



**HALIFAX REGIONAL MUNICIPALITY
FUTURE SERVICED COMMUNITIES –
MORRIS LAKE EXPANSION
TRANSPORTATION PLAN**

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Final Report

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Halifax Regional Municipality Future Serviced Communities – Morris Lake Expansion Transportation Plan

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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. 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 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 induced needs related to the introduction of new residents and commercial activity within the study area as well as the feasibility of transportation network and service enhancements that are required to connect the study area to surrounding and regional destinations.

The draft Halifax Regional Municipal Planning Strategy presented to Halifax Regional Council on June 20, 2023, and now subject to public review, continues to identify the new development area near Morris Lake as a Future Serviced Community.

The Morris Lake study area focuses on lands owned by Clayton Developments (under the operating name Morris Lake Holdings), the owner of a majority of the land within the study area, Brycon Development, and A.J. Giles Investments. These companies have previously announced their intention to develop their respective properties. The developer requested building scenario also takes other landowners into account, whose intentions range from exploring zoning designation appeals for their properties to submitting formal subdivision and development proposals.

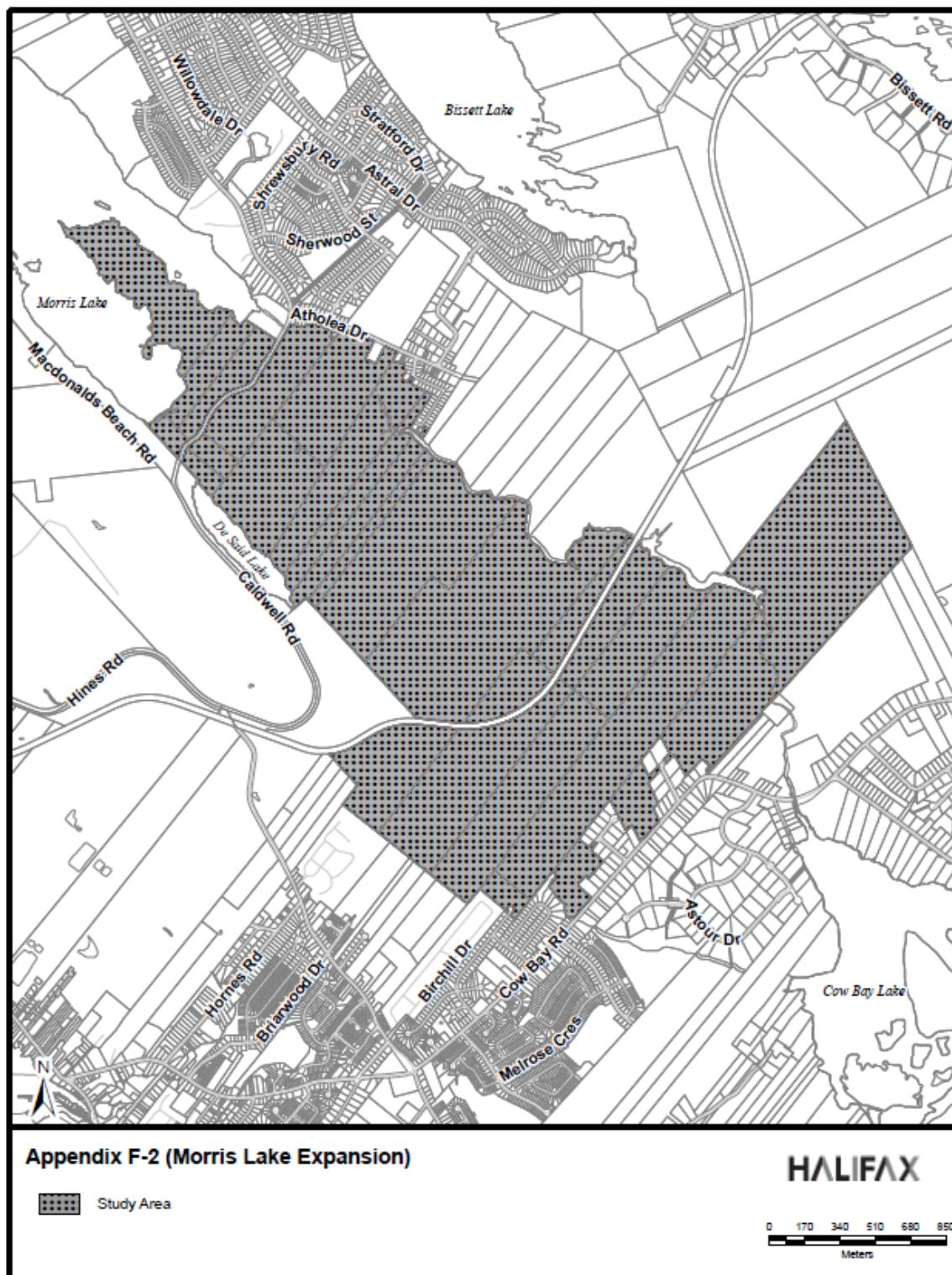
2 Study Area Overview

2.1 Location

The Morris Lake Expansion Study Area is situated beyond the southern end of Morris Lake, north of the Eastern Passage unincorporated suburban community, and adjacent to Shearwater Airforce Base (**Figure 1**). The area is otherwise bounded by parcel boundaries, including those of subdivisions located along Cow Bay Road to the south and Atholea Drive to the north.



Halifax Regional Municipality Future Serviced Communities – Morris Lake Expansion
Transportation Plan
2 Study Area Overview



Source: Halifax Regional Municipality

Figure 1: Morris Lake Expansion Study Area



2.2 Existing Land Use

The Morris Lake Study Area encompasses approximately 1,151 acres, much of which remains underdeveloped. Kiwanis Centre Beach and Park Morris Lake are located at the intersection of Caldwell Road and Atholea Drive. The beach serves as a recreational site and is used by Water Ski Wakeboard Nova Scotia for summer water skiing, wakeboarding, and adaptive accessible programs. The Cow Bay River flows through the Study Area, originating from Morris Lake and draining southeast into Cow Bay Lake and the Atlantic Ocean.

Caldwell Road is the only existing road within the proposed development area, crossing its northern portion to connect to Atholea Drive, the Willowdale subdivision, Millbrook First Nation lands, and Highway 207 where Dartmouth meets Cole Harbour. Exiting the study area to the west, Caldwell Road continues southward, passing De Said Lake before joining westbound Hines Road at an intersection from which another leg of Caldwell Road links the Morris Lake Expansion to the centre of Eastern Passage.

Although there are no other roads within the study area, the crushed stone Shearwater Flyer Trail, part of the Trans Canada Trail network, cuts across the southern portion from southwest to northeast. Previously operated and maintained by the Cole Harbour Parks & Trail Association, and now maintained by the Shearwater Flyer Trail Committee under an abandoned railway designation, the trail is a popular year-round recreational facility for residents and visitors to the area. The two nearest trailheads to the study area are located at Caldwell Road immediately to the west and at Bissett Road where the trail becomes the Salt Marsh Trail.

2.3 Adjacent Land Use

Morris Lake, located to the northwest of the Study Area, is one of the larger lakes in Dartmouth and is home to diverse wildlife. To the northeast of the Morris Lake development area is the Willowdale subdivision. Single-family detached homes along Atholea Drive and Beaver Crescent form a portion of the northeastern boundary of the study area. Likewise, low-density development along Cow Bay and Caldwell Roads border the proposed development area to the south. The remainder of the study area is bounded by Shearwater Airforce Base or undeveloped land.

The surrounding communities of Eastern Passage and Cow Bay are well-established. Eastern Passage, a historic fishing village, has transformed into a significant suburban area over the last 30 years. Cow Bay, known for its scenic beaches, has also become more connected to the urban core of HRM. Both coastal communities are largely developed, featuring public schools, parks, and commercial services. Residential areas are primarily characterized by single-family detached homes on large lots with mature trees. Bordering the study area, homes are set on lots with large front yards backing onto woodlands.

2.4 Development Proposals

Most major landowners plan to develop their lands within the study area. A partnership between Clayton Developments and Cresco controls extensive lands under the operating name Morris Lake Holdings (formerly Dartmouth East Holdings). Brycon Developments owns property that bisects the Morris Lake Holdings and proposals have been prepared in which these lands are developed as part of a broader Morris Lake Holdings concept as well as independently. A.J. Giles Investments controls an area in the



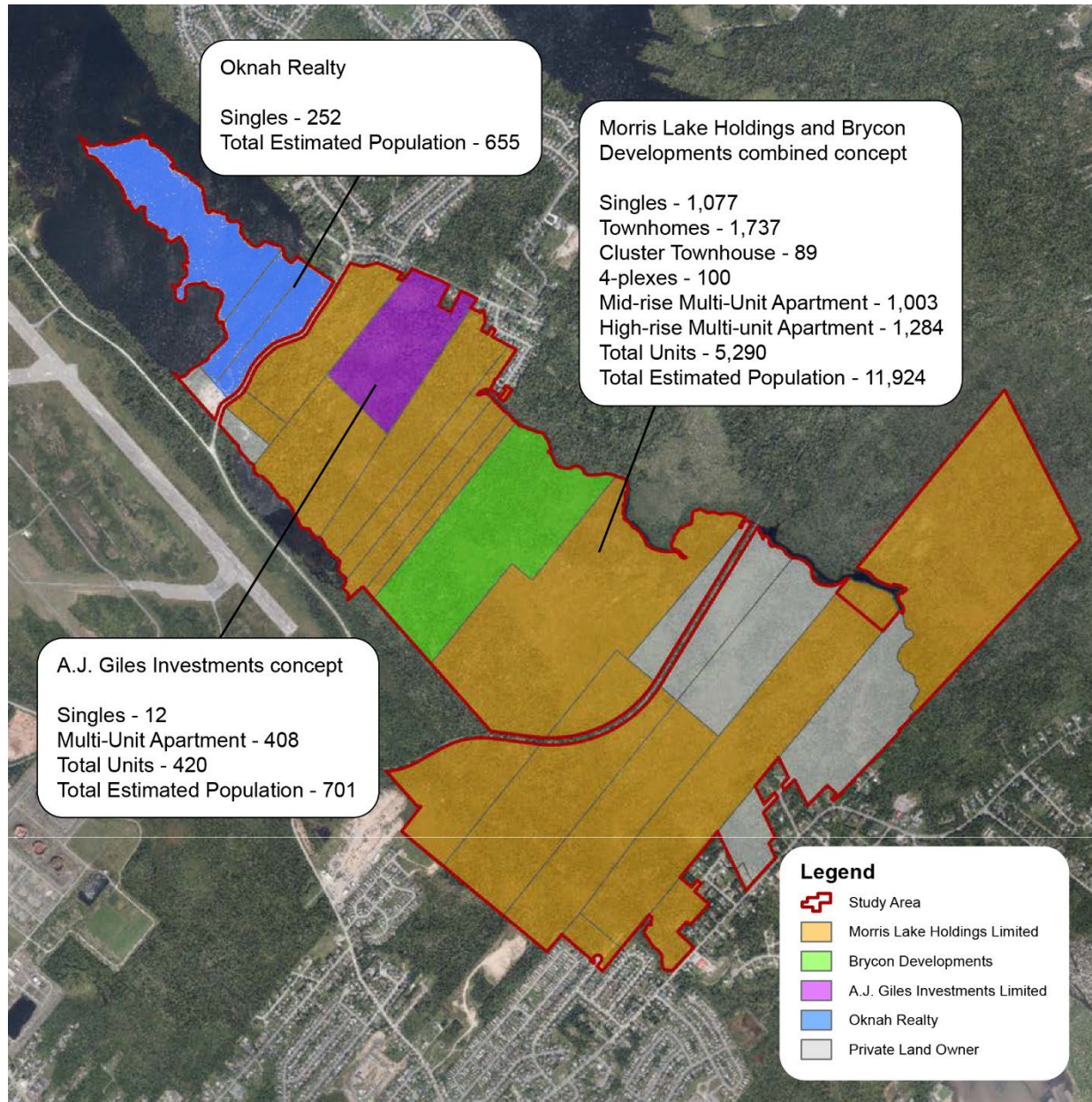
Halifax Regional Municipality Future Serviced Communities – Morris Lake Expansion

Transportation Plan

2 Study Area Overview

northern portion of the study area abutting the Willowdale subdivision for which development plans have been prepared that bridge Atholea Drive. Stantec also interviewed other landowners whose development plans are less definitive including Oknah Realty who owns the property directly bordering on Morris Lake.

Proposed development plans aim to transform the Morris Lake study area into a mix of residential and commercial spaces, with each development contributing to a broader vision for the area. The plans provide important context for the anticipated development, illustrating the scale and diversity of what is being proposed for the area.



Source: Halifax Regional Municipality

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



Halifax Regional Municipality Future Serviced Communities – Morris Lake Expansion
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2 Study Area Overview

The Morris Lake Holdings Limited partnership proposes to develop approximately 547 acres of land west of Cow Bay River, south of Morris Lake, east of Shearwater Airforce Base, and north of Cow Bay Road. The proposed development would be a mixed-use community containing lower density, ground-level housing (i.e., single-family detached, semi-detached, townhouses) and low-, mid-, and high-rise apartment buildings, as well as retail, commercial, and institutional space (**Figure 3**).

The phased development concept plan incorporates lands currently owned by external landowners, most notably a large parcel owned by Brycon Developments that splits the Morris Lake Holdings property. A total of 5,290 residential units have been proposed along with 42,600 square feet of retail/commercial space and 12.6 acres of institutional space. Census of Canada 2021 figures of 1.8 persons in apartments (i.e., flats in duplexes and low- and high-rise apartments) and 2.6 persons per detached house or stacked townhouse inform anticipated population estimates for the Morris Lake Holdings portion of the proposal, other owned lands in the Morris Lake study area, and for all other development proposals considered for Future Serviced Communities studies. Per this census-backed methodology, 11,924 residents would occupy the Morris Lake Holdings portion of the development area.

The concept plan portrays access points to the new community via Caldwell Road, Cow Bay Road, Orion Drive, and an apparent conversion of a segment of the Shearwater Flyer Trail to a roadway. Commercial uses are concentrated at Caldwell Road, at a retained portion of the Shearwater Flyer Trail, and at a new connection to Cow Bay Road.

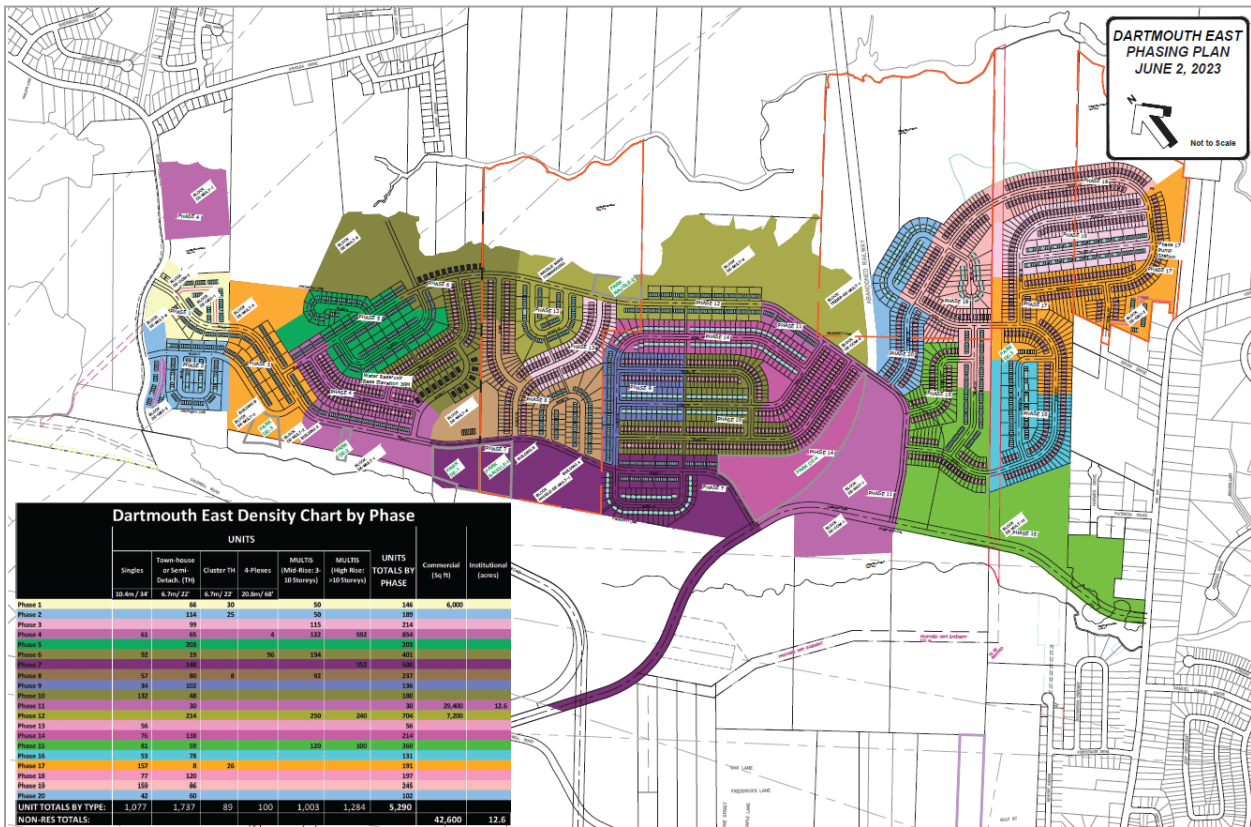


Figure 3: Morris Lake Holdings and Brycon Development Combined Concept Plan



Halifax Regional Municipality Future Serviced Communities – Morris Lake Expansion

Transportation Plan

2 Study Area Overview

As previously described, Brycon Development owns nearly 100 acres in the approximate middle of the Morris Lake Holdings concept plan area corresponding to portions of proposed Phases 6, 7, 8, 12, and 13. The plan references the property owner in plan notation and denotes parcel boundaries.

Brycon has prepared a plan for their lands independent of the Morris Lake Holdings concept (**Figure 4**). Their plan indicates an intention to build 887 dwelling units comprised of 55 singles-family residences on individual lots, 158 semi-detached units on 79 lots, and 640 apartments in eight apartment buildings. Stantec calculates the units would accommodate 1,706 residents based on previously stated estimation factors. By contrast, Phases 8, 12, and 13 in the Morris Lake Holdings Plan, which occupy essentially the same lands, would provide 997 dwelling occupied by 2,127 residents.

Internal circulation routes and access to surrounding neighbourhoods within the Morris Lake Holdings development area appear nearly identical in the Brycon concept, though the plan would realign the east-west major roadway travelling along the edge of the developable area.

