Halifax Regional Municipality

Regional Goods Movement Opportunity Scoping Study
Final Report

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Draft Final Report

1 EXECUTIVE SUMMARY

This Regional Goods Movement Scoping Study project was undertaken by Davies Transportation Consulting Inc. in collaboration with MariNova Consulting, Group ATN and S5 Services for Halifax Regional Municipality. It represents the starting point in examining goods movement issues in the context of development of a new Integrated Mobility Plan which will expand the focus of regional transportation planning.

The inclusion of goods movement issues in regional planning efforts is relatively new. Within North America, the U.S. leads in the theory and practice of goods movement planning, due to federal statutes governing Statewide and metropolitan transportation planning processes.

Current research on urban goods movements can be divided into two broad categories. One stream focuses primarily on freight movements, which include a broad range of industrial and large volume international, interregional and interurban freight flows. The other focuses on “last mile” issues related to delivery for local consumption by businesses and consumers. Environmental issues and land use also have a major influence on goods movement planning.

The consulting team conducted extensive consultations to identify issues related to goods movements which are of concern to the public. Meetings were conducted in person and by telephone with commercial stakeholders involved in goods movement, public agencies and community organizations.

Planning Recommendations

HRM’s Integrated Mobility Plan is being developed to expand the focus of regional transportation planning. The traditional focus on people’s need to move about the region will be supplemented to encompass issues including goods movement, higher-order transit, parking management, active and healthy communities, connected and autonomous vehicles, emerging options for ride sharing (such as Uber and Lyft), and the long-term potential for car sharing.

Currently there is no formal mechanism within HRM’s planning process to ensure that goods movement issues are considered in planning decisions.

There is currently great interest in “Complete Streets” policies. In planning for goods movements, it is critical that the “users” include trucks, which are critical for the economic vitality of a region. For HRM, a first step towards integrating goods movement considerations into

planning decisions could be development of a checklist to ensure that all users' issues and interests have been considered. For goods movements this could include information on whether or not the location is on a major truck route, local land use patterns, and potential safety or economic impacts from changes to the volume or mix of traffic.

U.S. experience has highlighted two key functional requirements for goods movement planning:

- Input from key stakeholders, to discuss issues and build consensus for solutions. In U.S. cities, this is often done through a regional freight advisory committee. For HRM, the most expeditious means may be through an expanded focus for the existing Halifax Gateway Council. The inclusion of regular discussions on HRM's transportation policy and investment decisions as a regular item in the Gateway Council's agenda could enable the organization to be used as a more effective mechanism for exchanging information and consulting on potential impacts.
- Data and analytical tools, to identify needs and assess effects. We recommend that Halifax work with major regional stakeholders to develop a program for collection of truck traffic data, and explore the possibilities for senior government funding for collection of data and modelling of truck traffic, and assembly of other key goods movement data to support the continuing competitiveness of the Halifax Gateway.

Downtown Truck Traffic

The goods movement issue most often identified by both commercial and community organizations is container truck traffic transiting downtown Halifax to and from Halterm. Analysis of available truck traffic data suggests that port-related activity is the largest generator of heavy truck traffic on the Halifax Peninsula and on the A. Murray MacKay Bridge. Based on HRM Police data, commercial vehicles account for a larger share of collisions in the downtown area and along the port truck routes (7.7% to 7.9%) than in HRM as a whole (4.9%).

HRM is not the primary decision maker in planning for port infrastructure and operations, but the city has a major stake in the outcome, and current decisions will affect the regional transportation system for decades to come. Close cooperation between HRM, HPA and other stakeholders is critical. The current Master Planning project being undertaken by HPA may provide an effective mechanism for this cooperation to take place.

Public recognition of the vital economic role of the Port of Halifax has been a factor in public tolerance of heavy truck traffic. However, the realization of HRM's plans to create a more densely populated and liveable urban core in the downtown area is likely to result in increased public pressure for resolution.

Any solutions must maintain the competitiveness of the Port of Halifax as an international trade gateway. HRM needs to play a key role as a champion for the Port. It is particularly important to maintain the diversity and scale of container shipping services to support local and regional export industries in the future.

We recommend further exploration of two potential solutions to port-related truck traffic in downtown Halifax:

- Cross-Harbour Ferry: This concept has been suggested as a potential alternative for container movements from Halterm. We recommend that further analysis be conducted on the feasibility of load on/load off (LO/LO) and roll on/roll off (RO/RO) options for a cross-harbour ferry operation to transport containers to and from Halterm.
- Ceres – Halterm Rail Shuttle: The merger or consolidation of Ceres and Halterm and the potential movement of significant additional volumes through Halterm present an opportunity to examine the potential for a Ceres – Halterm rail shuttle. It may also be useful to review Railrunner technology as an alternative to a conventional rail shuttle, and assess the potential for its use in Halifax.

2 INTRODUCTION

2.1 Study Background

This Regional Goods Movement Scoping Study project was undertaken by Davies Transportation Consulting Inc. in collaboration with MariNova Consulting, Group ATN and S5 Services for Halifax Regional Municipality. The analysis will identify issues, constraints, impacts and threats related to the movement of goods by all modes, including air, sea, rail and road, even if potential solutions are outside the mandate of the Municipality. The study will consider both medium (3-10 year) and long (10-25 year) term solutions.

This project represents the starting point in examining goods movement issues in the context of development of a new Integrated Mobility Plan which will expand the focus of regional transportation planning. The traditional focus on people's need to move about the region will be supplemented to encompass issues including goods movement, higher-order transit, parking management, active and healthy communities, connected and autonomous vehicles, emerging options for ride sharing (such as Uber and Lyft), and the long-term potential for car sharing. The plan will also strive to identify the two-way inter-relationship between settlement patterns and investment in mobility. Management of truck traffic will be critical to the success of HRM's Centre Plan, which strives to create livable cities in the Regional Centre.

The Integrated Mobility Plan will help to direct HRM's future investment in transportation demand management, transit and the active transportation and roadway network. While the focus will be on intra-regional mobility, regional infrastructure that facilitates inter-regional goods movement will also be in scope. Mobility components outside the jurisdiction of the Municipality (i.e. provincial highways and the harbour bridges) will be considered integral to the plan.

2.2 Planning for Goods Movements in Metropolitan Areas

The inclusion of planning for goods movements in regional planning efforts is relatively new:

> *Unlike passenger transportation, research in the area of goods movement is in its infancy. Transportation professionals and policymakers lack comprehensive understanding, robust data and common terminologies, all of which have major*

implications for the management of individual urban freight systems as well as the larger global freight network.[1]

In the United States, the primary driver for increased attention to goods movement issues has been federal surface transportation legislation. Increased emphasis on freight as a factor to consider in the transportation planning process began with the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The importance of incorporating freight issues within metropolitan and statewide planning efforts was further emphasized in the Transportation Equity Act of the 21st Century (TEA-21) in 1998; the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005; and the Moving Ahead for Progress in the 21st Century (MAP-21) in 2012. Statewide and metropolitan transportation planning processes are governed by Federal law and applicable state and local laws if Federal highway or transit funds are used for transportation investment.[2]

The most recent highway bill, the Fixing America's Surface Transportation Act (FAST Act), was passed in December 2015. The FAST Act continues requirements for a long-range plan and a short-term transportation improvement program (TIP) to be prepared for each state and metropolitan area, with the long-range statewide and metropolitan plans now required to include facilities that support intercity transportation, including intercity buses. The statewide and metropolitan long-range plans must describe the performance measures and targets that States and MPOs use in assessing system performance and progress in achieving the performance targets. Additionally, the FAST Act requires the planning process to consider projects/strategies to: improve the resilience and reliability of the transportation system, stormwater mitigation, and enhance travel and tourism. In an effort to engage all sectors and users of the transportation network, the FAST Act requires that the planning process include public ports and private transportation providers.[3]

Progress has been mixed. A study commissioned by the U.S. Transportation Research Board in 2007 noted:

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[1] Why Goods Movement Matters Strategies for Moving Goods in Metropolitan Areas Regional Plan Association and Volvo Research and Educational Foundations June 2016 http://goodsmovementmatters.org/

[2] US Federal Highway Administration (FHWA) http://www.fhwa.dot.gov/planning/

[3] Fixing America's Surface Transportation Act or "FAST Act" FHWA http://www.fhwa.dot.gov/fastact/summary.cfm

Over the last decade, the incorporation of freight issues into the transportation planning activities of state departments of transportation and metropolitan planning organizations has received significant focus. Much of this focus has been on integrating freight into the planning portion of the project delivery process. Although most states and MPOs have successfully incorporated freight issues into long-range planning activities, fewer have fully integrated freight throughout the entire transportation planning, programming, and project development process.[4]

Under the U.S. Federal Transportation Act, states must submit a Statewide Transportation Improvement Plan (STIP) listing priority projects for federal funding. The STIP includes projects such as pavement overlays, roadway widening, bridge replacement or repair, signal systems, safety enhancements, bicycle and pedestrian facilities, and transit improvements. The STIP is developed in coordination with statewide Metropolitan Planning Organizations[5] (MPO's) and Rural Transportation Planning Organizations (RTPO's) to ensure that the proposed projects are consistent with local, regional and state plans.[6]

Challenges in integrating freight transportation in the planning and programming process are described below:

Although the specific planning and programming process used by states and MPOs can vary slightly, it normally consists of four major elements: needs identification, plan development, project programming, and project development and implementation. The activities that occur in these four elements are supported by a number of functions, including input from key stakeholders, to discuss issues and build consensus for solutions; data and analytical tools, to identify needs and assess effects; and funding and financing techniques, to equitably allocate available resources. This process, along with its supporting functions, has proven effective in helping states and MPOs identify transportation needs, develop long-range mobility strategies, and target transportation investments.

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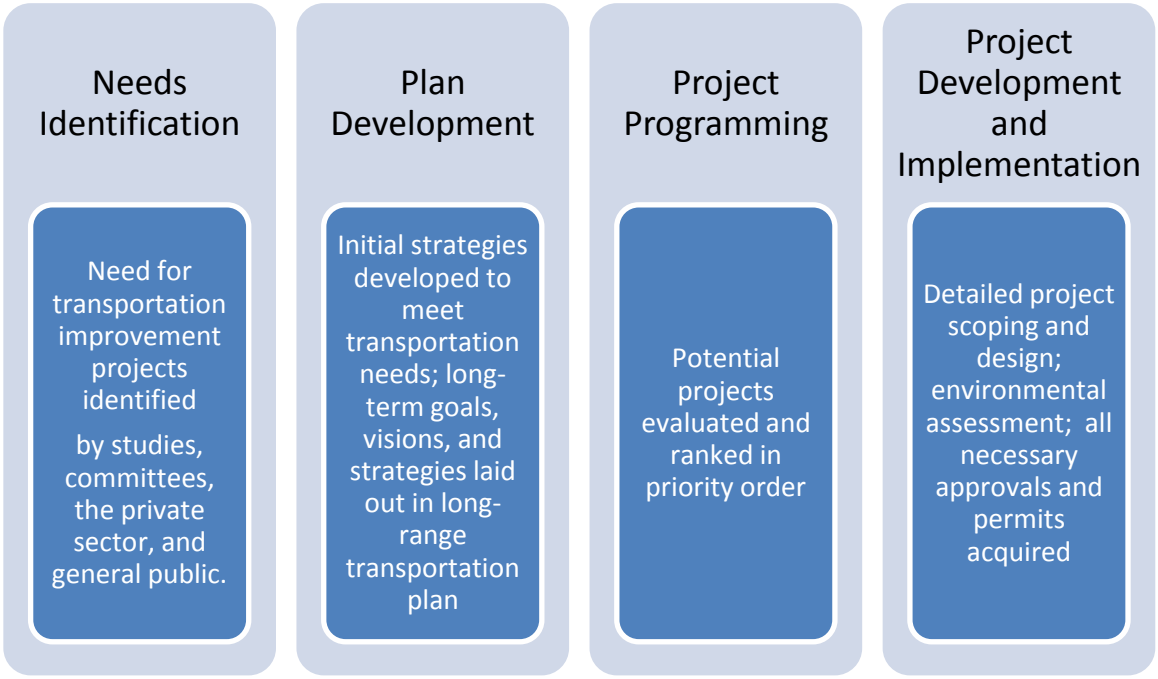
[4] Guidebook for Integrating Freight into Transportation Planning and Project Selection Processes National Cooperative Highway Research Program (NCHRP) Report 594; Cambridge Systematics, Prime Focus and Kevin Heanue; Transportation Research Board Washington D.C. 2007 pp. 5-6.

[5] Federal transportation legislation requires that a Metropolitan Planning Organization (MPO) be designated for each urbanized area with a population of more than 50,000 people in order to carry out the metropolitan transportation planning process, as a condition of Federal aid.

[6] Statewide Transportation Improvement Program (STIP) 2016-2019 Washington State Department of Transportation https://www.wsdot.wa.gov/LocalPrograms/ProgramMgmt/STIP.htm

However, many potential freight improvement projects have a difficult time entering, navigating, and surviving this process. Even in states and MPOs where freight is addressed within long-range planning documents, specific freight issues are not often integrated within other elements of the transportation planning and programming process. As a result, freight issues are not often translated into actual improvement projects that can be programmed, developed, and implemented. Lack of freight-specific data and tools, limited outreach to the private-sector freight industry, and institutional resistance to planning and implementing freight-specific solutions also make it difficult for freight improvement projects to be included in discussions of statewide or regional transportation priorities or to effectively compete for funds and planning resources.[7]



In the U.S., key challenges in integrating goods movement into mainstream transportation planning include:

- Limited Freight Data: Publicly available datasets, when used in isolation, often do not provide sufficient detail to conduct meaningful freight planning activities at the state or metropolitan levels; privately maintained freight databases are often costly to acquire and analyze. Unlike other transportation program elements, freight-related data often have not been fully integrated into ongoing data collection programs. Limited data can

[7] NCHRP 594, p.p. 5-6.

make it difficult for states and MPOs to fully understand freight trends and issues as well as the potential costs and benefits of freight improvement projects. In addition, although some agencies collect truck counts or conduct freight surveys, combining these sources to support transportation planning activities effectively can be challenging.

