines directly inform subsequent transportation analyses pertaining to the Sandy Lake study area such as the 2020 Rapid Transit Strategy. The Sandy Lake proposed development site is in the IMP-defined Inner Suburban area which is identified as a priority area to provide: "safe and enjoyable active transportation connections to important destinations such as transit stops and terminals, employment districts, shopping, schools, service centres and other community amenities" with an emphasis on the role of transit in providing access to the downtown.

The **Active Transportation Priorities Plan**, a precursor to the IMP that proposed a vision for active transportation in 2026 and a broad set of priority initiatives for the years between 2014 and 2019, relevantly recommends that bicycle facility development outside the regional centre should focus on improved connections to local destinations such as schools, community centres, and transit hubs as well as completion of the greenway network and the addition of new bicycle lanes where identified.

The **Rapid Transit Strategy** is HRM's plan to realize a rapid transit system by 2030 that builds on the vision of the IMP, supporting population growth by investing in high-quality transit service. 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. A BRT line extended as far as Larry Uteck Boulevard at Highway 102 as well as ferry docks at the eastern ends of Hammonds Plains Road and Larry Uteck Boulevard represent the most proximate access points to the future rapid network from the Sandy Lake Development.

These prior plans inform the latest update to the **Regional Municipal Planning Strategy**, which frames the Future Serviced Communities designation and requirements in the process of defining long-range regional policies outlining expectations of future settlement and development. Its new community planning framework redefines major planning geographies, placing Sandy Lake in a newly defined

Suburban Area consisting of lands outside of the Regional Centre but within the Urban Settlement Designation.

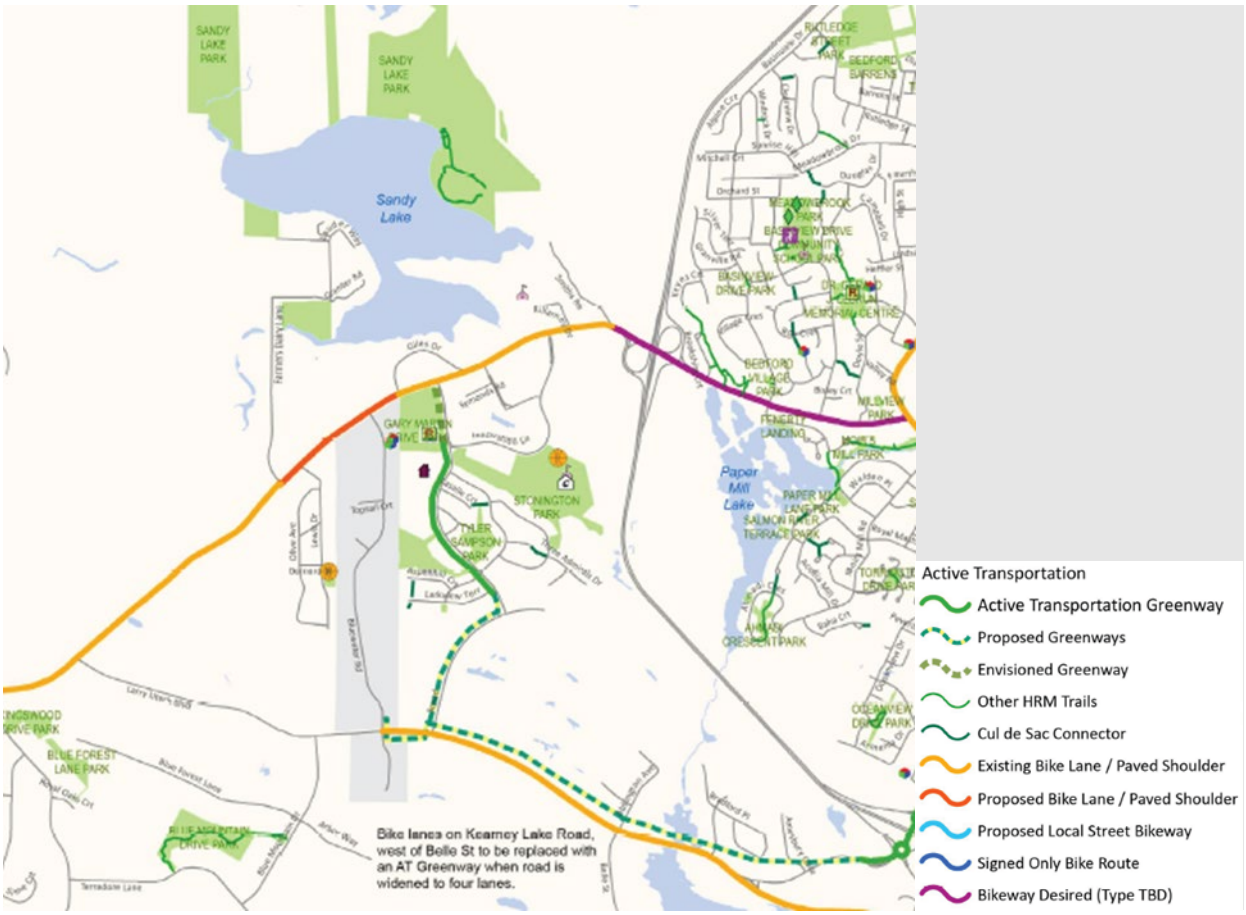
Chapter 7 of the new Planning Strategy focuses solely on transportation and establishes objectives that aim to connect people, improve public health, support environmental responsibility, align capital investments, and allow for streets to perform multiple functions by facilitating sustainable choice in transportation and lifestyle. It establishes new mode share targets aligned with the planning geographies and provides guidance for planning the regional and community mobility networks. The Strategy links to the IMP and Active Transportation Priorities Plan by defining consideration criteria for active transportation projects, especially emphasizing transit connections.

3.1 Development Site Relationship to Policy and Direction

The HRM Integrated Mobility Plan reiterates regional mode share targets originally established in the 2014 Regional Plan. To be achieved by 2031, the planning targets were only projected to be achievable through incorporation of IMP recommendations. The IMP anticipates arrangements and behaviour in the various sub-areas of the region to contribute differently to overall regional goals. Within the Inner Suburban area, where the Sandy Lake development is found, the 2031 targets seek at least 20% transit mode share and at least 6% for trips made solely by walking or cycling.

Implementation actions within the IMP define preferred approaches to meet planning targets. Individual approaches integrate and support a number of the foundational and mode-share specific policies described in the plan. Large-scale developments like Sandy Lake present an opportunity to require the application of those approaches to contribute to the realization of regional goals. The IMP further seeks to require developers to plan and implement pedestrian and cyclist facilities in early phases. The Plan states that a multi-connection pedestrian and bicycling network should be provided where topography and other environmental conditions allow that connects street and pathway networks with those of existing communities and neighbourhoods.

The Active Transportation Priorities Plan envisioned completion of the Gary Martin Drive greenway to meet Hammonds Plains Road as well as closing the gap between sets of on-road bicycle facilities along Hammonds Plains Road adjacent to the proposed development site (**Figure 6**). In addition to the planned greenway completion, the Plan asserts that on-road facilities should not only be connected, but also upgraded as the opportunity arises.



Source: HRM – 2014-2019 Halifax Active Transportation Priorities Plan

Figure 6: Sackville/Bedford Area Candidate Bicycle Routes and Greenway Network

The IMP does not characterize major corridors in the immediate vicinity of Sandy Lake as transit priority corridors and the 2020 Rapid Transit Strategy extends Bus Rapid Transit only as far as Larry Uteck Boulevard at Highway 102. However, the Draft Regional Municipal Planning Strategy has identified Hammonds Plains Road, Larry Uteck Boulevard, and the Bedford Highway as Strategic Corridors. Strategic Corridors are designed to improve public safety, connect communities, and manage congestion by prioritizing sustainable modes of transportation over private motor vehicles, and are intended to integrate regional and community mobility connections with land use planning.

4 Site Plan Transportation Assessment

Identification of transportation system implications associated with new development requires a comprehensive assessment of prior transportation study related to the Sandy Lake development. Key assumptions underlying methodology are critically examined to ensure their validity and relevance. As previous transportation impact study represents the source of development concept plans for Sandy Lake, we analyze the dependent relationship between proposed internal circulation networks and existing surrounding active transportation and public transportation facilities and services.

4.1 Roadway Network Impacts

WSP completed a traffic impact study in February 2023 to determine anticipated necessary roadway network modifications related to Clayton's contribution to study area development. Noting that mix of residential, commercial, and educational uses would be built-out in multiple gradual phases through 2036, the study established the following objectives:

- To develop projected 2023 and 2044 background weekday AM and PM peak hourly volumes for study area adjacent intersections.
- To estimate the number of weekday AM and PM peak hour trips that will be generated by the proposed development.
- To distribute and assign site generated trips to study area adjacent intersections to project 2044 peak hourly volumes that include site generated trips.
- To evaluate impacts of site generated traffic on the performance of study area adjacent intersections.
- To complete warrant analyses, as necessary, for study area adjacent Intersections and recommend improvements that may be needed to mitigate the impacts of site development.

The impact study performed an extensive intersection operational analysis on six existing intersections plus one proposed to be created as an access point from Hammonds Plains Road to the new development. Turning movement data collected in January 2023, modified by seasonal adjustment factors, is further projected to 2044 with volumes added from a traffic impact study for a nearby neighbourhood to determine future background traffic levels if the proposed development were not realized.

Based on anticipated land uses for the proposed Clayton development, the study estimates external trips generated by the new uses. Reduction factors are applied in consideration of future active transportation connections and transit improvements. These factors also acknowledge that proposed commercial and educational components of the new development would primarily serve the local community and be unlikely to attract significant traffic from outside of the immediate area. WSP applied a 15% reduction to residential trip generation to specifically account for anticipated active transportation and transit trips. Finally, and importantly connected to the Integrated Mobility Plan, a sensitivity analysis assuming an achieved 27% non-auto mode share was performed on the 2044 full build-out scenario. The study does not explicitly detail the mode share assumed for the core analysis, however.

4.1.1 TRAFFIC IMPACT STUDY CONCLUSIONS

The traffic impact study draws several conclusions regarding operational performance of study area roadways versus Regional Municipality guidance in 2044 after full build-out of the development area is completed. Intersections were analyzed in existing configurations, with lane and signal modifications, and in certain cases, as a roundabout.

The Study estimates that the entirety of the residential and commercial development will generate 2,416 external vehicle trips during the AM peak hour and 3,039 during the PM peak hour. Distributed primarily to the south and east, intersections were identified that warrant left turn lanes and traffic signals. Further performance analysis yielded a suite of roadway modifications for full site build-out.

The TIS recommendations primarily focused on roadway and intersection modifications to address the projected traffic volumes based on the assumed trip generation and distribution scenarios. Proposed solutions included the addition of left-turn lanes, traffic signals, and roundabouts at key intersections along Hammonds Plains Road and Larry Uteck Boulevard. While the recommendations provide insights for roadway improvements, the findings place less emphasis on broader considerations, such as addressing the existing gaps in active transportation and transit infrastructure in the area or proposing larger-scale transit solutions and opportunities for enhancing multimodal connectivity in the area.

The study's sensitivity analysis applies a 27% non-auto mode share, the Inner Suburban target of the HRM's Integrated Mobility Plan, to qualify the implementation timeline of many of the proposed roadway and intersection modifications. For example, operations would substantially improve at the intersection of Hammonds Plains Road and Larry Uteck Boulevard versus a 2044 full build-out scenario that assumes no non-auto mode share. While not true for all intersections due to the assigned distribution of site-generated trips, similar conditions would exist at the Hammonds Plains/Bluewater, Hammonds Plains/Gary Martin, Larry Uteck/Blue Mountain, and Larry Uteck/Bluewater intersections.

Although the study states that promotion and subscription of transit and active transportation to, from, and within the study area would potentially delay the implementation of identified roadway modifications, relying solely on promotion is insufficient given current levels of transit and active transportation infrastructure in the area. Furthermore, the TIS does not provide specific strategies for achieving the 27% non-auto mode share target. Meeting this goal will require significant investment in transit service expansion, prioritization measures, and the development of a fully connected cycling and pedestrian infrastructure network in and around the study area.

4.1.2 VALIDATION OF TRIP GENERATION ASSUMPTIONS

At the core of the Transportation Impact Study are the assumptions and technical considerations used to determine future trip volumes. Based on turning movement data collected in January 2023 at six locations adjacent to or near the Sandy Lake development site, 2044 background traffic volumes are projected at these locations by applying HRM's historical seasonal adjustment factor and adding trips generated by the Bedford West Sub Area 1&12 development. Additive trip generation estimates and the distribution of trips entering/exiting the proposed Sandy Lake development during peak periods uses published rates from the Institute of Transportation Engineers Trip Generation Manual 11th Edition. The

estimates are directly based on the proposed number of residential units, leasable square footage of commercial components, and student counts at the on-site elementary school.

Several reductions were applied to trip generation estimates that account for the likelihood of trips that either start and end within the development area or are not made by personal vehicle. The analysis applied a 15% reduction to trips generated by residential land uses in consideration of active transportation and planned transit improvements. Larger reductions were applied to the on-site commercial components as these services are expected to primarily serve the new community rather than function as regional retail destinations. Commercial trips to/from Hammonds Plains Road were reduced 60% and commercial trips within the neighbourhood were reduced 90%. Trips generated by the school were also reduced 90%.

While these reductions appear high at first glance, by not applying a corresponding trip generation reduction to the residential component of that trip, the trip is still accounted for. This method avoids double counting while also allowing for trip chaining, such as a resident stopping at a retail store on their way home but does not control for the potential of a regional draw on the school or commercial destinations. This high trip reduction reflects a need to implement an active transportation network that enables seamless and convenient local movement. The connectivity analysis conducted as part of this transportation report has revealed access gaps that challenge the ability to achieve a level of internal activity that supports this level of trip reduction. The presence of on-site destinations is equally important as the implementation of a supportive active transportation network with respect to non-car trip access to frequent destinations.

A secondary major assumption of the TIS is the assignment of trips generated from the development site to segments of the transportation system. The assignment starts with 48% of trips leaving the site via the western access road (intersection of Hammonds Plains Road and Larry Uteck Boulevard), 8% leaving via the central access road, and 44% utilizing the Bluewater Road extension. This in turn feeds a secondary assignment that assumes 45% of site generated trips leave the area via each of eastbound Hammonds Plains Road and southbound Larry Uteck Boulevard. An additional 5% of trips would depart to the west via Hammonds Plains Road while 4% of trips would use Bluewater Road to continue south and only 1% of trips would head immediately north via Gatehouse Run toward Highway 101.

While the TIS states that the distribution percentages are based on WSP's local knowledge of the area, this alone does not provide adequate justification for the assumptions made. However, trip distribution seems initially consistent with the general expectations for travel behaviour, without the added lens of a regional population-destination assignment. It should be noted that when considering the impacts of larger scale transit, especially servicing the urban core of Halifax, trips are more concentrated towards the east, reflecting the location of major employment, and service hubs such as Downtown Halifax, Bedford, and Burnside.

Future vehicle volume assignment considered the existing network constraints, development layout, and assumptions about the future available road capacity. The future capacity is typically determined based on the road network and planned infrastructure improvements outlined in regional or municipal plans. The However, the study does not explain how these assumptions were derived and does not appear to use a formal assignment model. The assignments also overlook destination attraction and are not proportionately consistent with the collected data, which indicates a large preference for outbound traffic

to ostensibly use Hammonds Plains Road for more direct access to Highway 102. Additionally, the first-tier assignment assumption of 44% of trips leaving the development site via a Bluewater Road extension is contingent on an unresolved property access situation.

Finally, the TIS does not provide any recommendations regarding support for shared mobility. Shared mobility solutions may be provided through a community mobility hub, which provides a mix of transportation options to users including cars, bikes, scooters, and charging facilities. The presence of shared mobility options can reduce car dependence for internal trips within new development, supporting the movement of people to the extent that a car is not required on a daily basis. Co-siting the micromobility options with a commercial and/or transit centre can provide the relatively small amount of land required for the community hub. This practice can be replicated across all Future Serviced Community study areas.

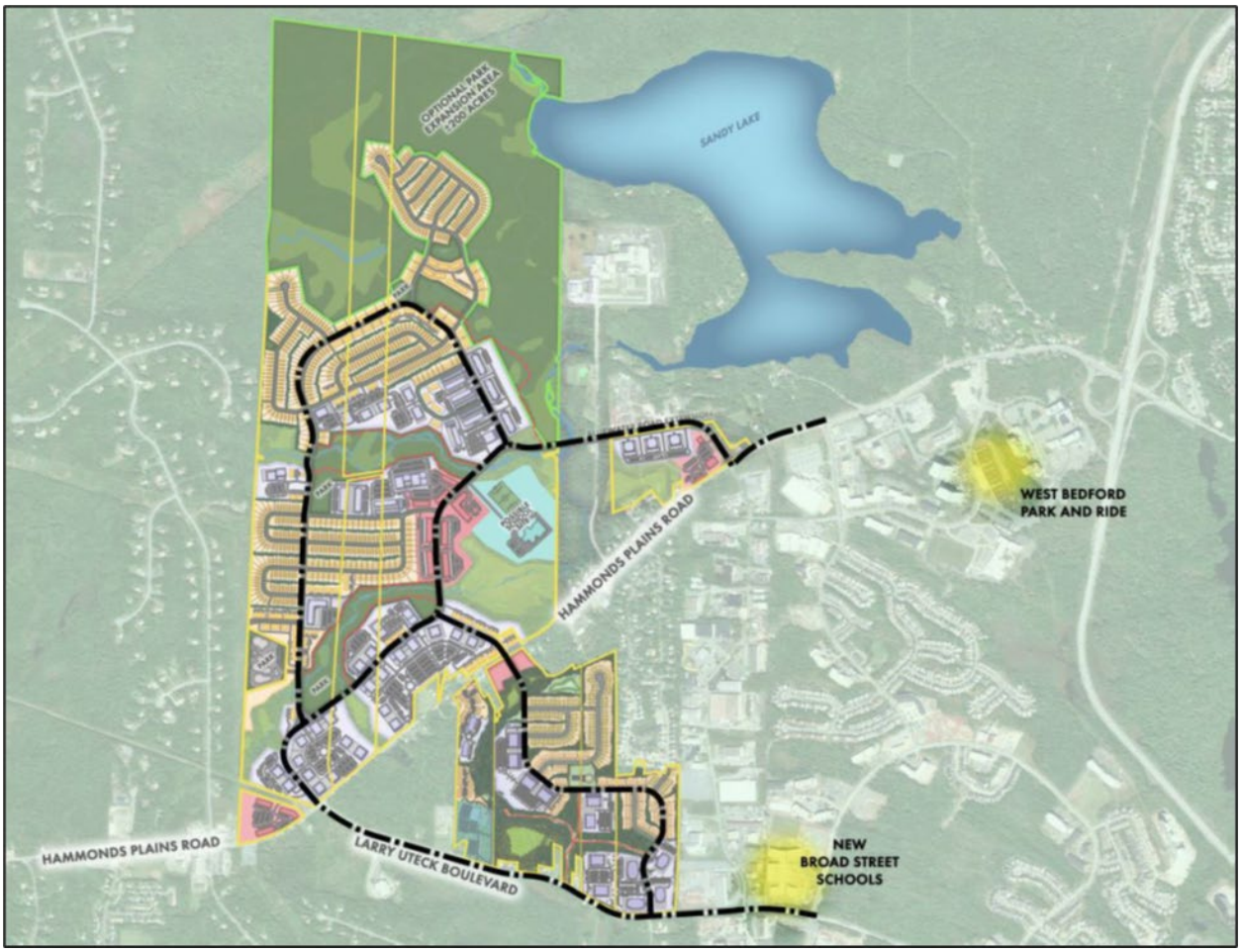
4.2 Active Transportation

Context drawn from prior HRM plans and policy documents specific to existing developed areas adjacent to the development site describes a network of greenways, connecting paths, and bikeways. Development concept plans received to-date include internal active transportation loops. When integrated into the existing non-motorized facility and public transit systems, proposed facilities are designed to enhance connectivity and accessibility for future residents, contributing to a comprehensive active transportation network. Concurrently, an audit of active transportation access examines the needs of the proposed new community as it relates to the external proximity of services and daily needs. The Stantec connectivity analysis identifies potential deficiencies in access for future residents, informing strategies related to amenity location as well as transit vehicle routing.