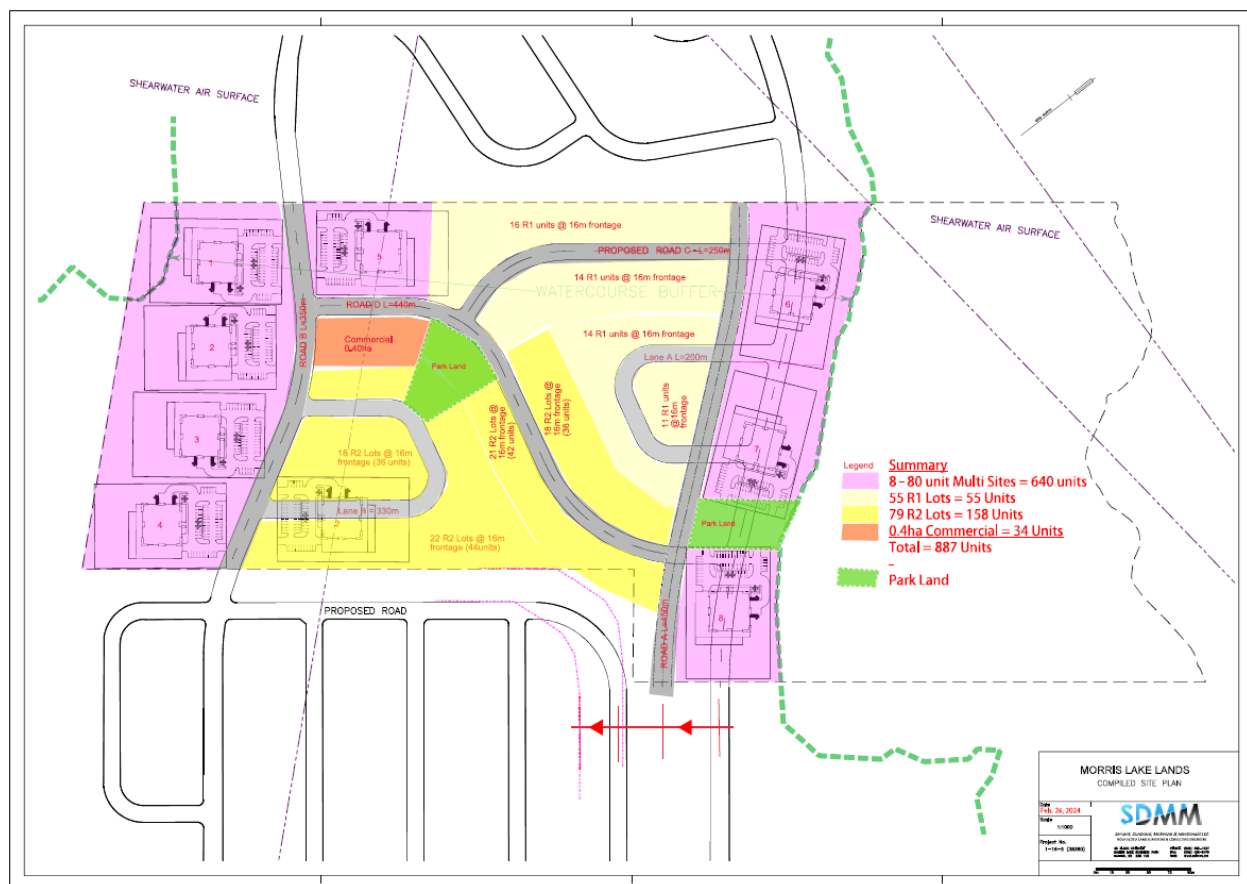


Figure 4: Brycon Development Independent Concept Plan

A.J. Giles Investments Limited owns approximately 80 acres both north and south of Atholea Drive. While the area north of Atholea Drive is outside of the Morris Lake Future Serviced Communities designation, its development is expected to coincide with development proposed by Giles to the south and will rely on the same municipal infrastructure. The area to the south of Atholea Drive covers roughly 45 acres.



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Transportation Plan

2 Study Area Overview

A concept plan prepared on behalf of Giles Investments shows a community consisting of single-detached homes and multi-unit housing (**Figure 5**). The plan proposes no commercial development. Designs for the land to the south of Atholea Drive, which lies within the Morris Lake study area, features dense forms on a small proportion of the land area. The design is attentive to environmental features within the study area, preserving explicitly described wetlands. Proposed structures are largely multi-unit with five groupings of apartment structures providing an estimated 372 units. The concept plan suggests multi-unit dwellings will have surface parking. Twelve lots assumed to be for single-detached homes and access for two apartment groupings front the south side of Atholea Drive. Watercourse and wetland constraints dictate that access to three of five apartments would be provided from the adjacent Morris Lake Holdings property, which is not reflected in other concept plans.

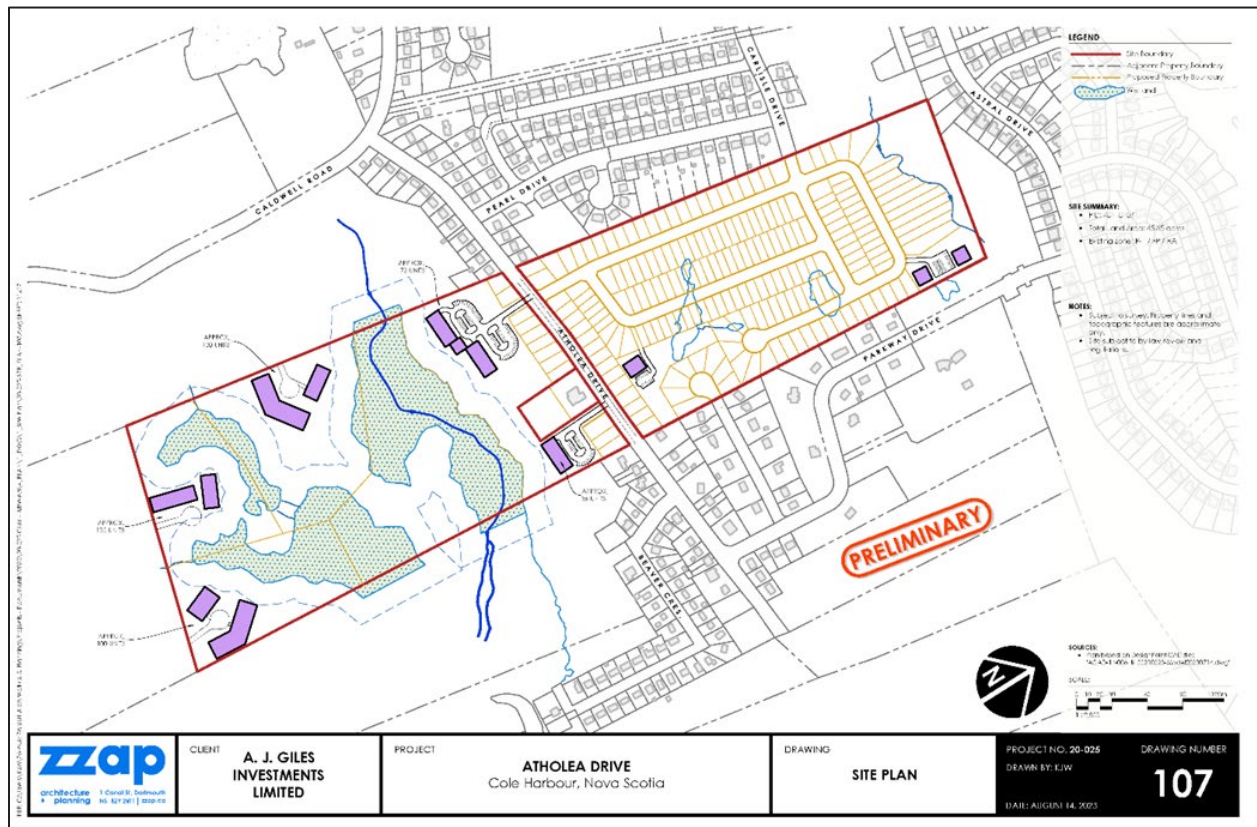


Figure 5: A.J. Giles Investments Concept Plan

Stantec received no indication of immediate interest in development from other landowners within the study area. However, in consideration of the development potential of remaining properties to assess the full impact of development in the study area, estimates have been prepared for the remaining major land holding. The area between Morris Lake and Caldwell Road consists of three properties owned by Oknah Realty. The location of significant portions of the Oknah property bordering Morris Lake requires imposition of a 30-metre watercourse buffer. Significant wetlands also present environmental constraints that diminish the total developable area of the Oknah property. Assumptions for the development of this land relate to expectations of low-density development in a pattern similar to the Morris Lake Holdings plan.



3 Transportation Policy Context

The 2017 Halifax **Integrated Mobility Plan (IMP)** is the foundation that seeks to inform 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 Policies** provide objectives, policies, and actions for integrated planning, land use, Complete Streets and Transportation Demand Management;
- **Mode-Specific Policies** 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 study area such as the 2020 Rapid Transit Strategy. The vast majority of the Morris Lake development site with the exception of the area northwest of Caldwell Road falls within the IMP-defined Outer Suburban area, which is identified as an area of high private motor vehicle use where, “Neighbourhoods should be designed with walking, bicycling and transit in mind to provide mobility for people of all ages and abilities.”

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 proposes a Bus Rapid Transit (BRT) network, new ferry services, and a direction for land use policy to align with Rapid Transit. The proposed Red Line BRT offers a direct connection from the southern peninsula to Portland Hills Terminal, the nearest access point to the future rapid network from the Morris Lake study area.

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 the vast majority of the Morris Lake study area in a newly defined Rural Community area consisting of lands within rural designations that use on-site services such as water wells and sewers.



Halifax Regional Municipality Future Serviced Communities – Morris Lake Expansion

Transportation Plan

3 Transportation Policy Context

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.

The vast majority of the developable study area is within the plan area of the **Eastern Passage/Cow Bay Municipal Planning Strategy**. The Planning Strategy establishes policy related to environmental health services, waste management strategies, infrastructure charges, land use designations, transportation, and other community factors for a large area which includes Eastern Passage, Cow Bay, Shearwater, and parts of southern Dartmouth.

The transportation section of the document encompasses a wide range of both detailed and broad policy proposals. Those most pertinent to the development of the Morris Lake study area include:

- Improve movement through the road network, particularly where new subdivisions are being considered, by requiring developers to reserve rights-of-way and/or build higher order roadways in order to improve overall efficiency of the road network.
- Resolve pedestrian safety concerns related to the lack of sidewalks, particularly near schools.
- Extend transit service to destinations throughout the community with particular emphasis given to residential areas adjacent to Cow Bay Road

Specific policies in the adopted strategy:

- Establish mechanisms which ensure that the necessary rights-of-way for future arterial and collector roadways are provided for as development occurs (TR-9)
- Designate Caldwell Road and Cow Bay Road as truck routes and proceed with any improvements necessary to accommodate such vehicles in a safe and efficient manner (TR-10)
- Place priority on the development of a coordinated internal road network within the plan area's communities (TR-11)
- Undertake a review of existing sidewalks, crosswalks and street lighting and produce a priority list of future improvements including overhead walkways (TR-17)
- Encourage the continued provision of public transit services for the Eastern Passage and Cow Bay areas (TR-18)

The 2014 Regional Municipal Planning Strategy¹ and draft updates include a potential future municipal connection between Caldwell Road at the northwest corner of the Morris Lake development area and Mount Hope Avenue near its interchange with Highway 111. Described in maps of regional and

¹ [Regional Plan || Halifax](#)



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3 Transportation Policy Context**

community links as the **Shearwater Connector**, its purpose has been stated to accommodate future land development in the Morris-Russell Lake master plan area and relieve traffic congestion on Portland Street.

Staff reports to Council identified an alignment to complete the Shearwater Connector, as a two lane collector (**Figure 6**). In addition, a multi-use trail has been included within the cross-section to provide a key link withing the regional trail network. A Secondary Plan policy prohibits the extension of Portland Estates Boulevard to the Shearwater Connector until a connection is made to Caldwell Road to limit traffic utilizing roadways within the Portland Estates subdivision as a through route.

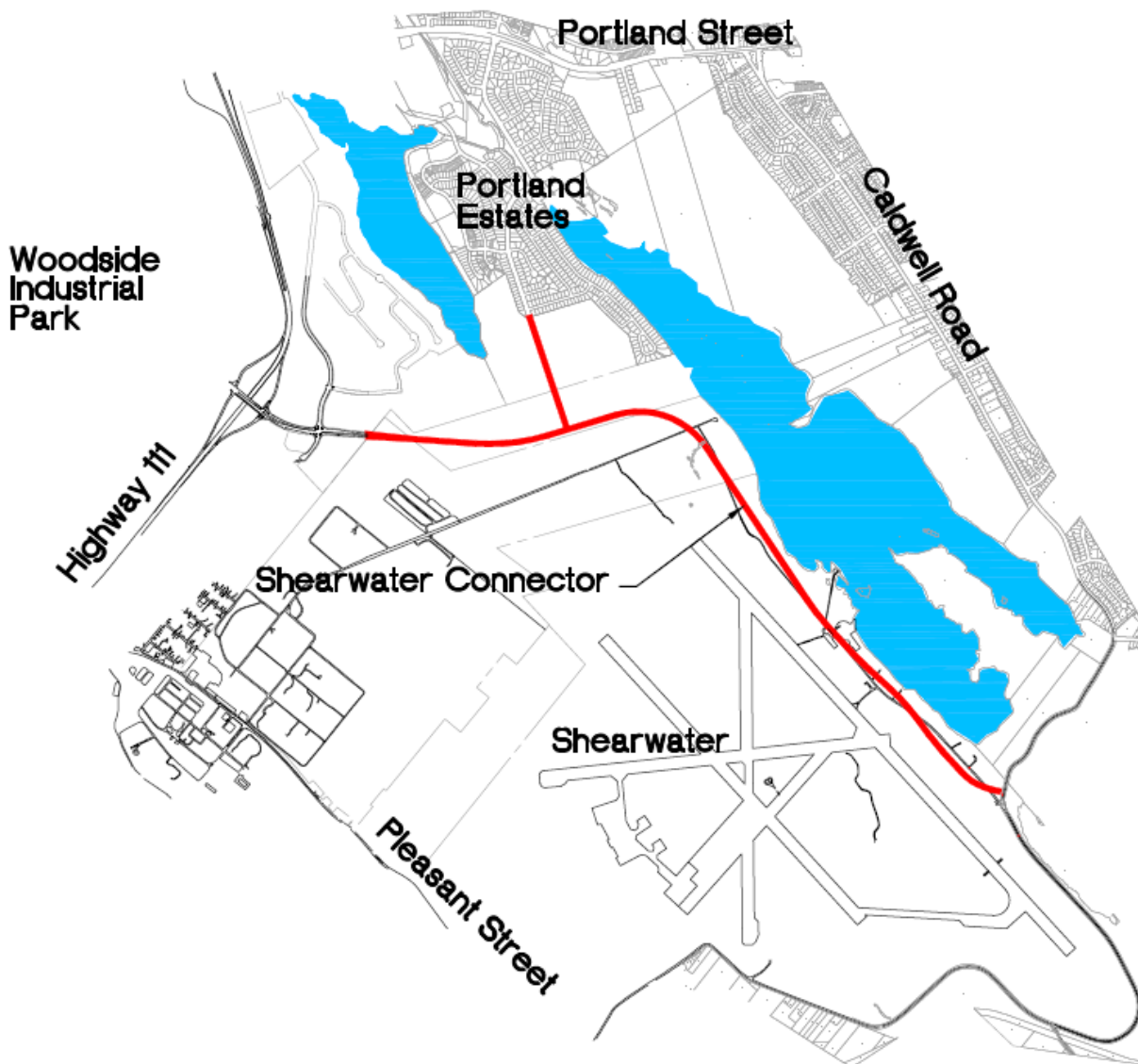


Figure 6: Shearwater Connector Proposed Alignment



3.1 Site Relationship to Policy and Planning

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 project 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 Outer Suburban area, where the Morris Lake study area is found, the 2031 targets seek at least 10% transit mode share and at least 4% for trips made by walking and cycling.

The Active Transportation Priorities Plan 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.

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 the combined Morris Lake Holdings/Brycon concept plan present an opportunity to require the application of those approaches to contribute to the realization of regional goals. The IMP does not however, characterize major corridors in the immediate vicinity of the study area as transit priority corridors, nor does it identify any nearby potential Transit Oriented Communities.

The 2020 Rapid Transit Strategy advances the importance of Portland Street/Highway 207 and the Portland Hills Terminal by routing and terminating the proposed Red Line BRT approximately 3.5 kilometres from the northern corner of the development area, connecting Cole Harbour with Dartmouth and ferries to the southern peninsula. However, as the Morris Lake study area is outside of the urban transit service boundary, the Draft Regional Municipal Planning Strategy does not recognize any nearby roadways as a Strategic Corridor. Strategic Corridor designation would establish an intention 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.

The Cole Harbour/Westphal Municipal Planning Strategy places a priority on advancing active transportation through the improvement of pedestrian accommodations and the provision of quality transit service. The emphasis on walkways stems from maintenance responsibility as well as general provision. The strategy recognizes the importance of public transit in managing increased population and energy costs.

Implementation of the Shearwater Connector has faced delays as earlier approved Council direction required that the IMP confirm the Shearwater Connector as a priority project. The project however, scored poorly when evaluated by staff using the IMP evaluation scorecard. Subsequent cost-benefit analyses have identified the project as viable, especially when travel time savings are taken into account.



4 Site Transportation Assessment

Identification of transportation system implications associated with new development requires a comprehensive assessment of prior transportation study related to the Morris Lake development. Key assumptions underlying methodology are critically examined to ensure their validity and relevance. As previous transportation impact studies represent the source of development concept plans for Morris 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 (TIS) the in August 2023 to determine anticipated necessary roadway network modifications related to Morris Lake Holdings' contribution to study area development. Noting that mix of residential, commercial, and educational uses would be built-out in 20 gradual phases between 2025 and 2044, 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.

Concept plans depict five access points to the proposed development. Two access points are planned on Caldwell Road between Atholea Drive and Macdonalds Beach Road. Two additional roads would intersect a new collector road running along the southwestern edge of the development, connecting to Cow Bay Road to the south and Hines/Caldwell Roads to the west. Another access point is planned at the southern end of the proposed development via intersection with the local Orion Drive. The traffic impact study also considered the envisioned Shearwater Connector that extends Mount Hope Avenue along the Macdonalds Beach Road corridor in an effort to alleviate traffic pressure along the Portland Street corridor. 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 the anticipated land uses for the proposed Morris Lake development, the study estimates the external trips generated by the new development. Reduction factors were applied to account for future active transportation connections and transit improvements. These factors also consider that the proposed commercial and educational components will primarily serve the local community, reducing the



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likelihood of attracting significant traffic from outside the immediate area. Specifically, WSP applied a 15% reduction to the new residential trips for non-auto trips, 75% reduction to the commercial trips for internal capture, 40% reduction for neighborhood non-auto trips close to Caldwell Road, and 90% reduction for elementary school-related trips due to internal capture. The study does not explicitly detail the mode share assumed for the core analysis, however.

Griffin Transportation Group Inc. submitted a traffic impact addendum letter in April 2022 in support of urban service boundary extension and planning applications by Giles Investments, revising the study analysis based on the latest site plan changes. As previously described, only the portion of the proposed Giles development located south of the Atholea Drive lies within the Morris Lake FSC study area.

The traffic impact letter analyzes the development under three scenarios. The first scenario reflects the original May 2020 development plan, which includes 305 units with a mix of unit types and lot sizes. The second scenario examines the "as-of-right" low-density development, consisting of 178 R1 units on 60-foot lots, while the third scenario considers an amended "as-of-right" low-density plan with 270 units on 40-foot lots.

The traffic impact letter references detached single-family and low-rise multi-family residential land use to determine the anticipated vehicle trips generated by the development. No multi-modal reductions were applied to the calculated trips to account for active transportation and transit trips.

4.1.1 TRANSPORTATION IMPACT STUDY CONCLUSIONS

The traffic impact study for the Morris Lake Holdings development 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. The analysis considers nearby existing and proposed intersections as well as more distant existing intersections in existing configurations, with lane and signal modifications, and in certain cases, as a roundabout.

The larger TIS estimates that the entirety of the residential and commercial development will generate 2,438 two-way external vehicle trips during the AM peak hour and 3,188 during the PM peak hour. The analysis primarily distributed site generated trips west toward Woodside, Shearwater, Dartmouth, and Halifax via Main Road and Portland Street.

The TIS recommendations primarily focus on roadway and intersection modifications to address the projected traffic volumes based on the assumed trip generation and distribution scenarios. Proposed solutions include the addition of left-turn lanes, traffic signals, and roundabouts at multiple key study intersections along Caldwell Road, Cow Bay Road, and the proposed new collector road extending from Hines Road. Further performance analysis yielded a suite of roadway modifications for full site build-out. 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.

Although the study highlights the potential for increased ridership and enhanced transit service in the broader area due to the new development, it does not specify how the development will contribute to realization of non-auto mode share targets or justify related trip generation reductions. The study briefly



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describes proposed active transportation links and the potential for a major transit node in the form of a park and ride, but does not present any detailed strategies or analysis related to levels of adoption of more sustainable transportation modes.

The traffic impact addendum letter for the Giles Investments development on Atholea Drive updates a previous study, reflecting changes to the development plan that reduce the number of residential units from 305 to 270. The letter concludes that the revised development will generate similar traffic results as the original plan, 253 vehicles during the PM peak hour, and that no additional improvement strategies are necessary to accommodate the traffic generated. The analysis does not apply any mode split reductions to the calculated trips, effectively analyzing the “worst-case” scenario for traffic generation.

The Giles traffic impact addendum also provides no specific details regarding the impact of the development’s form and pattern on modal split, nor does it discuss strategies to encourage sustainable transportation modes.

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 Morris 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 site. Additive trip generation estimates and the distribution of trips entering/exiting the proposed Morris 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 due to co-location of complementary land uses 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 on-site transit routing. 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 Caldwell Road were reduced 40% and commercial trips within the neighbourhood were reduced 70%. Trips generated by the school were also reduced by 90%.

This seemingly high reduction methodology avoids double counting residential trips while also allowing for trip chaining, but does not control for the potential of broader demand generation by the school or commercial destinations. High trip reduction factors reflect a need to implement an active transportation network that enables seamless and convenient local movement. 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 as evidenced by connectivity analysis described in section 5.1.