- Limited Private-Sector Participation: Many elements make up the "private-sector freight industry," including shippers/receivers, carriers, logistics providers, and others, and it can be challenging to effectively engage this diverse group. The private sector plans over a much shorter time horizon than the public sector and can quickly grow impatient with the public process. In addition, the private sector may be concerned about potential release of proprietary information if it participates in public processes.
- Limited Freight Expertise within an Organization. While most transportation planners hold advanced degrees in transportation or planning, few have formal training in freight planning, and few transportation decision-makers fully appreciate the complexity of national and international freight movements and their associated statewide or local effects. This is compounded by an agile private-sector freight community that reacts and responds to market and logistics trends and innovations quickly.
- Limited Institutional Support for Freight Planning: There remains some institutional resistance to spend time and resources on conducting freight planning activities and/or implementing freight improvement projects. There are very few examples of funding resources that are expressly dedicated to conducting freight planning activities. Rather, freight-related activities must fit within existing programs and responsibilities. Because this often involves the reallocation of existing staff and funding resources, building support among key transportation decision makers is critical to moving freight-specific projects forward. Limited funding resources are also a stumbling point to private-sector participation: it can be difficult to keep the private-sector freight community engaged if funds to implement improvement projects do not exist.[8]

In the U.S. a rigorous transportation planning process is imposed by federal legislation, and enforced by state and local dependence on federal funding programs. In Canada, freight planning is less advanced. This Regional Goods Movement Scoping Study represents the first step in integrating goods movement in HRM's new Integrated Mobility Plan: Needs Identification.

[8] NCHRP 594, pp. 22-23.

3 LITERATURE REVIEW SUMMARY

Current research on urban goods movements can be divided into two broad categories. One stream focuses primarily on freight movements, which include a broad range of industrial and large volume international, interregional and interurban freight flows. The other focuses on "last mile"[9] issues related to delivery for local consumption by businesses and consumers. As the scale of freight operations has grown, there has also been an enhanced focus on environmental impacts of goods movements, and on land use planning to mitigate the negative effects.

3.1 Freight Planning and Trade Gateways in North America

In the U.S., goods movement planning has focused primarily on large scale international, interregional and interurban freight flows.[10] Federal legislation requires states and Metropolitan Planning Organizations (MPO's) to provide reasonable opportunity for the public and interested parties, including "freight shippers" and "providers of freight transportation services" to participate in developing plans and programs.

The most prominent goods movement issues in North America have arisen in metropolitan regions serving as gateways or hubs for international trade. These include major port cities such as Los Angeles and Long Beach on the U.S. West Coast, New York and New Jersey on the U.S. East Coast, and Chicago which is a major hub for North American railway traffic.

Within Canada, these issues have been addressed at the federal level under the National Policy Framework for Strategic Gateways and Trade Corridors, with the objective of advancing the competitiveness of the Canadian economy through improvements to nationally significant transportation infrastructure.[11]

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[9] "The last mile (or miles) represents the final haul of a shipment to its end receiver, be it a shop, a business, a facility, or a home (in the case of home deliveries). Cities also experience first mile(s), as one-third of urban truck traffic is goods pickups. (In this report, both first-mile and last-mile trips will be referred to collectively as the "last mile.")" Synthesis of Freight Research in Urban Transportation Planning National Cooperative Freight Research Program (NCFRP) Report 23 Genevieve Giuliano, Thomas O'Brien, Laetitia Dablanc and Kevin Holliday; Transportation Research Board Washington D.C. 2013 p. 23.

[10] As an example, a recent TRB report on goods movement issues uses the terms "freight" and "goods movement" interchangeably. Guidebook for Understanding Urban Goods Movement NCFRP Report 14, Suzann S. Rhodes, Mark Berndt, Paul Bingham, Joe Bryan, Thomas Cherrett, Peter Plumeau and Roberta Weisbrod; Transportation Research Board Washington D.C. 2012 p. 2.

[11] National Policy Framework for Strategic Gateways and Trade Corridors http://www.canadasgateways.gc.ca/media/documents/en/NationalPolicyFramework.pdf

The Gateway approach was pioneered in BC's Lower Mainland by the Greater Vancouver Gateway Council (GVGC). The GVGC was formed in 1994, and in 1995 adopted the "Gateway" concept as a marketing and advocacy tool for improving the competitiveness of the Lower Mainland transportation system as a route for trade between Asia and North America. The GVGC has been very successful in lobbying for government funding for freight-related transportation improvements, and the Gateway concept was adopted by Transport Canada as a framework for policy development in Central Canada (the Ontario-Quebec Continental Gateway) and the Maritimes (Atlantic Canada Gateway and Corridor).

The Halifax Gateway Council, established in 2004, was modelled after the Greater Vancouver Gateway Council. It produced a Strategic Plan and Economic Impact Study in 2005. It also developed a program of work which it carried out over the next few years. It was quickly realized that Halifax's issues differed from those of Vancouver, which was concerned with congestion and an infrastructure deficit. Halifax had excess capacity in its system and sought to increase volume. Projects included the feasibility of an air cargo facility at Halifax International Airport and a regional distribution centre for the Atlantic region liquor boards. It also pursued an initiative to grow and enhance the gateway's fledgling container transload business and a section of Burnside Industrial Park devoted to logistics.

In addition to typical urban freight issues, trade hubs experience unique problems related to the scale of activity associated with freight flows:

> *A combination of rising trade volumes, demand for larger facilities, and the cost of land has pushed distribution centers and warehouses to the periphery of metropolitan areas. These facilities generate freight-related activity that may pass through the urban core on its way from ports and airports to markets outside the region.*[12]

The importance of trade hubs has increased due to technological innovations in transportation which have reduced transport costs and facilitated rapid increases in trade volumes. These have included containerization of cargo, and rapid growth in vessel size, with a consequent reduction in unit costs for container movements.

[12] NCFRP 23, p. 49

Trade hubs generate substantial local economic activity. An Economic Impact Study conducted for Port Metro Vancouver in 2012 found that on-going operations at the Port of Vancouver support 38,200 direct jobs representing 35,300 direct person years and contribute $3.5 billion in gross domestic product (GDP).[13] A similar study completed for the Port of Halifax estimated that in 2013 direct and spinoff (indirect and induced) impacts of port - related activities include $1.661 billion in economic output, $744 million in GDP and 11,820 full-time equivalent (FTE) jobs.[14]

In the Canadian context, trade hubs provide a critical service for exporters by providing competitive access to international markets.

Due to the highly developed state of North American transportation networks, trade hubs must compete with other gateways for substantial portions of their traffic. The competitiveness of trade gateways is dependent on a variety of factors, including:

- Location (distance from major freight origins/destinations by ocean transport).
- The local population base, which provides a market for imported commodities.
- The availability of export loads to balance inbound cargo flows.
- Cost and service quality of inland transportation.
- Availability of value-added services (warehousing, etc.).

This poses a challenge for local transportation planning.

> *The large trade volumes that confer a special status upon trade nodes also carry heavy social costs that include vehicle operations, congestion, increased accidents, environmental costs (including air and noise pollution), and increased infrastructure development and maintenance costs.*[15]

These impacts are particularly severe for cities with port facilities in close proximity to downtown areas. Container terminal operations generate large volumes of truck and rail traffic which can cause traffic congestion at both the local (i.e. in the vicinity of the terminal) and regional levels

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[13] 2012 Port Metro Vancouver Economic Impact Study – Final Report Intervistas Consulting Inc. May 31, 2013 http://www.portvancouver.com/wp-content/uploads/2015/03/2012-port-metro-vancouver-economic-impact-study3.pdf

[14] Port of Halifax Economic Impact Report Chris Lowe Group. Port of Halifax January 2015 p. 4 http://portofhalifax.ca/wp-content/uploads/2015/02/HPA-Economic-Impact-Report.pdf

[15] NCFRP 23 p. 51.

(for example through delays to vehicular traffic at level crossings). Growth in port traffic volumes and the need to expand marine facilities to accommodate ever-larger vessels, and increasing population densities in the urban core, heighten the conflicts. There are a range of options which have been employed in port cities around the world to mitigate impacts, including streamlining of port-related transportation operations, infrastructure investments to mitigate congestion, and relocation of port facilities outside of the urban core. The case studies which follow will highlight examples of approaches to planning and implementing these solutions.

3.2 "Last Mile" Urban Delivery Issues

Last-mile/first-mile strategies address local deliveries and pick-ups to or from businesses or residences.[16] This approach to goods movement is most prominent in Europe, where high population density and infrastructure limitations often result in traffic congestion and environmental problems. In North America, these issues are also prominent in the most densely populated cities such as New York and San Francisco.

Problems related to "Last Mile" issues are primarily related to traffic congestion and environmental impacts (noise and emissions) caused by commercial vehicle movements and parking. Potential strategies to mitigate these problems include:[17]

- Freight Forums: Formalized consultation processes with the freight industry, often called "Freight Forums," constitute one of the most successful strategies to deal with last-mile delivery issues.[18]
- Labelling or other certification programs for firms that demonstrate environmentally responsible behavior.
- Traffic, access and parking regulations, which may include route specific or area-wide truck bans, or be based on time windows, or vehicle characteristics.
- Off-peak deliveries to ease traffic congestion during peak daytime hours.
- Efficient loading/unloading areas.
- Zoning and building requirements for off-street deliveries, which can reduce congestion by reducing on-street deliveries.

[16] NCFRP Report 23, p. 23.
[17] NCFRP 23 p. 7.
[18] NCFRP 23 p. 24.

- Consolidation of shipments or “City Logistics” through initiatives such as urban logistics spaces and urban consolidation centers.

3.3 Environmental Issues

Trucks are a significant source of air emissions in metropolitan areas. Trade hubs may also experience significant emissions due to other modes as well, including marine vessels, rail locomotives and aviation activity. Concern over the global warming impact of CO_2 emissions has further focused attention on air emissions from freight transportation.

Strategies to mitigate environmental impacts include:

- Reduction of emissions through more stringent emission standards for trucks.
- Use of alternative fuels.
- Switching to low or zero emission vehicles (hybrid or electric) for urban deliveries.
- Mode shift to lower emissions options, particularly from truck to rail. This can include the use of on-dock rail yards at port terminals to eliminate truck trips to rail intermodal yards, or use of rail shuttles to transfer port-related activities to less densely populated areas.

In the U.S., the Environmental Protection Agency sets standards under the Clean Air Act for cities’ ambient air quality for six principal pollutants, which are called “criteria” pollutants.[19] Regulations require that areas in violation of standards (“nonattainment areas”) improve air quality and reach the standards by specific dates. This poses additional challenges for metropolitan regions which are found to be “in nonattainment”, because the regional transportation plan must demonstrate how air quality will be brought into compliance with the standards required by the Clean Air Act in order to qualify for federal funding programs.

3.4 Land Use

There are two major changes in goods distribution which have had major impacts on urban freight: decentralization and consolidation.

- Decentralization of distribution activities outside the urban core has occurred in response to growing land requirements and lower land prices. In some regions this has led to

[19] “Criteria pollutants” include particle pollution (often referred to as particulate matter), photochemical oxidants and ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. US Environmental Protection Agency https://www.epa.gov/criteria-air-pollutants

"logistics sprawl" and resulted in an increased number of truck trips to circulate and deliver goods within the region.[20]

- The availability of large parcels of land and low land prices in suburban or exurban areas has allowed firms to consolidate warehouse and distribution activities into very large buildings to take advantage of economies of scale.

With the rising importance of ecommerce, firms are redesigning their distribution networks to enable multi-channel marketing that integrates operation of their on-line and "bricks and mortar" stores. Stores are now serving as fulfillment centers, and retailers are also setting up local depots in large urban areas to "either cross-dock items shipped from larger e-fulfillment centers or to ship certain 'fast moving' products direct to customers." The trend of increasing direct deliveries to customers, along with rising population density in city centres, may exacerbate "last mile" problems in the future.

[20] Freight Transport, A Key for the New Urban Economy Laetitia Dablanc The International Bank for Reconstruction and Development / The World Bank Washington DC 2009 p. 44.

4 CASE STUDIES SUMMARY

Case studies for a number of port cities/regions have been developed as instructive examples for HRM. The examples were chosen on the basis of their relevance to HRM, including their roles as port gateway cities. They include six North American examples (Southern California, New York/New Jersey, Central Puget Sound, Metro Vancouver and Portland, Oregon), two European examples (Helsinki and Gothenburg) and two examples in Oceania (Auckland and Sydney). The case study analysis includes relevant examples of planning practices, congestion mitigation and environmental issues, land use, and “Last Mile” urban delivery issues.

4.1 Freight Planning

Current planning practices have been reviewed to identify typical steps in the planning process for the case study examples. This analysis draws heavily on the U.S. experience, where federal legislation requires states and Metropolitan Planning Organizations to include freight planning in their transportation planning process.

4.1.1 Freight Planning Jurisdictional Issues

In the U.S., freight plans affecting major metropolitan areas may include overlapping plans among state, regional (MPO) and city/county jurisdictions. Cooperation is required among the planning agencies due to the multijurisdictional scope of the transportation network. Where necessary additional plans may be developed for specific purposes with other stakeholders; for example, development of a Comprehensive Goods Movement Action Program for the New York - New Jersey Metropolitan Region (GMAP) has been jointly developed by PANYNJ and the New Jersey and New York Departments of Transportation.

In Metro Vancouver, the only Canadian case study, there is no comprehensive goods movement strategy in place. Planning for gateway-related infrastructure has been initiated by the private sector-led Greater Vancouver Gateway Council, with resources for more formal planning studies and infrastructure investments provided primarily by Transport Canada and the provincial government. Translink has developed a Goods Movement Strategy which focuses primarily on the regional road network under their jurisdiction.

4.1.2 Data Resources and Modelling

Data availability has been identified as a major constraint for goods movement planning. In the U.S., federal agencies collect, analyze and distribute a variety of data on freight movements, including freight origin/destination data from the Freight Analysis Framework developed by the

Bureau of Transportation Statistics (BTS) and FHWA; disaggregate freight origin/destination data from the Commodity Freight Survey; inland waterway traffic data from the U.S. Corps of Engineers; annual rail waybill sample data from the Surface Transportation Board; detailed data on airline operations including passenger volumes and fares from the Bureau of Transportation Statistics; and a broad range of other topics. In addition, there are multiple private sources for freight data, including PIERS which sells detailed data on U.S. port traffic and Transearch which can provide transportation statistics by country, state, business economic area (BEA) and county.