4.2.1 NON-MOTORIZED MODES

Currently there are no sidewalks along either of the principal arterials serving the study area. Hammonds Plains Road does include painted bicycle lanes east of Giles Drive while bicycle lanes along Larry Uteck Boulevard terminate well south of the study area at the intersection with Abbington Avenue. Given anticipated vehicle volumes and speeds, any such facilities should be fully separated, ideally with a considerable buffer. Active transportation facilities along these major routes would create important connections to neighbouring communities and commercial destinations.

According to the Traffic Impact Study, the Clayton Developments concept proposes multi-use paths along its collector roads that connect to other planned multi-use paths through the Bedford West Sub Area 12 development. Proposed multi-use paths along the primary arterials connect the development site to the previously mentioned bicycle facilities east and south of the Sandy Lake development area. Eastern extension of the path network provides separated facilities along Hammonds Plains Road to connect to a future completed greenway along the entire length of Gary Martin Drive. Master concept planning displays additional trails along lands reserved for watercourses that provide alternate routes and through connections between various points on the primary active transportation loops.



Source: WSP – Sandy Lake Development: Traffic Impact Study (February 2023)

Figure 7: Sandy Lake and Bedford West Proposed Multi-Use Paths

The TIS reflects an active transportation network that aligns with the current Municipal Development Guidelines, using a network of Multi-Use Paths which are facilities shared between pedestrians and cyclists. Acknowledging that this is the established standard, there is an opportunity to improve the quality of the proposed active transportation network within the Sandy Lake development, reducing the need for vehicle trips to commercial and educational destinations, and making access to transit more convenient. These shared facilities operate well in a recreational context, where cyclists are generally moving at lower speeds and may tolerate pedestrian conflict, but do not serve regular commuting behaviours as well due in part to accessibility concerns for people with vision, hearing, or mobility issues.

In general, the larger scale roads proposed within the development serve connections within the community at a scale that could consider a cycling only facility. Such a facility would enable cyclists to travel in excess of 20km/h with lesser risk of dangerous interaction with pedestrians and greatly increase the usefulness of active transportation in reducing the number of internal vehicle trips destined for school or commercial services. Bicycle-only facilities must be supported through roadway intersections with a protected design. Dependent on the configuration of cycling-only facilities, the Multi-Use Paths as

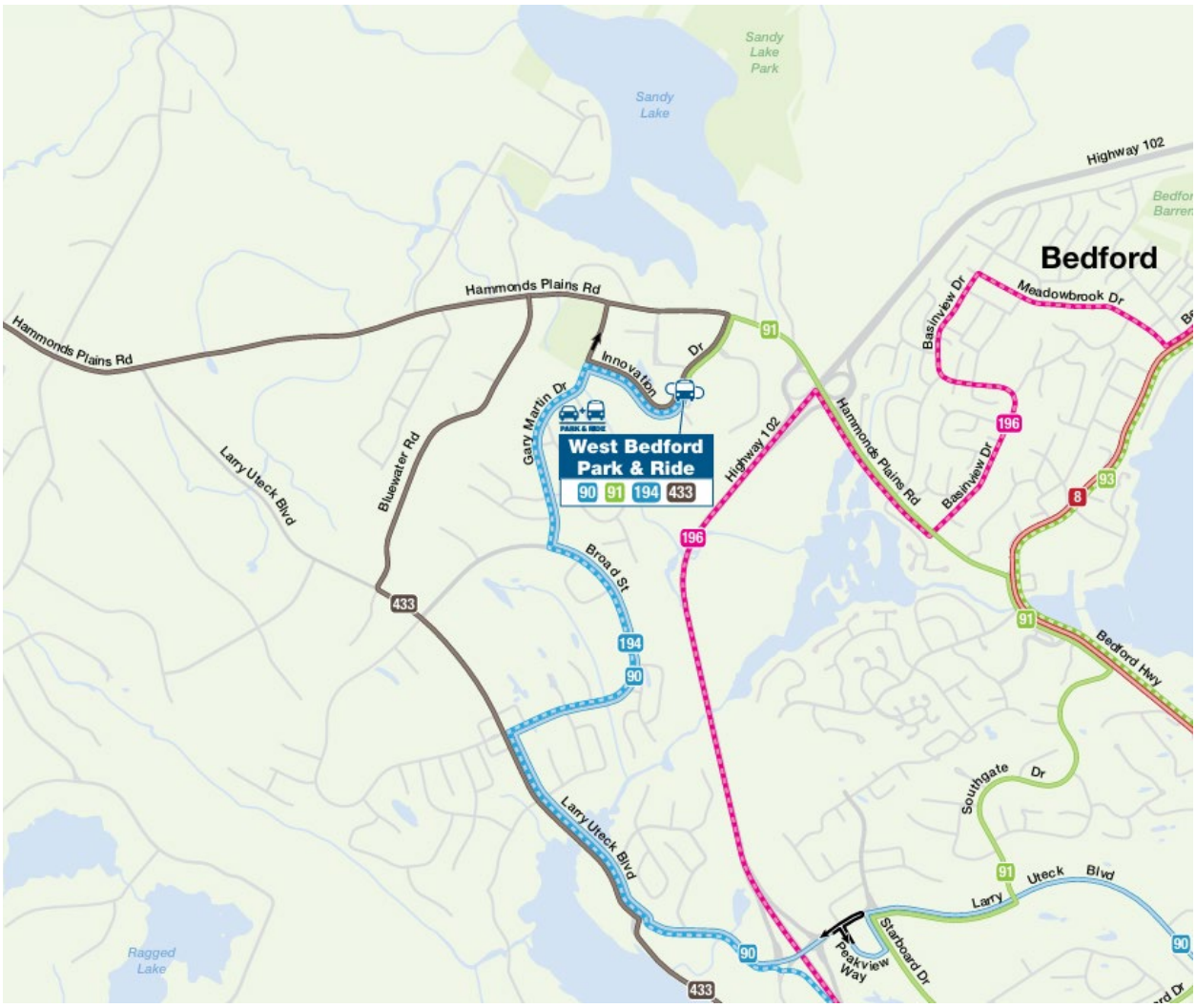
presented could continue to exist, knowing they serve primarily a pedestrian and recreational function, or those facilities could be converted to pedestrian-only sidewalks.

Proposed actions stated in the TIS do not provide cycling facilities on local roads, which leaves a gap at the point of origin and destination for all trips. Assuming these roadways are meant to operate in a shared context, roadway designers should consider the level of traffic stress and target a design speed for vehicles in the 30 km/h operating range.

4.2.2 PUBLIC TRANSPORTATION

The West Bedford Park and Ride and its associated transit terminal are located roughly one kilometre southeast of the intersection of Hammonds Plains Road and Bluewater Road. Halifax Transit serves the terminal with four routes.

- Route 90 – Local – to the Water Street Terminal via Larry Uteck Boulevard, Bedford Highway, and Windsor Street. Buses depart West Bedford roughly every half hour between 5:23am and 8:20pm (then every hour until 11:20pm) Monday through Friday. Saturday service begins at 5:55am and operates approximately every half hour until 7:50pm then every hour until 11:44pm. Sunday and holiday service begins at 5:50am, operating every hour until 10:50pm.
- Route 91 – Local – to Bayers Road Centre and the Mumford Terminal via Hammonds Plains Road, Bedford Highway, and Joseph Howe Drive. Buses depart on nearly half hour intervals during morning and evening peak periods (5:55am to 9:25am and 3:59pm to 6:03pm. Outside of these hours, buses operate every hour until 11:00pm. Saturday service is hourly from 7:49am to 10:49pm and Sunday service also departs the park and ride each hour from 8:18am to 10:18pm.
- Route 194 – Express – to Scotia Square via Larry Uteck Boulevard, Highway 102, and Bicentennial Drive. Only three outbound trips depart from the West Bedford Park and Ride at 7:06, 7:35, and 8:03am Monday through Friday. Return trips from the QEII Health Sciences Centre leave downtown at 3:30, 4:00, and 4:30pm.
- Route 433 – Rural – Connecting Lacewood Terminal to Tantallon via Kearney Lake Road, Larry Uteck Boulevard, and Hammonds Plains Road Eight buses, four in each direction, serve the West Bedford Park and Ride during peak commute periods Monday through Friday. Buses to the Lacewood Terminal depart at 6:57 and 7:46am, 5:59 and 6:54pm. Buses to Tantallon depart at 6:20 and 7:07am, 5:14 and 6:14pm.



Source: Halifax Transit

Figure 8: Transit Routes Serving West Bedford Park and Ride

It is important to note that riders generally limit the distance they are willing to walk to reach transit services. Practical maximums are 400 metres for local service stops and 800 metres for express services. Without transit improvements, the densest areas of the new development would be located 1,300 to 2,200 metres from the West Bedford Park and Ride, which is within a cycling distance (generally 2,500m) but lacks the cycling infrastructure to make that viable. Only Route 433, with stops at Bluewater and Hammonds Plains Roads would be more easily accessible by foot.

The sensitivity analysis of the TIS provided insight into needs for external transit trips from the Sandy Lake site. Starting with predicted non-auto trips from the application of the IMP's 27% mode share goal and dividing further between transit and walking/cycling the primary development site would create approximately 300 AM peak hour and 335 PM peak hour transit trips. To accommodate this level of transit demand, the additional travel distances required by the transit services require a routing which

provides rapid movement through the community. Such movement may require transit priority infrastructure specifically when entering and existing the development site.

The proposed development area's street network has been planned to concentrate higher density residential and commercial development closer to the primary collector corridor. That corridor, accessed by Hammonds Plains Road at three points creates an opportunity for transit routing through the development, bringing transit access well within 400 metres for a large percentage of new residents and employees. As described earlier, the Regional and Community Links Map of the Draft Regional Municipal Planning Strategy Update designates Hammonds Plains Road and Larry Uteck Boulevard as Strategic Corridors, a change from the IMP, which did not describe these as transit priority corridors. The entirety of those corridors and the development site is within the HRM Urban Transit Service Boundary. Within this process, a clearer understanding of new collector cross-sections will be required to properly plan for on-site routing.

5 Analysis and Considerations

5.1 Connectivity and Access Audit

Stantec developed a GIS-based analytical tool for examination of public and active transportation connectivity and levels of connectivity deprivation to inform investment in transportation infrastructure and services. The primary use of the tool is to determine the quality of pedestrian and transit access to key services and amenities from a neighbourhood in various scenarios. In this case, the tool was employed to identify connectivity deficiency for the future residents of the proposed Sandy Lake development to predict and prevent access-related deprivation.

The connectivity tool assessed pedestrian and transit access to 14 key service and amenity categories for the entirety of Halifax roughly equivalent to the sum of the Regional Centre and Inner Suburban areas defined in the Integrated Mobility Plan.

A second evaluation scenario solely considers the Sandy Lake study area and assigns it the approximately 15,400 new residents expected by developer requests. This scenario assesses future resident connectivity to health care (Hospital, Doctor, Pharmacy), transportation (Public Transport, Train Station), education (Primary Education, Higher Education), daily needs (Supermarket, Local Shops), leisure (Entertainment, Park Land, Natural Space, Sports), and places of worship if no other action is taken to diversify land use within the development site.

A third and final evaluation scenario adds new destinations and services to the future development area to determine relative connectivity improvements for the new population according to intentional land use decisions. The study area was subsequently reassessed with a public transit stop (route undefined), a doctor’s office, a pharmacy, local shops, an entertainment venue, and a primary school included.

Macro level connectivity data from the connectivity tool indicates that if certain destination types are not located within the new development or served by frequent and rapid transit from Sandy Lake, that large percentages of the newly settled population would not be able to access vital services via walking/public transit within 30 minutes (**Figure 9**). If increased to a one-hour time frame, new development residents would still not have access to a doctor’s office, hospital, shopping centre, or higher education opportunities.

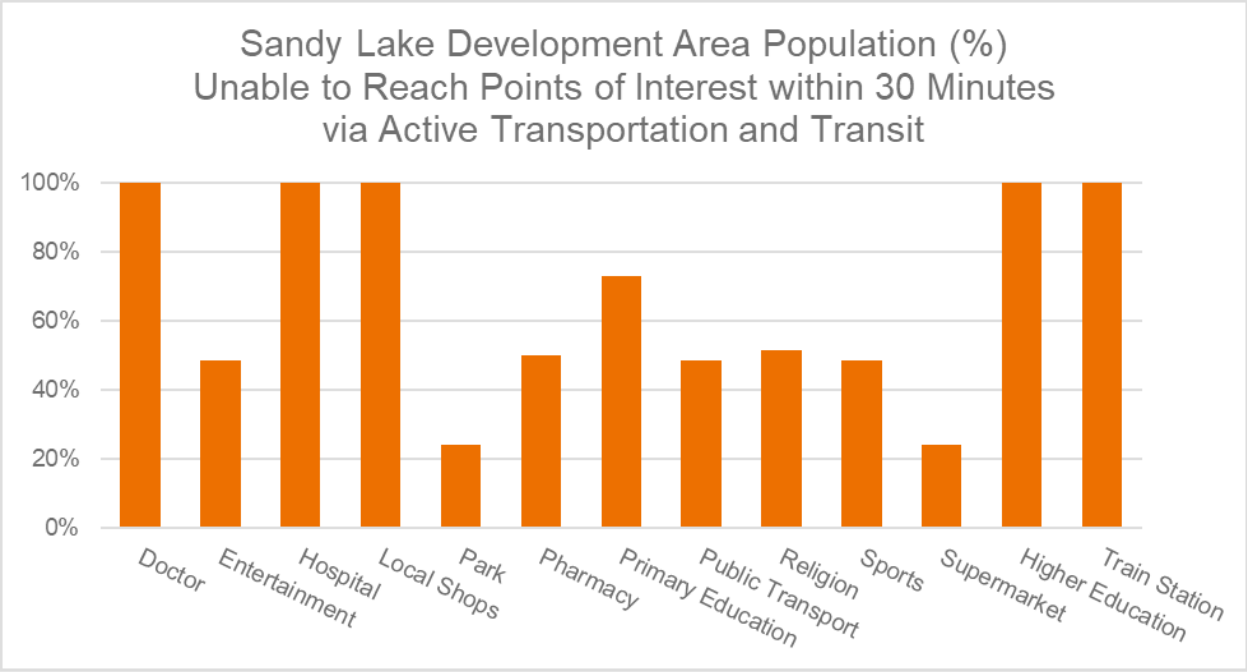


Figure 9: Connectivity Analysis – Undefined Development Site Destinations and Services

While some Sandy Lake residents might have access to a subset of destinations in less than 30 minutes, average travel times often exceed 30 minutes as seen in the polar chart (**Figure 10**). Even destinations seemingly more accessible to more of the development population such as park land and grocery (represented by Kingswood Market, Hammonds Plains Road @ Kingswood) require 30 minutes or greater to reach by foot dependent on the location of one's dwelling unit within the development.

Access issues can be mitigated from either the land use or transportation planning perspective. The third plotted dataset recalculates average active transportation access times if shopping and entertainment along with basic health care options are included in the commercial portions of the proposed development. This scenario improves missing connectivity. Average active transportation travel time to previously described destination types drop to 12-13 minutes for new development residents. Land use and siting decisions not only bring daily destinations closer to affected populations, but also reinforce the value of local active transportation networks for short trips.

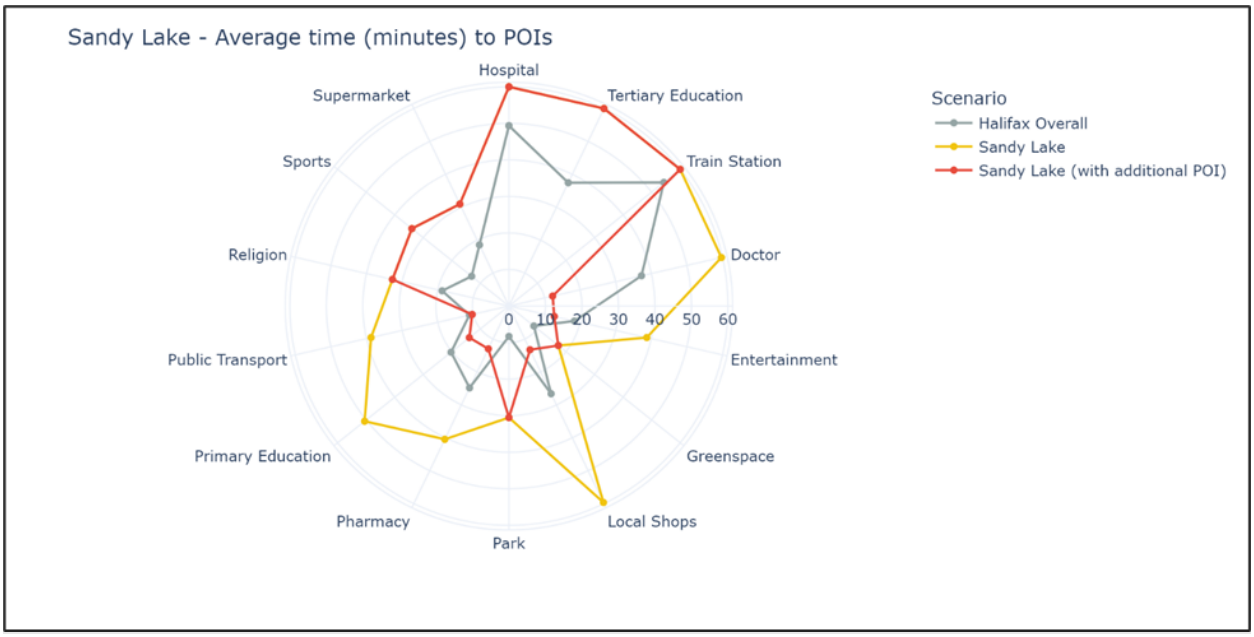


Figure 10: Connectivity Analysis – Associated Access Improvement (Sample On-Site Services)

The connectivity tool analysis outputs indicate that roughly half of Sandy Lake study area residents would not be able to access any public transportation routes within 30 minutes if buses do not more closely service the development. When a stop is added to the study area, the average time required to reach transit drops from just under 40 minutes to roughly 10 minutes, in line with the rest of the regional population.