Distribution of trips generated by the Morris Lake Holdings development across the surrounding transportation network incorporates assumptions with major implications. The largest share, 80%, of trips is directed west toward the regional centre via Main Road and Portland Street. The analysis assigns split



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portions of the remainder of generated traffic to the north, east, and south via Dorothea Drive, Cole Harbour Road, Cow Bay Road, and Caldwell Road (toward Eastern Passage). The distribution anticipates that a potential Shearwater Connection would significantly reduce the number of westbound trips using Main Road and Portland Street as development progresses.

The TIS states that trip distribution is designed to align with future available road capacity, development proximity, and other constraints. Future capacity is typically determined based on the road network and planned infrastructure improvements outlined in regional or municipal plans. 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. Despite fundamental lack of adequate justification of assumptions, trip distribution seems initially consistent with the general expectations for travel behaviour, without the added lens of a regional population-destination assignment. Existing transit services mirror this expectation, servicing the urban core of Halifax and concentrating trips towards the north and west, reflecting the location of major employment and service hubs.

Per the Morris Lake Study Area Development Scenarios report, the portion of the Giles Investments development within the Morris Lake study area has since been revised to contain 372 low-rise multi-family residential units and 12 detached family units. Applying comparable methodology from the traffic impact addendum letter, the Giles portion of development south of Atholea Drive is anticipated to generate 184 two-way external vehicle trips during the AM peak period and 224 two-way external trips during the PM peak period.

Speaking of the full Giles development plan, Griffin does not specify trip distribution assignment beyond a statement that trips would be split between the Atholea and Carlisle-Sherwood access points. Looking strictly at development within the Morris Lake study area, while Atholea Drive would experience increased traffic volumes, it is important to consider that the majority of multi-family units would be accessed from points within the Morris Lake Holdings development lands, modifying the distribution of expected traffic volume associated with the Giles Investments development.

Finally, neither traffic impact document provides 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. A commercial node and/or transit centre can provide the relatively small amount of land required to site micromobility options. This practice can be replicated across all Future Serviced Community study areas.

4.2 Active Transportation

Planning context for the study area is limited to plan view descriptions of generic transportation corridor locations. The proposed implementations appear to create multiple connectivity options for future residents, contributing to a more comprehensive local transportation network. However, the lack of detail leaves uncertainty regarding active transportation facilities, amenities, and connections. Further examination identifies potential access deficiencies and opportunities for future residents, informing strategies related to bicycle and pedestrian facility types as well as transit vehicle routing.



4.2.1 NON-MOTORIZED MODES

Currently, active transportation facilities along major roadways approaching or bordering the study area are limited to unbuffered bicycle lanes and a single sidewalk along Caldwell Road from its intersection with Atholea Drive leading north toward Cole Harbour/Dartmouth. Sections of Caldwell Road within the development area and parallel to its western boundary are not equipped with sidewalks and feature a narrow (one metre) paved shoulder that offers inadequate protection for people cycling. Cow Bay Road along the southern edge of the study area boundary features neither sidewalks nor paved shoulders. Anticipated traffic volumes, speeds, and turning movements induced by this scope of development are likely to create a high-stress environment for active transportation users that requires expansion or upgrade of fully separated and buffered facilities. Increasing the quality of active transportation options along this major corridor would better connect the study area to the neighbouring communities' commercial hubs and other destinations while reducing the impact of newly generated vehicular traffic.

Further north, Phase 1 of the Caldwell Road Active Transportation and Street Improvement Project² has installed a multi-use path and upgraded sidewalks from Astral Drive to Deerbrooke Drive. A multi-phase and multi-year project of the HRM to upgrade road, pedestrian, and cycling infrastructure on Caldwell Road, Phase 2 will extend the multi-use path and new sidewalk to Hampton Green, within 300 metres of Portland Street / Cole Harbour Road / Dorothea Drive. Completion is slated for 2026.

The Integrated Mobility Plan 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. In addition to the existing Shearwater Flyer Trail for non-motorized modes, the Active Transportation Priorities Plan indicates a desire for a bikeway on portions of Caldwell, Hines, and Cow Bay Roads through, around the perimeter, and leading to the Morris Lake study area (**Figure 7**). Facilities along Caldwell Road would have great utility for new resident cyclists as an extension of existing facilities to and from Cole Harbour

² [Caldwell Rd Active Transportation Street Improvement Project | Halifax](#)



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Figure 7: Morris Lake Study Area Candidate Bicycle Routes and Greenway Network

The combined development concept plan for the Morris Lake Holdings, Brycon, and other lands neither acknowledges the Shearwater Flyer Trail nor any internal pedestrian or bicycle facilities. Likewise, the Giles plan and the independent Brycon concept do not indicate any provisions for active transportation modes. The Morris Lake East Traffic Impact Study however, does describe active transportation links within an alternate visualization of the development concept plan (**Figure 8**).

The concept included in the Traffic Impact Study proposes multi-use paths parallel to its collector roads, including a roadway that utilizes a portion of the Shearwater Flyer Trail. Each multi-use path connects to a major development area access point, including connections to Caldwell Road in the north and west and a connection to Cow Bay Road in the south. Proposed facilities do not connect the development site to any previously described external bicycle facilities north of the Morris Lake study area.

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Source: WSP – Morris Lake East: Traffic Impact Study (August 2023)

Figure 8: Morris Lake Study Area Combined Concept Circulation Plan

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 Morris Lake developments, 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.

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 final configuration of cycling facilities, the multi-use paths as presented could be converted to pedestrian-only sidewalks.

No concept plans display additional trails beyond retention of the Shearwater Flyer Trail through areas not slated for development. Additionally, as there is no narrative accompanying currently available site plans, any provision of active transportation facilities on secondary area corridors is unclear. The



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shortage of detail leaves gaps in understanding of any planned accommodations for non-motorized modes in the final distances to and from the points of destination and origin of many potential trips. A shared roadway context is appropriate for local streets with lower speeds and vehicular volumes, and should target a vehicle design speed of 30 km/h or less.

4.2.2 PUBLIC TRANSPORTATION

A local and express route pair directly links the northern study area gateway to the Portland Hills Terminal approximately 3.5 kilometres from the northern corner of the proposed development area (**Figure 9**). The terminal features eight bus loading platforms, indoor waiting facilities, and a park and ride lot where Portland Street becomes Cole Harbour Road, enabling wider regional connections.

From Caldwell Road, Route 65 travels along Astral Drive, Sherwood Street, and Brookfield Avenue. Express Route 165, which makes limited stops in the urban core, replaces Route 65 along the same roadways during peak periods. Express runs also continue beyond the Portland Hills Terminal to Alderney Gate and connection to the Alderney Ferry. Subsequently, Route 165 connects to Bridge Terminal before crossing the Macdonald Bridge on their way to Scotia Square and Dalhousie University.

Route 6C approaches the southern corner of the study area along Cow Bay Road. Terminating at Bridge Terminal with intermediate stops at Alderney Gate and the Woodside Ferry Terminal, the route primarily serves Eastern Passage via Pleasant Street/Main Road, Hornes Road, and Caldwell Road.



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Source: Halifax Transit

Figure 9: Transit Routes Serving the Morris Lake Study Area and Portland Hills Terminal



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Route	Route Type	Destination	Weekday Service Details	Saturday Service Details	Sunday and Holiday Service Details
6C	Local	Bridge Terminal	~30-minute intervals: 5:58 a.m. – 9:30 a.m., 4:31 p.m. – 6:57 p.m. ~60-minute intervals: 10:10 a.m. – 3:11 p.m., 8:13 p.m. – 1:10 a.m.	~60-minute intervals: 5:57 a.m. – 1:01 a.m.	~60-minute intervals: 5:57 a.m. – 1:01 a.m.
65	Local	Portland Hills Terminal	~60-minute intervals: 9:39 a.m. – 2:40 p.m., 6:58 p.m. – 10:58 p.m. Irregular 25-85 minute intervals: 2:40 p.m. – 6:58 p.m.	60-minute intervals: 6:13 a.m. – 10:13 p.m.	60-minute intervals: 7:13 a.m. – 10:13 p.m.
165	Express	Dalhousie University	Five (5) departures from Astral Drive and Grenadier Drive: 6:04 a.m. – 8:04 a.m. Five (5) arrivals at Astral Drive and Grenadier Drive: 4:05 p.m. – 6:05 p.m.	No service	No service

Figure 10: Existing Transit Service Characteristics – Morris Lake Study Area



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People accessing transit generally limit the distance they are willing to walk to reach bus services. Practical maximums are 400 metres for local service stops and 800 metres for express services. No dwelling or commercial units portrayed in concept plans would be located within 800 metres of an existing bus stop.

While cycling to reach transit may be an option for some, the proposed development area's street network creates an opportunity for transit routing through the development. Primary access points to the north (Caldwell Road), west (Hines Road extended parallel to the Shearwater Flyer Trail), and south (Cow Bay Road), along with distributed pockets of mixed-use and high-density housing, lend themselves to intra-site bus routes that are capable of bringing transit access well within 400 metres for a large percentage of new residents. Proper planning for on-site routing requires a clearer understanding of new roadway geometry and configuration. When accommodating an increase in transit demand, additional travel distances require a routing that allows for minimal delay of movement through the community.



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 neighborhood in various scenarios. In this case, the tool was employed to identify connectivity deficiency for the future residents of the proposed Morris Lake development area 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 Morris Lake study area and assigns it the approximately 13,000 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, that the entirety of the newly settled population would not be able to access health care, local services, pharmacy, groceries, or higher education opportunities via walking/public transit within 30 minutes (**Figure 11**). The vast majority of new residents would not have access to entertainment, recreation, or educational activities for children.



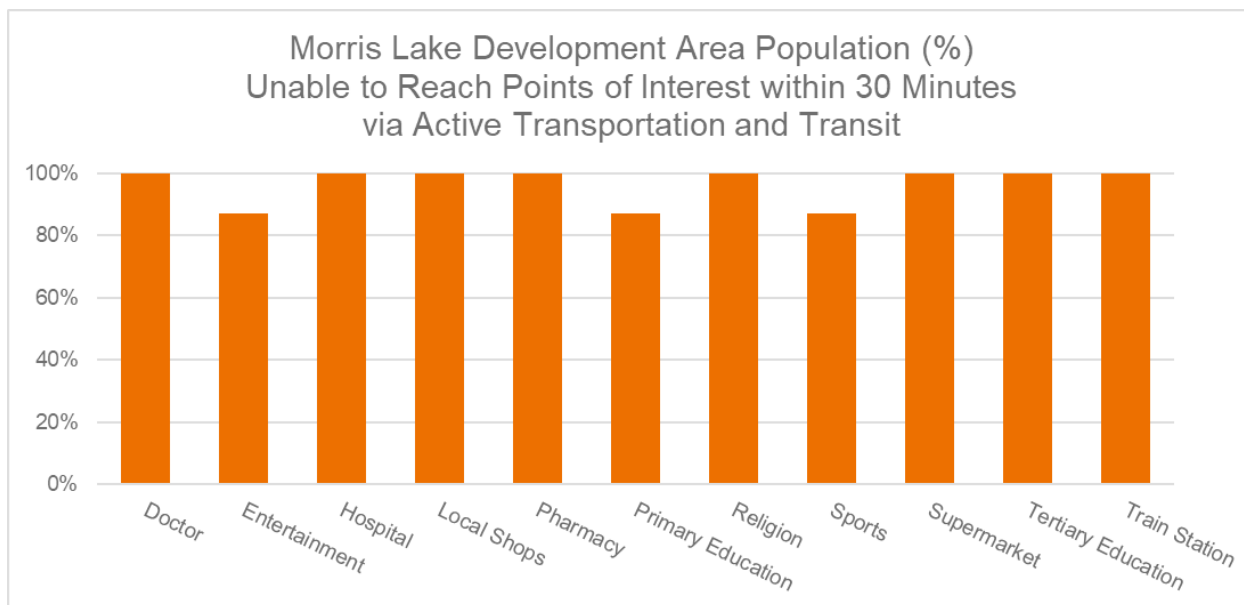


Figure 11: Connectivity Analysis – Undefined Development Site Destinations and Services

While some study area 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 12**). Even destinations seemingly more accessible to more of the development population such as Caldwell Road Elementary School 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 trend 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 in important categories. Average active transportation travel time to a school, doctor's office, a pharmacy, local retail, and entertainment options drop to 21-23 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.

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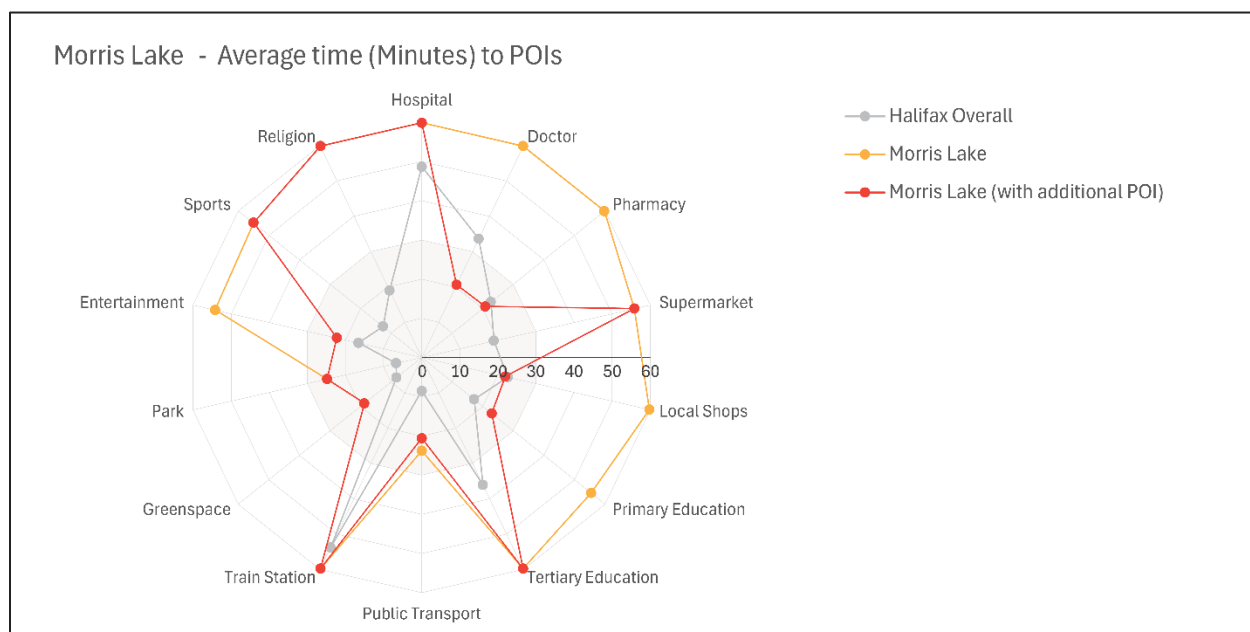


Figure 12: Connectivity Analysis – Associated Access Improvement (Sample On-Site Services)

The connectivity analysis outputs indicate that the greatest access benefits realized by the integration of commercial and service destinations within the development site are related to basic daily and medical needs. Inclusion of a pharmacy in the site plan would reduce the average pedestrian/transit access time for a potential resident from over an hour to 21 minutes. Addition of a primary care physician and/or other medical or dental care offices realizes comparable access benefits. Likewise, the addition of a shopping centre or other varied local retail options would reduce access time for the average resident from over 60 to 22 minutes.

5.2 Detailed Transportation Modeling

The JRTA 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. 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 Morris Lake development, the ABM approach predicts how trips will be distributed to and from the development site. This process involves assigning each study



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area resident a Place of Work (POW) and, at the same time, matching the projected 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 development site.

However, the ABM process has limitations, particularly when a large development site 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 existing trips to the new site, therefore creating changes across the Halifax region.

Matrices visually illustrate the relationship between Place of Residence (POR) and Place of Work (POW) and how this relationship shifts across sectors when the proposed developments are introduced (**Figure 13**). The four development sites are represented at the bottom of the matrix. Compared to the scenario with no developments, all sectors show an increase in activity (highlighted in orange), while the introduction of the new development redistributes existing POW-POR relationships, shifting employment demand away from certain sectors and toward the newly developed site.

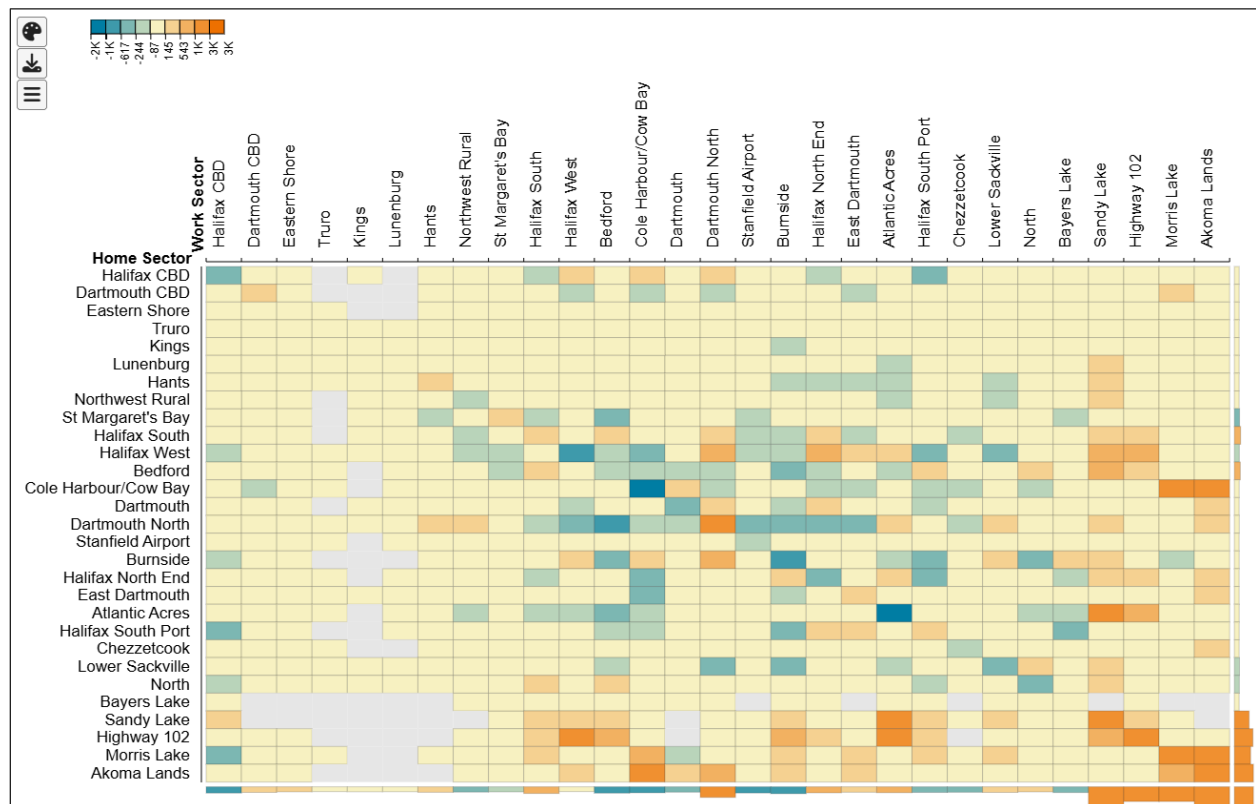


Figure 13: POR-POW – Shift Between 2031 No Dev – 2031 All Dev



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Comparing trip length distributions between the development and no-development scenario illustrates that the shift in POW-POR relationships does not significantly alter the overall trip length distribution (**Figure 14**). The existing distribution, which was calibrated to census data for place of work, remains largely consistent despite the introduction of the new development.