In Canada data on freight movements is extremely limited, and Statistics Canada confidentiality restrictions severely limit the data which can be publicly released.[21]

In spite of the abundance of data available on international and domestic freight flows in the U.S., it is not generally adequate for regional goods movement planning. Planning efforts rely heavily on locally gathered truck classification counts and surveys. For example, In Washington State the Washington State Department of Transportation collects traffic data through a network of Permanent Traffic Recorders including truck traffic classified into single, double and triple categories. In developing its Freight Master Plan, the Seattle Department of Transportation (SDOT) supplemented the State data by collecting truck volume data at more than 620 locations on certain arterials over a four-year period. The Puget Sound Regional Council maintains a regional land use/transportation demand model for forecasting and analyzing traffic patterns, including truck trips.[22]

In Metro Vancouver, Translink has undertaken region-wide truck classification counts with federal and provincial funding assistance in 1999, 2008 and 2015. The data has been used to update the regional EMME2 transportation demand model.

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[21] "Statistics Canada is prohibited by law from releasing any data which would divulge information obtained under the Statistics Act that relates to any identifiable person, business or organization without the prior knowledge or the consent in writing of that person, business or organization. … Data for a specific industry or variable may be suppressed (along with that of a second industry or variable) if the number of enterprises in the population is too low." This rule results in the suppression of data on passenger traffic for most small airports i.e. which are served by two or fewer air carriers.

[22] PSRC Travel Model Documentation (for Version 1.0) Updated for Congestion Relief Analysis prepared for Washington State Department of Transportation and Puget Sound Regional Council by Cambridge Systematics, Inc. et al September 2007 http://www.psrc.org/assets/1511/model_doc_final_.pdf

If necessary, freight (commodity) movements are generally estimated on the basis of truck counts and additional data which may be available from specialized origin/destination surveys from major freight generators (like ports), typical commodity distribution patterns, etc.

4.2 Congestion Mitigation and Environmental Issues

Container terminal operations generate large volumes of truck and rail traffic which can cause traffic congestion at both the local (i.e. in the vicinity of the terminal) and regional levels (for example through delays to vehicular traffic at level crossings). These impacts are particularly severe for cities with port facilities in close proximity to downtown areas. Growth in port traffic volumes and the need to expand marine facilities to accommodate ever-larger vessels, and increasing population densities in the urban core, heighten the conflicts.

Environmental issues are generally linked to congestion in goods movement planning. For most jurisdictions, improvements in environmental performance are seen as an important co-benefit of reducing congestion. For some jurisdictions, notably Southern California, environmental issues have become the driving force in shaping goods movement policies and investments.

There are a range of options which have been employed in port cities around the world to mitigate these impacts.

4.2.1 Streamlining of Port-Related Transportation Operations

A number of alternatives for mitigating congestion due to truck traffic at container terminals have been implemented in North America and around the world. These can include:

- The use of truck appointments, extended truck gate hours and financial penalties such as the PierPass fees in Southern California to shift truck traffic to non-peak periods.
- Off-dock storage of empty containers.
- Increasing “triangulation” of containers i.e. transferring empty containers directly from importers to exporters for reloading.
- More efficient load - matching at container terminals (i.e. ensuring trucks travel loaded both inbound and outbound).
- Regulation of trucker and terminal operator performance to ensure efficiency.

4.2.2 Infrastructure Investments

Infrastructure investments to reduce traffic and environmental impacts of port traffic typically include the following.

- Road Improvements - Road improvements to mitigate congestion and environmental impacts of port traffic may be made at either the local or regional level. Recent examples of improvements to local access roads include PANYNJ's program for design, construction and realignment of parts of five main access roads to marine terminals in the Newark-Elizabeth port complex; and the reconstruction of the I-5/Port of Tacoma Road interchange in the City of Fife to improve freight mobility to the port and reduce local travel times.[23]

- In some cases, major regional road projects are undertaken primarily to accommodate truck traffic. Examples include the I-710 Freeway reconstruction project in Southern California and the South Fraser Perimeter Road in Metro Vancouver.

- Rail Improvements - Rail improvements to mitigate congestion may include expansion of on-dock rail capacity to reduce local truck trips, or capacity enhancements through double tracking, etc. to improve the efficiency of rail operations. In recent years there have been major improvements in the Eastern U.S. rail networks to accommodate double stack container trains (Heartland Corridor and National Gateway projects).

- Inland terminals may be developed to divert truck traffic to less congested suburban or rural areas. These solutions are more prevalent in Europe than in North America, though recently there have been a number of new facilities developed to serve ports such as Savannah and Charleston in the U.S. The first successful inland terminal on the U.S. East Coast was developed by the Virginia Port Authority.

- Road-Rail Conflicts - Road-rail conflicts can be a significant source of traffic congestion due to the need for vehicles to wait for trains at at-grade crossings. There are three examples of major projects to mitigate these impacts among our case studies: the Alameda Corridor in Southern California; the FAST Corridor in Central Puget Sound (Seattle-Tacoma); and the Roberts Bank Rail Corridor in Metro Vancouver. Financing these investments can be a major challenge. The Alameda Corridor has been funded through bonds based on a revenue stream from user fees. The FAST and Roberts Bank

[23] I-5/Port of Tacoma Rd. Interchange Reconstruction Port of Tacoma
http://www.portoftacoma.com/sites/default/files/POT%20Road%20Interchange%201-Pager.pdf

corridors were planned and funded through a collaborative process among federal, state/provincial, regional and local governments and other agencies including ports.

4.3 Land Use

Land use issues for goods movement planning include those related to the port terminals, and the impacts of land availability and costs for port-related activity on regional transportation patterns.

Port operations (particularly in downtown locations) are often affected by encroachment of non-compatible land uses. Policy options range from restrictions on allowable land uses on the waterfront and reservation and protection of existing and future infrastructure corridors and buffer zones, to relocating port operations outside of the downtown core. In Sydney and Helsinki port operations were moved to less congested areas outside of the downtown; in Metro Vancouver port expansion took place through the construction of Roberts Bank 35 km south of downtown in a predominantly agricultural area.

Regional land use problems include the trends of decentralization and consolidation of distribution activities in very large distribution centres at the edge or outside of the metropolitan area. This results in increasing truck traffic transiting the regional road network with a concomitant increase in traffic congestion and air emissions. Options for mitigating these trends include measures to retain the local industrial land base (an ongoing issue in Metro Vancouver) and the redevelopment of brownfield sites for logistics uses similar to the PortFields program developed by PANYNJ.

4.4 “Last Mile” Urban Delivery Issues

Consideration of “Last Mile” urban delivery issues is more common in Europe than in North America due in part to higher population density in urban core neighbourhoods and physical infrastructure constraints. In North America the leader among large cities has been New York, which has the highest “Central City” population density in North America. NYDOT has undertaken a pilot project to promote off-hour deliveries which has shown promise in reducing congestion and truck travel times. For most other jurisdictions “Last Mile” urban delivery issues are generally managed at the local level through development of truck routes, loading zone protocols and zoning requirements.

	Freight Planning								Congestion Mitigation					Land Use	Last Mile
Area	Region/City	Population (Millions)	Container Traffic 2015 (000 TEU's)	National	State - Province	Regional	City	Other	Operational Streamlining	Roads	Rail	Short Sea Shipping	Road - Rail Conflicts	Port Land Use	Innovative Last Mile Programs
North America	Southern California	18.8	15,353	n/a	Caltrans	SCAG	LA County	Ports of LA, Long Beach	PierPass	I-710 Freeway reconstruction	Expanded on-dock rail and SCIG near-dock terminal		Alameda Corridor	n/a	
North America	New York - New Jersey	12.0	6,400	n/a	NYDOT	NYMTC	NYCDOT	GMAP		PANYNJ access improvements to Newark-Elizabeth and Howland Hook	PANYNJ ExpressRail	Cross-harbor ferry		Shift in port activity from New York to New Jersey	Off-hour Delivery Pilot Program, Delivery Windows
North America	Puget Sound	3.7	3,529	n/a	WSDOT	PSRC	Seattle	Ports of Seattle, Tacoma	Extended gate hours peak periods	Port of Tacoma Road/I-5 interchange	Expanded on-dock rail		FAST Corridor	n/a	Daytime truck ban in downtown Seattle; Recommendation to develop Urban Goods Delivery Strategy
North America	Norfolk	1.6	2,500	n/a	Virginia DOT; DRPT	HRTPO		Virginia Port Authority		Improved port access roads	Heartland Corridor; National Gateway	64 Express Barge Service			
North America	Metro Vancouver	2.5	3,054	n/a	n/a	GVGC - Translink	City Transp. Plans	Port of Vancouver	Truck appointments, night gates, off-dock storage	South Fraser Perimeter Road	Deltaport Road and Rail Improvement Program		Roberts Bank Rail Corridor	Port expansion to Roberts Bank 1970	n/a
North America	Portland	2.4	0	n/a	ODOT	METRO	Portland	Port of Portland			Portland Passenger-Freight Rail Speed Improvement Project				B-Line Delivery Service
Australia/New Zealand	Auckland	1.4	972	NZ Transport Agency	n/a	n/a	Auckland Council	Ports of Auckland	Truck appointments; Program to improve truck utilization (reduce empty moves)	East-West Connections Project	Inland terminals (Wiri, Longburn, Mount Maunganui, Northgate)			10 year window to plan relocation of port operations by 2030	
Australia/New Zealand	Sydney	5.0	2,200	National Land Freight Strategy	Transport for NSW	n/a	n/a		Port Botany Landside Improvement Strategy regulations		Port Botany Rail Line upgrade; Inland terminals (Cook's River, Enfield, Moorebank)			Port operations moved to Botany Bay starting 1979	
Europe	Gothenburg	0.9	900	Swedish Transport Administration	n/a	n/a	City of Gothenburg	Gothenburg Port Authority		Improved port access roads	Gothenburg Port Line double tracking			n/a	Local Freight Network
Europe	Helsinki	1.4	430	Finnish Transport Agency	n/a	n/a	Helsinki City Council	Port of Helsinki						West Harbour operations moved to Vuosaari 2009	

5 STAKEHOLDER ISSUES

The consulting team conducted extensive consultations to identify issues related to goods movements which are of concern to the public. Meetings were conducted in person and by telephone with commercial stakeholders involved in goods movement, public agencies and community organizations.

5.1 Stakeholders Consulted

5.1.1 Commercial Organizations and Public Agencies

Commercial organizations consulted included the two container terminal operators, Halterm and Ceres; Halifax Port Authority; Halifax Stanfield International Airport; CN Rail; shipping lines; shippers; and companies involved in trucking, courier and warehousing operations. The following issues were discussed:

- Firm operations (goods and/or services provided, employment levels, facilities, etc) and history.
- Goods transported within the Halifax Region by mode of transport, and major infrastructure and routes used.
- Goods transported into, out of, and beyond the region by mode of transport, and major infrastructure and routes used.
- Proposed expansion projects or new ventures.
- Current goods movement issues and challenges.
- Major local and global issues affecting their business.
- Opportunities for improving the efficiency of their transportation operations.
- Opportunities for improving the environment performance of their transportation activities
- (modal shift, etc.).

Public agencies consulted included Halifax Harbour Bridges, Nova Scotia Transportation and Infrastructure Renewal, Halifax Partnership and Halifax Gateway Council.

5.1.2 Other Stakeholders

The team also reached out to a group of stakeholders who may not be considered experts in goods movement or related transportation matters, but are nonetheless important stakeholders

in goods movement. This group of stakeholders included those who are formally or informally representing the interests of organizations, businesses, and individuals located either along the major goods movement routes or are otherwise impacted by truck traffic, related traffic congestion, and routing of traffic in response to congestion avoidance strategies (either formal detours or ad hoc driver responses to congestion.

Interviews were conducted with stakeholders from a number of public associations, including:

- The Halifax Chamber of Commerce, representing business interests of a variety of businesses from across the region;
- The Ecology Action Centre, which is working in active transportation and related areas to encourage more active transportation;
- The Halifax Urban Greenway Association, representing those who are seeking to utilize the perimeter around the rail cut as part of a larger active transportation system;
- Communities and Residents for Sustainable Transportation (CREST), a south end community group that advocates commuter and freight rail solutions in the “rail cut”;
- Selected Developers, contacted as representatives of the overall development community;
- The Downtown Halifax Business Commission, representing businesses in the urban core;
- The Spring Garden Road Merchants Association, representing largely retail interests in and around Spring Garden Road; and
- Waterfront Development Corporation Limited, which has a variety of interests and projects in development.

Interviews were conducted though a mix of in-person meetings and telephone-based interviews, depending on the availability and convenience of the individual participants. In some cases, several individuals from a single organization would participate in the interview. All interviews were consistently structured with the consulting team providing a brief overview of the study purpose, its fit within the overall Integrated Mobility Strategy. This was followed by an open and informal discussion on the mandate and mission of the particular organization and their views on the impacts of goods movements, and the range of potential traffic solutions.

All interview participants were assured that their responses would be presented in an aggregated summary format, without attribution. While we have maintained this commitment, some of the emerging themes are able to be associated with the known views of the organizations noted above.

All interview participants recognized the importance of goods movement and related truck traffic and its linkage to port activities, trade, and commerce. This activity is recognized as supporting the supply chain that has developed around this industry and the employment and economic impacts that are being contributed. This recognition applies to port traffic, as well as local pick-up and delivery traffic.

Members of the development community seem to recognize that, at least in the short term, they are part of the problem of traffic congestion in downtown Halifax. During construction periods, project sites can tie up traffic with deliveries of equipment and materials and consume street lanes during excavation and / or for staging areas during the building process. Form work can also shut down traffic for safety reasons, as forms are lifted over roadways. Once construction is over, however, the truck traffic impacts the development over the longer term.

Both residential and commercial tenants are impacted by congestion and noise to the point that the development community is noting individual decisions concerning spaces to occupy are impacted by road noise. Spaces further away from the road are in higher demand relative to those that are closer or overlooking roadways.

A number of interview participants highlighted the need to have transportation solutions that are supportive and encouraging of active transportation throughout the urban core. The development community noted the importance of active transportation to downtown Halifax's growing residential community. Others speaking from a health perspective and from an environmental perspective noted the need to support and develop active transportation to further these respective agendas. These groups also highlighted the incompatibility between goods movement and commercial truck traffic and the safety and relative comfort of users of active transportation routes.