5.2 Detailed Transportation Modeling

The Joint Regional Transportation Authority and HRM (in partnership with WSP Canada and the University of Toronto) have completed a new activity-based travel demand model named the Joint Regional Transportation Simulator. The model provides the ability to interpret development impacts on the regional transportation network through the model's innovative Agent Based Model (ABM) process of simulating travel behavior (where, how, and when people travel), including trip generation, trip distribution, mode choice, and reassignment impacts. These processes are modeled using an ABM framework, which captures the behavior of individual agents, such as travelers or households, allowing for a more precise representation of travel demand and network effects at the regional level.

The ABM is a flexible, and policy-sensitive tool that simulates travel behaviour (where, how, and when people travel). A regional-scale travel demand model examines the interactions of population, employment, land use, and mobility options and allows the testing different possible futures, estimate the future need for travel, and assesses the impact and benefit of different modes of transportation that will be required to serve the region in the future.

In analyzing the transportation impacts of the Sandy Lake development, the ABM approach predicts how trips will be distributed to and from the development site. This process involves assigning each Sandy Lake resident a Place of Work (POW) and, at the same time, matching the projected Sandy Lake

employment opportunities with potential residents. This allocation of trips is carried out using a gravity-based distribution model, which factors in both the distance between residential areas and employment centers, as well as the size and capacity of these employment areas. The model ensures a balance of trips by weighing the proximity of residents to available job spaces. In addition to work-related trips, the ABM also accounts for other tour-based travel patterns, such as school commutes and shopping trips. This approach provides a detailed distribution of trips to and from the Sandy Lake site.

However, the ABM process has limitations, particularly when a large development site like Sandy Lake is introduced. The model has sensitivity to shifts in existing travel demand, especially when assigning Place of Residence (POR) to POW connections. As new developments create a significant influx of residential and employment opportunities, the model can react to the POR-POW relationship by reallocating too many existing trips to the new site, therefore overestimating the changes across the region.

Sensitivity testing was conducted to determine the most appropriate scenario to use and to better understand the HRM model's response to changes in travel demand. Several scenarios were tested, revealing that the POR to POW sensitivity was significantly higher when the Sandy Lake development was added to the 2045 forecast, compared to applying the same development to the 2022 base year. The logic supporting this concept follows from the addition of population and accompanying increases in network congestion and travel time. The model showed increased sensitivity in areas far removed from Sandy Lake in the 2045 scenario.

To investigate the cause of this sensitivity, additional sensitivity tests were performed to examine whether it was due to the higher levels of congestion in the 2045 model affecting the cost of travel, or whether the additional infrastructure in the 2045 network played a role. The results indicated that the sensitivity was not driven by congestion or network changes, even under extreme conditions such as closing major bridges between Halifax and Dartmouth. Instead, it stemmed from sensitivities in the 2045 POW-POR gravity model, which became more pronounced when Sandy Lake was introduced, causing a ripple effect in trip assignments across the region.

To assess the infrastructure requirements for Sandy Lake, an interim 2031 model has been developed as a baseline. The interim model provides a more focused assessment baseline, as the 2045 model incorporates a broader range of infrastructure schemes intended to support wider development, potentially overestimating infrastructure capacity and underestimating the impacts of the Sandy Lake development. This model includes a reduced level of committed infrastructure compared to the 2045 baseline model. Notwithstanding the reduced levels of traffic demand growth, the 2031 forecast year is still deemed as being highly sensitive in trip reassignment when adding the Sandy Lake development.

As such, two future scenarios have been created in order to benchmark the impact of the Sandy Lake development:

- **2031 Do Minimum Scenario (Baseline):** This scenario assumes no new development or infrastructure beyond those already planned and committed. It serves as a baseline to understand the impact of maintaining the current trajectory without additional interventions. The 2031 scenario provides a midpoint between the model base year of 2022 and the end of the JRTA planning period in 2045. The Do Minimum model provides a high level of travel demand growth, corresponding to a regional population increase of approximately 50 percent. This

scenario was created by interpolating population and employment inputs between 2022 and 2045.

- **2031 Sandy Lake Development Scenario:** This scenario builds upon the Do Minimum scenario by incorporating the proposed Sandy Lake development. It considers the full build-out of the development, including residential, commercial, and educational components, along with their associated traffic generation. The network detail of the Sandy Lake development site includes connector links to represent access to and egress from the site, but no through-routes across the development. As noted, due to the model's sensitivity to changes in background travel demand, only incremental change attributable to the Sandy Lake Future Serviced Community study area was included in this scenario. This was achieved by running the full ABM process and isolating the origin and destination demand from the development, and then adding this to the baseline demand of the Do Minimum scenario.

5.2.1 MODEL APPLICATION

The HRM model provides a framework for analyzing the transportation impacts of the Sandy Lake development, covering key elements such as trip distribution, mode choice, and time-of-day travel patterns. These components allow the model to predict how trips will be generated, distributed, and assigned across the network, as well as the modal split between car, transit, and other forms of transportation. For this analysis, we have used the model's outputs to inform key aspects of the transportation impact assessment, such as traffic volumes, congestion hotspots, and transit demand, focusing on the outputs of the AM and PM Peak period models.

In order to inform and understand the transportation network impact of, and constraints posed by the Sandy Lake development, the following key metrics have been derived from the HRM Model:

- **Link Volume-to-capacity (V/C):** - This metric represents the capacity of the road network relative to total hourly vehicle demand. Any value exceeding 100% indicates that the road segment is over capacity and likely to experience congestion.
- **Mean Link Delay: –** This measures the delay per kilometer, capturing traffic slowdowns based on the relationship between link speed and traffic flow. Since delay increases with link length, the metric accounts for this by incorporating the length of each link in the calculation.
- **Transit Volume-to-Capacity: –** Calculated at link level (each road section) by using the transit frequency from the modelled headway and the capacity of each transit vehicle type to obtain an estimated capacity, then comparing against the calculated link transit person volume.

It should be noted that junction delay has not been simulated within this assessment. Within a modelled junction, turning movements are given a constant turn time independent of junction type (1 second for right turn, 10 seconds for left turn, and zero turn delay for through movements). This limitation means that the full impact of traffic congestion, particularly at critical junctions or high-traffic intersections, may be underestimated in the analysis.

Likewise, modelling may overestimate traffic growth in certain areas. In such cases, the model may predict higher traffic volumes than would realistically occur, as it assumes that the network can absorb large amounts of traffic, limiting the scale of potential behavioral changes, such as shifts in mode choice

or reduced travel during peak times. To address this, professional judgment has been applied alongside the model outputs, ensuring a more balanced and accurate interpretation of potential transport impacts, especially in future-year scenarios (e.g., 2031). This approach allows for a realistic assessment of the effect of development at Sandy Lake on the transportation network.

5.2.2 NETWORK IMPACTS

The application of the HRM Activity-Based Model contributes greatly to an assessment of the network impacts associated with the Sandy Lake development. Analysis has identified specific effects on traffic flow, congestion levels, and overall connectivity within the surrounding transportation network.

5.2.2.1 Future Do Minimum Network Constraints

An analysis of forecasted transportation network constraints in a 2031 Do Minimum scenario identifies key areas of congestion before the Sandy Lake development is introduced. Volume-to-Capacity (V/C) plots (**Figure 11**, **Figure 12**) reveal a significant increase in existing congestion by the 2031 forecast year. Throughout the HRM region in the AM peak period, 15 percent of the 2031-modelled vehicle-kilometres are on roads with V/C values exceeding 85% of the road capacity, rising to 24 percent in the PM peak period, indicating severe levels of congestion. Congestion is particularly visible along Highway 102, both east and west of the Bedford Interchange. Larry Uteck Boulevard, which connects Highway 102 to Hammonds Plains Road, also projects to experience increased congestion.

Further south on Highway 102, V/C plots show congestion worsening with the forecast increase in population, with V/C values exceeding 100% up to the Highway 103 interchange, indicating over-capacity conditions. The Bedford Highway and its connection to Highway 111 are similarly forecasted to remain congested, with V/C ratios greater than 100%, mirroring current conditions. The most severe congestion is projected on the MacKay and Macdonald Bridges, reflecting ongoing congestion issues in these areas. It should be noted that traffic congestion is projected to be more severe during the PM peak period than the AM peak period. Modelling additionally shows alleviation of existing congestion along Windmill Road due to the implementation of the Sackville-Bedford-Burnside (Highway 107) connector.

Delay per kilometre plots (**Figure 13**, **Figure 14**) reinforce the V/C plots and reflect the same congestion areas. Highway 102 and the two bridges show significant delay of greater than two minutes per kilometre. Also, Hammonds Plain Road and Larry Uteck Boulevard show high levels of delay – greater than two minutes per kilometre.

In summary, the following roadway corridors experience high levels of congestion within the 2031 baseline:

- Highway 102 – Between the Highway 101 Interchange and Dunbrack Street
- Hammonds Plains Road – Between Larry Uteck Boulevard and Bedford Hills Road
- Larry Uteck Boulevard – Between Broad Street and Kearney Lake Road
- Kearney Lake Road – Near Highway 102 Interchange
- Bedford Highway – Between Dartmouth Road and Highway 111