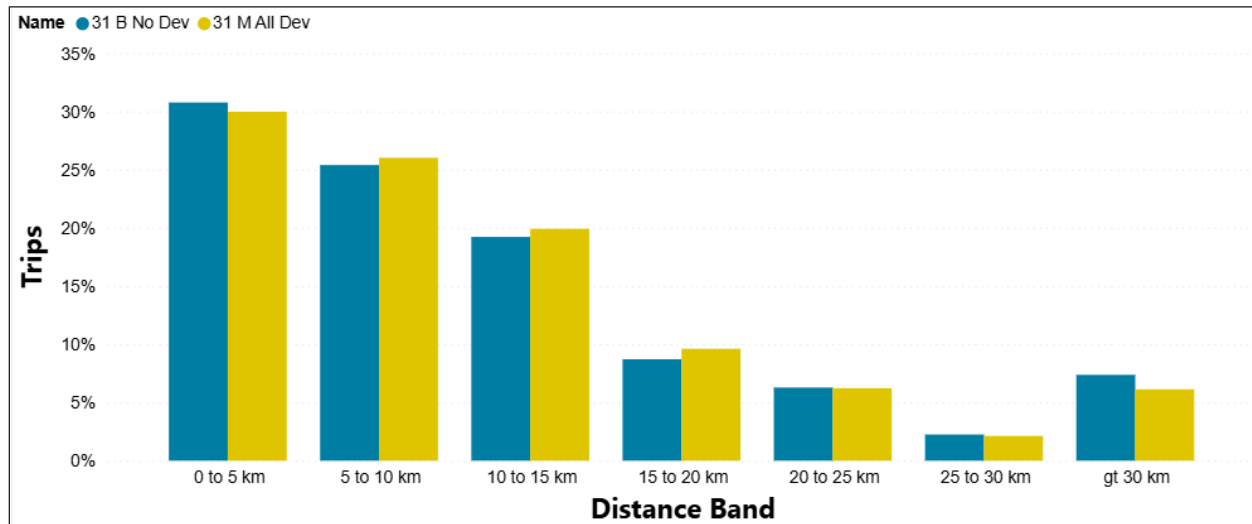


Figure 14: Trip Length Distribution Change between 2031 Baseline and Development Scenarios

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 impact of development sites was added to the 2045 forecast, compared to applying the same development to the 2022 base year. The logic supporting this concept follows the addition of population and accompanying increases in network congestion and travel time. The model showed increased sensitivity in areas far removed from development sites 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 development site contributions were introduced, causing a ripple effect in trip assignments across the region.

To assess the infrastructure requirements for the Morris Lake study area, 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 at the time of new development buildout, and underestimating impacts. 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 Future Serviced Communities development site contributions.



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As such, two future scenarios have been created in order to benchmark the impact of the Morris 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 All Development Scenario:** This scenario builds upon the Do-Minimum scenario by incorporating all development, including the Highway 102 West Corridor, Sandy Lake, Westphal, and Morris Lake study areas. It considers the full build-out of these developments, including residential, commercial, and educational components, and aggregates all inter-related effects of their associated traffic generation.

5.2.1 MODEL APPLICATION

The HRM model provides a framework for analyzing the transportation impacts of the Morris 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 Morris 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 in the Morris Lake study area 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 Morris 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 prior to development of Future Serviced Communities sites. Volume-to-Capacity (V/C) plots (**Figure 15, Figure 16**) 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.

Traffic congestion in the Do Minimum scenario is projected to be more severe during the PM peak period than the AM peak period. PM peak congestion is visible on corridors proximate to the Morris Lake development site, including Caldwell Road as it approaches Portland Street / Cole Harbour Road. To the west, capacity analysis shows volume nearing capacity along Main Road due to the forecast background increase in overall regional population.

The most severe congestion in the region is projected on the MacKay and Macdonald Bridges, reflecting ongoing congestion issues in these areas. Modelling additionally shows heavy congestion in a non-development baseline scenario along Portland Street / Highway 207 from the area near the Portland Hills Terminal west to Highway 111.

Delay per kilometre plots (**Figure 17, Figure 18**) reinforce the volume-to-capacity analysis and reflect the same congestion areas. A restrained environment just east of Highway 111 on Portland Street / Highway 207 shows significant delay of four minutes per kilometre. Other segments previously described as nearing or exceeding capacity approach one minute of delay per kilometre.



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

- Caldwell Road – Between Deerbrooke Drive / Cherrywood Drive and Portland Street / Cole Harbour Road
- Portland Street / Highway 207 – Between Portland Hills Drive and the Highway 111 Interchange
- Main Road – Between Norah Lane and Hines Road

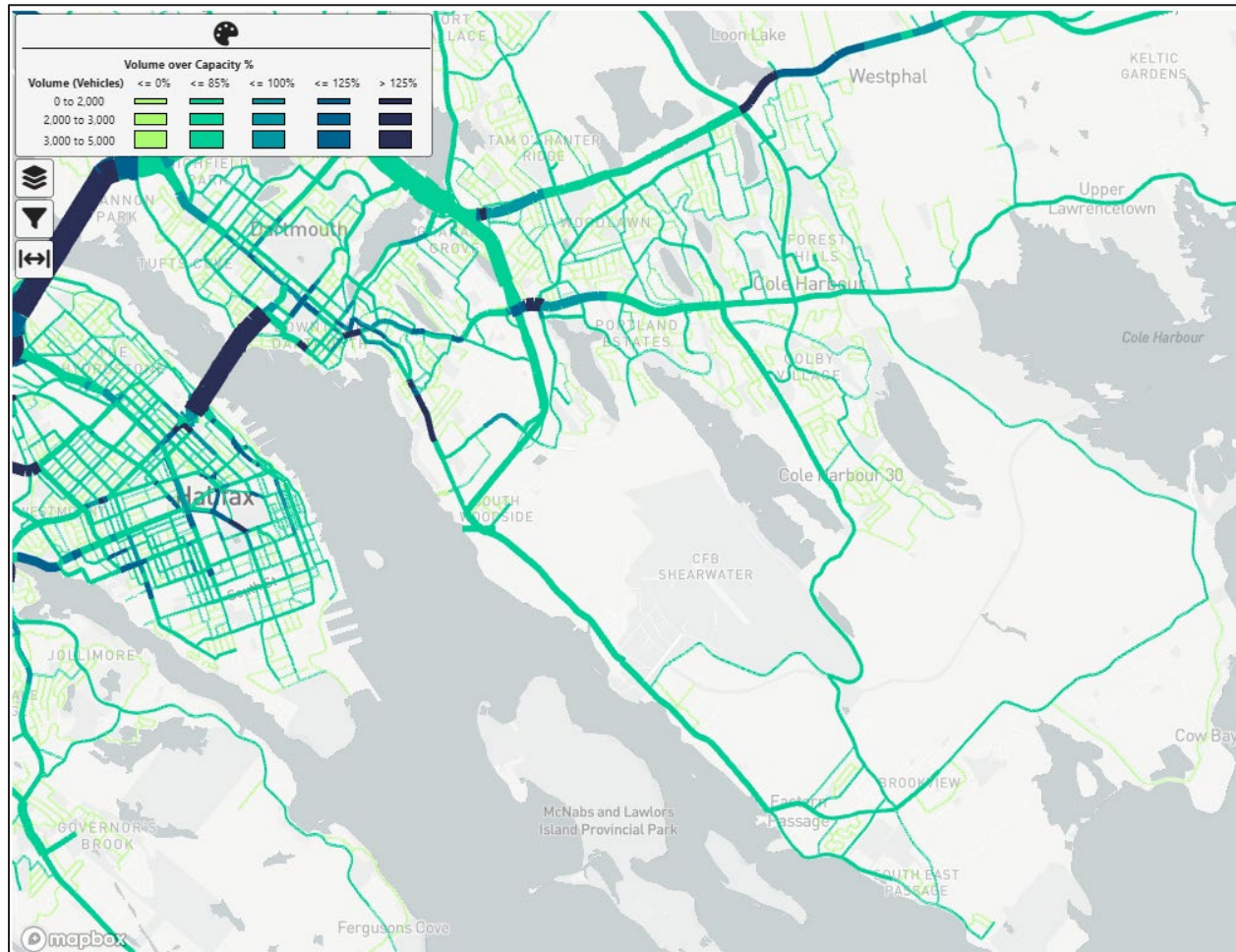


Figure 15: V/C Ratio – AM Peak – 2031 Do Minimum Scenario



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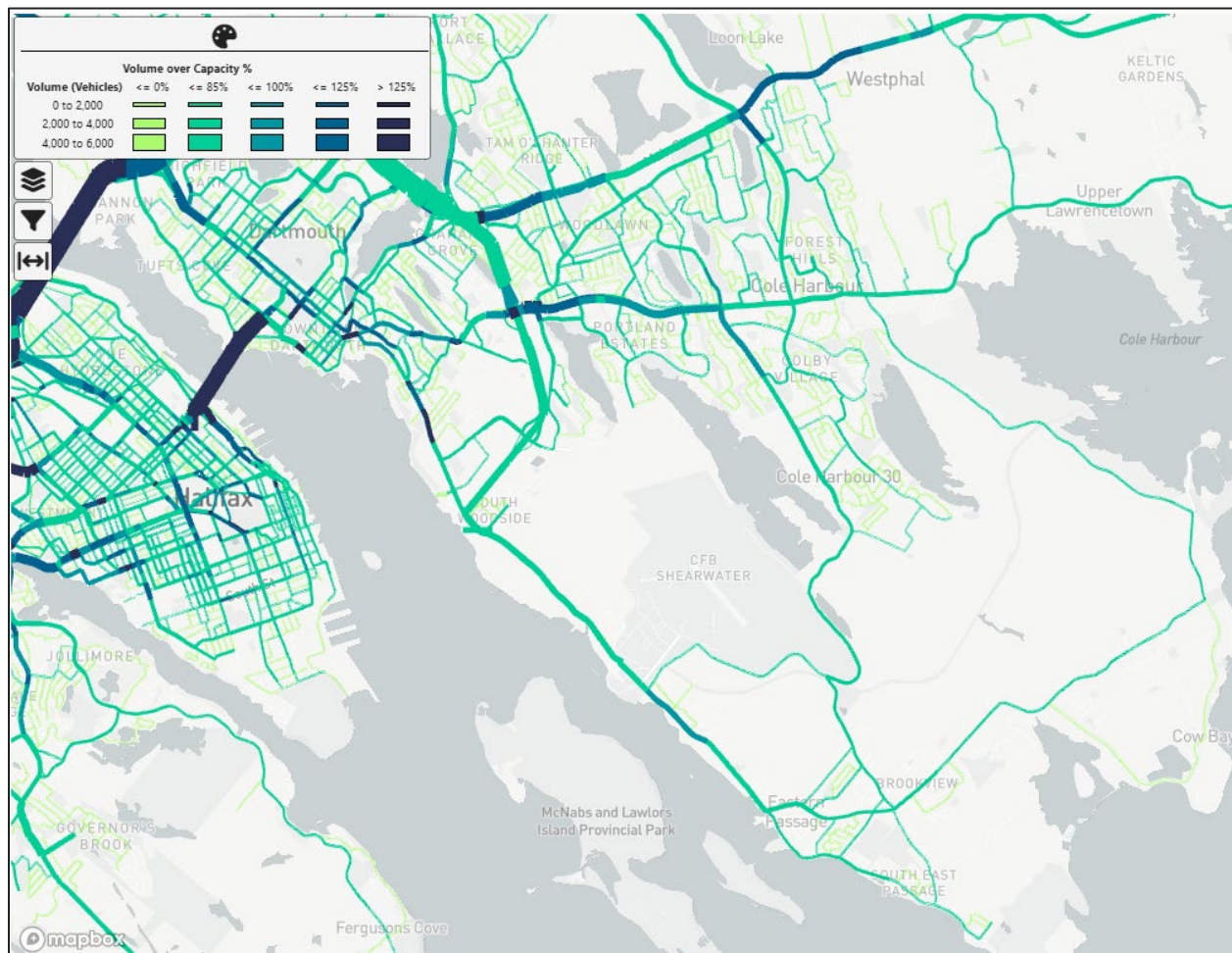


Figure 16: V/C Ratio – PM Peak – 2031 Do Minimum Scenario



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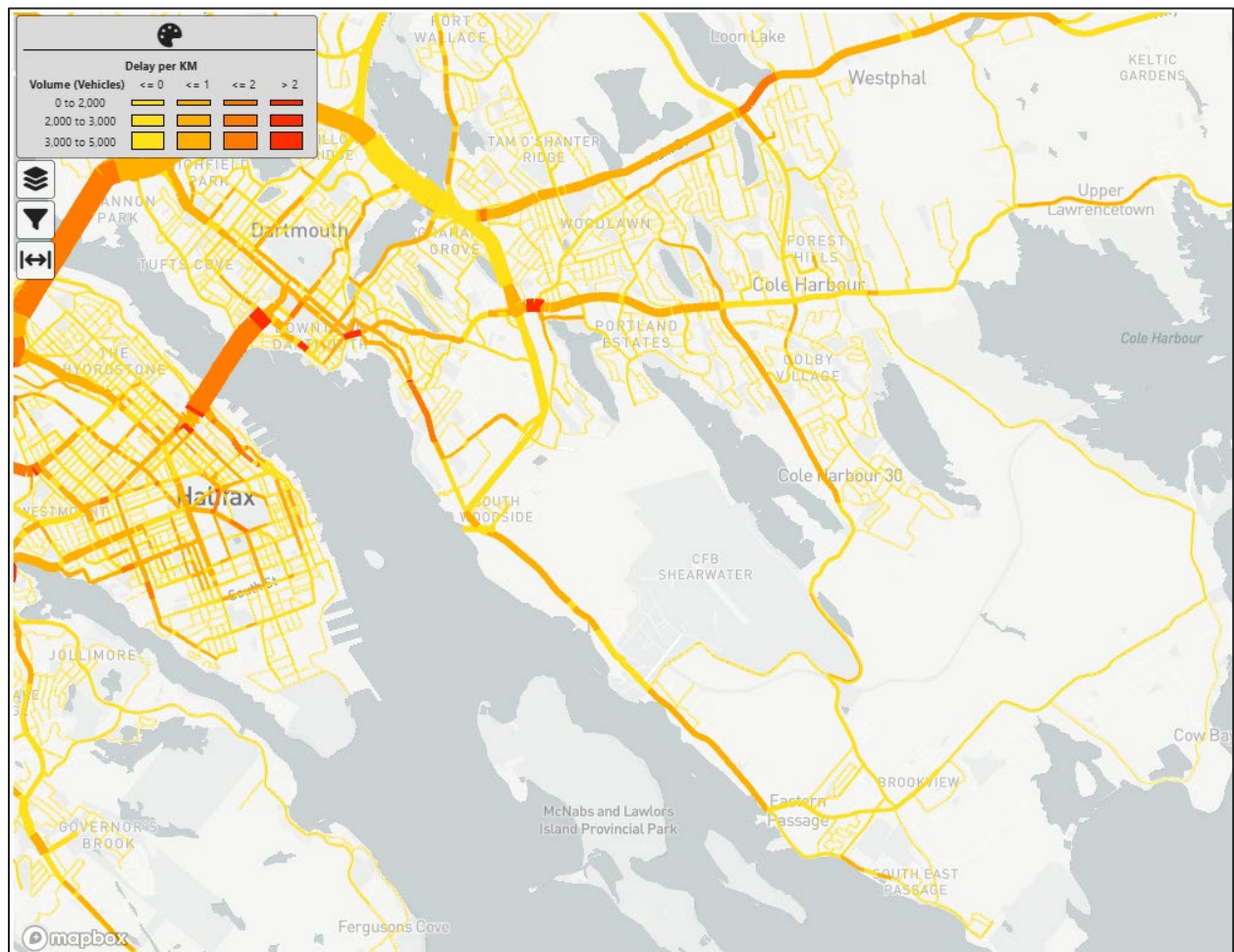


Figure 17: Travel Delay per km – AM Peak – 2031 Do Minimum Scenario

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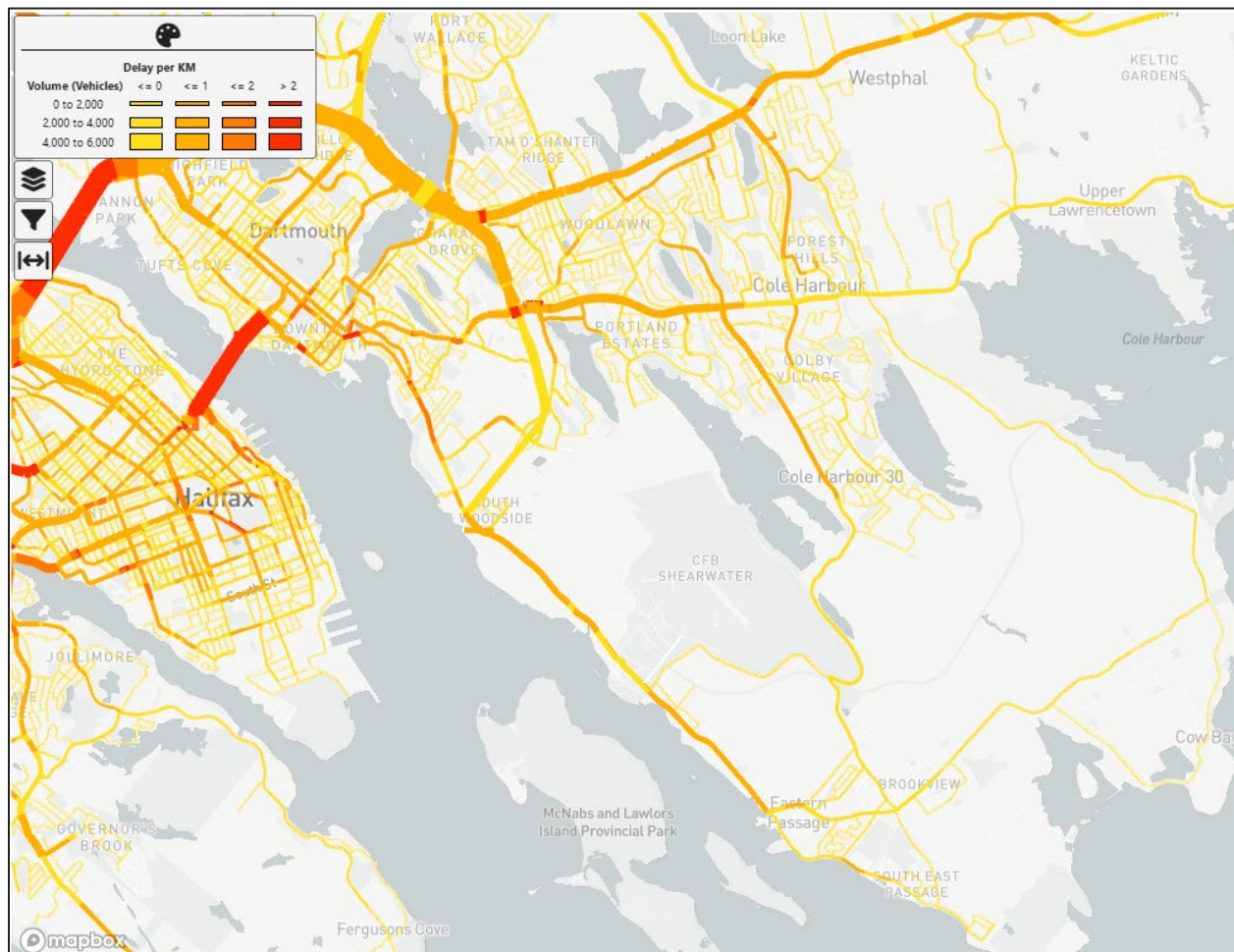


Figure 18: Travel Delay per km – PM Peak – 2031 Do Minimum Scenario

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5.2.2.2 Existing Transit Constraints

Each modelled scenario includes ferry routes while excluding proposed Bus Rapid Transit routes as they are not part of the projects list that informs the 2031 scenarios. Transit demand versus capacity maps of the HRM (**Figure 19**, **Figure 20**) highlight several routes that are already operating at or near capacity, particularly in the central areas of Halifax and Dartmouth as well as along Portland Street northwest of the study area and Pleasant Street near the Halifax Harbour oil terminals. This underscores that projected population growth in the HRM independent of Future Serviced Communities site development will add to demand for existing transit services. Transit flow-to-capacity analysis further indicates that most corridors near the Morris Lake study area would operate far from maximum capacity as the currently available transit service is expected to be able to absorb baseline demand increases.