5.2 Port-Related Truck Traffic in Downtown Halifax

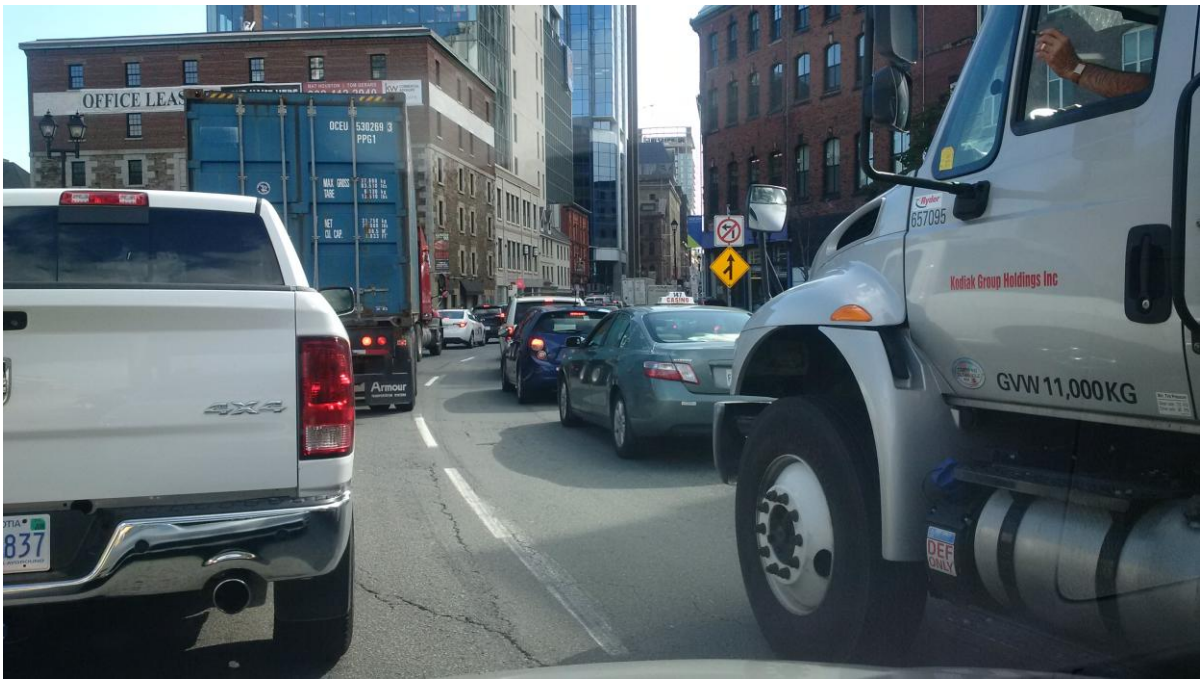
The issue most often identified by both commercial and community organizations is container truck traffic transiting downtown Halifax to and from Halterm.

5.2.1 Commercial Organizations and Public Agencies

The major problems which were mentioned by commercial stakeholders include:

- Traffic conflicts between container trucks, cars, bicycles and pedestrians in the downtown core. This is exacerbated by on-street parking, road closures due to construction and snow clearing activity which reduces the usable width of streets in the winter.
- There is a perception that the large volume of container trucks transiting downtown represents a safety hazard.
- Environmental impacts including noise and vibrations from heavy truck traffic. These impacts are expected to become more acute due to the surge in development of residential properties in downtown Halifax.

Traffic Congestion – Hollis Street



Source: James Frost

Commercial stakeholders using Halterm expressed concerns about the impending demolition of the Cogswell interchange and the potential disruption to cargo flows. One shipping company receives more than 50% of its cargo on Friday and cannot withstand long delays, or it will lose market share to another gateway.

There was also some concern regarding proposed street designs for replacement of the Cogswell Interchange, and the potential use of roundabouts. Truckers dislike roundabouts as they require them to use two lanes and cut off traffic on the inside lane.

Recent changes to incorporate bike lanes on Hollis St. and parking on Lower Water Street are not popular with the trucking industry. They are viewed as slowing down the movement of traffic and making courier deliveries difficult on both streets.

Halifax snow clearing is viewed as inferior to other cities with similar or greater snowfalls. Downtown Halifax streets become progressively narrower as the winter goes on, creating issues for both trucking and urban delivery.

A number of potential solutions were suggested. However, many commercial stakeholders emphasized the importance of avoiding additional transportation and handling costs for container traffic at the Port of Halifax to maintain competitiveness against competing trade gateways.

There have been several past studies on the use of the rail cut as a substitute for downtown routing of trucks, either through shifting the truck traffic to rail or through construction of a truck route through the rail cut. Many commercial stakeholders favoured the use of the rail cut.

It was suggested that a truck route in the CN rail cut could be used in one or both directions. Hollis St. could be used inbound and the rail cut could be used outbound, or, traffic could alternate morning and evening, similar to what is done on the Macdonald Bridge, Chebucto Road and Herring Cove Road between the Armdale roundabout and Purcell's Cove Rd. Some advocated a one or two-way truckway, while others believe a rail shuttle to either Fairview Cove or Burnside would be preferable. One stakeholder suggested taking advantage of federal infrastructure funding to build a two-way truckway in the railway cut, with no cost to use it.

A number of truckers and shippers suggested the container terminals open earlier and stay open later to smooth out deliveries and alleviate traffic on downtown streets at peak times.

Access to the Ceres terminal is uncongested compared to Halterm. Some stakeholders suggested concentrating container traffic at Ceres, though most were aware that this is not practical because Ceres cannot handle large vessels due to air draft restrictions under the

bridge. Most were aware that talks between the Haltern and Ceres terminal operators are under way, and many expressed concern over potential increases in downtown truck traffic if more traffic is concentrated at Halterm.

Many commercial stakeholders suggested that the long term solution is to construct a new container terminal across the harbour outside the downtown core.

5.2.2 Other Stakeholders

Truck traffic in the downtown area was also an issue for these groups, and as with commercial stakeholders the level of concern over truck traffic in the downtown appears to be heightened in view of the Cogswell redevelopment and apprehension over the potential slowing and re-routing of both inbound and outbound truck traffic. This concern was amplified as a result of media reports (which have since been corrected) that indicated HRM-planned truck diversion during the entire construction period would impact routes in the south end and mid-town Halifax streets.

There is a strong sense that current levels of truck congestion on lower downtown streets already have the effect of pushing traffic into upper streets, as private and smaller commercial vehicle traffic seek alternative routes to avoid areas around Hollis and Lower Water Streets.

One developer has written into leases a clause wherein the lessee must sign to acknowledge they understand that there are trucks associated with nearby commercial properties, as a means to insulate themselves from the liability of tenants seeking compensation / adjustment after the fact; notably, this clause is now the norm for at least some of the developers.
Stakeholders we spoke with seemed to have a high awareness of the possible solutions that had been offered over the years, some commenting that solutions are by now, well studied. Ultimately, the options that were offered were repetitive of what has been discussed to date:

- Cross harbour truck ferry;
- Steel wheels in the rail cut with containers;
- Steel wheels in the rail cut with drive-on live loads (Trailer on Flat Car or drivers in a passenger cab);
- Development of a truck route in the rail cut – two-way or one-way / in / out;
- Use of an inland terminal;

- Expand Ceres;
- Move container terminal(s) to Eastern Passage/Shearwater;
- 3rd Bridge across the harbour;
- Tunnel under the harbour;
- Operating changes (time of day);
- Fees or restrictions for trucks in downtown;
- Status Quo – let the traffic build, truckers face the associated challenge, and allow industry to find a solution.

Solutions which emerge as popular or unpopular are dependent on the groups being consulted: greenway advocates see expanded use of the rail cut as undesirable. Active transportation stakeholders see use of the downtown streets as less attractive to solutions that provide separation of active transportation participants and trucks. Both greenway and active transportation supporters are worried that their efforts to advance their agendas to date will be undermined by any one of a number of potential options that either continue to see active transportation users and trucks using the same corridors without adequate separation and/or take up routes that these groups see as vital to their plans going forward.

Uneasiness over traffic increasing due to the terminals merger led some interview participants to suggest that Ceres should become the favoured point for consolidation.

The stakeholders most consistently embraced the “move the terminal to Dartmouth/Woodside”, citing the valuable waterfront land that would be made available as a result, the industrial use being more compatible with the Woodside area, and the benefit to downtown and traffic levels on peninsular Halifax. Use of existing Infrastructure was also seen as an important component of the solution, wherein new investment is kept to a minimum and existing assets like the rail cut are more fully leveraged. In this regard, the solution includes using the rail cut as a passenger route which, at least among some interview participants, seemed to be more appealing than its uses in moving container traffic.

Globally, stakeholders recognize that there are many players and that cooperation leading to an ideal solution will be challenging. Some suggested that the solution may need to be forced, with

a benefit/cost analysis leading to a mechanism whereby those that benefit can compensate those with greater costs as a result of the solution.

5.3 Other Choke Points in the Road Network

Volume at Autoport in Eastern Passage has grown substantially over the past 4-5 years, where it now handles about 225,000 vehicles per annum. With capacity to store about 15,000 vehicles, it does about 15 turns of its inventory per year. With 3-5 ships per week (not counting Oceanex's weekly call), it depends on a smooth and efficient operation. Vehicles are initially stored in the compounds next to the dock and are later moved across Pleasant St. into longer term storage. We have heard anecdotally that school crossing guards are sometimes required to facilitate this process.

The Fairview Cove terminal has good access from Dartmouth via the MacKay Bridge, and from the south shore via Highway 102 and Joseph Howe Dr., although commercial stakeholders mentioned exiting the terminal and getting back onto Joseph Howe can be difficult for oversized cargo, such as that sometimes carried by ACL's con-ro vessels.[24]

5.4 "Last Mile" Urban Delivery

With the planned work on Cogswell, and the potential consolidation of port traffic at Halterm, there is a sense among the business community that Spring Garden Road and other core areas of downtown Halifax will be impacted with congestion even more than is currently the case. Even at current levels, the traffic is causing an increased interest in exploring 'time-of-day' restrictions on local deliveries to form at least part of the solutions. With the potential influx of Ceres traffic and the potential impact of Cogswell, there is a 'perfect storm' of effects that are contributing to a readiness to engage in solutions that might otherwise be difficult to implement.

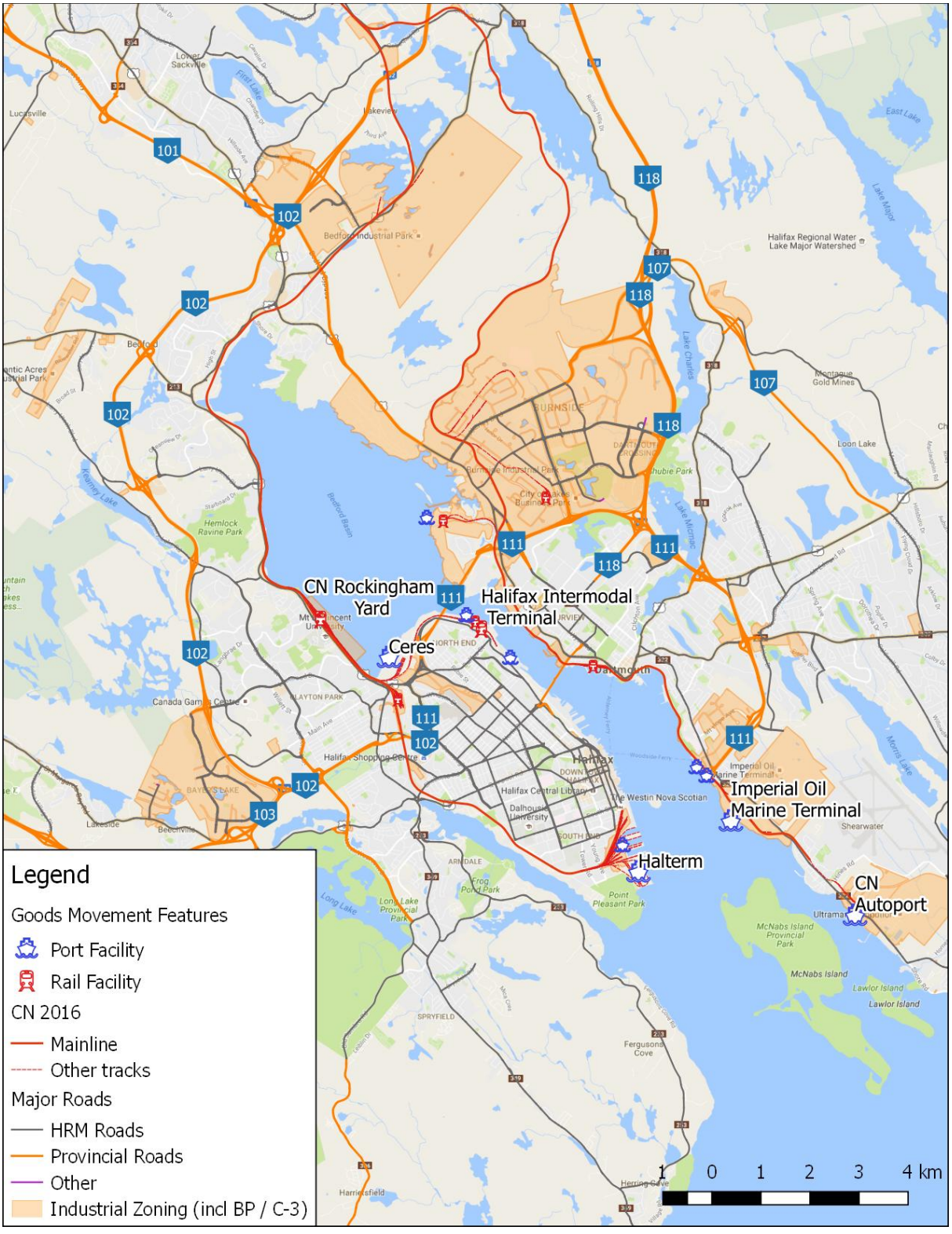
One trucking company indicated that they mounted a campaign to convince local shippers to accept deliveries in off hours; however, they were unsuccessful in this regard.

[24] A "con-ro" vessel handles both containerized and roll on/roll off (RO/RO) cargo.

6 CURRENT GOODS MOVEMENT SYSTEM IN HRM

The goods movement system in Halifax Regional Municipality encompasses the road and rail systems, port terminals, and logistics facilities located in industrial areas throughout the region.