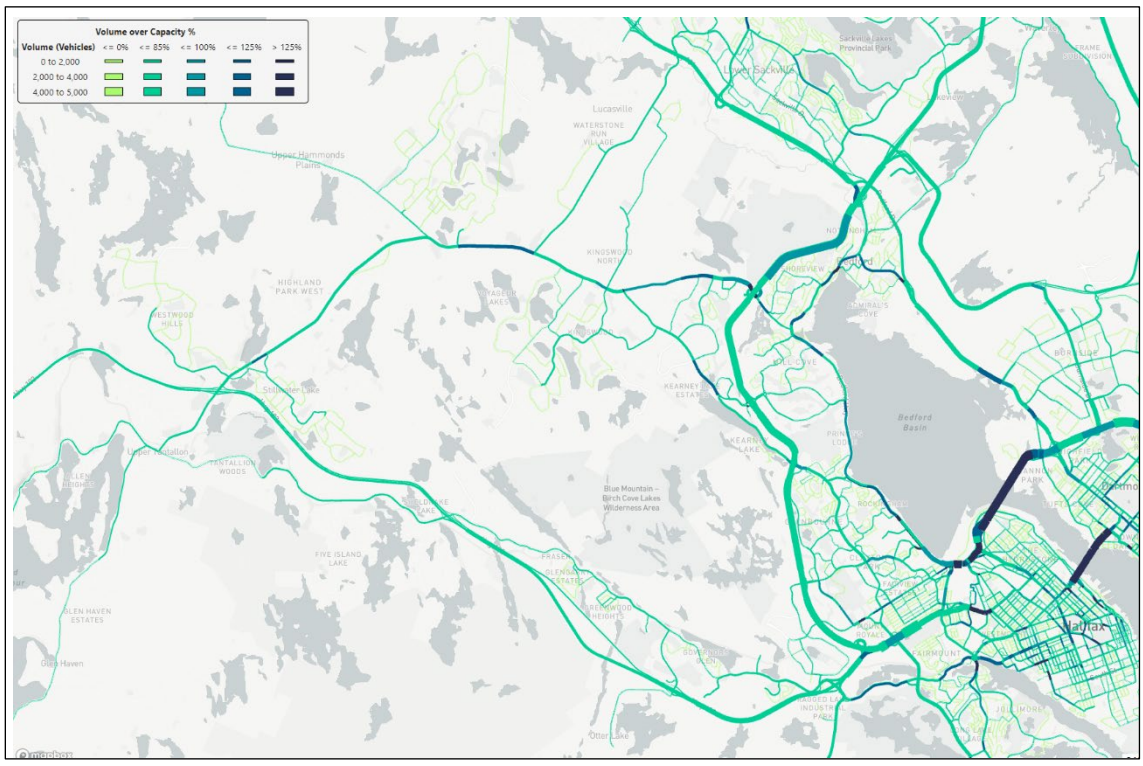


Figure 11: V/C Ratio – AM Peak – 2031 Do Minimum Scenario

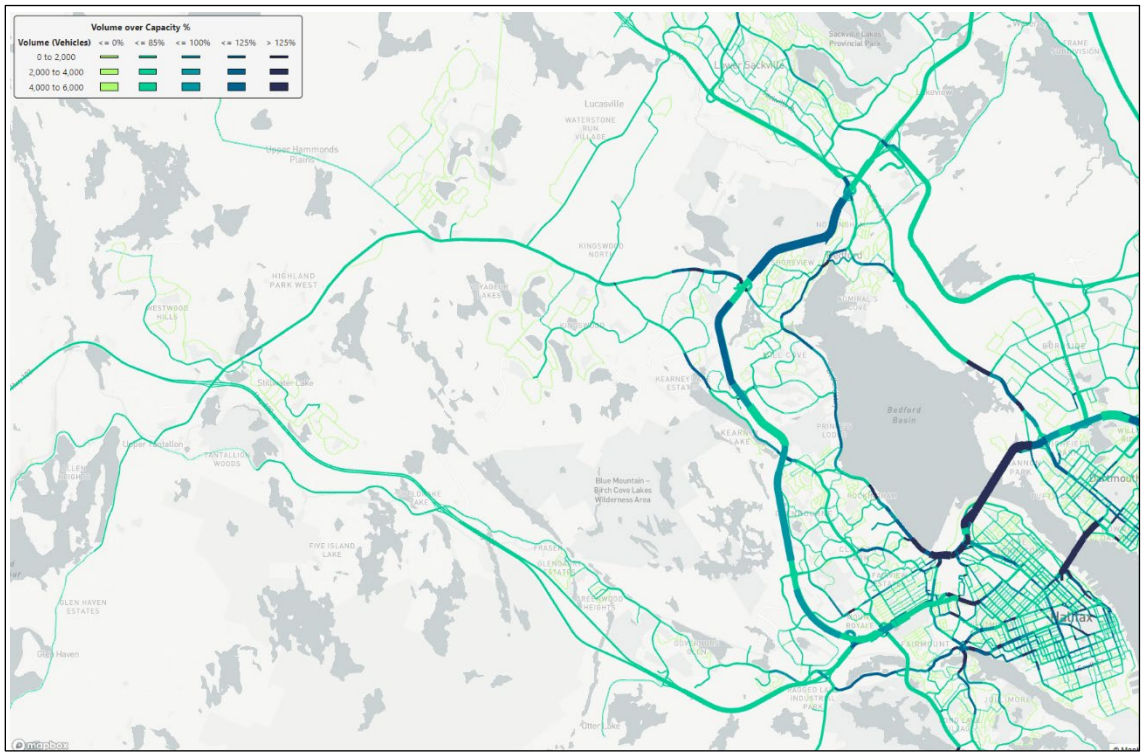


Figure 12: V/C Ratio – PM Peak – 2031 Do Minimum Scenario

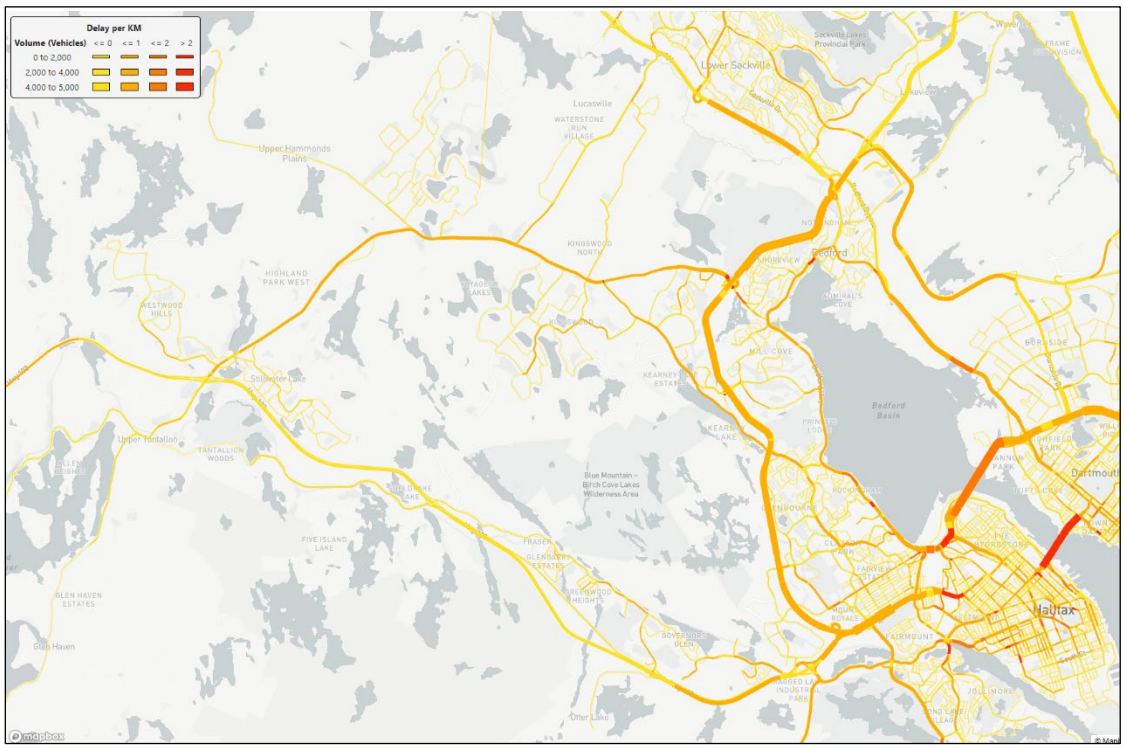


Figure 13: Travel Delay per km – AM Peak – 2031 Do Minimum Scenario

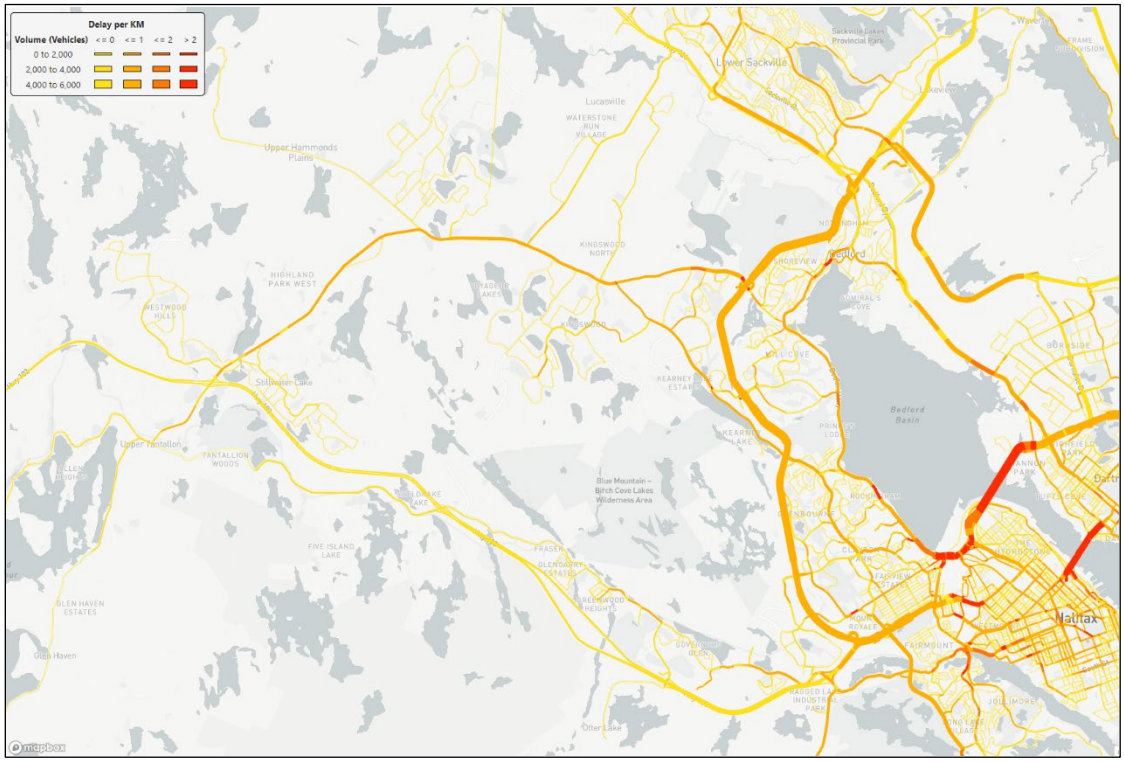


Figure 14: Travel Delay per km – PM Peak – 2031 Do Minimum Scenario

5.2.2.2 Existing Transit Constraints

With regards to the public transit network of the 2031 Do Minimum scenario, it should be noted that the additional ferry routes from Mill Cove to the Downtown Halifax are included within each modelled scenario while proposed Bus Rapid Transit routes are not included as they are not part of the project list that informs the 2031 scenarios. Transit demand versus capacity maps of the HRM (**Figure 15, Figure 16**) highlight several routes that are expected to operate at or near capacity by 2031, particularly in the central areas of Halifax and Dartmouth. This underscores that the projected population growth in the HRM will significantly strain existing transit services, especially in these core areas, where much of the available transit capacity is expected to be absorbed.

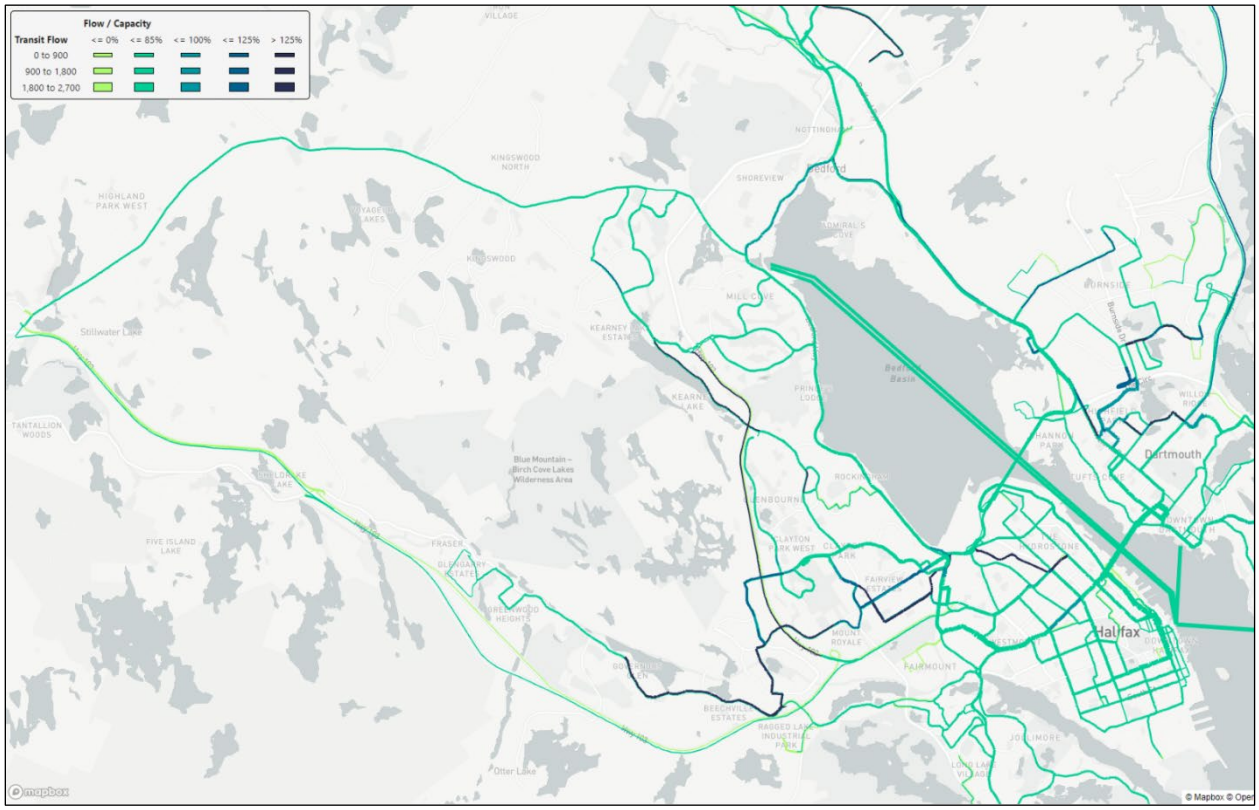


Figure 15: Transit V/C – AM Peak – 2031 Do Minimum Scenario

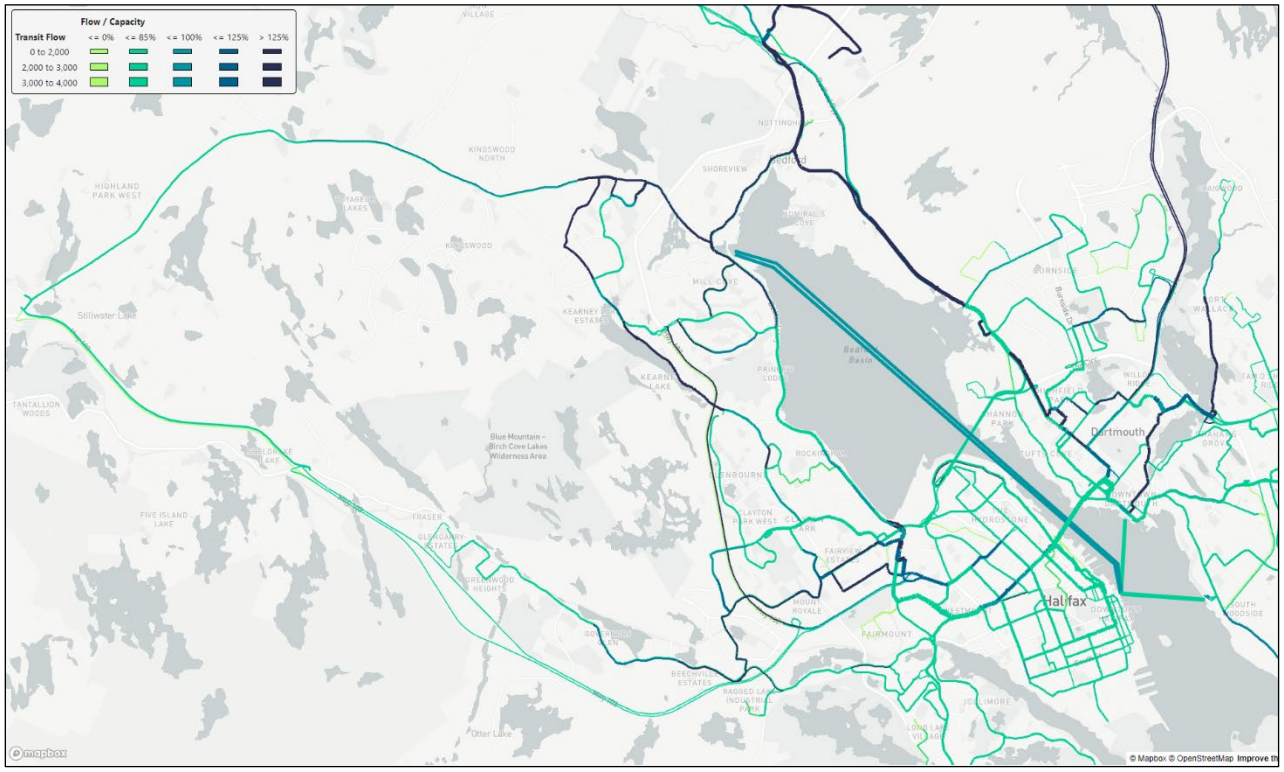


Figure 16: Transit V/C – PM Peak – 2031 Do Minimum Scenario

5.2.2.3 Distribution of Sandy Lake Travel Demand & Mode Share

Charts describe the External Only (**Figure 17**) and Internal Only trip mode share (**Figure 18)** separately and show the variance of mode share for internal and external travel demand projected through the HRM mode choice model. For example, walking trips comprise nine percent of trips within the Sandy Lake study area shown as compared with five percent of external trips. Internal zone cycling rates are not calculated within the HRM ABM process. Non-auto mode share for external trips is notably different than reduction factors applied in the Traffic Impact Study. The model has derived a high level of internal automobile trips from existing assumptions related to the employment opportunities located on site coupled with distance of trips within and near the study area without further calibration related to the ease of use of a particular mode and/or embedded site plan detail.

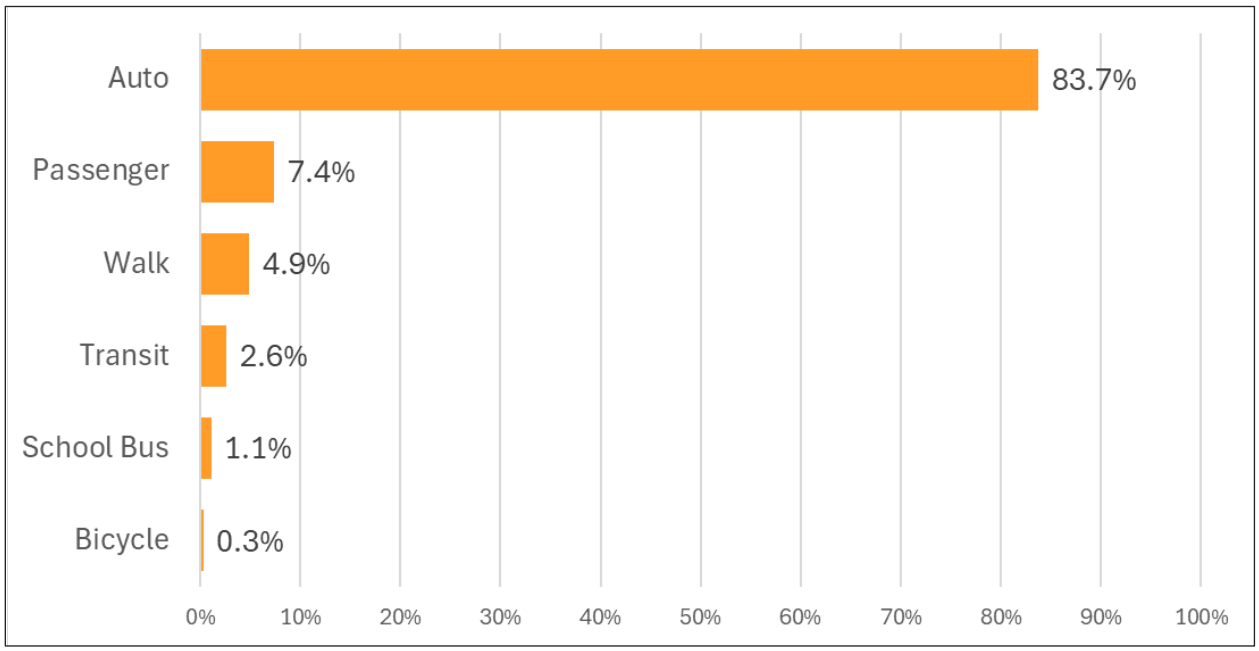


Figure 17: Sandy Lake Study Area 2031 Projected Mode Share – External Trips

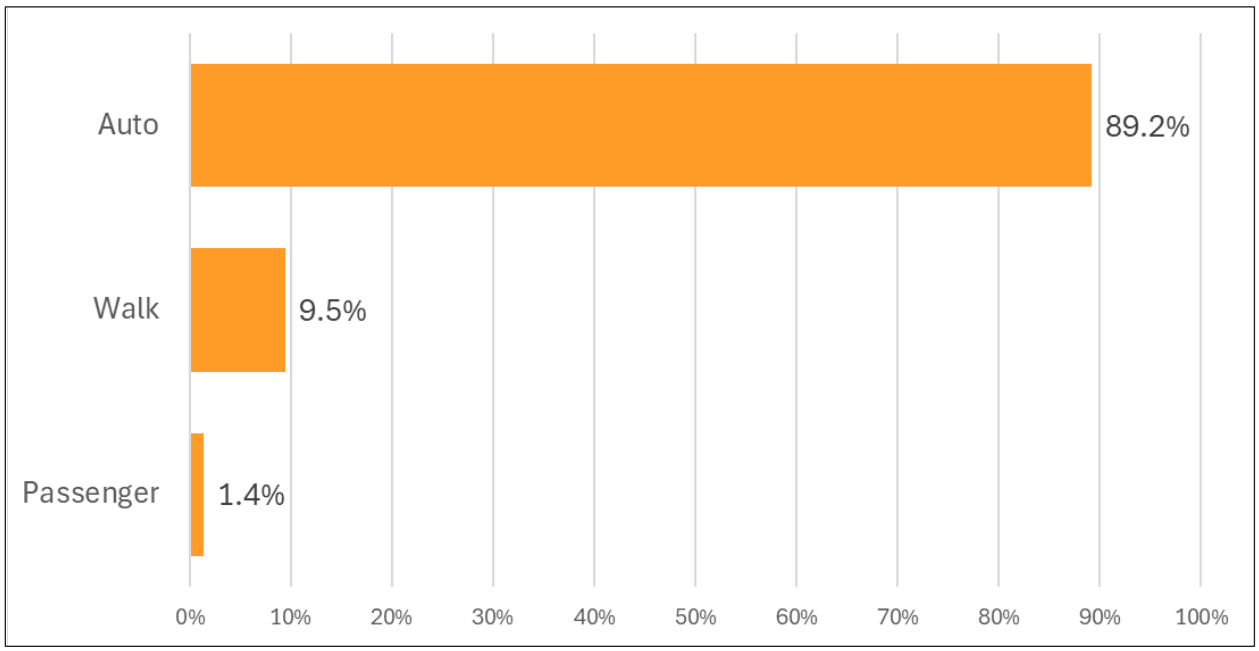


Figure 18: Sandy Lake Study Area 2031 Projected Mode Share – Internal Trips

Tabulated projected travel demand to and from the Sandy Lake development, for all motorized vehicles including both private auto and transit users covers the total travel across the whole day and the other modelled time periods within the ABM, including peak periods, overnight, and mid-day models (**Figure 19**). Approximately 7,000 projected internal vehicular trips produced during peak periods, roughly 18 percent of all projected vehicle trips, are excluded from the origin-destination table. To note, comparing to the wider region population growth of 285,000, the Sandy Lake population of 15,000-18,000 equates to a small proportion of wider region growth.

Per the Development Scenarios report, the Clayton concept plan devotes approximately 170,000 square feet (15,793.5 square metres) of gross leasable floor area. Using median floor space per worker ratios ranging from 21 square metres for small-format retail to 29 square meters for general office, the development concept would host 545 to 752 workers, far below modelled assumptions. The practical implications are that modelled external trip distribution of Sandy Lake residents is likely understated while external trip attraction to Sandy Lake is likely overstated.