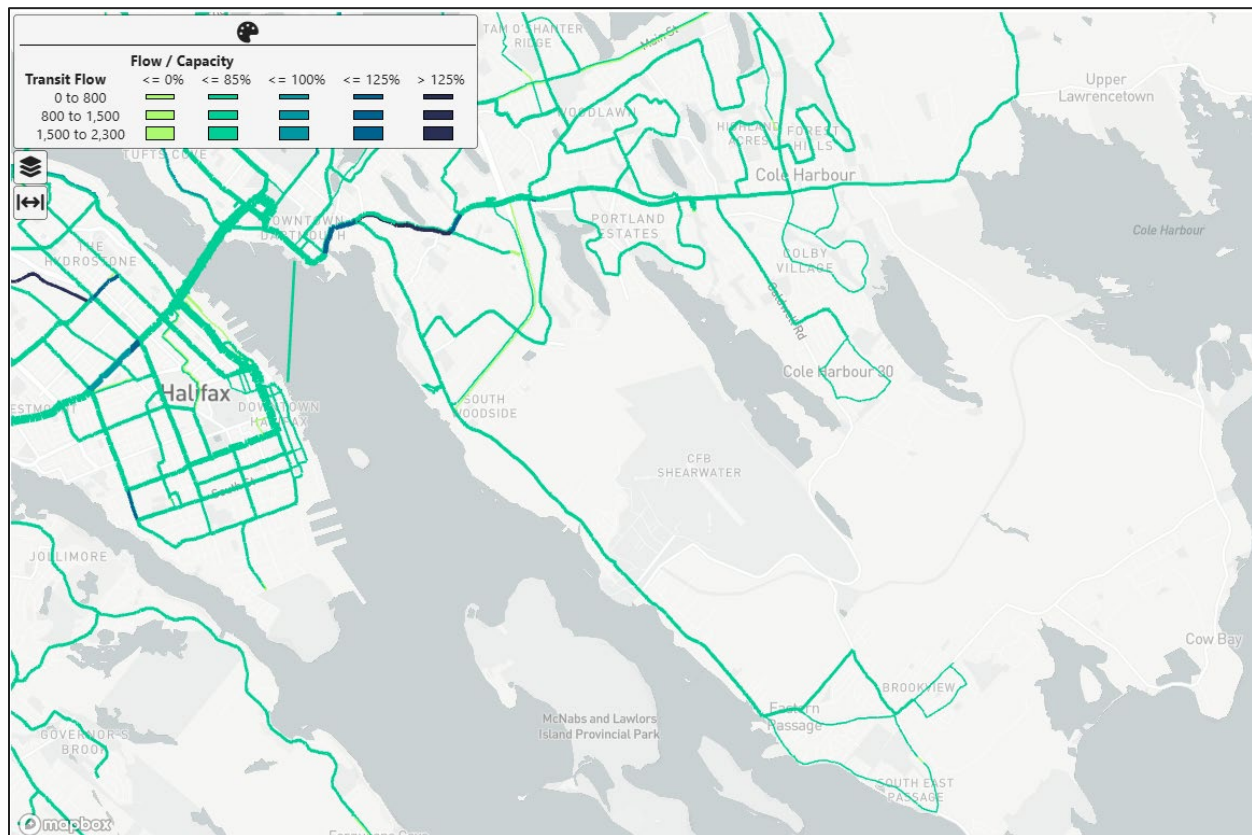


Figure 19: Transit Flow/Capacity Ratio – AM Peak – 2031 Do Minimum Scenario

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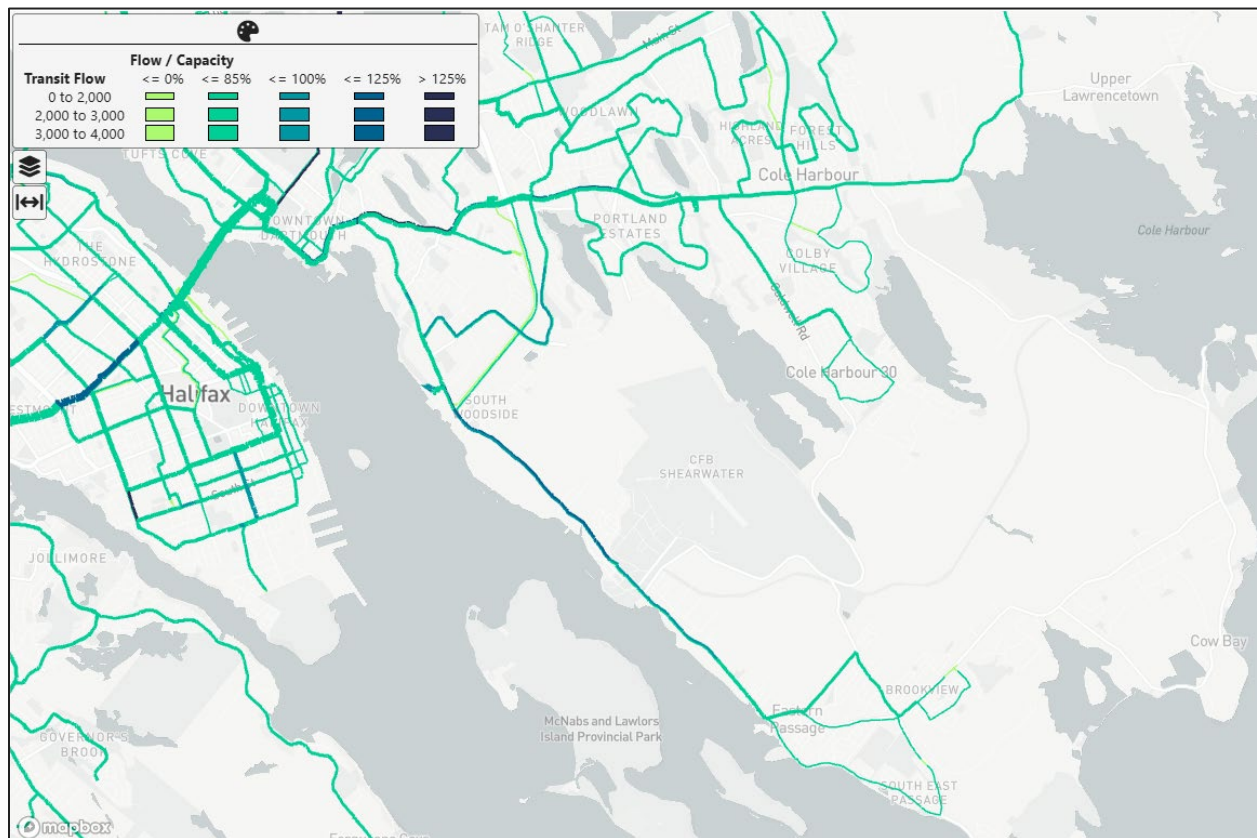


Figure 20: Transit Flow/Capacity Ratio – PM Peak – 2031 Do Minimum Scenario

5.2.2.3 Distribution of Morris Lake Development Travel Demand & Mode Share

Charts describe the External Only (**Figure 21**) and Internal Only trip mode share (**Figure 22**) separately and show the variance of mode share for internal and external travel demand projected through the HRM mode choice model. Of note, walking trips comprise over sixteen percent of trips anticipated to remain within the Morris Lake study area compared with under five percent of external trips. Combined walk, bicycle, and transit mode share of 10.3 percent across all trips falls short of the Integrated Mobility Plan's goal of at least 14 percent.

Per the Development Scenarios report, the combined concept plan devotes approximately 42,600 square feet (3,958 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 136 to 188 workers, far below embedded model (5,164) This difference may inflate the modelled number of internal trips and thus the overall proportion of trips made by people walking.



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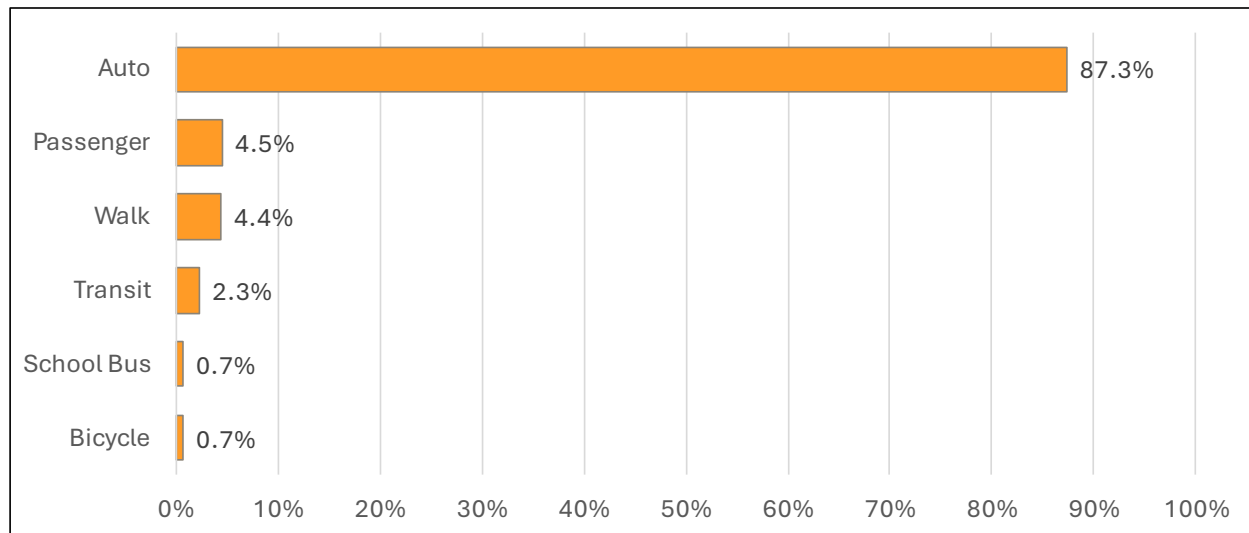


Figure 21: Morris Lake Study Area 2031 Projected Mode Share – External Trips

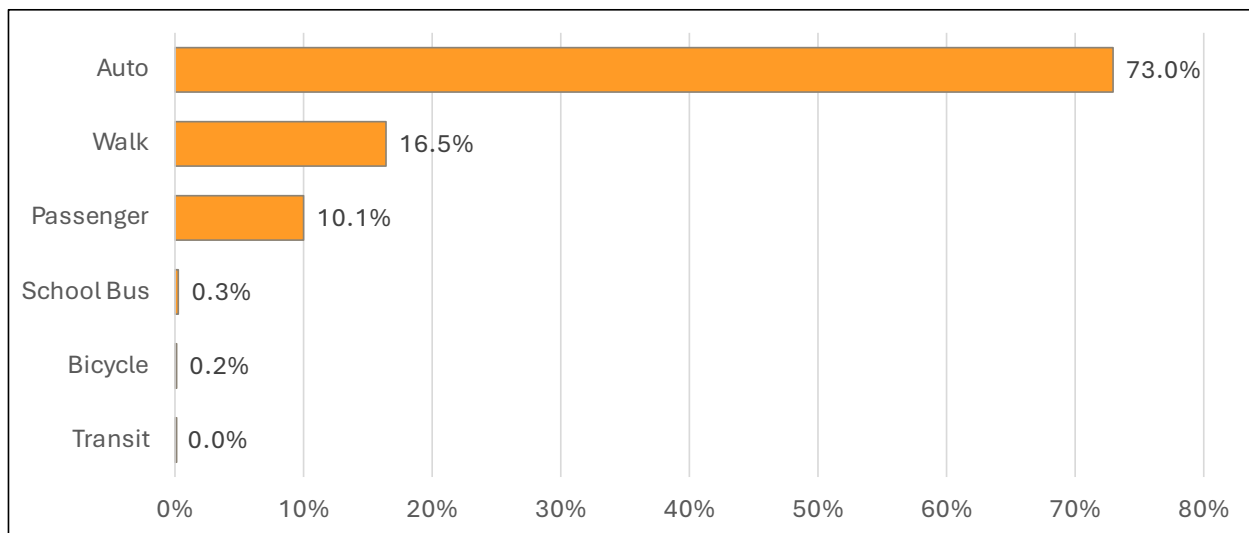


Figure 22: Morris Lake Study Area 2031 Projected Mode Share – Internal Trips



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Spatial visualization (**Figure 23**) and tabulation (**Figure 24**) of projected travel demand to and from the Morris Lake development, for all motorized vehicles including both private auto and transit users, consists of all travel throughout the entire day and the other modelled time periods within the ABM, including mid-day, evening, and overnight time periods. Approximately 8,800 projected internal vehicular trips, roughly 16 percent of all projected vehicle trips, are excluded from comparison of trip generation and attraction. A plurality of generated and attracted external trips begin and end relatively nearby in the Cole Harbour/Cow Bay analysis zone.

Previously discussed disparities between modelled and expected commercial activity/employment location also imply that future study area residents are more likely to travel outside of the development to reach places of employment or services than the model states while non-residents are less likely to travel to the developed Morris Lake study area for the same purposes.

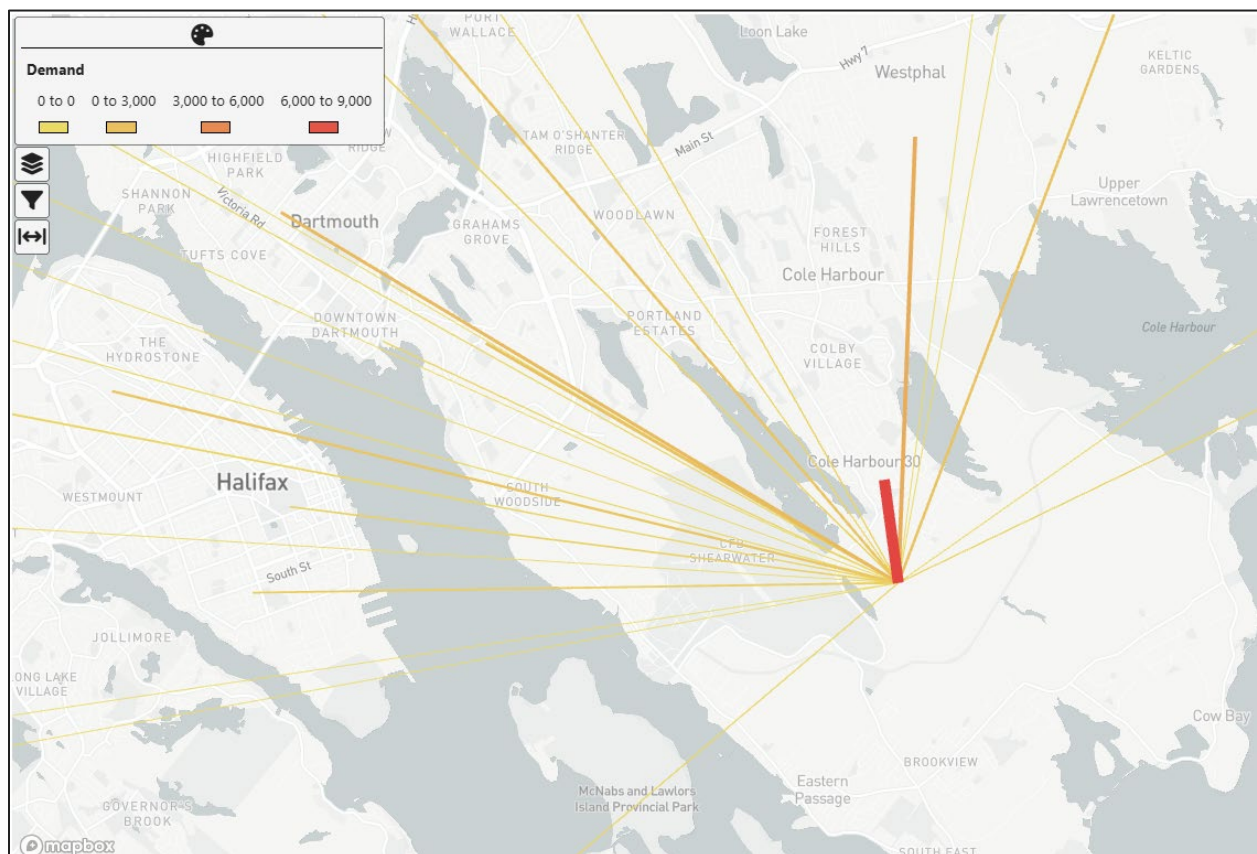


Figure 23: Visual Projected Trip Destination Demand from Morris Lake Study Area

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Destination	Demand	Percent	Origin	Demand	Percent
Cole Harbour/Cow Bay	8,314	36.5%	Cole Harbour/Cow Bay	8,421	37.0%
Akoma Lands	2,606	11.4%	Akoma Lands	1,925	8.5%
Dartmouth North	1,830	8.0%	Dartmouth North	1,858	8.2%
Dartmouth	1,459	6.4%	Burnside	1,657	7.3%
East Dartmouth	1,365	6.0%	East Dartmouth	1,383	6.1%
Burnside	1,248	5.5%	Dartmouth	1,341	5.9%
Halifax North End	1,164	5.1%	Halifax North End	1,093	4.8%
Halifax South Port	740	3.2%	Halifax South Port	764	3.4%
Halifax CBD	571	2.5%	Halifax CBD	658	2.9%
Lower Sackville	440	1.9%	Lower Sackville	483	2.1%
North	420	1.8%	North	431	1.9%
Halifax West	405	1.8%	Halifax West	411	1.8%
Hants	381	1.7%	Hants	380	1.7%
Chezzetcook	362	1.6%	Chezzetcook	361	1.6%
Dartmouth CBD	325	1.4%	Dartmouth CBD	356	1.6%
Halifax South	321	1.4%	Halifax South	338	1.5%
Bedford	259	1.1%	Northwest Rural	252	1.1%
Northwest Rural	142	0.6%	Bedford	241	1.1%
Atlantic Acres	91	0.4%	Atlantic Acres	101	0.4%
Kings	76	0.3%	Stanfield Airport	76	0.3%
Stanfield Airport	70	0.3%	Kings	71	0.3%
Eastern Shore	51	0.2%	Eastern Shore	39	0.2%
Bayers Lake	38	0.2%	Bayers Lake	39	0.2%
Highway 102	38	0.2%	Lunenburg	30	0.1%
Lunenburg	22	0.1%	St Margaret's Bay	19	0.1%
St Margaret's Bay	21	0.1%	Highway 102	18	0.1%
Truro	12	0.1%	Truro	12	0.1%
Sandy Lake	7	0.0%	Sandy Lake	7	0.0%
Total	22,778		Total	22,765	

Figure 24: Tabulated Projected Travel Demand to/from Morris Lake Study Area



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External trip distribution maps highlight the diffusion of auto trips on the highway network during the AM and PM modelled peak periods (**Figure 25, Figure 26**), reflecting the heavy demand along the Caldwell Road and Portland Street / Highway 207 corridors to access Highway 111, Highway 107, and points north. Modelling also indicates sizable trip distribution from southern development access along Cow Bay Road, Marine Drive, and Main Road into central Dartmouth and Downtown Halifax.