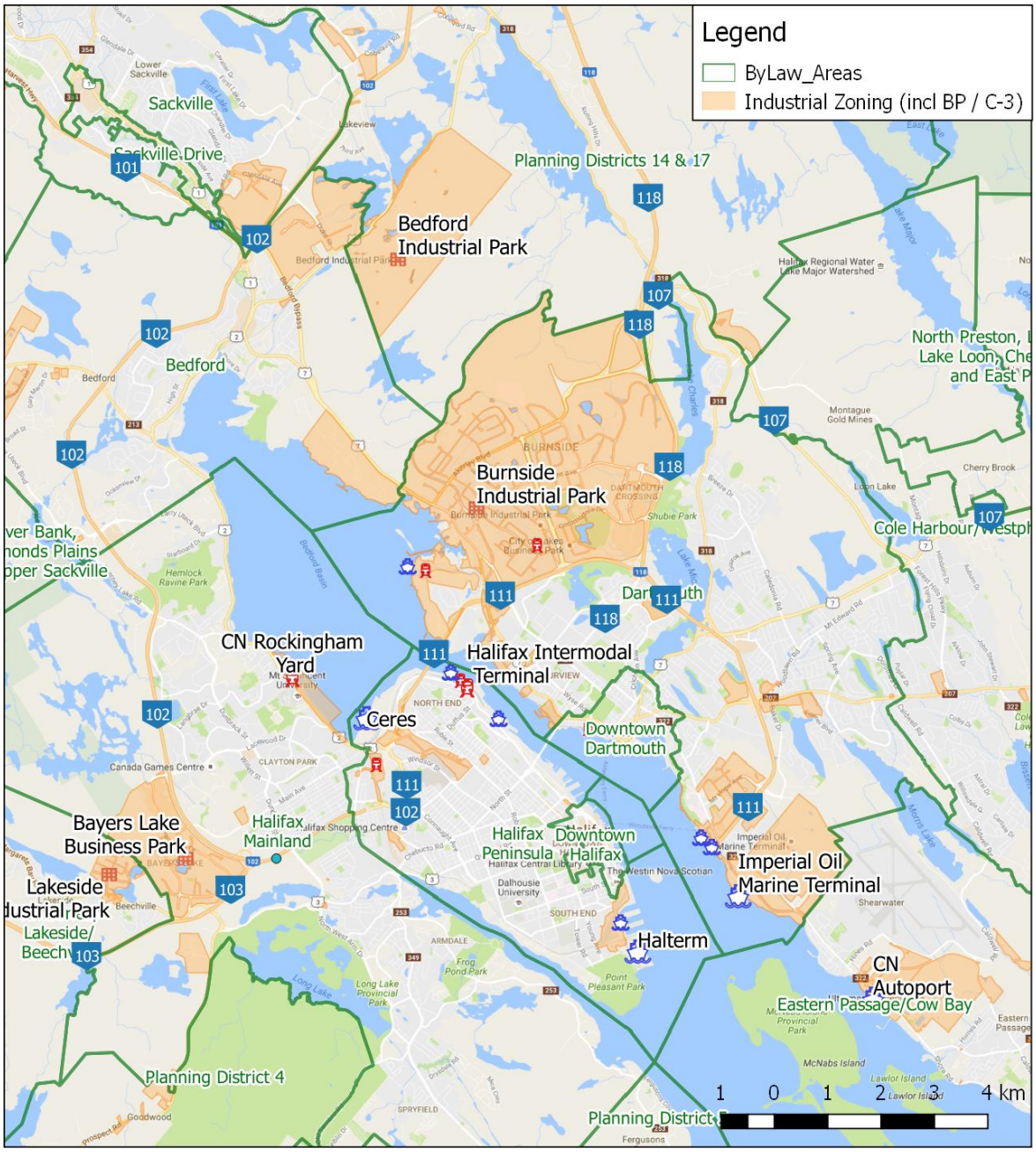
HRM Goods Movement System



Land Use

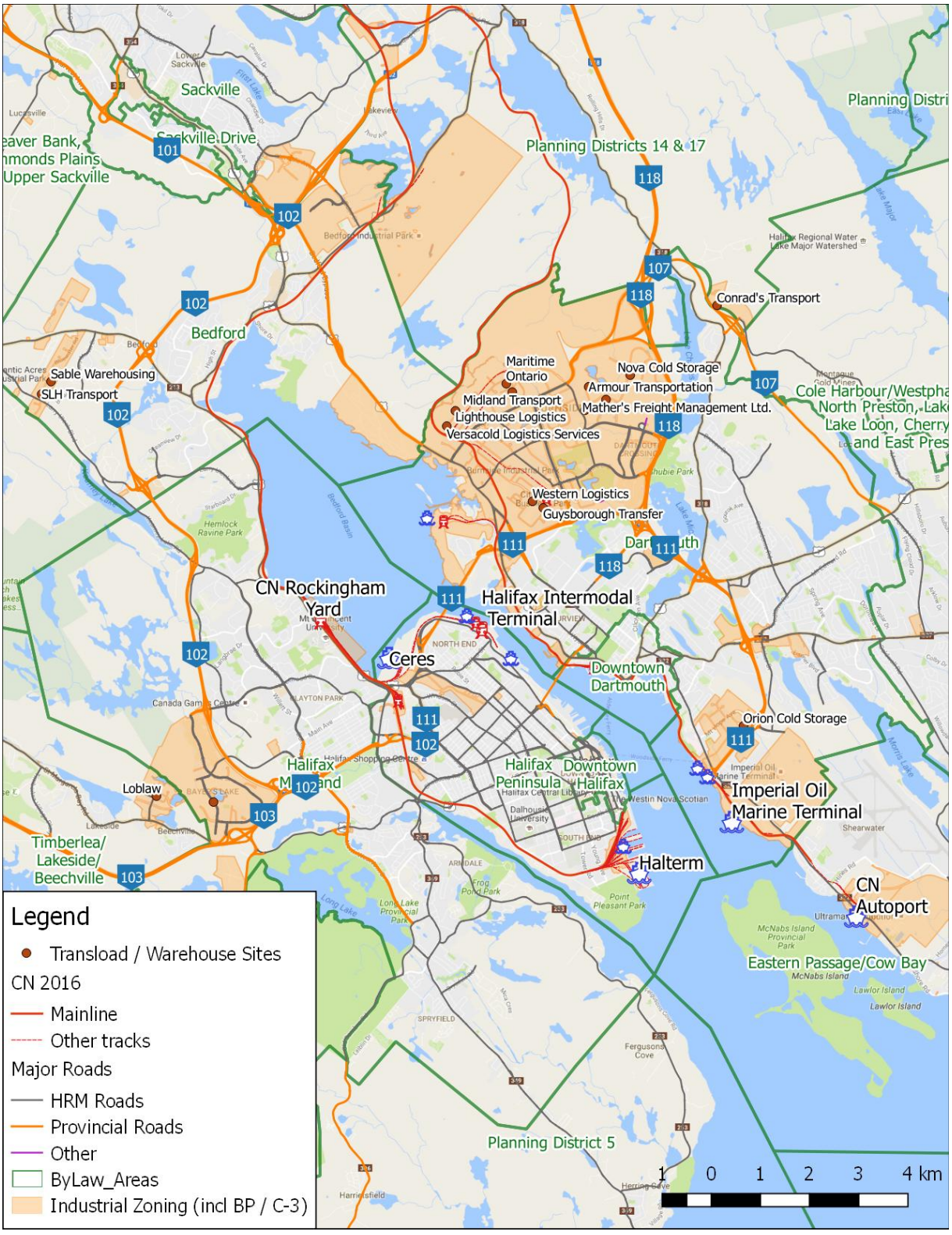
The regional goods movement infrastructure includes logistics facilities located in industrial areas throughout the region. Industrial zones and major business parks are highlighted in the map below. Approximately 80% of the areas zoned for industrial use (including C-3 zoning) are located in Dartmouth, Burnside, Bedford or other communities on the east side of Bedford Basin / the Narrows. Burnside is by far the largest business or industrial park in HRM. Indeed, at 3,400 acres it is the largest such park north of Boston and east of Montreal. It is home to 1,500 enterprises and more than 30,000 employees work there.

HRM Industrial Zoning



The locations of logistics facilities associated with port traffic are depicted below. Most of these facilities are located in the Burnside Industrial Park or adjacent areas.

HRM Transload Facilities



A large percentage of local port drayage takes place to and from Burnside and the shipping terminals on the Halifax side. Most trucking firms and their warehouses are also located in Burnside, with the exception being Conrads Transport, which is just across Highway 118 from Dartmouth Crossing (Clarke Transport recently closed their terminal in Bayers lake and now make extensive use of Armour Transportation's facility in Burnside).. Other areas with significant warehousing and truck movements are Lakeside (Loblaws) and Atlantic Acres (Micco) and SLH (Sears). NSLC has their own warehouse at the Highway 103 entrance to Bayers Lake, as well.

Historic data are not available, but from 2007-2012, 33% of land sales were in the warehousing, transportation and logistics sector, followed by commercial/ wholesale (15%), and manufacturing and fabrication (14%).

When the container transload sector began to take off after 2004-05, an area of Burnside was set aside to cater to this business and branded the "Halifax Logistics Park". Streets and corners in the new sections of the park have been designed to accommodate long combination vehicles.

Distribution and warehouse activity takes place throughout the park, in older sections as well as newer ones. CN also has a "team track" on MacDonald Ave, where it handles box cars and other types of rail cars carrying forest products and other material.

A 2014 Transport Canada study identified several areas around Burnside that are prone to congestion. These include highway 111 and Burnside Dr., Wright Ave and Windmill Rd. and Akerley Blvd and Windmill Rd at the foot of Magazine Hill.[25]

6.1 Road System

Responsibility for road infrastructure and maintenance in HRM is shared between the Municipality and the Province. HRM is responsible for local, collector and arterial roads. The Province is responsible for highways and, through Halifax Harbour Bridges, maintains and operates the Macdonald and MacKay Bridges.

The 100 Series highways within HRM are nearly all divided limited access freeways with two lanes in each direction. They define the major growth corridors within the region. The major roadways are as follows:[26]

[25] Metro Halifax Truck Mapping and Analysis CPCS for Transport Canada April 7, 2014.

- Highway 103 – Parallels the coast from the west of Halifax, south of Timberlea/Lakeside/Beechville, through Tantallon to Hubbards.
- Highway 102/Bicentennial – Connects Halifax to Truro and areas to its west to the border with New Brunswick. It also carries the bulk of traffic from areas between Truro and HRM and from Bedford- Sackville into western Halifax.
- Highway 101 – Provides further connection from the 102 north to the boundary between HRM and East Hants from which it continues to the Annapolis Valley. It is the primary carrier of commuters to the metro area from Windsor, Wolfville, and Kentville, as well as from Upper Sackville.
- Highway 107 – Intersects with Highway 118 east of Bedford connection from Dartmouth to the Eastern Shore. Unlike Highways 101 and 102, Hwy. 107 is almost all undivided. There is a gap between the Forest Hills Extension segment of Hwy. 107, and the Eastern Shore segment of Hwy. 107. It ends at Musquodoboit Harbour at which point the more traditional Highway 7, a two-lane, undivided roadway running through communities of the area provides the primary eastward route.
- Highway 118 – Provides a connection between Highway 102 and the Circumferential Highway (Hwy. 111), as well as the Forest Hills Extension segment of Highway 107, and secondary access to the eastern portions of Burnside and City of Lakes Business Park, as well as Dartmouth Crossing.
- Highway 111/Circumferential – Provides a ring road around the core of Dartmouth through which users can move quickly between major points such as Burnside Industrial Park, Dartmouth Crossing, Portland Street, Morris- Russell Lake, and Woodside.

Trucks are allowed on all provincial highways subject to standard regulations related to vehicle weights and dimensions. Municipal truck routes are designated in HRM By-Law No. T-400. For purposes of the bylaw, a truck is defined as “a motor vehicle designed, used or maintained primarily for the transportation of goods, material or property, and weighing more than three thousand kilograms (3,000 kg) according to the registration certificate of the vehicle”. Designated truck routes are shown below.

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[26] Source: Quantifying the Costs and Benefits of Alternative Growth Scenarios Stantec Consulting and Gardner Pinfold Consultants for HRM April 2013 p. 54.

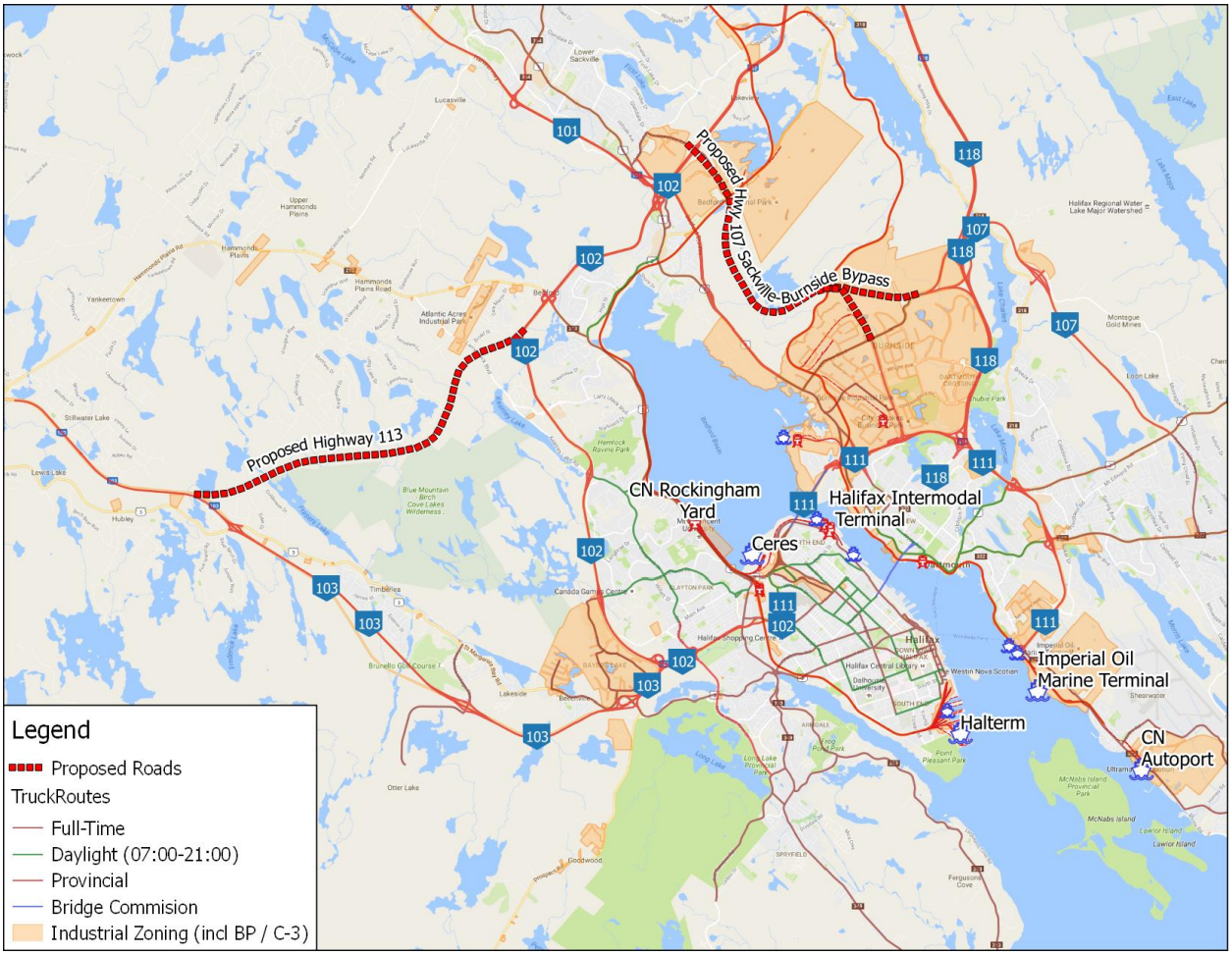
Regional Truck Routes

Halifax Peninsula Truck Routes

One of the projects discussed and proposed for funding is an expressway connecting Burnside Dr. with Highway 102 and Cobequid Rd. in Sackville. Negotiations are still underway between various parties including NS TIR, DND and adjacent landowners. This highway is designed to alleviate much of the congestion at the foot of Magazine Hill, and provide better connections between Burnside and Highway 101 to the Annapolis Valley and 102/103 to the South Shore. It will also be an alternative for accessing Highway 102 towards the airport.