Origin	Destination	Demand
Sandy Lake	Bedford	4,046
Sandy Lake	Atlantic Acres	2,726
Sandy Lake	Halifax West	2,421
Sandy Lake	Lower Sackville	2,155
Sandy Lake	Halifax North End	1,122
Sandy Lake	Northwest Rural	954
Sandy Lake	Burnside	952
Sandy Lake	North	937
Sandy Lake	Halifax South	831
Sandy Lake	Halifax South Port	691
Sandy Lake	Dartmouth North	615
Sandy Lake	Halifax CBD	571
Sandy Lake	Cole Harbour/Cow Bay	367
Sandy Lake	Hants	361
Sandy Lake	Lunenburg	335
Sandy Lake	Bayers Lake	298
Sandy Lake	East Dartmouth	199
Sandy Lake	St Margaret's Bay	194
Sandy Lake	Stanfield Airport	121
Sandy Lake	Dartmouth	113
Sandy Lake	Truro	69
Sandy Lake	Kings	65
Sandy Lake	Eastern Shore	57
Sandy Lake	Chezzetcook	32
Sandy Lake	Dartmouth CBD	22
Sandy Lake	Morris Lake	20
Sandy Lake	Akoma Lands	12
Total		**20,286**

Origin	Destination	Demand
Bedford	Sandy Lake	3,717
Atlantic Acres	Sandy Lake	2,597
Lower Sackville	Sandy Lake	2,297
Halifax West	Sandy Lake	2,185
Halifax North End	Sandy Lake	1,768
North	Sandy Lake	921
Northwest Rural	Sandy Lake	888
Halifax South	Sandy Lake	822
Burnside	Sandy Lake	776
Halifax CBD	Sandy Lake	638
Halifax South Port	Sandy Lake	560
Dartmouth North	Sandy Lake	547
Hants	Sandy Lake	394
Lunenburg	Sandy Lake	356
Cole Harbour/Cow Bay	Sandy Lake	286
Bayers Lake	Sandy Lake	263
East Dartmouth	Sandy Lake	252
St Margaret's Bay	Sandy Lake	229
Stanfield Airport	Sandy Lake	137
Dartmouth	Sandy Lake	102
Truro	Sandy Lake	77
Kings	Sandy Lake	76
Eastern Shore	Sandy Lake	66
Chezzetcook	Sandy Lake	40
Dartmouth CBD	Sandy Lake	33
Morris Lake	Sandy Lake	15
Akoma Lands	Sandy Lake	11
Highway 102	Sandy Lake	4
Total		**20,057**

Figure 19: Tabulated Projected Travel Demand to/from Sandy Lake Study Area

External trip distribution maps highlight the diffusion of auto trips on the highway network during the AM and PM modelled peak periods (**Figure 20, Figure 21**), reflecting the heavy demand to Bedford and Halifax West/North End.

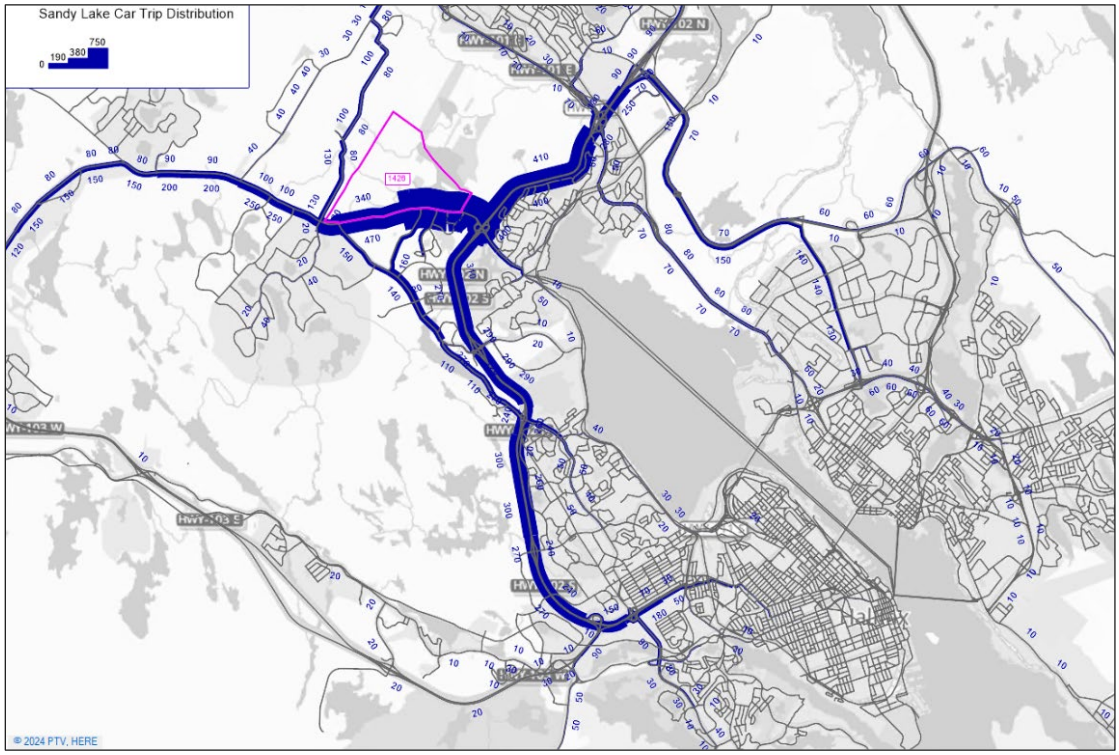


Figure 20: Projected Sandy Lake External Trip Distribution – AM Peak

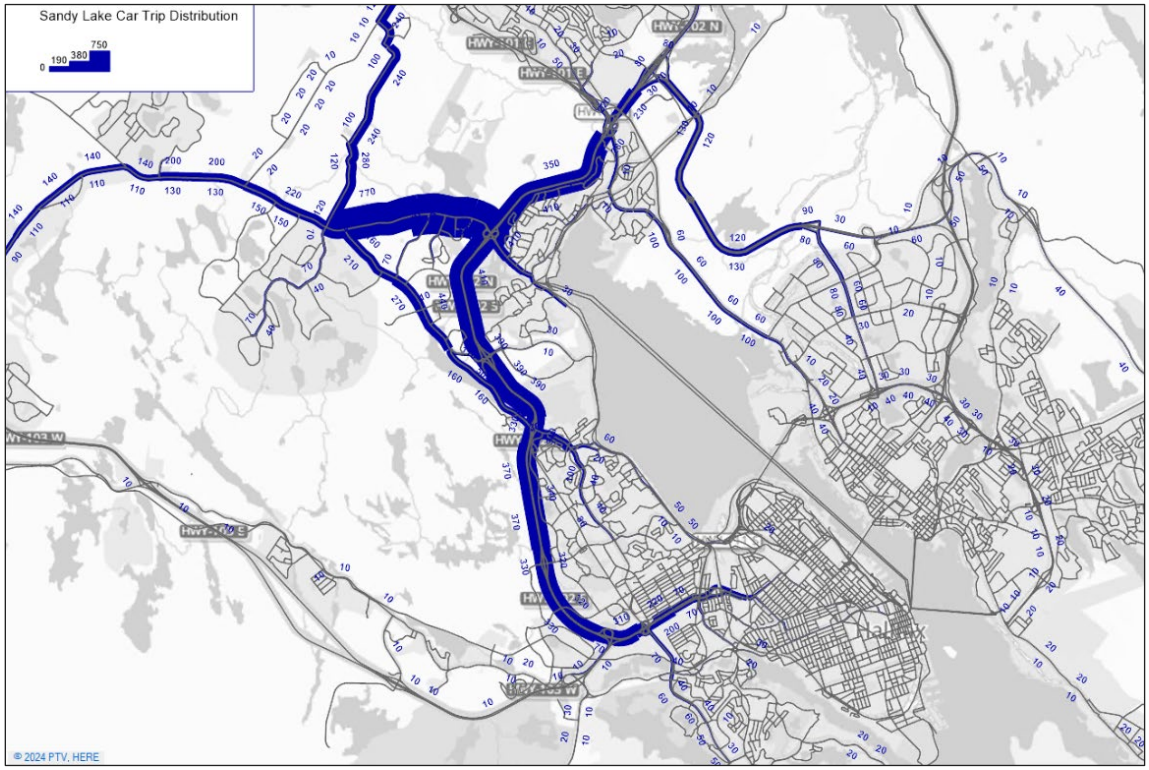


Figure 21: Projected Sandy Lake External Trip Distribution – PM Peak

5.2.2.4 Highway Traffic Impacts

The development of Sandy Lake is expected to significantly influence traffic patterns on the surrounding highway network. As the project introduces new residential, commercial, and educational facilities, the resulting increase in travel demand will have direct implications for highway capacity, congestion and overall traffic flow. Detailed analysis of the projected highway traffic impacts focuses on key corridors and junctions that will experience the greatest shifts in volume.

Flow differential maps (**Figure 22**, **Figure 23**) highlight the distribution and impacts of car trips from the Sandy Lake development. As expected, trends are similar to the Sandy Lake auto distribution plot. The largest increases in traffic volume are seen along Hammonds Plain Road and Highway 102 during both the AM and PM Peak periods.

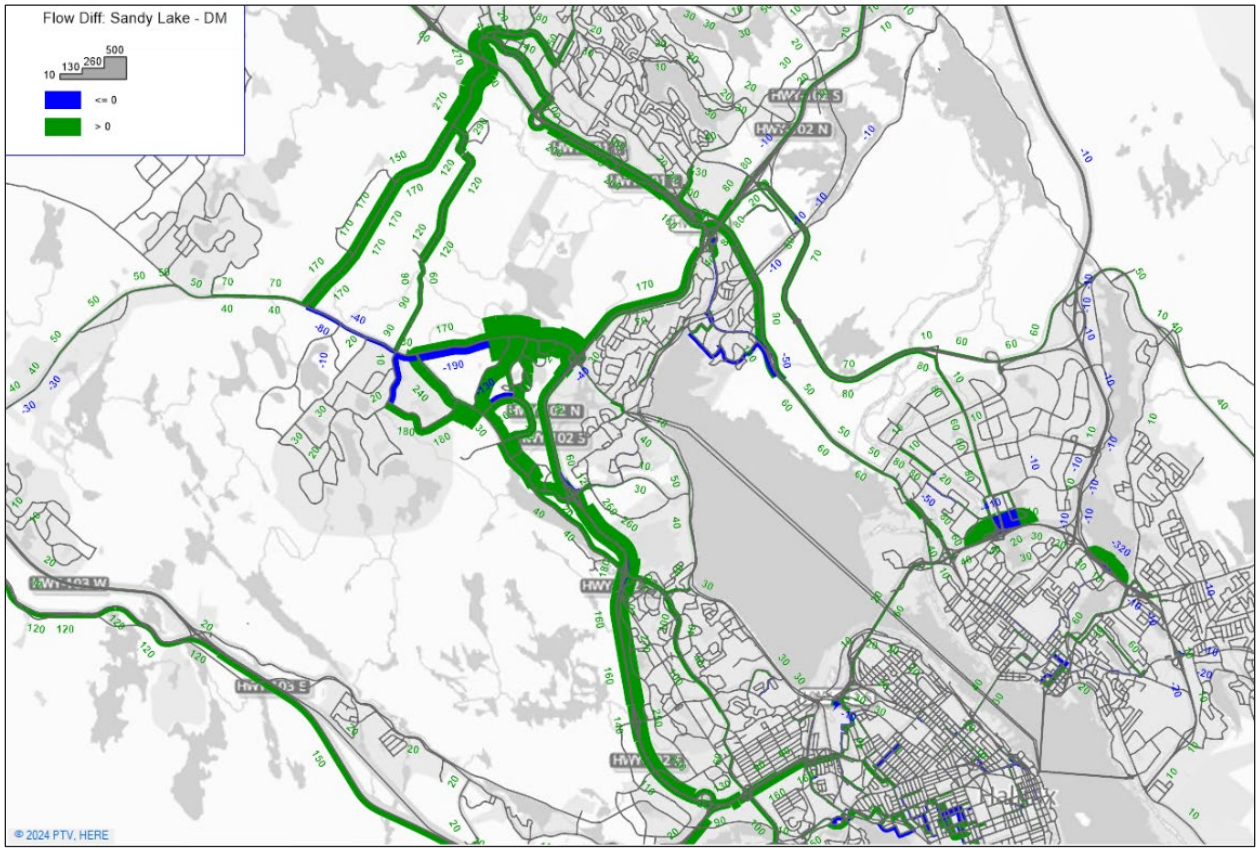


Figure 22: Trip Distribution Peak Flow Change – AM Peak – 2031 Sandy Lake Development Scenario

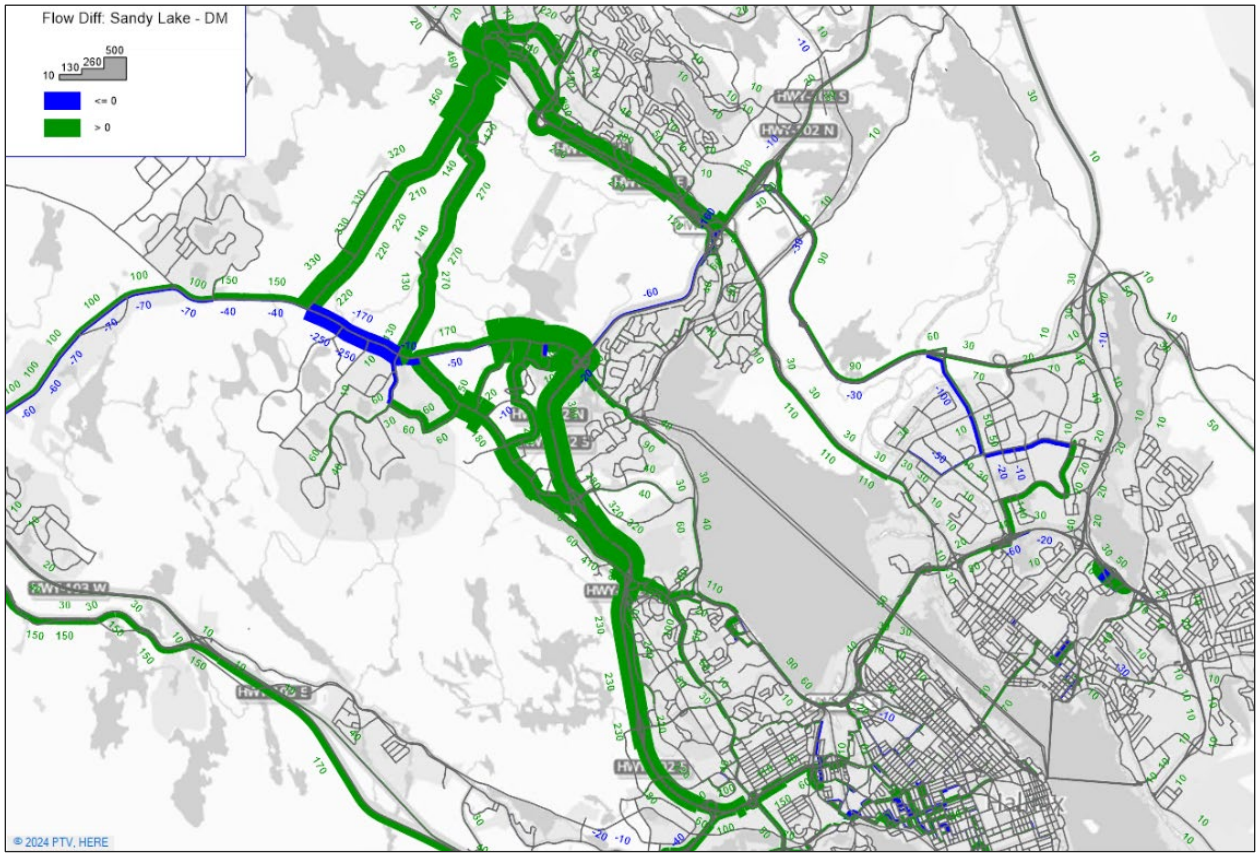


Figure 23: Trip Distribution Peak Flow Change – PM Peak – 2031 Sandy Lake Development Scenario

A significant increase in travel demand is also observed along Lucasville Road and parallel residential streets Gatehouse Run, Viscount Run and Bryanston Road. In addition to the trip distribution generated by the development itself, the model reassigns background trips to these north-south connectors due to increased congestion on Hammonds Plains Road that results in longer journey times for travel demand, particularly for trips with origins or destinations in Sackville. The Province has identified the need for a new strategic link between Hammonds Plains Road near Sandy Lake and Exit 2 on Highway 101 and will be initiating the planning process.

Peak flow change diagrams suggest that Lucasville Road north of Bryanston Road would be forced to accommodate 930 additional peak hour vehicles. The currently stop controlled intersection at Lucasville Road and Bryanston Road would need to handle 270 additional east leg movements, 210 added south leg movements, and an increase of 460 north leg movements during this peak hour. The primary utility of an additional link to the east would be to provide a more efficient route choice, alleviate congestion by absorbing the peak flow change resulting from the Sandy Lake development, and reduce the diversionary impacts of that development on existing roadways.

A previous iteration of the Regional Plan proposed a parallel connection between Highway 101 and Hammonds Plains Road via an extension of Margeson Drive and the southern end of Lucasville Road.

The previously programmed “Middle Sackville Connector” aligns with Exit 2A of Highway 101 and the proposed Beaver Bank Bypass around Lower Sackville. Like the Highway 101 to Hammonds Plains Road connection proposed by the Province, the Middle Sackville Connector would have utility in absorbing diverted traffic, especially that which the model indicates would divert to Lucasville Road. New residents of the Sandy Lake development however, would remain more likely to utilize the connection proposed by the Province, which creates a more seamless network connection to Hammonds Plains Road and Larry Uteck Boulevard closer to the proposed development site. The Margeson Drive extension proposal incorporates what is today Cranley Road and forms a T intersection approximately 1.4 km north of Hammonds Plains Road. Lucasville Road meets Hammonds Plains Road roughly 2.5 km west of Larry Uteck Boulevard.

While each option is likely to perform a positive function in the network, the eastern Hammonds Plans Road to Highway 101 connection would provide more utility, especially to new Sandy Lake residents. A final decision will require comparative evaluation of localized community impacts, acute and broad environmental impacts, cost of construction, ease of land assembly, and other factors.

Focusing on the Bedford Interchange, the greatest increase in AM peak traffic flow is shown to be for demand accessing southbound Highway 102 from Hammonds Plains Road (**Figure 24**). During the PM peak period, the largest impact at the Bedford interchange is seen for retuning trips travelling from northbound Highway 102 to westbound Hammonds Plains Road.