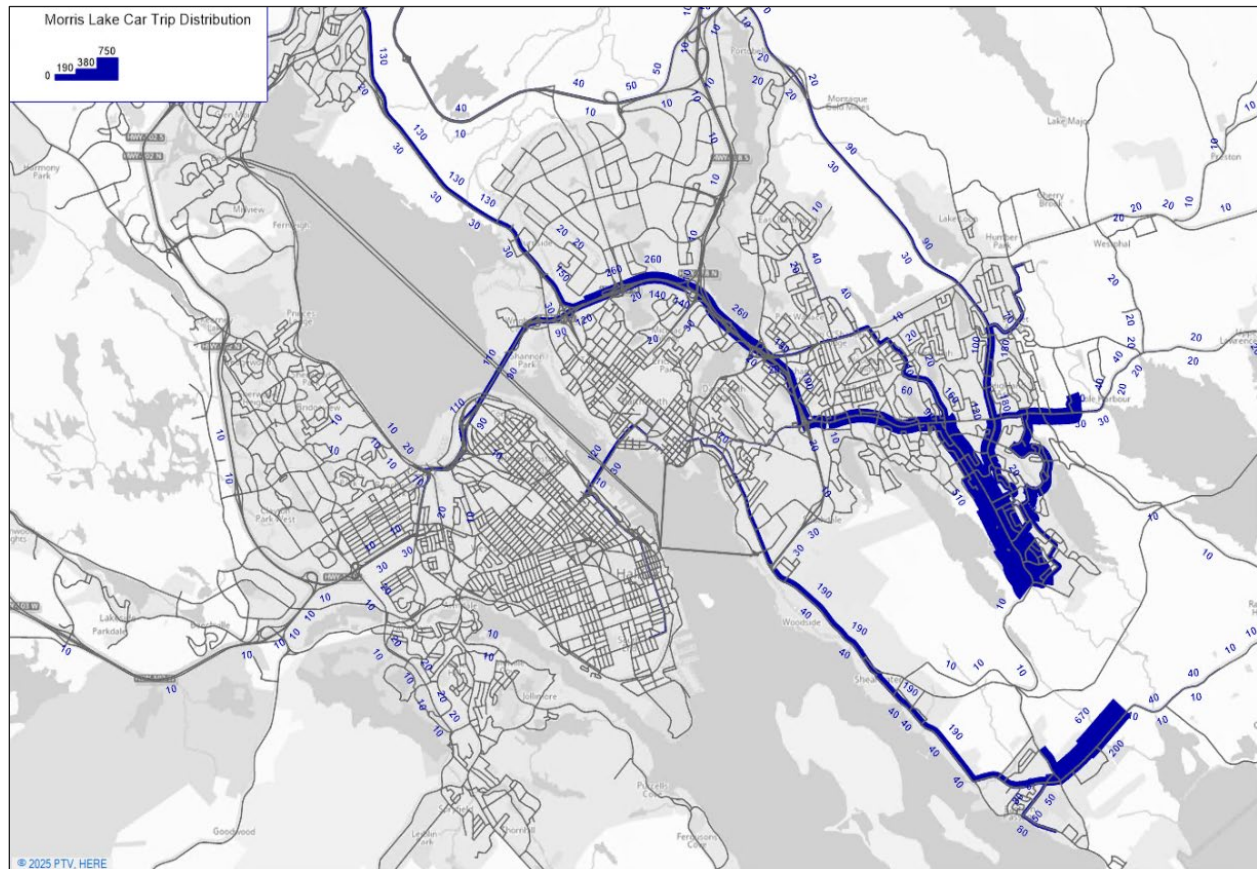


Figure 25: Projected Morris Lake Development External Trip Distribution – AM Peak

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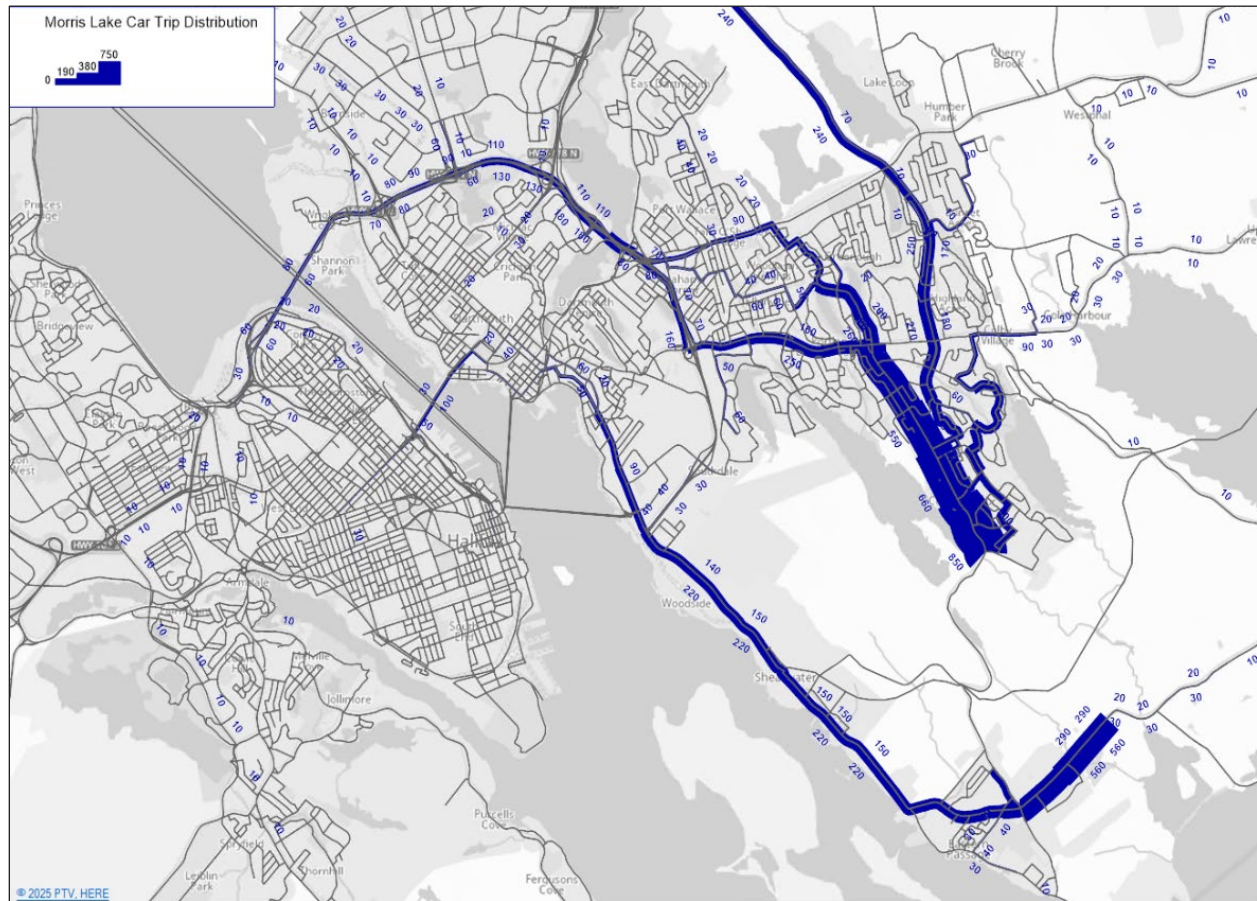


Figure 26: Projected Morris Lake Development External Trip Distribution – PM Peak

5.2.2.4 Highway Traffic Impacts

The Morris Lake development is expected to add to dominant traffic patterns on the surrounding highway network. As this and other development projects introduce new residential, commercial, and educational facilities, the resulting increase in travel demand will have direct implications for highway capacity, congestion and overall traffic flow. 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 27**, **Figure 28**) highlight the distribution and impacts of car trips from all Future Serviced Communities study areas. As expected, trends are similar to trip distribution plots. Large increases in hourly volume are seen along Caldwell Road, other parallel routes to reach Cole Harbour Road, the Cole Harbour Road / Portland Street corridor itself, and Cow Bay Road during both the AM and PM Peak periods. Lesser increases are observed on Main Road along the harbour following alternating directions in the AM and PM peak periods.

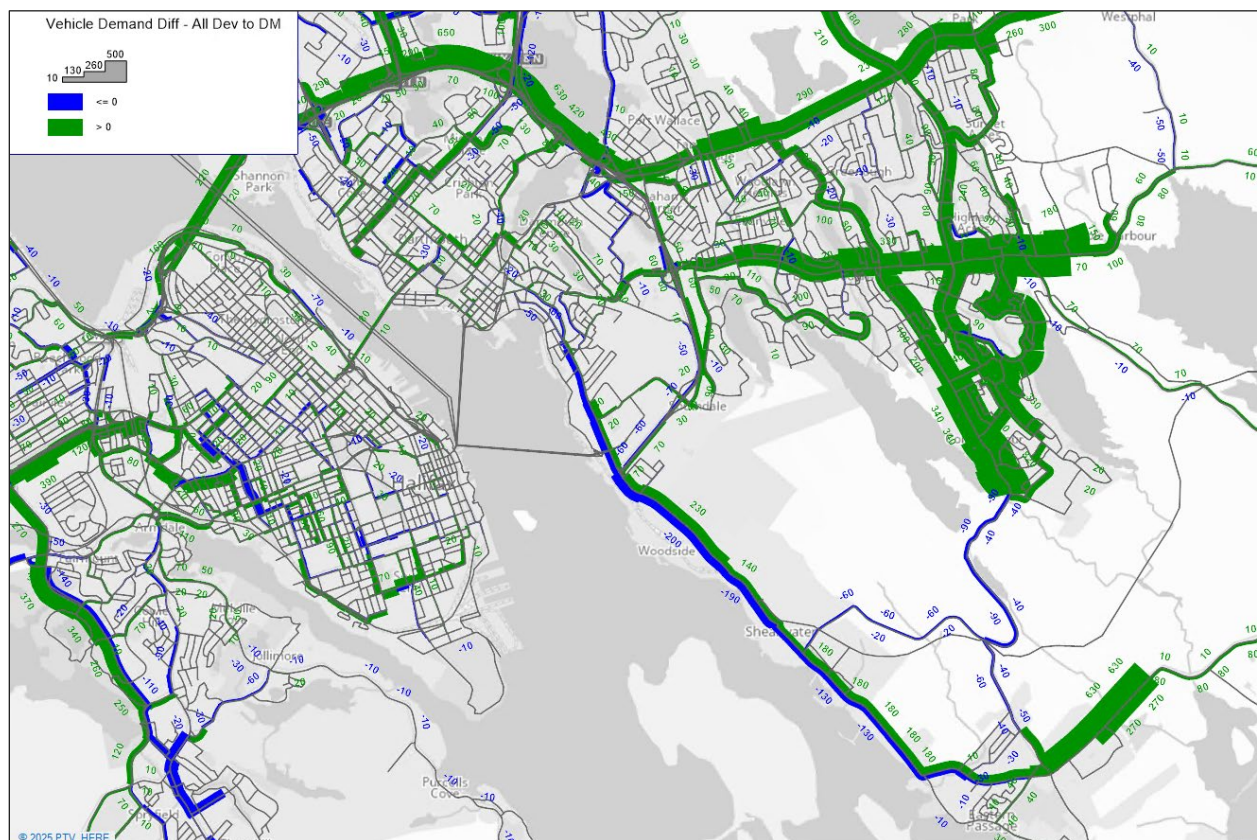


Figure 27: Trip Distribution Peak Flow Change – AM Peak – 2031 All Development Scenario

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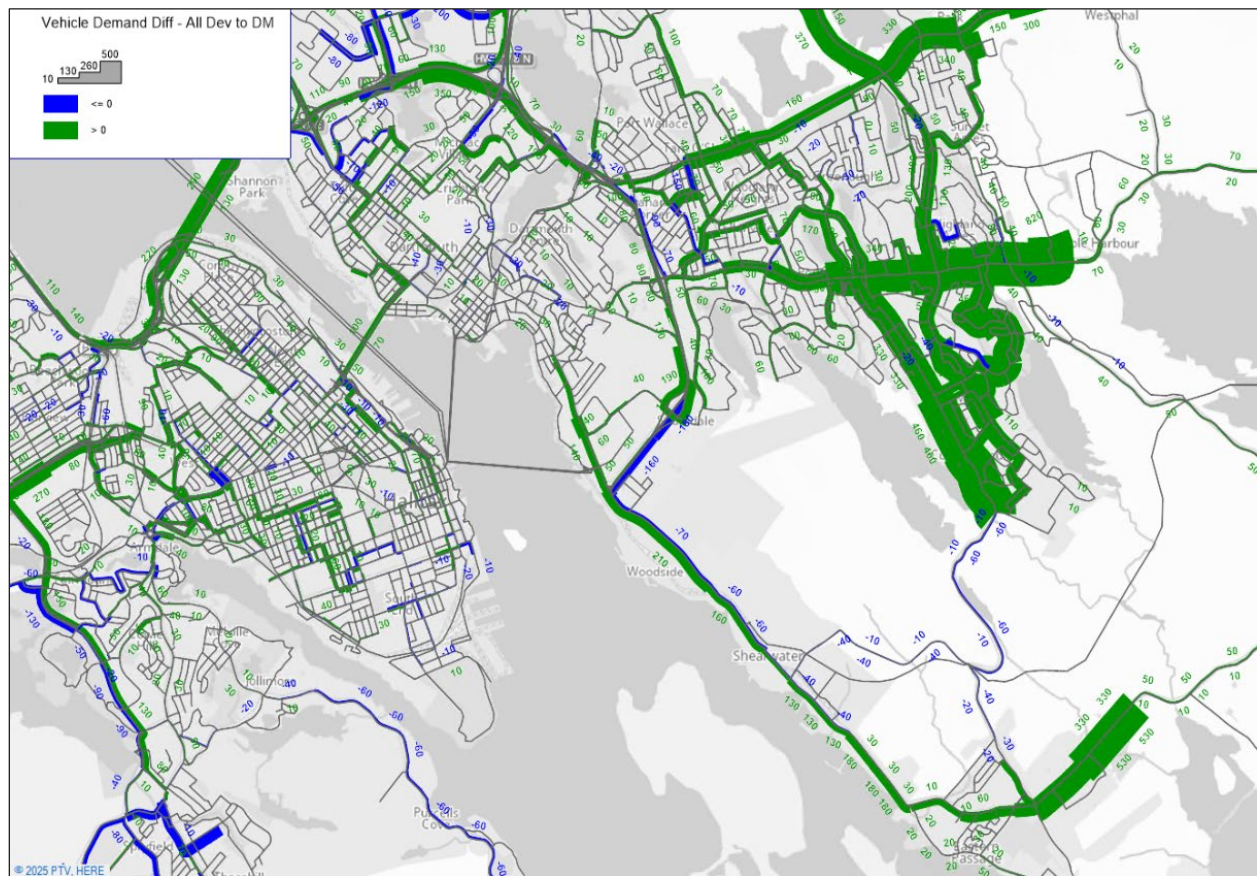


Figure 28: Trip Distribution Peak Flow Change – PM Peak – 2031 All Development Scenario

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Joint impacts resulting from the introduction of both the Morris Lake and Westphal developments forecast heavy added demand on the Cole Harbour Road corridor from multiple approaches including non-traditional access routes along local streets (**Figure 29**). Cole Harbour Road nearest the southern access to the Westphal development site may experience additional peak period demands of 900 vehicles or more while segments of Caldwell Road may be required to accommodate over 450 vehicles during peak periods. Demand appears to be even higher for the Caldwell Road corridor such that modelled behaviour shows increases of 300 peak hour vehicles or more on currently lightly travelled roadways such as sections of Colby Drive, Astral Drive, Flagstone Drive, and Fiddlers Green.

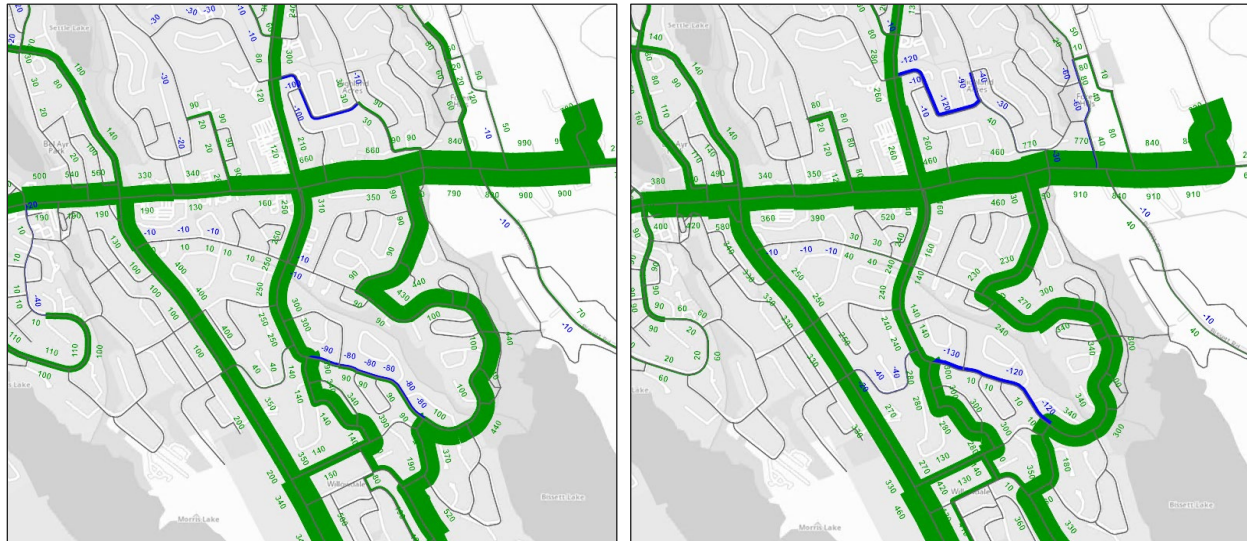


Figure 29: Trip Distribution Peak Flow Change – Cole Harbour Road & Caldwell Road / Forest Hills Parkway / Ashgrove Avenue Intersections – AM and PM Peak Periods – 2031 All Development Scenario

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Likewise, volume-to-capacity ratio increases attributable to new development occur in the Cow Bay Road and Caldwell Road corridors (**Figure 30, Figure 31**). In tandem with effects from the Westphal development, other significant increases take place along the Cole Harbour Road corridor and more circuitous routes parallel to Caldwell Road.

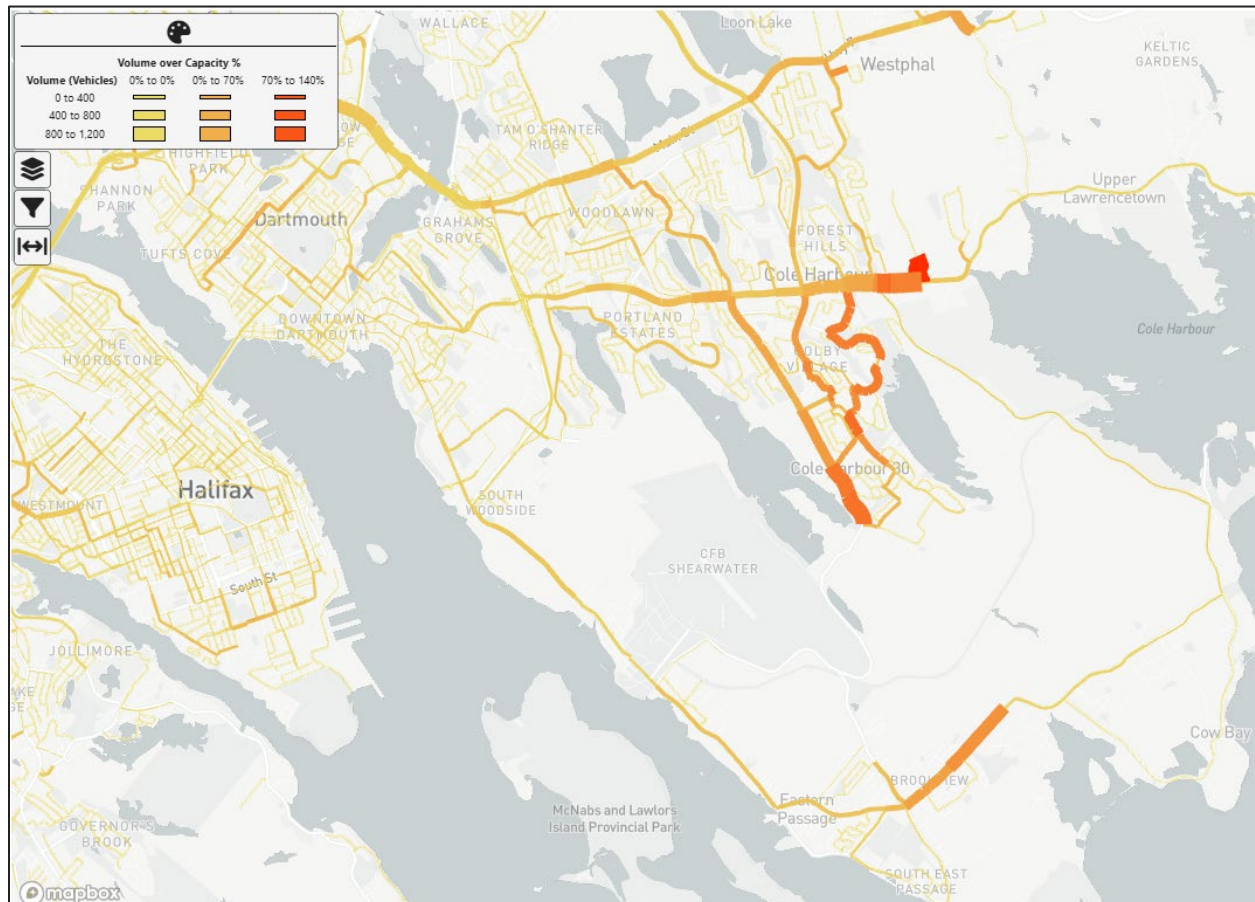


Figure 30: Volume/Capacity Ratio Change – AM Peak – 2031 All Development Scenario