The Province has also proposed building a new 9.9 km 100-series highway linking Highway 103 at Hubley with 102 at Hammonds Plains Rd. This would allow vehicles travelling between the South Shore and the airport / northern Nova Scotia and New Brunswick to avoid congestion in the Bayers Rd./ Bayers Lake / Lacewood Dr. area. Construction does not appear imminent, however, as the project is not listed in the Province's current 5-year highway plan.

Proposed Highway Projects

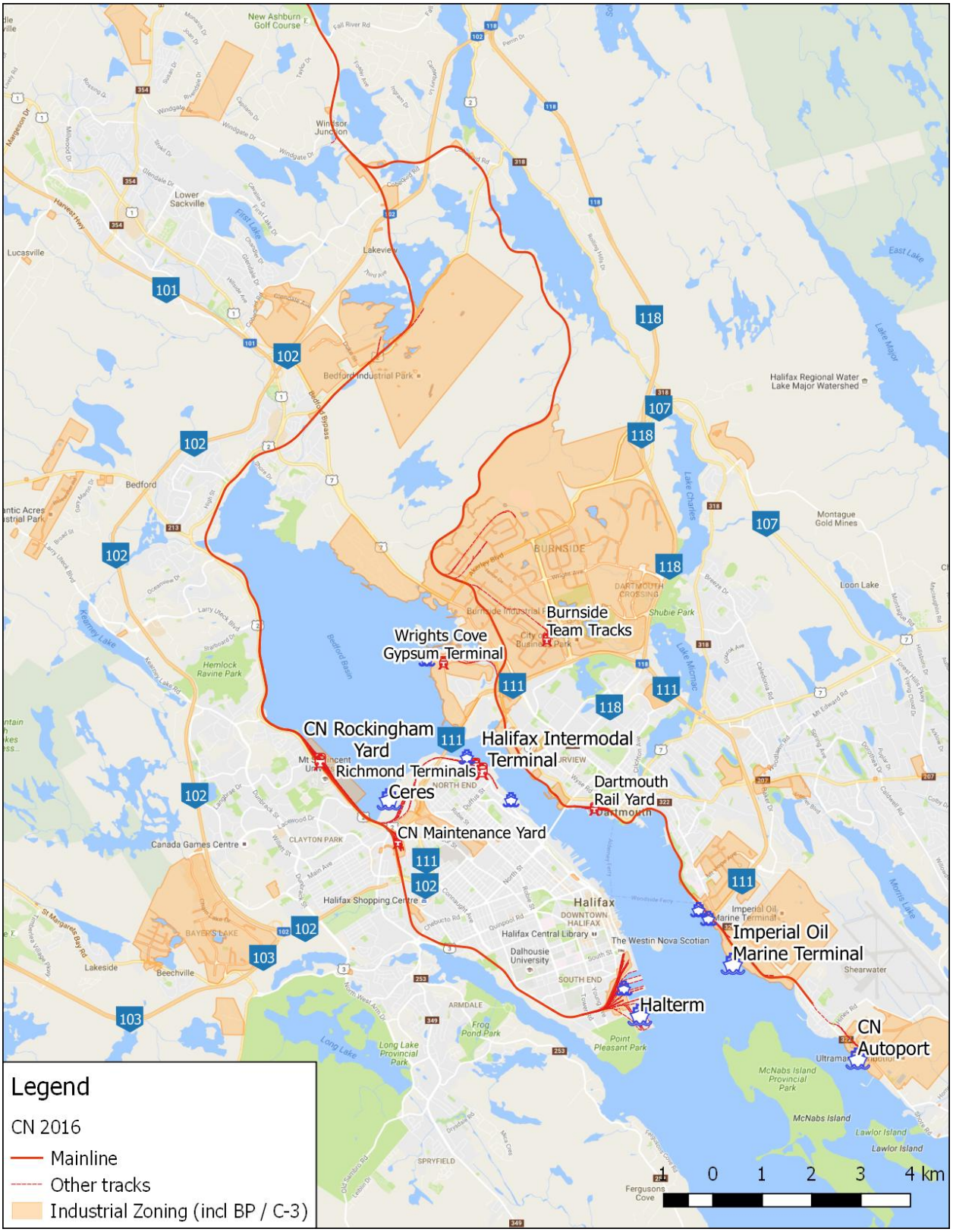


6.2 Rail System

Halifax serves as the eastern terminus for CN train operations. The Bedford Subdivision covers the local route between Truro and Halifax. Heading east toward Halifax the Dartmouth subdivision branches off at Windsor Junction (mi. 15.8) thereby providing a connection between the CN mainline and Dartmouth.

Continuing into Halifax on the Bedford Subdivision from Windsor Junction, over 95% of the freight rail traffic consists of containers bound for the port terminals of either Ceres or Halterm. Originally, this section was a two track mainline between Halifax and Windsor Junction.

CN Rail


Legend
CN 2016
Mainline
Other tracks
Industrial Zoning (incl BP / C-3)
Wrights Cove Gypsum Terminal
Burnside Team Tracks
CN Rockingham Yard
Halifax Intermodal Terminal
Richmond Terminals
Ceres
Dartmouth Rail Yard
CN Maintenance Yard
Imperial Oil Marine Terminal
Halterm
CN Autoport
0 1 2 3 4 km

Frequent trains plus slower speeds owing to the heavy 1.5% ruling grade between Bedford (mi. 9.5), (elevation 5 M) up to the Rocky Lake quarry (mi. 12.7) (elevation 60 M), provided the impetus for double tracking this section. In 2004 a hurricane washed out a section of one of the 2 tracks near Bedford, which resulted in CN removing the second main track from mileage 7.0 to Windsor Junction. There is still the ability for trains to pass in the section since the Halifax Transfer Track (formerly the second main track), runs as an additional track between mileage 4.5 and mileage 7.0 through Rockingham yard.

The mainline continues from Rockingham through the cut toward Halifax, and is designated the HOT-Rock Connecting track. CN removed one of the two main tracks several years ago in the cut, leaving only a second yard service track between Marlborough Woods and Halterm/Ocean Terminals/Via Rail and between Bayers Rd. and Rockingham. The Deepwater Branch diverges at Fairview Junction (Mile 5.0) from the mainline, connecting the CN domestic intermodal terminal (Halifax Intermodal Terminal).

The CN Dartmouth Subdivision descends eastward from Windsor Junction, passing under Highway 102, and by the community of Waverly, dropping down toward Lake William and then climbs toward the Burnside Industrial area. It finally descends to the Bedford Basin and downtown Dartmouth. The Dartmouth Rail Yard is located in prime downtown real estate at the waterfront and is used as a support track for various industries but primarily as a holding area for empty auto rack railcars waiting to load imported automobiles at the CN Autoport facility east of downtown, at the end of a branch line extending southeast from Downtown Dartmouth to Shearwater.

Major rail yards in Halifax on the Bedford Subdivision include:[27]

- South End Container Terminal (Halterm)
- Fairview Cove Container Terminal (Ceres)
- Halifax Ocean Terminal (CN Rail marshalling yard)
- Rockingham Yard
- Halifax Intermodal Terminal

[27] Source: Commuter Rail Feasibility Study Final Report Prepared for Halifax Regional Municipality by CPCS et al August 31, 2015 pp 9-10.

- Fairview Maintenance Facility.

Major rail yards and facilities in Halifax on the Dartmouth Subdivision include:

- Dartmouth Yard
- Wright's Cove Gypsum Terminal (owned and operated by National Gypsum Company)
- Autoport (owned by CN Rail and operated by Autoport Limited)
- Burnside Industrial Park includes a network of non-mainline tracks servicing local industries, a common use yard and a small marshalling yard.

A recent study noted that there has been no growth in rail traffic in recent years, and this trend is not likely to be reversed. However, the number of trains has been reduced and they have become longer. As an example, less than 10 years ago, CN departed three intermodal trains daily from Halifax (two with international traffic from Ceres and Halterm and one from the CN Halifax Intermodal Terminal. It now departs one train daily composed of both domestic and international container traffic.[28]

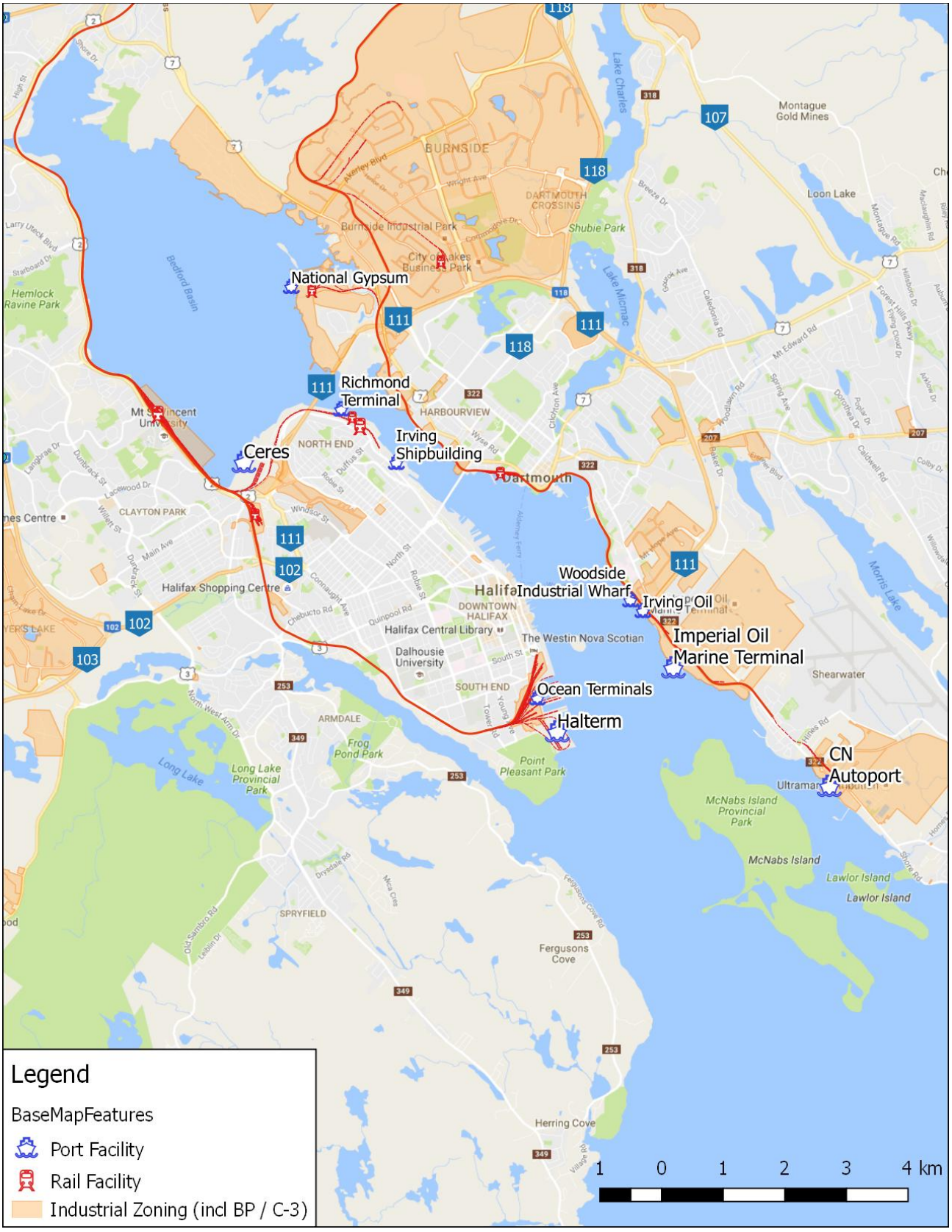
6.3 Port Terminals and Operations

Halifax Harbour is the second largest natural harbour in the world and is the location of numerous terminals and facilities which impact urban goods movement. These include facilities owned or leased by the Halifax Port Authority as well as private facilities. The Port Authority only controls 258 acres (104 ha), while other significant landholdings are owned or controlled by DND, Irving Shipbuilding, National Gypsum, CN and the Province.[29]

There are a myriad of cargo-handling facilities on Halifax Harbour, but the main ones affecting urban goods movement are profiled below.

[28] Ibid., p. 23.
[29] See Gardner Pinfold (with MariNova and Cantwell, "Economic Potential of HRM and Halifax Harbour", HRM, May 2004.