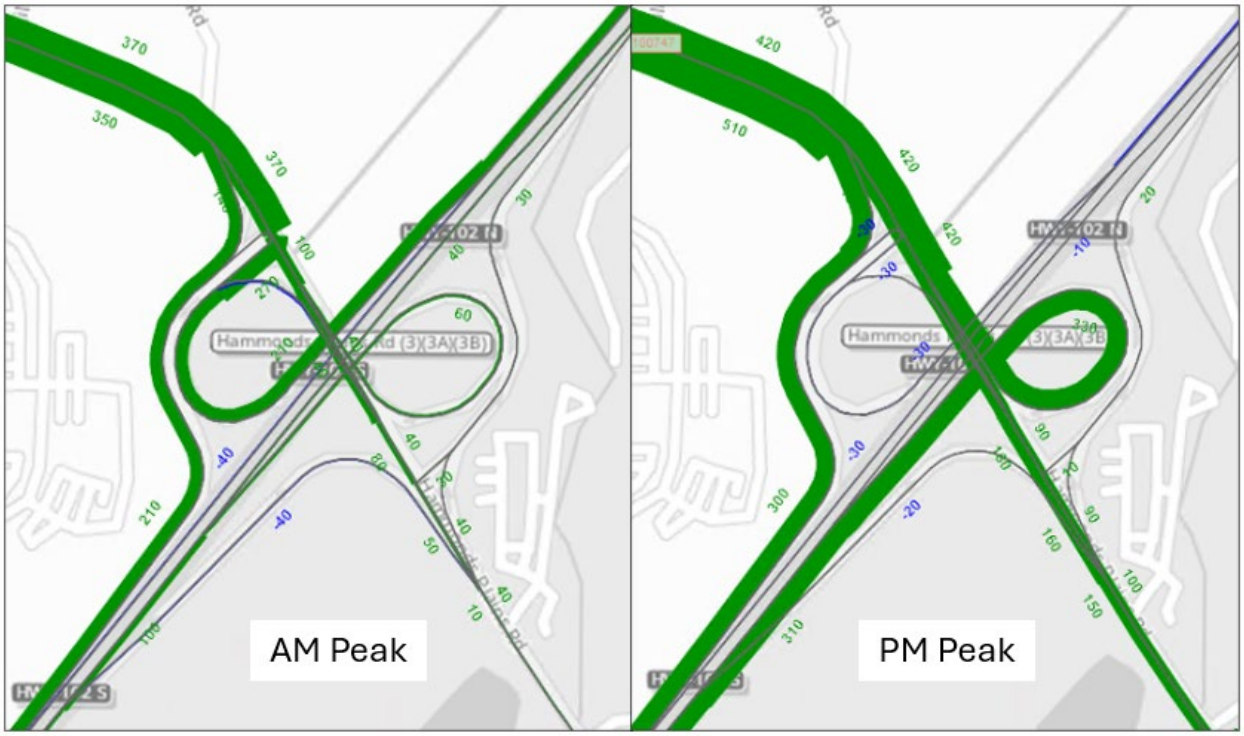


Figure 24: Trip Distribution Peak Flow Change – Bedford Interchange – 2031 Sandy Lake Development Scenario

Although the HRM model simulates negligible junction delay, significant impacts are expected at the signalized intersection as a result of the projected increases in traffic volumes at these approaches.

The delay plots below illustrate the impacts of the Highway 102 development. Within the modeling context, no significant delays are shown despite the increased traffic volumes. Even on Highway 102, where traffic demand is rising, the model reflects minimal increases in congestion. However, as previously noted, these outputs must be interpreted with caution due to the model's limitations, particularly its underestimation of junction delays.

A minor slowdown is observed on Highway 102 south of the Clayton Park West interchange, primarily due to the increase in traffic from the development site during the AM peak period. This southbound flow contributes to the localized reduction in speeds, although overall congestion levels remain low within the model's outputs.

The increase in delays observed across the Macdonald and MacKay Bridges highlights the sensitivity of these locations to congestion. Here, even a minor increase in traffic demand results in a disproportionate, exponential rise in delays, underscoring the critical nature of these bottleneck areas within the network.

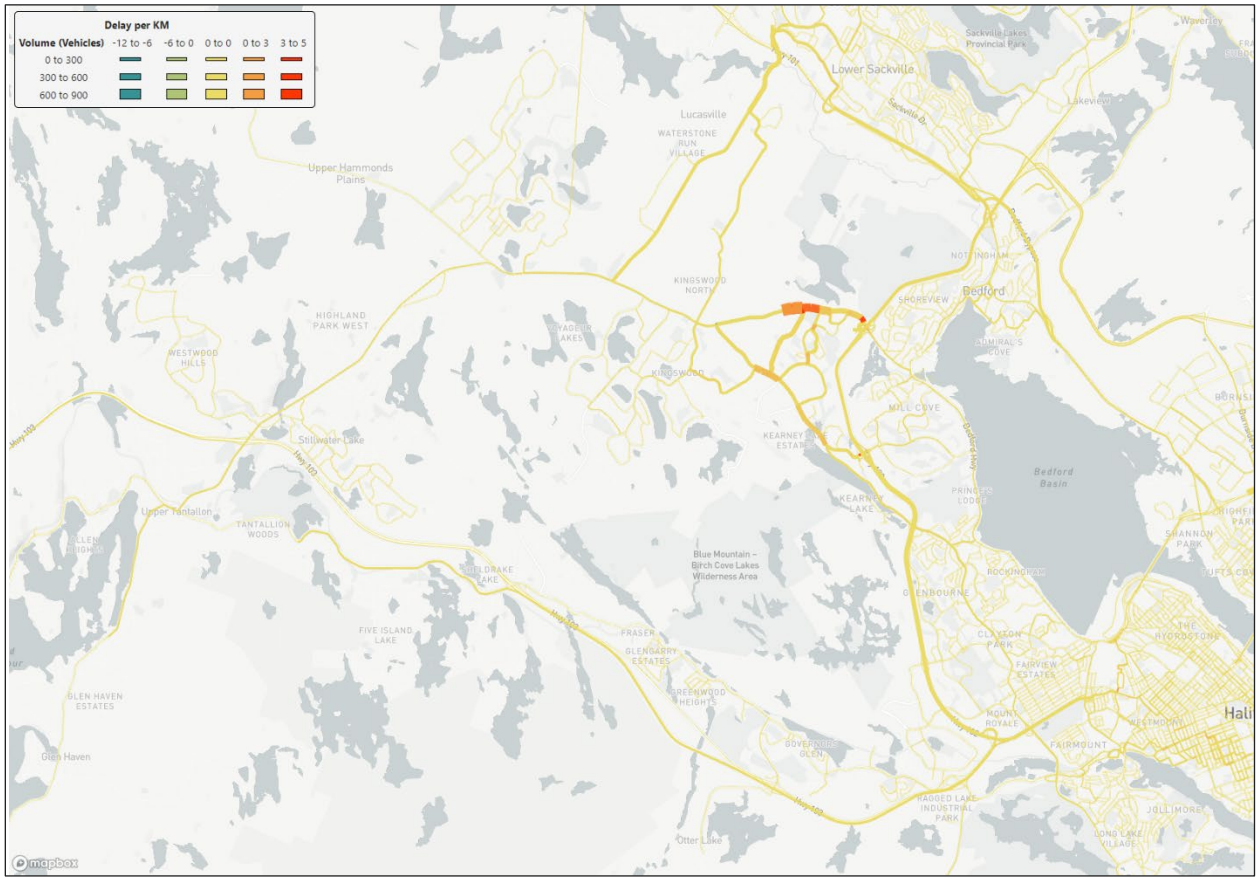


Figure 25: Travel Delay Change – AM Peak – 2031 Sandy Lake Development Scenario

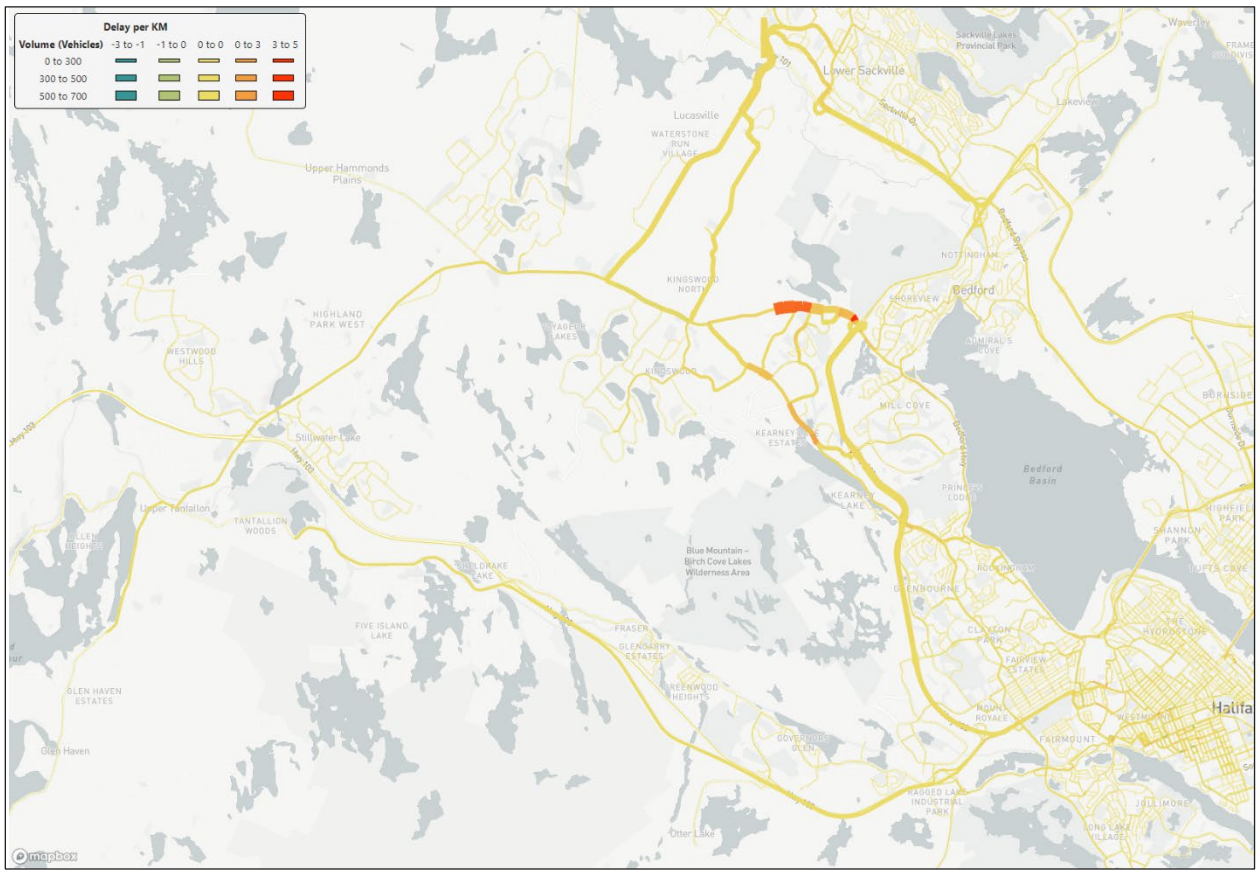


Figure 26: Travel Delay Change – PM Peak – 2031 Sandy Lake Development Scenario

5.2.2.5 Transit Impacts

The impacts of transit demand changes due to a large scale Sandy Lake development are illustrated through transit passenger demand variance maps (**Figure 27**, **Figure 28**). The maps compare the passenger volumes at the link level between the Sandy Lake Development Scenario and the Do Minimum Scenario, highlighting the anticipated increase in transit usage stemming from the development.

The predominant destination area of transit demand from the Sandy Lake development is shown to be the Halifax CBD and areas within Dartmouth, taking capacity away from the already oversaturated transit network routes along Larry Uteck Boulevard and Dunbrack Street.

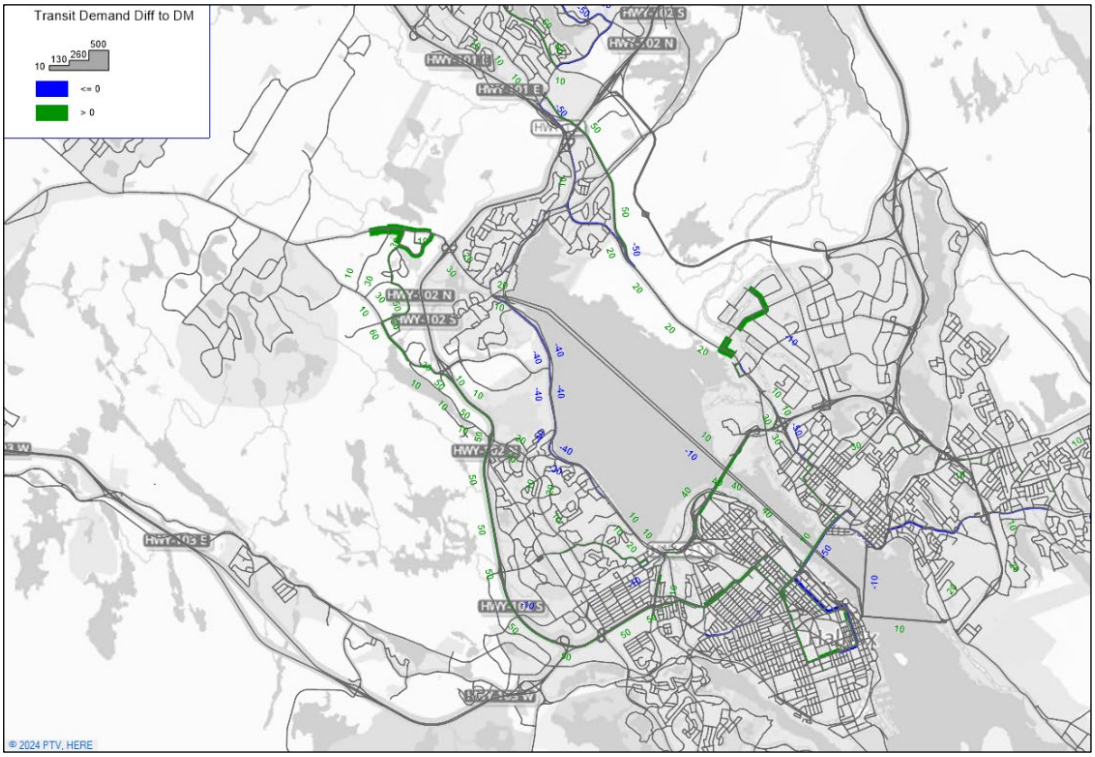


Figure 27: Transit Demand Change – AM Peak – 2031 Sandy Lake Development Scenarioc

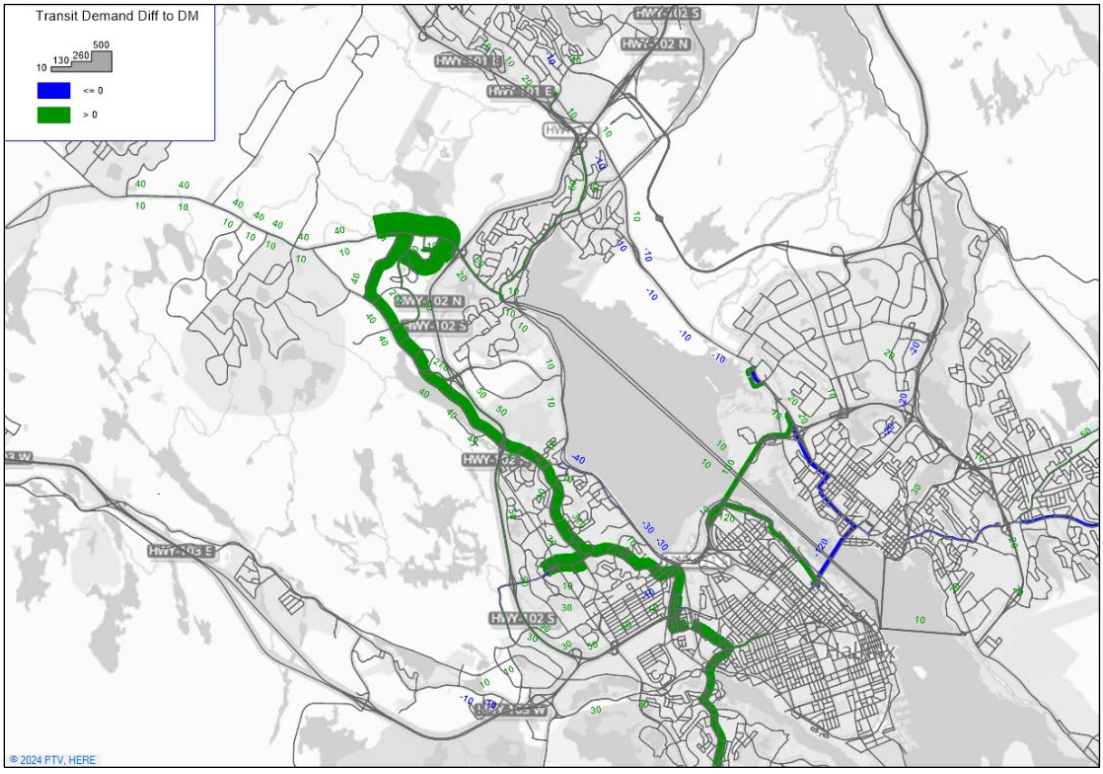


Figure 28: Transit Demand Change – PM Peak – 2031 Sandy Lake Development Scenario

Transit capacity change maps further emphasize areas where predicted transit demand increases and either approaches or exceeds predicted transit capacity. A significant uptake of remaining capacity along transit lines in proximity to Sandy Lake indicate a need for augmented transit frequency along Hammonds Plains Road and Larry Uteck Boulevard (**Figure 29**).

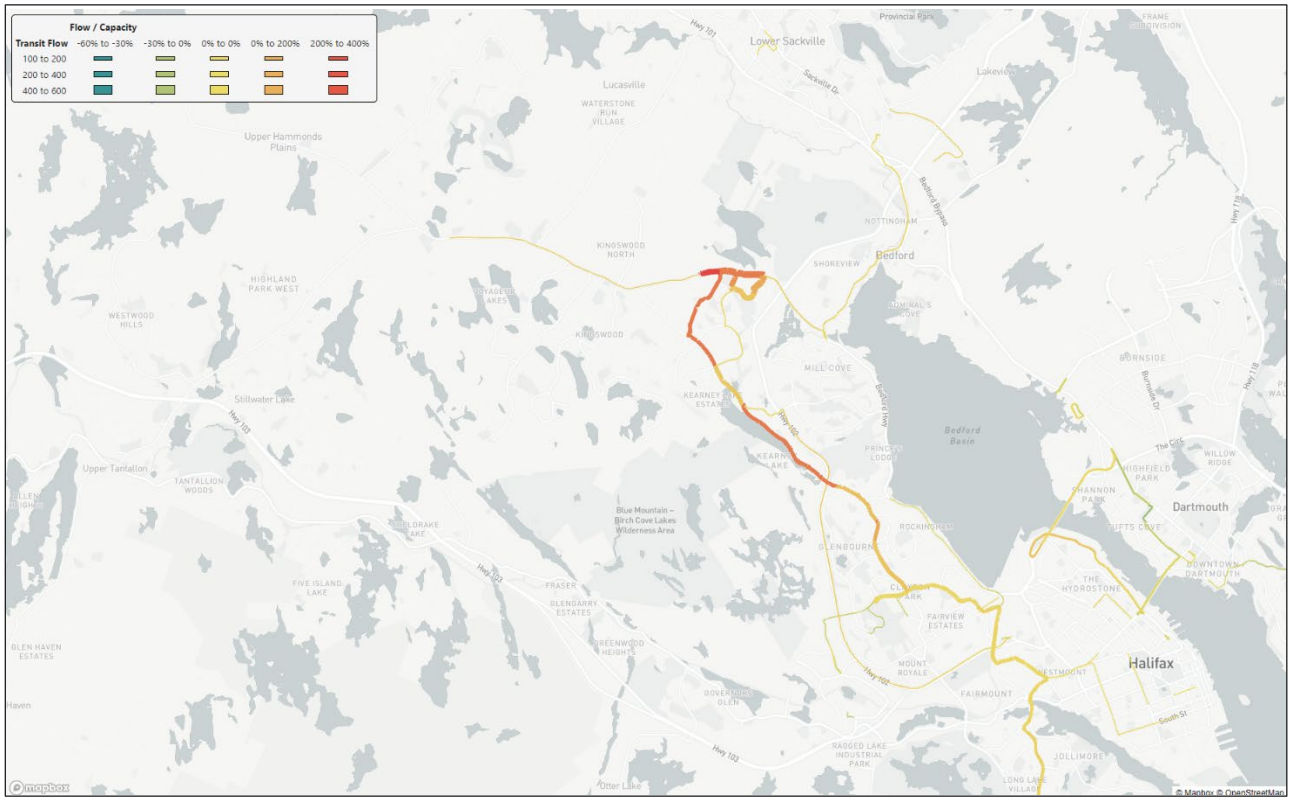


Figure 29: Transit Flow/Capacity Ratio Change – AM Peak – 2031 Sandy Lake Scenario

The largest anticipated transit ridership increase on an individual transit line during peak hours (8:00-9:00 a.m. and 4:00-5:00 p.m.) in response to the introduction of the Sandy Lake development – over 140 passengers – corresponds to Route 433 along Hammonds Plains, Bluewater, and Kearney Lake Roads connecting to the Lacewood Terminal (**Figure 30**). Routes 91 (via Hammonds Plains Road and Bedford Highway) and 194 (West Bedford Express via Gary Martin Drive, Broad Street, Larry Uteck Boulevard, and Highway 102), both serving the West Bedford Park and Ride, also experience significantly increased demand – over 50 passengers – during peak hours.