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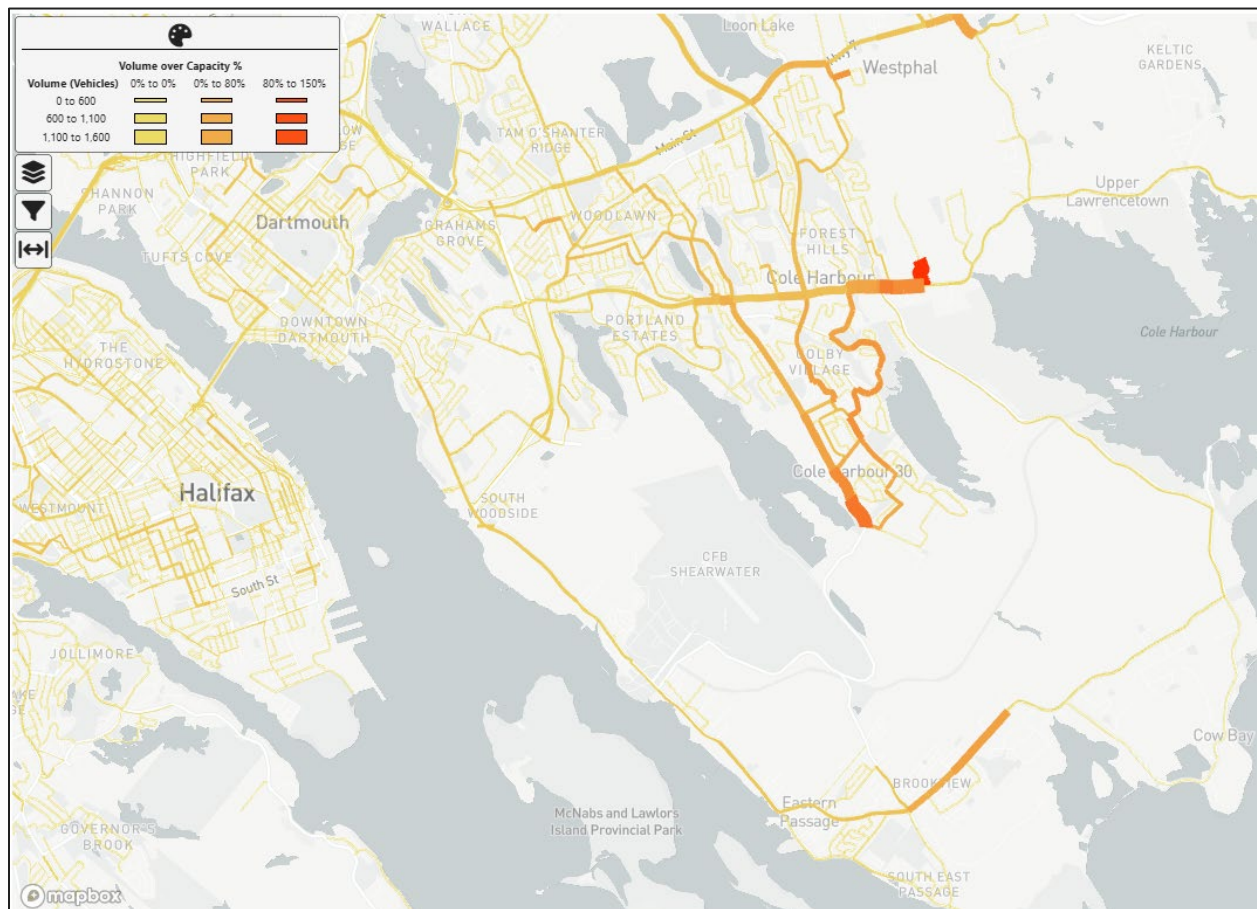


Figure 31: Volume/Capacity Ratio Change – PM Peak – 2031 All Development Scenario

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Model results predict intensification of initial issues identified by the Do Minimum scenario (**Figure 32**). Congestion worsens along Portland Street, northern segments of Caldwell Road, and portions of Main Road nearer the Harbour. Volumes above capacity accompany the introduction of development along previously uncongested segments of Caldwell Road near the northern access point of the Morris Lake development as well as portions of Cumberland and Colby Drives. Additionally tandem effects related to the simultaneous introduction of other developments create volume above capacity conditions on Cole Harbour Road near the southern access to the Westphal site.

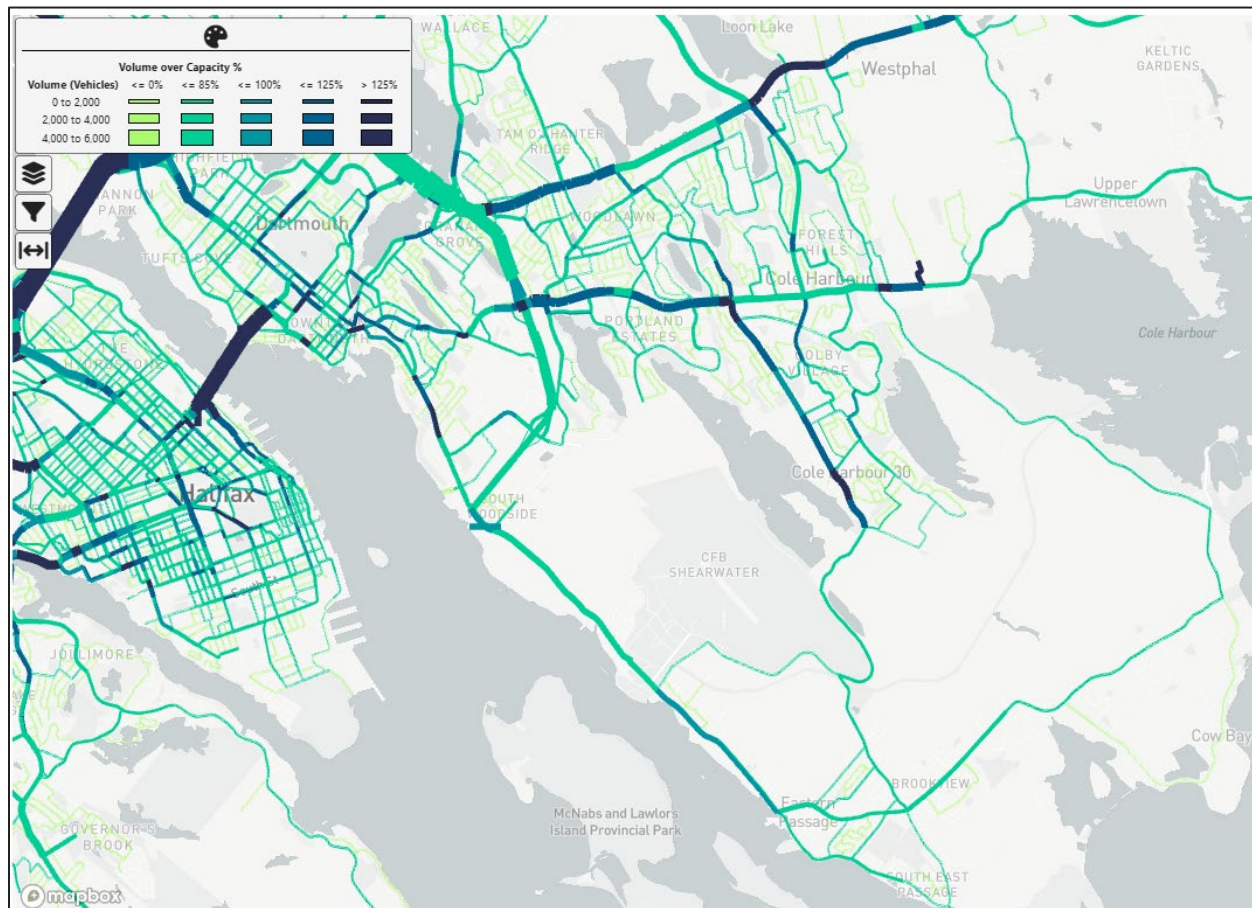


Figure 32: Volume/Capacity Ratio – PM Peak – 2031 All Development Scenario

Predicted traffic analysis shows bi-directional demand for vehicular travel along Portland Street / Highway 207 near Highway 111 exceeding capacity by 735 to 1,280 vehicles during peak hours, suggesting mitigation is necessary. These figures include trip distribution from the new Morris Lake development that portrays 410 vehicles attempting to use a route including Caldwell Road and Portland Street to access and return from Highway 111 during the PM peak period (**Figure 26**). The distribution analysis also shows Morris Lake attributable vehicle demand using other routes north of Portland Street to reach Highway 111, likely due to anticipated congestion along the primary access route.

A synthesis of these factors suggests sizable local benefits along Caldwell Road, Portland Street, and Main Road due to the previously described Shearwater Connector. The roadway is expected to alleviate traffic pressure immediately adjacent and attributable to the new Morris Lake development, which will



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exacerbate expected capacity constraints that already exist further west along Portland Street prior to the introduction of new residents, commercial opportunities, and travel demands. Extending Portland Estates Boulevard to meet Mount Hope Avenue without completing the Shearwater Connector would help to mitigate capacity constraints on Portland Street, but is currently precluded by Secondary Plan policy. Regardless, it would not provide the same level of overall traffic relief, especially along Caldwell Road, as would the complete connector.

5.2.2.5 Transit Impacts

Modelled transit ridership and capacity impacts associated with the introduction of the Morris Lake development indicate increases in demand originating from the development site during peak periods. Modelled transit distribution from the new development indicates that most new ridership is destined to and returns from the direction of the Woodside Ferry Terminal and destinations further north and west (**Figure 33, Figure 34**). The transit demand model attributes approximately 100 and 120 new boardings to the study area during AM and PM Peak periods, respectively, as well as roughly 35 to 50 alightings during each peak period. Most activity is attributed to the Cow Bay Road / Main Road corridor connecting directly to the Woodside Ferry Terminal via local Route 6C.



Figure 33: Projected Westphal Development Transit Trip Distribution – AM Peak

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Figure 34: Projected Westphal Development Transit Trip Distribution – PM Peak

Modelled transit flow-to-capacity information for the development scenario shows a future with transit demand approaching capacity in the Route 6 corridors in Eastern Passage and closer to the ferry terminal (**Figure 35**).

Recommendations for any transit service increases will focus on corridor level travel demand, inclusive of all modes, rather than bus route level projections. For example, northern sections of Caldwell Road retain transit capacity versus predicted demand after absorbing anticipated increased subscription for Routes 65 and 165, but experiences vehicular demand stress that may be mitigated through greater transit adoption and mode share increase.

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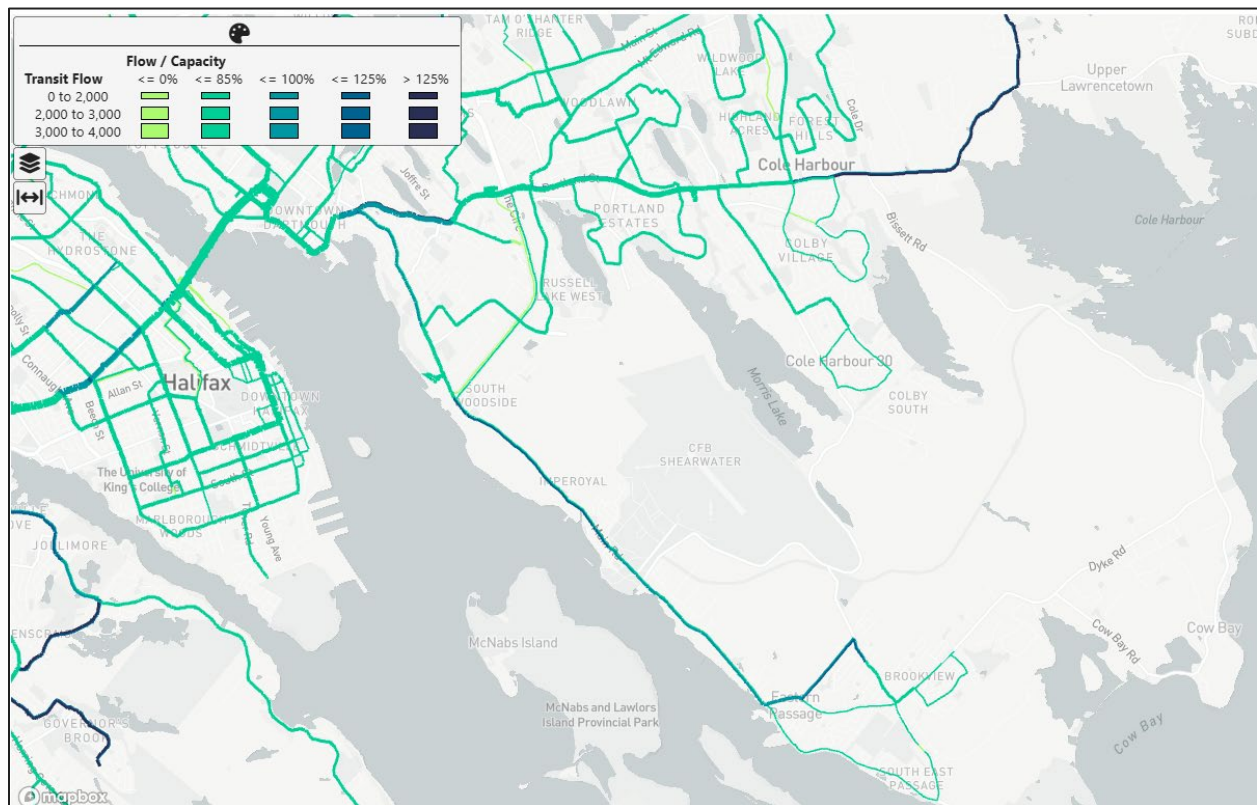


Figure 35: Transit Flow/Capacity Ratio – PM Peak – 2031 Morris Lake Development Scenario

5.2.2.6 Active Transportation

Within the Highway 102 West Corridor development area, the model estimates that active mode trips (walking, cycling) comprise between 16 and 17 percent of all internal trips, based on the HRM model's default algorithms and the established Place of Residence (POR) to Place of Work (POW) ratios (**Figure 22**). This approach assigns a higher proportion of internal trips to the walk mode, particularly for individuals walking to their workplace, as POW model parameters include a high level of self-contained employment within the development.

The HRM model predicts a regional mode share of 6.2 percent for walking and 0.2 percent for cycling. However, evaluation of external active transportation generated by the new development yields a lower active transportation mode share of only 5.2 percent (**Figure 21**). The modest disparity between internal and external active mode shares reflects active transportation facilities along Caldwell Road that nearly reach the development area and a major regional trail that traverses site. Opportunities exist to bolster active transportation facilities along connecting corridors from the southern end of the development to the Eastern Passage activity centre.

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



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applies a variety of environmental values to each area within HRM. The plan identifies Protected Areas as land formally designated for open space protection by varying tiers of government, **Regulated Areas** as riparian buffers, large wetlands and wetland complexes and other land protected from development by Municipal or Provincial regulations, and **Areas of High Environmental Value-Overlap** as high-valued areas whose loss would have a detrimental impact on ecological integrity. The Green Network Ecology Map in the GNP (**Figure 36**) identifies majority of the Morris Lake development area as an Area of High Environmental Value-Overlap with a large Protected Area along the Cow Bay River. Much of the land between Caldwell Road and Morris Lake is categorized as a Regulated Area.



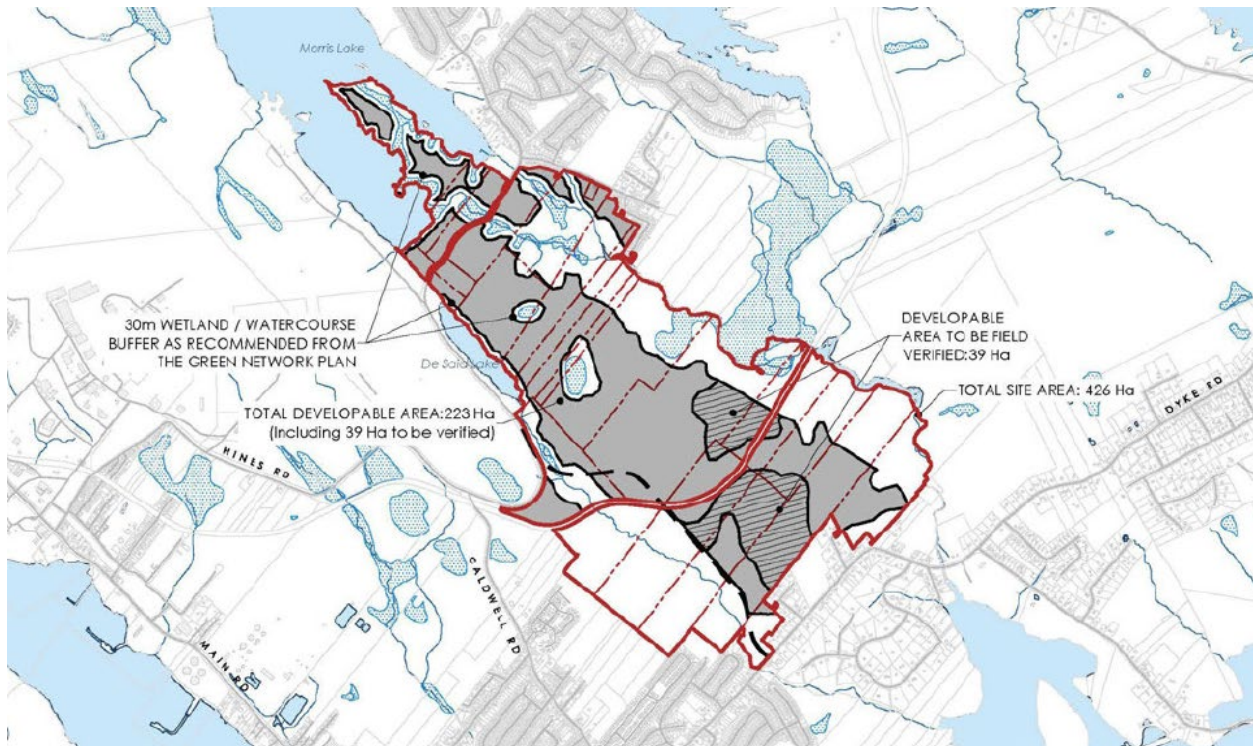
Source: HRM – Halifax Green Network Plan (2018)

Figure 36: Green Network Ecology Map



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While the full study area extends north to the Cow Bay River, the proposed plan avoids significant acreage abutting the west side of the river. That area, among others, has been set aside for conservation per a consultant assessment of the Green Network Plan reporting on behalf of HRM (**Figure 37**). The assessment based its conclusion on summation of ecological open space, working landscapes, and sociocultural values derived from the plan, which were determined to be high along the river.



Source: ZZap – Review of Green Network Plan and Potential Developable Area Study for Dartmouth East (November 2020)

Figure 37: Morris Lake Future Serviced Community Developable Area

Concept plans for development in the Morris Lake study area show general respect for the conservation assessment, especially along the Cow Bay River and Smelt Brook watercourses. Without an accompanying narrative description, the Morris Lake Holdings and Giles Investments plans shows irregular green open spaces, preserved wetlands, and stormwater management area, though not necessarily corresponding perfectly to those identified in the official Green Network Plan review. Analyses identified in the Watershed Study and Stormwater Management Plan will determine the adequacy of any ecological mitigation approaches and have been noted as a qualifying factor that may impact transportation solutions pending changes to the development proposal.

6 Limitations/Qualifications

Factors persist that limit or qualify the accuracy and value of analyses performed to date. 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 analyses.

The planned extent and quality of the pedestrian and cycling networks within proposed developments is unknown at this time. Network analyses depend on understanding all pedestrian and bicycle access options. The location of all sidewalks and walking paths should be known to ensure accuracy in connectivity analyses based on trip distance. Additionally, the future of the Shearwater Flyer Trail is not well understood per provided preliminary concept plans as a portion of the alignment appears to be reserved for a new roadway between Hines/Caldwell Roads and Cow Bay Road. The intention for the remainder of the on-site trail corridor is not noted.

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.

Transit modelling appears to underreport transit mode share and increased level of demand attributable to new study area residents due to large study area geography, the modelled distribution of residences versus actual building concentrations in the concept plan, and yet to-be-determined on-site transit routing. The model derives a distance to transit access based on current network stops.

The proximity of the Westphal and Morris Lake development sites yields overlapping impacts according to transportation demand modelling, especially along the Cole Harbour Road / Portland Street corridor. Additionally, the combination of simultaneous transit demand contributions of all Future Serviced Communities development sites uncovers certain limitations in accurately capturing route-level changes in transit demand. The aggregated system-wide impact of multiple new large population concentrations may dilute the visibility of localized fluctuations from baseline conditions against wider model sensitivity that considers complete route lengths and the broader transit system.