Halifax Marine Facilities

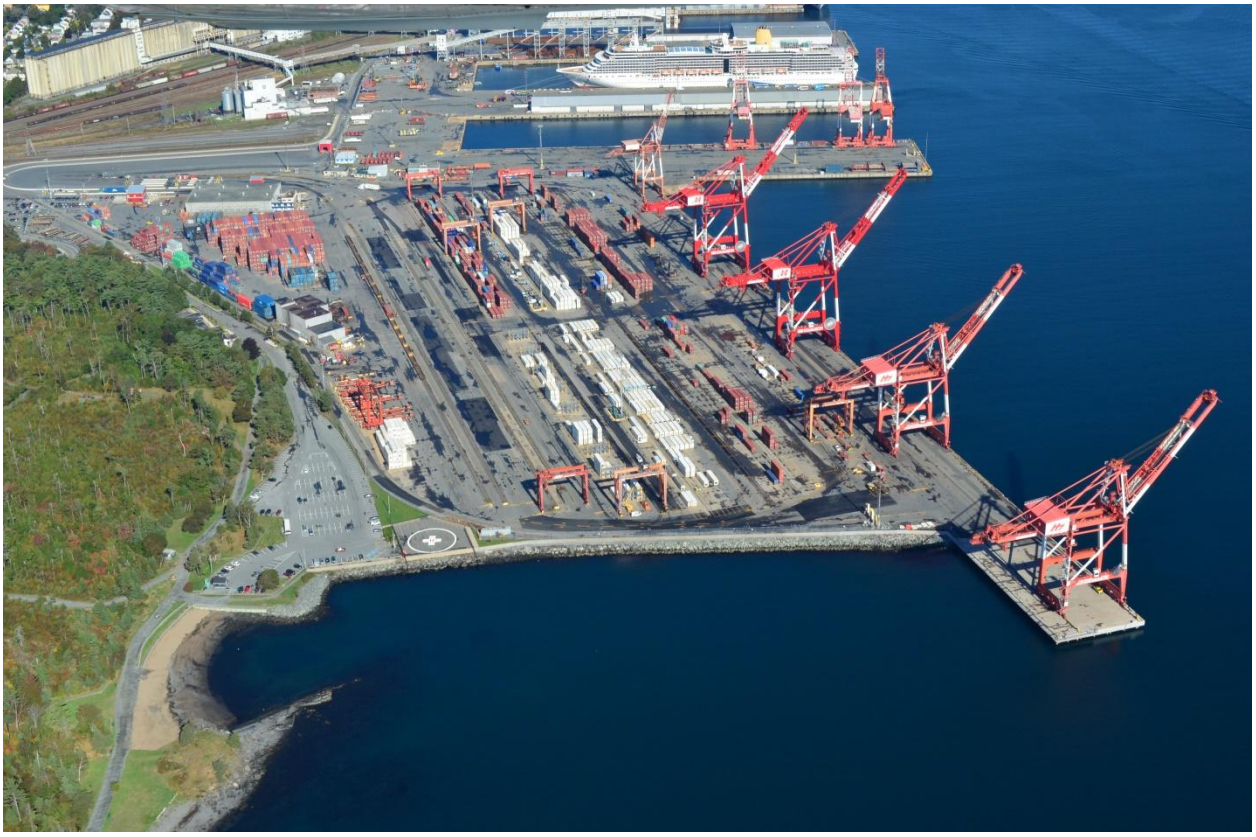


6.3.1 South End Container Terminal (Halterm)

Halterm opened in 1969 and was the first common user terminal built in Canada. It was purchased by Macquarie Infrastructure Partners in early 2007. The facility now comprises 74.5 acres (30.2 ha), 5 berths comprising 4,059 feet (1,237 m) of dockage, and 7 cranes (including 4 post-Panamax units). It also has 3 ramps for roll-on, roll-off (ro-ro) cargo and is equipped with 485 in ground plugs for refrigerated (reefer) containers. Total capacity, according to HPA's web site is 750,000 TEUs. It has 8,000 ft. of on-dock, double-stack rail, equivalent to 320 TEUs. Depths on the main berth are 53 ft. (16.2 m), while the others range from 45-46 ft (13.9-14.1 m).

A $35 million, extension to Halterm was completed in 2013, with $17.5 million provided by the federal Gateway and Border Crossings Fund. It included a state-of-the-art truck marshalling yard and gate facility, as well as extending the main berth 80 m x 45 m, providing 666 m (2,186 linear feet) of dockage. Current 8,500-9,300 TEU post-Panamax vessels measure about 335 m in overall length and the facility cannot accommodate two at one time, without overextending beyond the southern tip of the berth.

South End Container Terminal (Halterm), with extension



Source: Halifax Port Authority

Halterm's current roster of shipping line clients includes:

- Oceanex (weekly container and ro-ro service to St. John's, Newfoundland & Labrador)
- TMSI (weekly service to St. Pierre et Miquelon
- Eimskip (bi-weekly service to Portland, ME and Reykjavik, Iceland)
- Melfi Line (monthly service to Cuba and Caribbean, westbound from Med)
- Maersk Line (weekly export service to North Europe)
- Zim Container Service (weekly services to and from Med as well as Asia via Panama)
- CMA CGM and Ocean 3 partners[30] (weekly westbound service from Asia via Suez)
- Tropical Shipping (as of January 2017) (weekly service to Florida and Caribbean)

Road access to the terminal is via Hollis St. and Marginal Rd. inbound, and Marginal Rd and Lower Water St. outbound. Stakeholders indicated that Friday is the busiest day, as the terminal is handling trucks for three days' worth of cargo, and one of those customers tends to take delivery of over 50% of its cargo on Friday. With respect to urban goods movement, the biggest issue relates to trucks moving into and out of Halterm via Hollis and Lower Water Streets.

6.3.2 Fairview Cove Container Terminal (CeresGlobal)

After strong growth in the first years after Halterm opened, planning began for a second terminal in Fairview Cove. The new terminal opened in 1981 and was operated by Ceres Incorporated, based in Chicago. Its initial customer was Polish Ocean Lines, which had built four new con-ro ships for a new trans-Atlantic service. They were followed in 1982 by Hapag Lloyd, which shifted from Halterm, and has stayed in Fairview Cove ever since. Ceres was purchased by NYK Terminals, of Japan, in 2002, and 49% of NYK Terminals was subsequently purchased by Macquarie Infrastructure Partners in early 2015. This transaction, however, did not include the Halifax terminal. It is understood that discussions are currently under way regarding Macquarie acquiring the remaining NYK Terminals it does not already own, or merging their container terminals assets, including the Fairview Cove terminal. Earlier this year, Macquarie purchased Maher terminals in New York for US $454 million.

[30] In April 2017, the Ocean Alliance will comprise CMA CGM, COSCO, OOCL and Evergreen Line.

Fairview Cove Container Terminal

Source: Halifax Port Authority

The Fairview Cove terminal comprises a 70 acre (28.3 ha) site, with two berths totaling 2,297 linear feet (700 m) in length. It is equipped with 5 gantry cranes, including 2 x post-Panamax units, as well as 500 reefer plugs and a ro-ro ramp. It also features 11,000 ft. of on-dock, double-stack rail, equivalent to 440 TEUs. Minimum berth depth is 55 ft. (16.8 m). Total throughput capacity, according to the HPA's web site is 780,000 TEUs. Access for post-Panamax vessels is encumbered by the height of the two harbour bridges, currently 49 m. (The Angus L. Macdonald Bridge is being raised by 2 m).

Ceres' current roster of clients includes the following:

- Atlantic Container Line (weekly service to and from North Europe – 2 vessels/wk).
- Hapag Lloyd and partners (currently G6[31]) – PA1 service – pendulum North Europe to Asia via Panama – 2 vessels / week – one in each direction).
- Hapag Lloyd and partners (currently G6) – AZX service – Asia-Suez – 2 vessels / wk – one in each direction).

The Fairview Cove terminal has good access from Dartmouth via the Mackay Bridge, and from the south shore via Highway 102 and Joseph Howe Dr., although stakeholders mentioned

[31] As of April 2017, a new alliance, The Alliance will come into effect, comprising Hapag Lloyd, United Arab Shipping (UASC), three Japanese carriers which are merging (NYK, K Line, MOL), Yang Ming and perhaps a Korean line, however as of this writing, the latter remains in doubt. So far, as of November 2016, The Alliance will call Halifax with its Asia-Suez service in both directions, with a westbound service from the Mediterranean and an eastbound service to North Europe.

exiting the terminal and getting back onto Joseph Howe can be difficult for oversized cargo, such as that sometimes carried by ACL.

Cargo volumes at the Fairview Cove terminal have fluctuated somewhat in the past 3 years. For a brief period, the AZX service only called in the westbound direction and export volumes dropped off. When it was restored, they picked back up. It is expected that volumes will increase again in the future as ACL introduces all of its new con-ro vessels to their service to and from North Europe.

6.3.3 Autoport

Autoport, located in Eastern Passage, has been in business since 1971. Its business model was initially predicated on the westbound shipment of European imports, including Volkswagen Beetles, British Leyland (Austin Mini, MG, Triumph), Renault, Saab, and Fiat, amongst others, which were being imported into Canada; they were balanced eastbound with domestic autos for the local Atlantic Region marketplace. Since then, Japanese and South Korean manufacturers have also captured a significant share of the Canadian market, but it still operates on the same principle of balanced flows.

Today, Autoport handles most European autos imported into Canada, as well as a large percentage of North American and Japanese autos destined for the Newfoundland & Labrador markets. Imports move to markets inland by CN Rail and to the Maritimes (Nova Scotia, PEI, New Brunswick) by truck. Oceanex's weekly short sea service from Halifax delivers vehicles to St. John's, while some other units move via Marine Atlantic's ferries between North Sydney and Port-aux-Basques. Some autos are also moving via Oceanex's Montreal-St. John's service, on the new *Oceanex Connaigra*.

Autoport occupies a 40.5 ha (100 acre) site, with a 262 m dock, that accommodates the largest auto carriers afloat. It employs about 200 people and has the capacity to store about 13,500 vehicles. The facility includes a 5,574 m² service building to accommodate value-added and inspection services. The terminal's rail siding was expanded in 2013 and can accommodate 47 rail cars. Annual volume is about 225,000 units, having grown significantly in the past 4-5 years. In recent years, CN has expanded the Autoport concept and offers sister facilities across the country and in the US mid-west.

CN Autoport

Source: Vision Air Services Inc.

With an international vessel every 3-5 days and Oceanex's weekly call, we estimate Autoport handles about 150 vessels per annum. With storage for 13,500 vehicles and handling 225,000 vehicles per year, inventory probably turns over about 15 times.

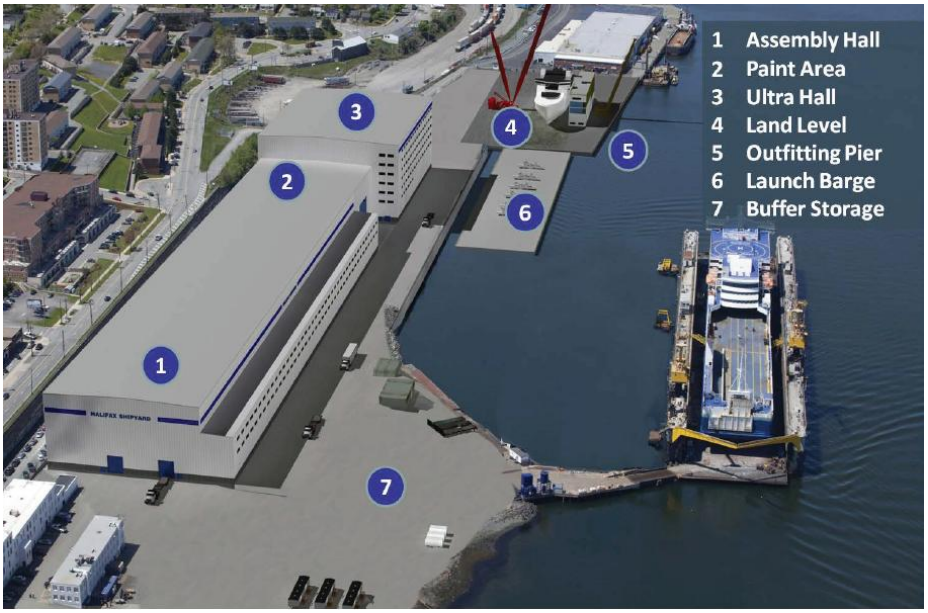
Autoport traffic is consolidated with CN's "manifest" train in Dartmouth yard, which is a daily train in both directions between Dartmouth and Moncton. Traffic is further consolidated in Moncton for shipment west to Montreal. The facility is accessed by road along Pleasant St. from Highway 111. The auto companies distribute vehicles to the Maritimes by purpose-built auto carrier trucks.

In terms of urban goods movement, the operation of Autoport presents some challenges, particularly when vehicles are being unloaded from large international vessels. Vehicles are initially stored in the compounds next to the dock and are later moved across Pleasant St. into longer term storage. We have heard anecdotally that school crossing guards are sometimes hired to facilitate this process.

6.3.4 Irving Shipbuilding

In 2011, Irving Shipbuilding was selected to construct Arctic and Offshore Patrol Ships (AOPS), followed by Canadian Surface Combatants (CSC) for the Royal Canadian Navy (RCN). The shipyard will construct "up to" 21 vessels over the next 30 years, a contract worth $29B.

Halifax Shipyard Investment Plan



Source: Irving Shipbuilding; (Note: the drydock shown above has been removed).

New facilities have been constructed on the Halifax waterfront as well as at the intersection of Windmill Rd. and Victoria Rd. in Dartmouth. The Marine Fabricators facility in Dartmouth consists of a 9,270 m² of production space, which provides steel burning, cutting, forming, and fabrication services, for the shipbuilding, oil and gas and energy sectors.

The main facility on the Halifax side include a massive new Assembly Hall, Paint area, Ultra Hall, outfitting pier and launch area. The AOPS vessels will be built in blocks. Sixty-three (63) units will become 21 larger blocks, which will become 3 “mega-blocks”. The CSC’s will be built the same way.

Urban goods movement will be affected in several ways. Raw steel will arrive by road, rail or sea, from producers in various national and global producers, initial fabrication will take place in Dartmouth, the 63 smaller units will be trucked across the Mackay Bridge, and then assembled into the 21 larger blocks followed by the 3 mega-blocks and final assembly and outfitting.

The main facility is located immediately adjacent Richmond Terminal and HIT, which will facilitate shipments by rail or vessel. The shipyard has good road access from the MacKay Bridge via Africville Rd and through the Richmond Terminal access road (North Marginal Rd.). It has less than ideal access off Barrington St., where two sharp left hand turns are required. We understand that most deliveries of large pieces and critical equipment will use the north

entrance to the shipyard, and the shipyard itself has a road network to facilitate goods movement.

6.3.5 Richmond Terminal

Richmond Terminal is located just north of the Irving Shipyard and east of HIT. In the recent past (1980s-early 2000s) Pier 9C and D were primarily used as an offshore supply base for Shell, Husky/Bow Valley, Pan Canadian and then Encana. Pier 9B is also the base for Teleglobe Canada and their cable-laying vessels, as well as several marine technology companies including Satlantic. Part of Pier 9A is leased to Irving to support its shipbuilding program.