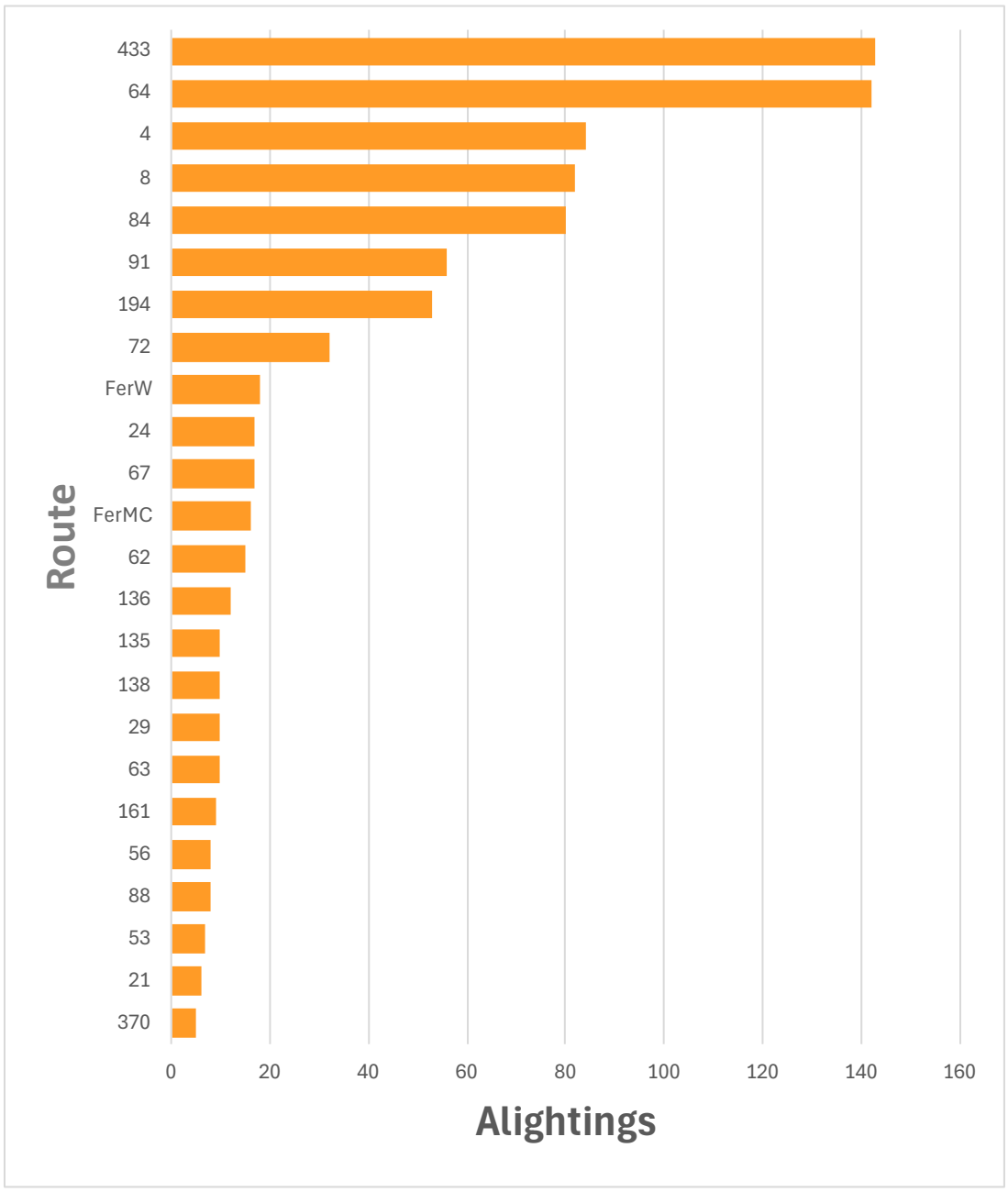


Figure 30: Transit Demand Change by Route – AM Peak Hour

5.2.2.6 Active Transportation

The HRM model forecasts a total mode share of 6.2% for walking trips and 0.2% for cycling. Within Sandy Lake, active mode internal trips are estimated to be 9.5%, calculated using the HRM's default algorithms and the established Place of Residence (POR) to Place of Work (POW) ratios (**Figure 18**). This approach results in a higher proportion of trips originating from within the site, specifically for individuals walking to their place of work. As previously stated, the HRM ABM process does not calculate cycling rates internal to zones.

However, it is important to note that this total is likely an overall conservative estimate, especially considering the mixed land use within the development. The presence of residential, commercial, and recreational spaces in close proximity may encourage higher levels of active transportation than predicted. Therefore, actual walking and cycling trip rates could exceed the model's estimates especially if the development fosters a more walkable and bike-friendly environment.

5.3 Compatibility with Ecology

The Halifax Green Network Plan (GNP), released in 2018, defines an interconnected open space system, highlights ecosystem functions and benefits, and outlines strategies to manage open space. The GNP applies a variety of environmental values to each area within HRM. The plan identifies Core Areas as large, well-connected patches of natural vegetation and wildlife habitat surrounded by more altered landscapes. These patches provide essential functions, including the protection of biodiversity, soil, and water. Reducing the size of these core areas could lead to substantial impacts and loss of overall regional landscape function.

The Green Network Ecology Map in the GNP (**Figure 31**) identifies the majority of the Sandy Lake development site as a Core Area. Additionally, the GNP identifies an important natural corridor aligned east-west across the larger development site that embodies a connection between natural habitats.

Section 2.4 of this report describes consideration given within the large-scale development proposal to open space. The concept plan buffers the two watercourses flowing through the site and ultimately into Sandy Lake. The northeastern-most proposed neighbourhood, comprised of single-family units, would be surrounded by lands designated as a core ecological area that the developer has offered for sale to HRM. Abutting HRM-owned property intended for the expansion of the Sandy Lake Regional Park, the preserved lands contain wetlands and an additional watercourse that drains into Sandy Lake.

Analyses identified in the Watershed Study and Stormwater Management Plan determine the adequacy of this ecological mitigation approach and have been noted as a qualifying factor that may impact transportation solutions pending changes to the development proposal.

Source: HRM – Halifax Green Network Plan (2018)

Figure 31: Green Network Ecology Map

5.4 Potential Impact of Proposed Highway 113

A proposed Highway 113 would connect Highway 103 at Sheldrake Lake to Highway 102 southwest of the Hammonds Plains Road interchange. Its most obvious role is to allow traffic from Bedford, Sackville, and points north destined for St. Margarets Bay and points on the South Shore to make a direct connection directly rather than travel additionally on Highway 102 to its interchange with Highway 103 east of Bayers Lake. The proposal includes an interchange at Larry Uteck Boulevard north of its intersection with Kearney Lake Road and another south of the Kingswood Subdivision.

The main utility of Highway 113 in terms of regional traffic diversion for Hammonds Plains Road involves attracting traffic that currently uses Hammonds Plains Road to connect between Bedford and Highway 103. In 2006, Delphi-MRC examined shifts in demand related to the Highway 113 proposal for a 2026

planning horizon year against a regional population forecast of 446,000. The appendix reports forecast link volume changes for the PM Peak Hour. Note that at time of this analysis, a direct interchange between Larry Uteck Boulevard and Highway 102 did not exist.

Dependent on the forecast scenario examined, the volume change along Hammonds Plains Road west of Highway 102 and east of Lucasville Road ranges from reductions of 150 to 400 vehicles. Larry Uteck Boulevard west of Highway 113 would experience reductions of 0 to 150 vehicles. When compared with the modelled 2031 Do Minimum scenario, which sees Hammonds Plains Road exceeding roadway capacity during the PM Peak by more than 640 vehicles, and the 2031 Sandy Lake scenario, in which link demand exceeds capacity by over 1,700 vehicles, the value of Highway 113 in relieving traffic burden on Hammonds Plains Road appears modest compared to the required investment.

Further concern that any utility may be undermined stems from the proposed joining of Highway 113 to Highway 102 along a projected heavily congested segment only 1 km from the Bedford Interchange. Interchange spacing in urban/suburban areas generally ranges from 2 km to 3 km. Successive interchanges along expressways that are too close in proximity impair the operation of the expressway, which loses its capacity to collect and deliver traffic from crossing arterial roads or other converging limited-access highways.

6 Limitations/Qualifications

Factors persist that limit or qualify the accuracy and value of analyses performed to date. The first is related to the extension of Bluewater Road, the assumed eastern access to the Clayton development lands. This extension crosses land owned by Argopur, operators of the nearby dairy processing plant. Concerns persist related to vehicular conflict between new residents and the industrial operation as well as those of plant security. Agropur's is currently unwilling to sell a portion of their land to Clayton for this purpose.

As discussed previously regarding future connectivity analyses, future commercial and service offerings available within or near the development site change the perception of access for new development residents and are not precisely captured in available concept plans and impact studies. A pertinent and recent example exists in the newly constructed Brookline and Larry Uteck Plazas located approximately 2.5km from the proposed western access to the Clayton development.

The planned extent and quality of the pedestrian network within proposed developments is unknown at this time. Beyond intended multi-use paths along major internal routes, network analyses depend on understanding all pedestrian access options. The location of all sidewalks and non-roadway adjacent paths should be known to ensure accuracy in connectivity analyses based on walking distance.

6.1 Transportation Modelling

Junction delay was not simulated within the Joint Regional Transportation Simulator. While the model provides valuable data on link-level metrics, such as mid link volume-to-capacity ratios and travel demand distribution, it does not capture delays at intersections, particularly at signalized junctions. The absence of junction-level analysis means that the full extent of congestion, and its impact on network performance,

are not reflected in the results. Thus, while general traffic patterns and transit demands can be assessed, the localized impacts of high-traffic intersections – key areas for congestion – may be underestimated.

6.2 Impact of Other Assessments

Parallel accompanying reports tasked with assessing development suitability based on environmental and servicing factors may impact the future scale of development as well as the provision and alignment of transportation infrastructure. Regulated constraints for development may result in modified development plans and thus, modified transportation recommendations.

- Land suitability analysis identifies which portions of the Study Area are most suitable for new community development based on an assessment of wetlands, watercourses, forest habitat, species-at-risk, and the acid producing potential associated with sulphur-bearing bedrock.
- In the absence of a full water service system model the effect of the proposed development on the level of service of the remaining system could not be assessed. The Sandy Lake Water Servicing Plan recommends that the level of service and distribution system requirements be reassessed during subsequent design stages.
- The Watershed Study and Stormwater Management Plan recommends limiting the amount of increase in contaminant loading from existing conditions. Mitigation measures and limitations to development for the conservation of naturally forested areas are the most effective methods to limit increases in contaminant loading. The proposed development layout and associated stormwater management requires a thorough revision based on further analysis of the land use distribution and the siting of stormwater management ponds, as well as detailed hydraulic modeling, to confidently mitigate risks of flooding and reduce risks of degradation to the natural assets within the study area.

7 Conclusions and Recommendations

7.1 Conclusions

Should the Sandy Lake development progress into secondary planning, it is imperative that the project prioritizes the creation of a well-connected multimodal and complete community. Our connectivity analysis has highlighted the necessity for a more integrated and cohesive community structure in terms of co-located daily needs. Embracing the principles of a complete community, which includes an idealized ratio of residential spaces, commercial spaces, and transportation alternatives will be necessary to realize a functional development that reduces the transportation burden of its residents. Macro level connectivity data demonstrates that if key destinations are not located within the new development or connected by frequent and rapid transit from Sandy Lake, a significant portion of the new population will be unable to access essential services on foot or by public transit within 30 minutes. Even extending the timeframe to one hour, residents would still lack access to important facilities such as doctor's offices, hospitals, shopping centers, and higher education institutions.

A deeper understanding of detailed development plans, particularly regarding the inclusion of commercial services, is of primary importance for accurately assessing the environmental and social impacts related to transportation access. Our connectivity analysis further showed that access issues can be mitigated from either the land use or transportation planning perspective. Incorporating shopping, entertainment, and basic healthcare options within the commercial areas of the proposed development reduces the average active transportation travel time for new residents to reach common destinations. Strategic land use and siting decisions not only bring daily destinations closer to the community, but also reinforce the value of local active transportation networks for short trips. Additionally, the need for an easement or property sale to extend Bluewater Road from Hammonds Plains Road to the main development area poses challenges for transportation planning, including external trip assignments as described by traffic impact studies. Understanding these two major considerations allows for refined connectivity analysis, which leads to the optimal selection and placement of active transportation infrastructure and shared mobility services.

Travel modelling indicates that the Volume-to-Capacity (V/C) ratio on Highway 102 into Halifax will exceed 100 percent by 2031, characterized by severe congestion even before the Sandy Lake development is introduced. Mitigation measures for Highway 102 should ideally be implemented before or in parallel with the development of the Sandy Lake study area to mitigate further negative effects of congestion. In addition to improvements along Hammonds Plains Road, further junction upgrades are required to accommodate westbound-to-southbound and southbound-to-westbound movements more efficiently at the interchange with Highway 102. Enhancements along the Larry Uteck Boulevard/Kearney Lake Road and Bedford Highway corridors would be beneficial. All incremental demand-related impacts stemming from the Sandy Lake development only intensify baseline forecast conditions and do not highlight new areas of congestion. Policy conflict may arise from mitigation action decisions owing to the magnitude of transportation needs of an anticipated combination of general regional population growth and acute demand created by the development.

High level assessment of the impact of a proposed Highway 113 on Hammonds Plains Road traffic volume finds some demand reduction is possible, but that observed impact would be negligible compared to anticipated demand pressure on the corridor. Available studies of its impact did not anticipate the level of development that has occurred in Bedford West or the Highway 102 connection of Larry Uteck Drive. While the Sandy Lake development should enhance the role of Highway 113, the trip connections that it would facilitate will do little to alleviate the main sources of congestion that Sandy Lake will exacerbate, especially that of Highway 102 given the proximity of the Highway 113 connection to another high-volume interchange.

Modelling further indicates that without a BRT system in place at the time of development build-out, several transit services in the bay area near Sandy Lake are projected to face demand surpassing their capacity. This highlights the need to implement BRT service to enhance regional transit connectivity and alleviate demand pressure from the Sandy Lake development site.

For effective on-site transit route planning, developers must determine and specify the right-of-way dimensions of proposed roadways. Internal roads should be conceived and aligned to ensure that all new residents live within a 400-metre walk of a transit stop. Our connectivity analysis outputs indicate that without bus service closely servicing the development, approximately half of Sandy Lake study area residents would be unable to access public transportation within 30 minutes on foot. Furthermore, a comprehensive understanding of vehicle parking, including inventory and utilization management, impermeable surface quantification, and an EV charging program have implications in future study and planning related to achieving mode share targets and addressing environmental considerations. Only once these factors are fully understood can a proper accounting of environmental impacts take place. Additional site plan detail also facilitates the evaluation of opportunities to efficiently implement shared mobility services. Micromobility options such as scooters, cargo bikes, golf carts, and shared car services not only provide localized access for Sandy Lake residents, but also extend access and connectivity to and from adjacent neighbourhoods without requiring personal vehicle ownership.

While extending the All Ages and Abilities active transportation network from the central business district to Sandy Lake may be ambitious, creating active travel connections to Bedford would be highly beneficial. These connections could link the internal active travel infrastructure within the development to nearby destinations. Given the relatively short distance and the model's prediction of reasonable travel demand between Bedford and Sandy Lake, such links would support active transportation options for residents.

7.2 Recommendations

7.2.1 ROADWAYS

Per an understanding of baseline volume-to-capacity ratio, as well as projected external trip distribution, HRM should explore transportation corridor capacity upgrades in multiple locations. Noting that current policy direction encourages investment in alternative modes rather than additional vehicle capacity, HRM may opt for an approach that leans more heavily on other enhancements to person throughput. Additionally, physical constraints may preclude the addition of general purpose or transit priority lanes.

As modelling to date has been link-based rather than based on intersection analysis, the extents of required capacity upgrades given in the recommendation summary table are broad (**Figure 33**). Cost

estimates attempt to associate an order of magnitude cost with recommended physical implementations as a function of corridor segment length. Estimates assume uniform capacity upgrades independent of the current number of travel lanes, including multi-lane intersection approaches.