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, water quality, forest habitat, species-at-risk, surficial and bedrock geology, topography, contaminated sites, and areas of cultural significance. Combined concept plans are largely respectful of designations of low suitability for development.
- The Morris Lake Development Servicing Scenario report recommends reassessment of the level of service and distribution system requirements and consideration of sizing and placement of regional water infrastructure during subsequent design stages. It also recommends that the proposed development be incorporated in an all-pipe hydraulic model to perform a more refined fire flow level of service assessment.
- The Watershed Study and Stormwater Management Study notes increased contaminant loading compared to existing conditions. Implementation of structural Low-Intensity Development measures would be expected to reduce contaminant loads for the development area. Overall recommendations follow a no-net increase of loading approach prepared by Hutchinson Environmental Sciences for HRM in 2014.
- The stormwater management analysis recommends revising the proposed development layout based on further analysis of land use distribution and siting of stormwater management ponds. It suggests completing flow monitoring in watercourses to confirm regulatory floodplain limits and prohibiting active development within the 100-year regulatory floodplain, with some reduced-risk exceptions in agreement with HRM by-laws and the Nova Scotia Statement of Provincial Interest, subject to design considerations that mitigate the impact on the floodplain and riparian corridor. A detailed geotechnical investigation is recommended at the detailed design stage. The analysis also advises revising land use distribution to increase high-density uses and reduce development footprints, ensuring stormwater management ponds are located outside the 100-year floodplain and/or delineated wetlands. Additionally, it emphasizes prioritizing the retention of native and existing ground cover to preserve ecosystem service function and reduce runoff discharged into watercourses and implementing construction sequencing to minimize the quantity of soil exposed at any given time to prevent erosion.

7 Conclusions and Recommendations

7.1 Conclusions

The Morris Lake development, like all Future Serviced Communities, should prioritize the creation of a well-connected multimodal and complete community to ensure its success. 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 sustainable transportation modes 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, very few new residents will be able to access a wide array of essential and useful services on foot or by public transit within 30 minutes. Current conceptual plans include a noticeably low amount of commercial space relative to residential units. Compared to the Westphal development site, transportation from the Morris Lake study area to commercial, educational, and community centres is more distant and difficult.

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. Furthermore, a comprehensive understanding of vehicle parking, including inventory and utilization management, impermeable surface quantification, and an electric vehicle charging program have implications for achieving mode share targets and mitigating environmental impacts. 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 neighbourhood residents, but also extend access and connectivity to and from adjacent neighbourhoods without requiring personal vehicle ownership.

Travel modelling indicates that the Volume-to-Capacity ratio on segments of Caldwell Road, Portland Street, and Main Road will approach 100 percent by 2031, characterized by noticeable congestion before the Morris Lake development is introduced. Mitigation measures should ideally be implemented before or in parallel with the development of the study area to mitigate further negative effects of congestion. Upon buildout of the Morris Lake development, in the absence of modifications to transportation facilities and mobility services, sections of Caldwell Road are anticipated to experience intensification of congestion to a degree that causes notable vehicle volumes to spill into adjacent neighborhoods to the east in an effort to access Cole Harbour Road and Portland Street.

Analysis of modelled travel demand makes clear that the proposed Shearwater Connector, included in the 2014 Regional Municipal Planning Strategy and draft updates as a potential future municipal



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connective project, possesses benefit and ability to divert traffic from the anticipated heavily congested Caldwell Road and Portland Street corridors. Predicted traffic analysis shows possibilities to alleviate traffic pressure immediately adjacent and attributable to the new Morris Lake development that exacerbates baseline expected capacity constraints. Significant complications exist however, beyond typical environmental, community, and fiscal considerations. HRM's Integrated Mobility Plan notes challenges associated with the connection's proximity to the CFB Shearwater airfield that result in persistent uncertainty regarding the ability to construct the Shearwater Connector.

Modelling further indicates that the proposed BRT Red Line has a role to play in contributing to the handling of increased travel demand in the Portland Street / Cole Harbour Road corridor. While transit services closest to the Morris Lake development are projected to absorb modelled incremental transit demand increases, transit service increases and potential extension of the BRT system eastward are necessary to alleviate overall travel demand pressure from new development sites.

Effective on-site transit routing is equally important to increase adoption of transit by residents of new development and requires that developers determine and specify the right-of-way dimensions of proposed internal roadways. Primary corridors should be conceived and aligned to ensure that all new residents live within 400-metres, or a five-minute walk, of a transit stop. Connectivity analysis outputs indicate that without bus service more closely servicing the development, the average time required to access public transportation will exceed 20 minutes.

Specific locations and typologies of active transportation facilities within the development area should be clarified in future concept plans and supported through any roadway intersections with protected design features. Future plan versions must include detail related to any on-street bicycle facility, sidewalk, and other pedestrian path routing. Omission of active transportation facilities provision along local roads leaves gaps in the active transportation network at the point of origin and destination.

The Caldwell Road corridor north of the development area currently features dedicated facilities for people both walking and cycling. Phase 2 of the Caldwell Road Active Transportation & Street Improvement Project will extend proper protected cycling infrastructure closer to Portland Street / Cole Harbour Road / Dorothea Drive, further enhancing connectivity and safety for cyclists. Comparably, extending a Caldwell Road active travel corridor in the other direction through the study area to Shearwater Flyer Trail access points and on to Eastern Passage would be highly beneficial as the Shearwater Flyer Trail embodies a low-stress long-distance cycling facility connecting to proposed protected infrastructure along Pleasant Street serving the Woodside Ferry Terminal. Finally, portions of Cow Bay Road from southern Morris Lake development access points to Caldwell Road call for the addition of active transportation infrastructure. These connections first portrayed in the Active Transportation Priorities Plan would expand connectivity of the active travel infrastructure network surrounding the new development, supporting the usefulness of active transportation as a mode choice.

7.2 Recommendations

The needs summarized in the conclusions correspond to specific transportation infrastructure and service implementation recommendations. Transportation corridors that carry general traffic and transit vehicles, parallel active transportation opportunities, and intersections expected to experience significant increases in use form a sub-network of routes and nodes that require enhancements (**Figure 38**). Class E



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construction cost estimates attempt to associate a preliminary, directionally accurate cost with recommendations as a function of corridor segment length, transit operating cost, or figures previously cited by other planning efforts (**Figure 39**).

As compound factors due to the proximity of the Morris Lake and Westphal developments have been previously identified through transportation demand modelling, the Westphal Transportation Plan restates recommendations related to traffic impact mitigation and transit service increases for the Portland Street / Cole Harbour Road corridor, but does not imply duplication of actions and associated costs. The Morris Lake Transportation Plan otherwise limits facility and service recommendations to locations south of Cole Harbour Road / Portland Street.

7.2.1 ROADWAYS

Noting that current policy direction encourages investment in sustainable modes rather than additional vehicle capacity, automobile transportation system needs persist in the area of the Morris Lake development site based on the magnitude of predicted travel demand distribution and transportation network capacity stress. 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.

While the Integrated Mobility Plan revisited the Shearwater Connector and noted challenges associated with its location and feasibility uncertainty, modelling demonstrates a need to reduce heavy congestion in a non-development baseline scenario along Portland Street from the area near the Portland Hills Terminal west to Highway 111. Relief in that corridor was presented as a direct intention of implementation of the Shearwater Connector over twenty years ago. The corridor also corresponds with the planned Red Line BRT route, whose 10-minute frequency will provide a significant share, but not all, of the person moving capacity needed to absorb vehicular demand above capacity.

With or without the Morris Lake development, predicted volume approaches capacity on Caldwell Road leading to the intersection with Portland Street / Cole Harbour Road. Greatly increased traffic demand in the multiple development scenario implies a need for greater person movement capacity. Right-of-way constraints and/or compatibility with completed and future phases of the Caldwell Road Active Transportation & Street Improvement Project may preclude any changes to roadway dimensions, even for the purpose of establishing transit priority, further highlighting the utility of a potential Shearwater Connector as demand along Caldwell Road ultimately headed west is forced to funnel into Portland Street.

Main Road from Cow Bay Road to Hines Road represents a situation better suited to future monitoring related to travel capacity stress. Modelling of the development scenario shows vehicular volume of the dominant movement just below capacity during the AM (northbound) and PM (southbound) peak periods. Transit capacity stress in the Eastern Passage area appears to be related to model choice of variants of Route 6, but the spine of the corridor is projected to retain capacity to ease transportation demand pressure.



7.2.2 TRANSIT

As proposed, the BRT Red Line would terminate at Portland Hills Terminal, considerably north of the Morris Lake development area, along a corridor identified to experience heavy traffic congestion in background projections. Thus, the Morris Lake development does not directly contribute to the justification to build initial BRT lines. Extending the BRT Red Line east to Forest Hills Parkway however, would align the Red Line terminus with a node expected to experience heavy travel demand contributions from both the Westphal and Morris Lake Future Serviced Communities.

An increase in regular bus frequency and/or implementation of transit priority measures along Caldwell Road (Routes 65, 165) and Cole Harbour Road (Route 401) represents an alternative solution to accommodate the anticipated increase in general travel demand. If physical constraints and/or policy constraints preclude the addition of general-purpose travel lanes, high level analysis informs the level of transit service necessary to deliver a major mode shift from vehicle drivers to bus passengers.

Combining traffic and transit demand as well as traffic and transit capacity at the corridor level allows for a more holistic determination of transportation needs. Analysis designed to absorb overall directional travel demand finds needs for increased transit service along the Caldwell Road corridor between the Morris Lake development and Portland Street / Cole Harbour Road as well as the Cole Harbour Road corridor between the Westphal development and Portland Hills Terminal or any future terminus of the Red Line BRT. Absorbing the 2031 combined development scenario travel demand volume over capacity in the Caldwell Road corridor would require 7-8 additional buses during the AM peak hour, 8-10 additional buses during the PM peak hour, and 4-5 additional buses per hour during non-peak periods. Employing articulated buses can reduce the amount of additional buses needed to handle travel demand during the PM Peak to 5 assuming 80 passengers per vehicle. This still represents more than doubling of bus traffic along a corridor where geometry constrains the ability to add transit priority measures, pointing again to the need for implementation of the proposed Shearwater Connector to contribute to dispersal of travel demand across the transportation network.

Comparatively, transit access to the Westphal development via the Cole Harbour Road corridor requires 3 additional buses during the AM peak hour, 6-7 additional buses during the PM peak hour, and 2-3 additional buses per hour during non-peak periods.

The range of added 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.

7.2.3 ACTIVE TRANSPORTATION

Consistent with the Active Transportation Priorities Plan (ATPP), the study team identified a need for active transportation enhancements in the Cow Bay Road corridor. In addition, the plan calls for bicycle lanes or a paved shoulder along Caldwell Road south of the development site and Hornes Road. As facilities along these corridors would be geared toward transportation functions more so than recreation, dedicated bicycle facilities are preferred to multi-use paths. The ideal bicycle facility for such corridors



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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 curb/sidewalk presence and other right-of-way reassignment factors may dictate alternate facility type selection.

To better serve people walking, sidewalks along Cow Bay Road should be extended to primary southern accesses of the new development. As concept plans split primary southern access between Orion Drive and a new roadway directly intersecting Cow Bay Road, pedestrian facilities should be added along those roadways. As roadway traffic volumes are better understood, primary access roadways to the development site should also feature dedicated cycling facilities to link new development gateways to new dedicated cycling facilities along Cow Bay and Caldwell Roads.

The integration of newly realized and proposed active transportation facilities leading to and bordering the development site with those to be programmed within the Morris Lake study area creates a localized network with strong regional connections. The degree of interconnectivity and the ability to provide seamless and safe travel, especially for cyclists, is essential to attract higher usage rates. People who would walk and cycle seek accessibility and the usefulness of connections in their decision to use active modes of transportation for reasons other than recreation.

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.



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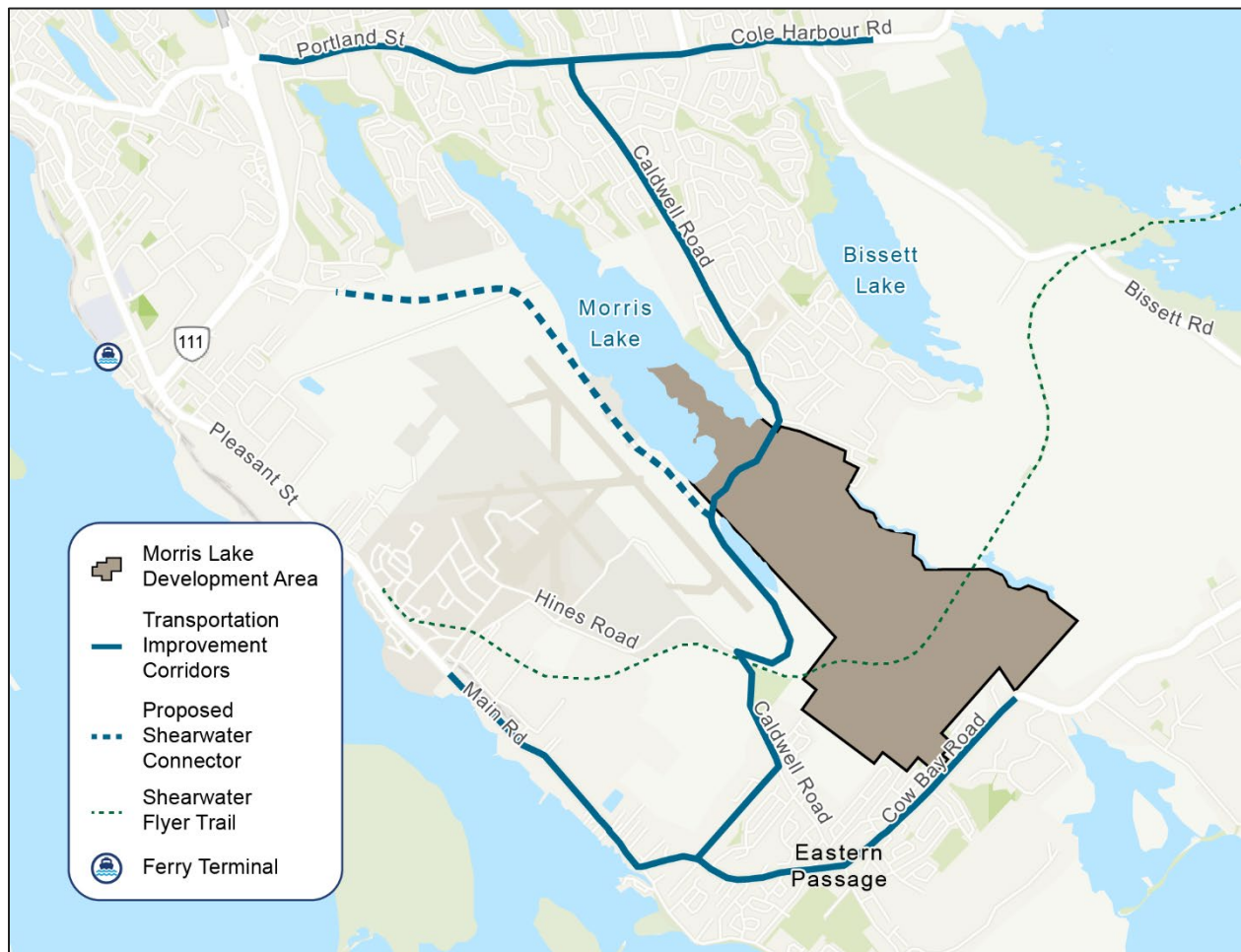


Figure 38: Spatial Recommendation Representation

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Facility/ Service	Baseline 2031 Improvements	Class E Construction Cost Estimate	Development- Specific Improvements	Class E Construction Cost Estimate
Roadway Infrastructure				
Shearwater Connector	Construction of new two-lane roadway (and accompanying multi-use path) connecting existing Mount Hope Avenue to Caldwell Road	\$26.9 million per Capital Project # CT000016 within the 2024/2025 Capital Plan ³		
Caldwell Road			Increased person movement capacity from Morris Lake study area to Portland Street / Cole Harbour Road	Potential lane addition, transit priority or general purpose – \$13.15 million based on \$3,835,000 per linear kilometre
Cole Harbour Road			Increased person movement capacity from Bissett Road to Coleridge Court	Potential lane additions – \$5.14 million based on \$3,835,000 per linear kilometre
Transit				
Portland Street	Construction of initial Red Line BRT to Portland Hills Terminal	Scoped per the 2020 Rapid Transit Strategy		

³ [HRM – 2024-25 Capital Plan](#)



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Facility/ Service	Baseline 2031 Improvements	Class E Construction Cost Estimate	Development- Specific Improvements	Class E Construction Cost Estimate
Cole Harbour Road			Extension of Red Line BRT from Portland Hills Terminal to Forest Hills Parkway	\$0.48 million (station) \$2.18 million (1.3 km transit priority lanes and intersection enhancements) \$0.74 million annual (operating) ⁴
Cole Harbour Road (Non-BRT Mitigation)			3 additional buses per hour during a.m. peak period 6-7 additional buses per hour during p.m. peak period 2-3 additional buses per hour before, after, between peaks.	\$1.11-1.58 million annual based on \$100.85 operating cost per hour for new service
Caldwell Road or parallel corridors			7-8 additional buses per hour during a.m. peak period 8-10 additional buses per hour during p.m. peak period 4-5 additional buses per hour before, after, between peaks.	\$2.14-2.65 million annual based on \$100.85 operating cost per hour for new service

⁴ [Rapid Transit Strategy - Final - May 2020.pdf](#)



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Facility/ Service	Baseline 2031 Improvements	Class E Construction Cost Estimate	Development- Specific Improvements	Class E Construction Cost Estimate
Development Site Primary Corridor(s)			Routing through the development site + stops.	Pending future detailed transit analysis
Active Transportation				
Caldwell Road	Multi-use path extension from Deerbrooke Drive to Hampton Green per the Caldwell Road Active Transportation & Street Improvement Project	Unseparated sub- project within Street Recapitalization budget per 2024/2025 Capital Plan ⁵		
			Paired one-way cycle tracks from Atholea Drive to Macdonalds Beach Road	\$810,000 excluding design and signal modifications
			Bicycle lanes/paved shoulders from Hines Road to Hornes Road	\$366,000 - \$417,000 dependent on level of pavement marking and paved buffer area
			Sidewalk on one side from Hines Road to Hornes Road	\$463,000 based on 1.8m sidewalk width, site prep, minor drainage modification

⁵ [HRM – 2024-25 Capital Plan](#)



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Facility/ Service	Baseline 2031 Improvements	Class E Construction Cost Estimate	Development- Specific Improvements	Class E Construction Cost Estimate
Hornes Road			Protected bicycle lanes on both sides of the road from Caldwell Road to Cow Bay Road	\$120,350 for 1.5m lanes + flex bollards in buffer zone at 10m intervals. Includes catch basin leads, signs, pavement markings
Cow Bay Road			Bicycle lanes/paved shoulders from Orion Drive to Samuel Danial Drive	\$319,000 - \$364,000 dependent on level of pavement marking and paved buffer area
			Paired one-way cycle tracks from Heritage Hills Drive to Shore Road	\$1,620,000 excluding design and signal modifications
			Sidewalks from Orion Drive to Samuel Danial Drive	\$404,000 based on 1.8m sidewalk width, site prep, minor drainage modification
Orion Drive			Sidewalks from Morris Lake development access to Cow Bay Road	\$92,600 based on 1.8m sidewalk width, site prep, minor drainage modification
			Bicycle Lanes from Morris Lake development access to Cow Bay Road	\$73,200 assumes road reconstruction required for added pavement width

Figure 39: Recommendation and High-Level Cost Estimate Summary Table



7.3 Follow-On Work Required

To adequately meet the mobility study goals of the Future Serviced Communities initiative, HRM and study area developers must perform further investigations, analysis, and planning. The Morris Lake development, due primarily to its distance from existing commercial, educational, and civic destinations, is expected to demonstrate a personal vehicle orientation. Additional efforts may be necessary to achieve the objectives of HRM policies supporting sustainable transportation modes.

- Connectivity analyses will require repetition as different assumptions, especially the inclusion of specific uses and destinations on site, become more concrete. These analyses should consider the distribution of residents throughout the development area and the cumulative effects of new commercial development in tandem with the transportation requirements associated with accessing more distant activity centres.
- To fully understand traffic volume and congestion mitigation needs, supplementary analysis focusing on junction performance is necessary to ensure a more complete assessment of network impacts and potential bottlenecks. Additionally, transportation impact study should be revisited that includes the most recent combined development concept plan housing and commercial space estimates.
- More detailed transit demand modelling is required to more accurately predict transit mode share of the new development, the associated increased demand for service adjacent to the study area, and capacity needs for an on-site route. Needed adjustments relate to the physical arrangement of residential development and inclusion of an example route travelling along primary corridors within the development that provides proximate access for all new residents. Using a more detailed development plan, determine ideal on-site routing and stop siting for high quality transit service and other micromobility that links to regional destinations.
- Current concept plans do not describe bicycle or pedestrian facilities slated for local roads and intra-development connections, which contributes to difficulties in routing and siting other transportation enhancements. Future plans should explicitly include intended pedestrian and bicycle circulation pathways.