- Hammonds Plains Road shows capacity strain from Bedford Highway near the Mill Cove Ferry Terminal to Larry Uteck Boulevard, the anticipated western access to the proposed development.
- Specific operational issues identified at the Hammonds Plains Road and its interchange with Highway 102 require modification from a shared signal approach for entering and exiting southbound traffic to separated approaches, which involves construction of a new southbound exit ramp from Highway 102 to Hammonds Plains Road and enables subsequent reconfiguration of signal cycles to benefit all movements.
- As the Larry Uteck Boulevard/Kearney Lake Road corridor provides direct southern access to Dunbrack Street and the Bedford Highway, a connection to the planned Larry Uteck Ferry Terminal, and multiple connections to Highway 102, it is poised to act as a key route alongside Hammonds Plains Road. Baseline model results dictate increased throughput needs for Larry Uteck Boulevard from Kearney Lake Road to Blue Mountain Drive. Added trip distribution from the Sandy Lake development extends those needs to Hammonds Plains Boulevard.
- Bedford Highway is an important link in the transportation network extending from Hammonds Plains Road to both the Mill Cove and Larry Uteck Ferry terminals and beyond to Highway 111 and the MacKay Bridge. Baseline model results indicate a need for additional mobility capacity by 2031 from Dartmouth Road as far south as its junction with Highway 111. The 2019 Bedford Highway Functional Plan examined this entire extent. Evaluation within the plan and consideration of public feedback chose a preferred corridor configuration option that provide continuous active transportation facilities, targeted transit priority improvements, and intersection reconfigurations to mitigate anticipated travel time increases.

While it is assumed that intersections within identified corridors will be examined individually as part of any enhancement project, the addition of the Sandy Lake Development will require specific reconfiguration of intersections at each access point, currently slated for Larry Uteck Boulevard, Bluewater Road, and an as-of-yet unnamed access road. Intersection enhancement should also specifically be considered for Hammonds Plains Road at Gary Martin Drive, given its location central to the southern boundary of the new development and Gary Martin Drive's importance as a transit-supportive corridor.

As announced by the province on October 24, 2024,[1] a more substantial connection from Hammonds Plains Road to Highway 101 should be explored, via either a modified Lucasville Road or new parallel corridor. A portion of traffic generated along Hammonds Plains Road is destined for Lower Sackville and points west along Highway 101. Modelled Sandy Lake scenario results suggest a sizable amount of traffic would divert to Lucasville Road and a chain of residential streets to the east. A more direct route closer to Sandy Lake would aid in alleviating congestion by absorbing traffic pattern changes in peak hour

[1] Traffic Solutions, Safety Improvements for Major Highways | Government of Nova Scotia News Releases

traffic flows directly due to the Sandy Lake development, and reduce the impacts of otherwise anticipated traffic diversion on existing roadways. The connection may also facilitate access to commercial destinations in Lower Sackville, primarily along Beaver Bank Road and Sackville Drive.

Likewise, the previously programmed "Middle Sackville Connector" between Exit 2A of Highway 101 (Margeson Drive) and Lucasville Road presents an option to absorb diverted traffic. However, as new residents of the Sandy Lake development would remain more likely to utilize the connection proposed by the Province, which creates a more seamless network connection to Hammonds Plains Road and Larry Uteck Boulevard closer to the proposed development site, initial assessment indicates a preference for the more eastern Highway 101 connection. Final selection requires in-depth evaluation of environmental, community, and fiscal impacts.

7.2.2 TRANSIT

Primary BRT system proposals derive justification from regional background projections. As proposed, the BRT Purple Line would terminate at Kearney Lake Road and Parkland Drive, east of Highway 102, with a planned extension to Larry Uteck Boulevard along an as-of-yet undermined alignment. Thus, the development of the Sandy Lake study area would not directly contribute to the justification to build initial BRT lines. Extending the BRT Purple Line to Sandy Lake would provide a more seamless transit connection to Halifax's central business district (CBD) and eastern destinations north of the MacKay and Macdonald Bridges. An extension would align with the expected distribution of travel to and from the development site. Consistent with the transit section of the IMP Action Plan and the Rapid Transit Strategy, transit priority lanes would be required along the Larry Uteck Boulevard corridor to extend the BRT Purple Line to Sandy Lake and position transit service as a competitive alternative to personal vehicle use for new area residents.

Absent an extension of true BRT, an increase in regular bus frequency and implementation of transit priority measures along Hammonds Plains Road and Larry Uteck Boulevard (current Routes 91, 194, 433) represents an alternative solution to accommodate the anticipated increase in transit demand. Transit service serving Hammonds Plains Road should directly connect to/from the Mill Cove Ferry and buses along Larry Uteck Boulevard should directly connect to the Larry Uteck Ferry, which will involve route reconfiguration as currently only Route 91 would serve both ferry terminals as well as the West Bedford Park and Ride. As modelled transit demand changes indicate substantial increases in riders during peak hours along Hammonds Plains Road and Larry Uteck Boulevard (**Figure 30**), each corridor would require 4-5 additional buses during peak hours and 2-3 additional buses between peaks. The current configuration of routes where each corridor is served by Route 433 and supported by routes 91 (Hammonds Plains Road) and 194 (Larry Uteck Boulevard) can reduce the overall bus requirement to 4-5 buses per route during peak hours and 2-3 buses between peak hours. Note that there are duplications of operating cost estimates that may be reduced if corridor routes are reassigned to a BRT network.

If physical constraints and/or policy constraints preclude the addition of both transit priority and general purpose travel lanes, the decision to choose only one may be informed by high level analysis of the transit service necessary to deliver a major mode shift from vehicle drivers to bus passengers. Modelled vehicular volume-to-capacity data of key corridor segments (Hammonds Plains Road immediately west of Gary Martin Drive and Larry Uteck Boulevard immediately south of Brookline Drive) for the 2031 Do Minimum and 2031 Sandy Lake scenarios helps to estimate the necessary vehicular demand conversion.

Analysis finds far greater transit needs along Hammonds Plains Road than Larry Uteck Boulevard. For instance, absorbing the 2031 non-Sandy Lake vehicle baseline volume over capacity would require 9-12 additional buses during the AM peak hour, 13-17 additional buses during the PM peak hour, and 6-7 additional buses per hour during non-peak periods. Conversely, the modelled baseline only indicates a need for additional bus service along Larry Uteck Boulevard during the PM peak period (5-6 buses).

The range of bus needs is based on occupancy per bus of either 40 or 50 passengers. Also note that this calculation does not apply a factor to adjust for the average number of people per vehicle. It effectively and conservatively treats each vehicle as containing only a driver in terms of its contribution to transit demand. Further, the calculations only attempt to reduce the V/C ratio to 1, which remains a severely congested condition.

As the Sandy Lake Development is brought into the equation, the amount of transit service needed to convert drivers to transit users in the Hammonds Plains Road corridor balloons to impractical levels. Peak hour needs range from 30-37 to 35-44 buses in addition to current service levels. Annual operating costs alone would range from $8.7 million to $10.8 million for this added service, which would require the use of a transit priority lane in an otherwise congested corridor. Demand estimates along Larry Uteck Boulevard in a scenario including the Sandy Lake development suggest transit service requirements in line with a moderate-to-high volume BRT system, ranging from 5-7 additional buses per hour in non-peak times to 15-18 additional buses during the PM peak hour.

7.2.3 ACTIVE TRANSPORTATION

Per the HRM Active Transportation Priorities Plan and as highlighted in the developer's Traffic Impact Study, primary corridor designs should include separated active transportation facilities along Hammonds Plains Road (between Larry Uteck Boulevard and Bedford Highway) and Larry Uteck Boulevard (between Hammonds Plains Road and Brookline Drive) to enhance non-motorized user connectivity, safety, and accessibility.

As facilities along these corridors would be geared toward transportation functions more so than recreation, the ideal bicycle facility would be a uni-directional cycle track, a bike lane raised and curb separated from the roadway, parallel to, but separate from the pedestrian sidewalk. Technical and practical considerations related to adding separated bicycle infrastructure to Larry Uteck Boulevard dictate an exception to the emphasis on commute-oriented facility selection. A multi-use path on the north and east side of Larry Uteck Boulevard would better connect to existing paths along the corridor while steering clear of other potential infrastructure conflicts.

Sidewalk gaps along Hammonds Plains Road to close include lengths from Brookshire Court to Smiths Road through the Highway 102 interchange.

Corridor design should utilize a complete suite of high visibility treatments at pedestrian and cycling crossings of Hammonds Plains Road (at Larry Uteck Boulevard, Bluewater Road, and a yet to be created intersection joining the Sandy Lake development area and Bedford West Sub Area 12 (**Figure 7**) to ensure safe and efficient movement across the roadway, again reducing the risk of collisions, but also more effectively and equitably connecting new and existing communities to existing amenities and services.

7.2.4 SHARED MOBILITY

Major new development should properly site a mobility hub to serve as a transportation anchor in a new community and offer a safe, comfortable, convenient, and accessible space to seamlessly transfer between different travel modes. Costs of mobility hubs are highly variable dependent on amenities provided and modes accommodated. Potential co-location at a commercial or transit centre within this and other Future Serviced Community development sites can centrally provide a mix of transportation options to users to reduce car dependence for internal trips within new neighbourhoods.

Facility/ Service	Baseline 2031 Improvements	OOM Cost Estimate	Sandy Lake-Specific Improvements	OOM Cost Estimate
Roadway Infrastructure				
Hammonds Plains Road	Increased person movement capacity from Larry Uteck Boulevard to Bedford Highway	Potential lane addition, transit priority or general purpose – $18.41 million based on $3,835,000 per linear kilometre		
Highway 102 Capacity Enhancements	Per Provincial Announcement[2]	Requires further scoping		
Highway 102 Exit 3	Capacity increases beginning with new southbound exit ramp and signalization upgrades	Requires further scoping per Provincial Announcement		
Intersection Enhancements			Intersection enhancements, Hammonds Plains Road at Larry Uteck Boulevard, Gary Martin Drive, Bluewater Road, and any new Sandy Lake development access	$0.4 million to $1.27 million per intersection ranging from capital costs of traffic signals without geometric modifications to roundabouts inclusive of removal and lighting

[2] Traffic Solutions, Safety Improvements for Major Highways | Government of Nova Scotia News Releases

Facility/ Service	Baseline 2031 Improvements	OOM Cost Estimate	Sandy Lake-Specific Improvements	OOM Cost Estimate
Hammonds Plains Road – Highway 101 Link	New two-lane non-local roadway	Requires further scoping per Provincial Announcement		
Larry Uteck Boulevard			Increased person movement capacity from Kearney Lake Road to Hammonds Plains Road	Potential lane addition – $13.88 million based on $3,835,000 per linear kilometre
Bedford Highway	Increased person movement capacity from Union Street to Highway 111 per the Bedford Highway Functional Plan	$35.1 million per Class D Plan estimates (2019)		
Transit				
Bus Rapid Transit			BRT Purple Line extension from Larry Uteck West station to intersection of Larry Uteck Boulevard and Hammonds Plains Road (assume alignment on Larry Uteck Blvd)	$0.48 million (station) $7.74 million (4.5 km transit priority lanes and intersection enhancements) $2.61 million annual (operating)[3]

[3] Rapid Transit Strategy - Final - May 2020.pdf

Facility/ Service	Baseline 2031 Improvements	OOM Cost Estimate	Sandy Lake-Specific Improvements	OOM Cost Estimate
Hammonds Plains Road non-BRT alternative local bus service			4-5 additional buses per hour during peak periods (8-9 a.m.and 4-5 p.m.). 2-3 additional buses per hour before, after, between peaks and weekends	$1.08-1.57 million annual based on $100.85 operating cost per hour for new service[4]
Larry Uteck Boulevard non-BRT alternative local bus service			4-5 additional buses per hour during peak periods (8-9 a.m.and 4-5 p.m.). 2-3 additional buses per hour before, after, between peaks and weekends	$1.08-1.57 million annual based on $100.85 operating cost per hour for new service
Active Transportation				
Hammonds Plains Road			Close sidewalk gaps from Larry Uteck Boulevard to Brookshire Court Uni-directional cycle tracks from Larry Uteck Boulevard to Bedford Highway	Sidewalks (1.8m width): $2.64 million – $463,170 per linear kilometre Cycle tracks (excluding curbing): $3.04 million – $633,732 per linear kilometre

[4] Halifax Transit

Facility/ Service	Baseline 2031 Improvements	OOM Cost Estimate	Sandy Lake-Specific Improvements	OOM Cost Estimate
Larry Uteck Boulevard			Multi-use path from Hammonds Plains Road to Brookline Drive	$1.00 – 1.18 million $400,650 (2.5m width) to $471,300 (3.0m width) per linear kilometre
High-Visibility Crossing Treatments			Bicycle and pedestrian crossings of Hammonds Plains Road at three (3) locations	$112,000 Includes materials cost for Rectangular Rapid Flashing Beacons, High Visibility Painted Crosswalks, and two warning signs.

Figure 32: Recommendation and High-Level Cost Estimate Summary Table

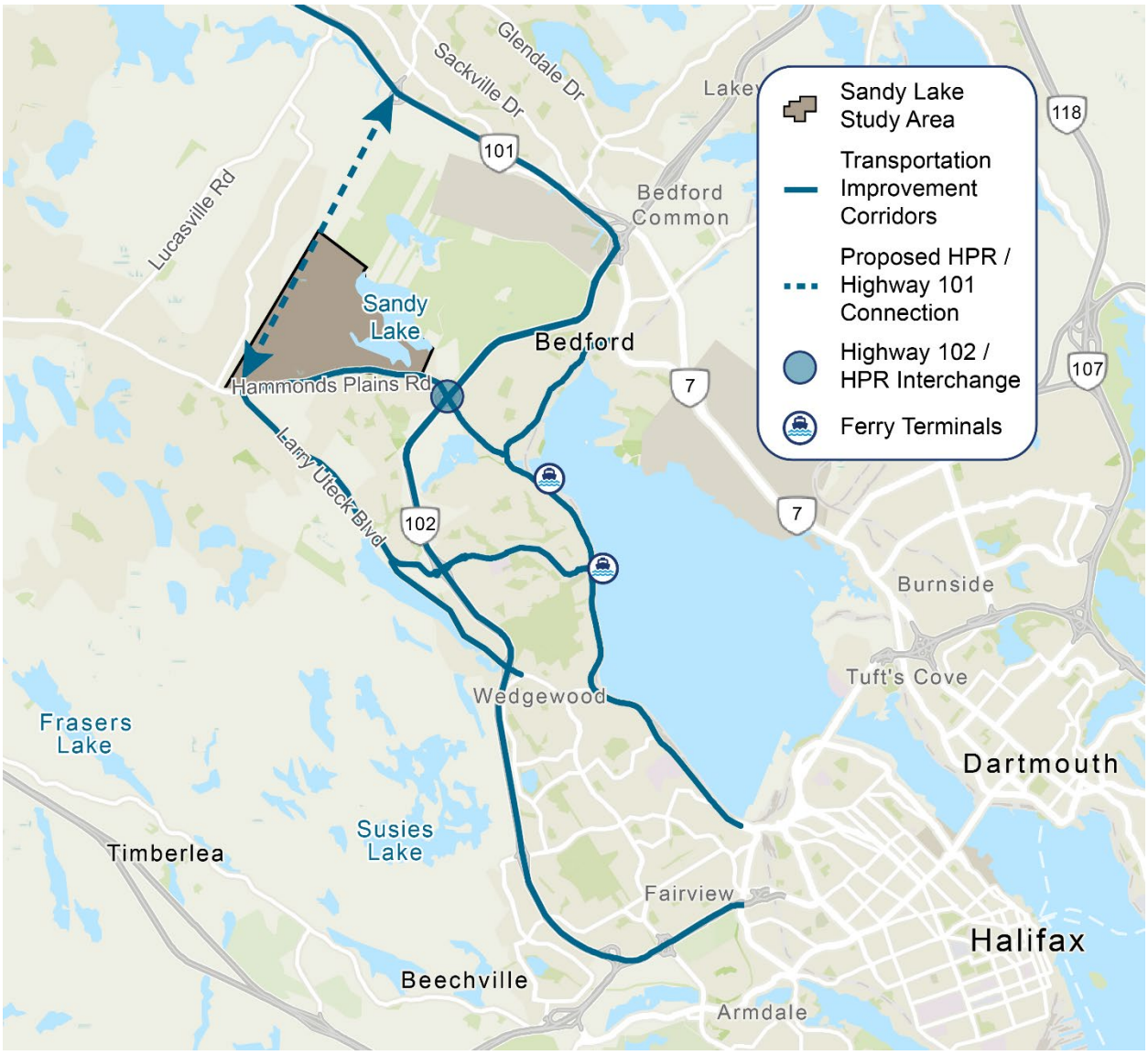


Figure 33: Spatial Recommendation Representation

7.3 Follow-On Work Required

To adequately meet the mobility study goals of the Future Serviced Communities initiative, further investigations, analysis, and planning will be performed. The Sandy Lake development, due primarily to its location in the Inner Suburban region of HRM, is expected to demonstrate a personal vehicle orientation. Additional work may be rationalized to achieve the objectives of HRM policies supporting transportation alternatives in addition to planning efforts described below.

- Connectivity analyses will require repetition as different assumptions, especially the inclusion of specific uses and destinations on site, become more concrete. There will need to be consideration of the cumulative effects of multiple development areas proceeding in the short term, especially the Highway 102 West Corridor study area, with a particular emphasis on the function of the 100 series highways and interchanges.
- To fully understand traffic volume and congestion mitigation needs, corridor functional design studies should analyze junction performance to more completely assess network impacts and potential bottlenecks.
- Future planning work will require a comprehensive comparative evaluation of the impact on the community, environment, and broader transportation network of two parallel publicly proposed strategic links between Hammonds Plains Road and Highway 101 west of the Sandy Lake development site. Each option must consider the cumulative effects of increased development in nearby areas, including the Paper Mill Lake Comprehensive Development District and the Beaver Bank and Hammonds Plains Growth Control Areas. Opportunities exist to integrate smart growth principles, which will require careful planning and stakeholder engagement to mitigate any negative impacts and realize enhanced regional connectivity from any improvements.
- Include the proposed Highway 113 in future modelling scenarios to gain a more up-to-date understanding of any traffic volume diversion benefits along Hammonds Plains Road as well as potential exacerbation broader regional impacts such as congestion on Highway 102.
- Using a more detailed development plan, determine ideal on-site routing for high quality transit service and other micromobility that links to top regional destinations and corridors to make progress toward the IMP's 27% non-auto mode share target for the Inner Suburban zone.
- Perform a more detailed feasibility and benefit-cost analysis of bus-only facilities to absorb and mitigate vehicular traffic demand in order to position transit service as a competitive alternative to personal vehicle use.
- Beyond more detailed and congestion-focused modeling, it would be prudent to explore variations in internalization of trips and travel distribution patterns. This would provide a clearer understanding of how active transportation can be further integrated within the development and its surrounding areas, potentially reducing reliance on car travel.