The terminal has undergone a $73 million ($36.5 million provided by the Gateway and Border Crossings Fund) redevelopment in the past 3 years, resulting in a new 500 m berth, a renovated 75,000 ft² shed, a new roadway and renewed rail infrastructure to support intermodal cargo. It is suitable for handling project cargoes, heavy lift cargoes and as an offshore supply base for drilling programs currently underway or planned.

Refurbished Richmond Terminal

Source: Halifax Port Authority

The terminal is easily accessed to and from the MacKay Bridge via Africville Rd. as well as northbound off Barrington St. In the winter of 2016 it served as back up to Shell's supply base at Woodside, which resulted in the movement of drilling pipe and other equipment through the facility, both by vessel and truck.

6.3.6 Halifax Grain Elevator

The Halifax grain elevator was built in the 1930s, as part of the Ocean Terminals complex. It comprises 365 storage silos with capacity of 5,152,000 bushels or 14,125 tonnes of wheat. It can receive grain by truck, rail or water. For marine shipments it can discharge self-unloading and non-geared vessels. It can also load direct rail to truck or from storage into containers, either in bulk or bagged.

Management have tried to diversify into other markets over the past 10-15 years and have in recent years also handled wood chips and wood pellets, mainly produced in Middle Musquodhobit.

While only operating at 10-15% of capacity, the elevator serves several key markets. It receives and stores grain for the P&H Milling facility, which is attached to it. It receives grain destined to farmers in the Annapolis Valley and other regions of the province and it is an export facility for certain niche markets such as Iceland and the Caribbean. P&H Milling (formerly Dover Flour) also supplies flour to 95% of the bakeries in the Maritimes.

Ocean Terminals Showing Grain Elevator and P&H Flour Mill

Source: Halifax Port Authority

With respect to urban goods movement, trucks move between the facility on South Bland Street to and from the Annapolis Valley; they use most of the same route used by trucks hauling containers to and from Halterm.

6.3.7 P&H Milling

P&H Milling occupies a site between Halterm and the Cunard Centre, in the Ocean Terminals Complex. The plant receives wheat by truck, rail and vessel, from western Canada and suppliers in the Maritimes. Most shipments arrived by vessel until a few years ago; now it mostly arrives by rail, however three vessels arrived in the first six months of 2016. They receive about 75-85,000 tonnes per year.

Because their site on the waterfront is constrained by neighbouring cargo activities they also operate a 30,000 sq. ft warehouse in Burnside. About 10-15 trucks per day move back and forth to Burnside and another 6 tanker trucks per day, of flour travelling to bakeries in the region move in and out of the port area.

Products are shipped by container to Newfoundland (via Oceanex), Jordan (via Halterm) and Puerto Rico (via Saint John, but as of January, via Halifax), and also trucked to Montreal. The company's biggest logistical challenge is moving trucks into and out of the port area, and they are very concerned about the Cogswell redevelopment. The alignment proposed in the Ekistiics study will not work for their particular type of truck.

6.3.8 Oil Terminals

The Imperial Oil refinery closed in 2013, after having operated in Woodside since 1912. The refinery itself is being dismantled but the tank farm across Pleasant St remains. So do the docks. The facility is presently (October 2016) used as a shipping terminal; refined product arrives by tanker vessels from refineries in the US, and is distributed by truck throughout the Maritimes. Trucks access the terminal from the same loading facilities as in the past, which are located on the eastern side of Pleasant St. Imperial Oil have not divulged any long term plans for the site, nor are we aware of the volume of truck traffic generated by the facility.

In early October 2016, Irving Oil opened a new $80M terminal adjacent to the Imperial Oil facility. This facility is designed to distribute fuel refined in Saint John throughout Nova Scotia.

Wilson Fuels has a small tank farm at the north end of Barrington St. It receives refined products by vessel from Come-by-Chance, NL, and then distributes by truck to its growing number of gas stations and home heating customers in the region.

6.3.9 National Gypsum

National Gypsum operates the largest gypsum mine in the world in East Milford, Hants County, about 50 km from Halifax Harbour. Product is mined and moved by unit train to the company's shipping facility in Wright's Cove. About 90% of production is shipped by water to markets on the US east coast, with the rest to receivers in Montreal and New Brunswick, the latter of which moves by rail. Volume depends on the health of the U.S. housing industry; it has been as high as 4 million tonnes per annum, but was probably closer to 2 million tonnes in 2015 (the HPA no longer publishes tonnage figures for non-HPA facilities).

With respect to urban goods movement, most product moves in unit trains. At their peak there were two trains per day. These trains cross public roads along the CN Dartmouth subdivision in Burnside Industrial Park and Princess Margaret Rd. National Gypsum had examined the potential to move additional bulk cargoes from their facility about 10 years ago, but this has not materialized.

6.3.10 Woodside Industrial Wharf

The Province of Nova Scotia owns several facilities in Woodside. The Woodside Industrial Wharf is 227 m (750 ft) in length and comprises about 3.3 acres. It is used for rig repairs and tying up harbour tugs.

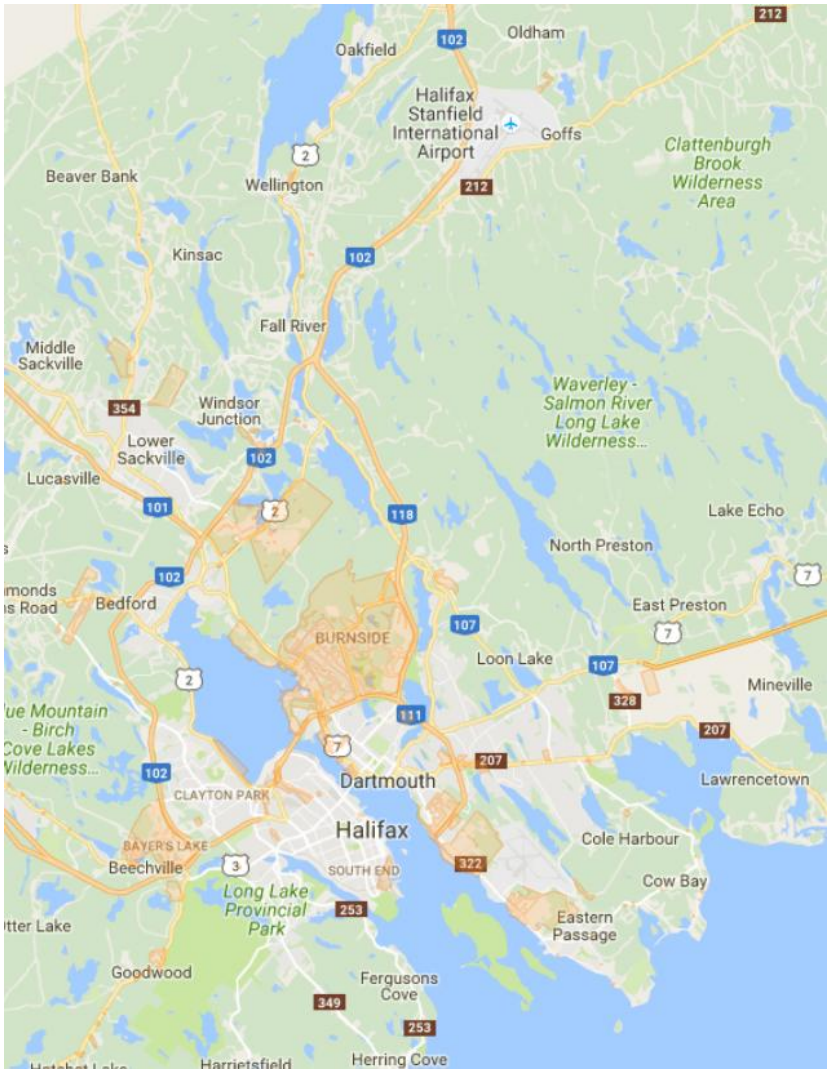
Adjacent this facility is the main supply base for oil and gas fields offshore Nova Scotia. It is currently being used by Sable Offshore (ExxonMobil), Encana (Deep Panuke) and Shell. This dock is 66 m (218 ft) in length, and includes a warehouse of 6,750 ft.^{2} Rather than using valuable waterfront real estate, it is operated in conjunction with a satellite facility across Pleasant Street, where drill pipe and other consumables are staged. This causes trucks to move back and forth across Pleasant St., but the industrial park at Woodside was developed with this in mind.

6.4 Halifax Stanfield International Airport

Halifax Stanfield International Airport (HSIA) is the largest airport in Atlantic Canada, serving as both a gateway and a hub for regional air travelers. In terms of passenger volume, it is the 8th busiest in the country, whereas the Halifax CMA is only 12th largest. It "punches" above its weight in this respect.

HSIA is also an important and growing hub for air cargo. Over 50% of the region's seafood is trucked out of the region to airports in Boston, New York, Montreal and Toronto, leading to delays and in some cases, deterioration of product. Much of HSIA's and the Halifax Gateway Council's focus has been on investing in infrastructure to attract air cargo carriers to include a stop at Halifax and this improve transit times, cost competitiveness and product quality.

Halifax International Airport



Two projects, in particular, have led to an increase in air cargo volumes at HSIA. Federal Gateway and Border Crossing Funds allowed HSIA to extend the main runway from 8,800 ft to 10,500 ft., to accommodate the largest aircraft in operation and to and attract new carriers. The total project cost $28 million, of which the federal government contributed $9 million.

In 2010, Gateway Facility ULC completed construction of a new multi-tenant facility on HSIA property. HSIA had built a new airside subdivision, which prepared the site. The new building is

a common use facility featuring a 7,000 ft.² refrigerated crossdock as well as another 20,000 ft.² dry cargo area. Cargo can be stored at temperatures between +3C and +20C in the warehouses.

Gateway Facility ULC, Multi-Tenant and Air Cargo Facility

Source: HSIA

HSIA is now able to handle the largest air cargo aircraft, which previously "over flew" Halifax on their way to or from other gateways. Gateway Facility ULC now provides service to Cargojet, Fedex, Korean Air Cargo and Quatar Airlines. The 2x weekly Korean Air Cargo service flies to Seoul in 14 hours, and cargo is transshipped from there to markets in China. (It should also be pointed out that Air Canada has a smaller air cargo facility at HSIA, but this serves passenger aircraft.) Other airlines carry cargo, but as "belly" cargo, not in air cargo freighters.

HSIA Passenger, Cargo and Aircraft Movements 2010 - 2015			
Year	**Passengers**	**Cargo (tonnes)**	**Aircraft Movements**
2010	3,508,153	28,450	87,015
2011	3,594,164	29,263	88,874
2012	3,605,701	29,570	84,486
2013	3,585,864	29,499	83,347
2014	3,663,039	32,000	81,030
2015	3,702,705	32,000	78,324

Source: HSIA

HSIA is well served by the regional road network and should be able to handle planned additional retail and service infrastructure. At some point in the future, it will need to build a new cargo apron to cope with expanded air cargo volumes. With respect to urban goods movement and the airport's competitiveness, it is essential that it remain open 24/7. Like other airports, HSIA is concerned with urban and suburban encroachment and is eager to maintain a buffer zone. A recent zoning issue has been resolved to their satisfaction, but they do not want it to change.

7 TRAFFIC AND SAFETY

7.1 Truck Traffic

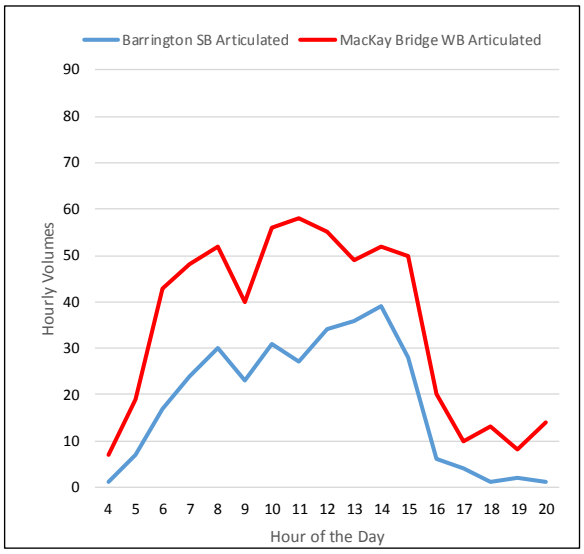
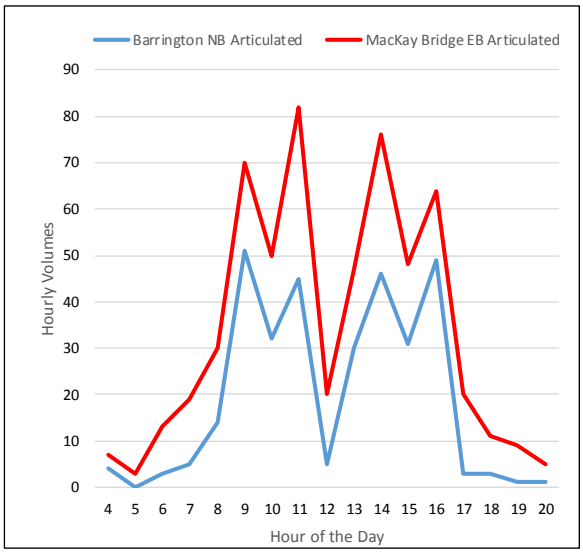
There is no comprehensive data on truck movements in HRM, However, recent traffic counts conducted for the Cogswell Redevelopment provide an indication of port-related truck traffic in downtown Halifax. The truck route between Halterm and the cluster of port-related trucking and warehouse facilities in Burnside Business Park is shown in the following map.

Principal Drayage Routes

Trucks inbound to Halterm use Barrington Street southbound to the Cogswell Interchange and then Hollis Street to Marginal Road. Outbound trucks return to the Cogswell Interchange via Lower Water Street and Upper Water Street. The route from the Ceres terminal to the MacKay Bridge is also shown for reference.

A 24-hour traffic count was conducted on Barrington Street south of the Cogswell Interchange on Thursday May 5, 2016. Heavy (articulated) truck traffic totalled 648, 316 southbound and 332 northbound. To analyze the impact of port-related trucks on traffic on the MacKay Bridge, hourly data was obtained from Halifax Harbour Bridges for the week of May 1. Comparisons of the Barrington and bridge traffic counts for May 5 between 4:00 and 20:00 are illustrated below in order to estimate the proportion of truck traffic on the MacKay Bridge which is attributable to port activity.

Heavy Truck Traffic – May 5 2016

Inbound Halterm (MacKay Bridge WB and Barrington SB)	Outbound Halterm (MacKay Bridge EB and Barrington NB)
	

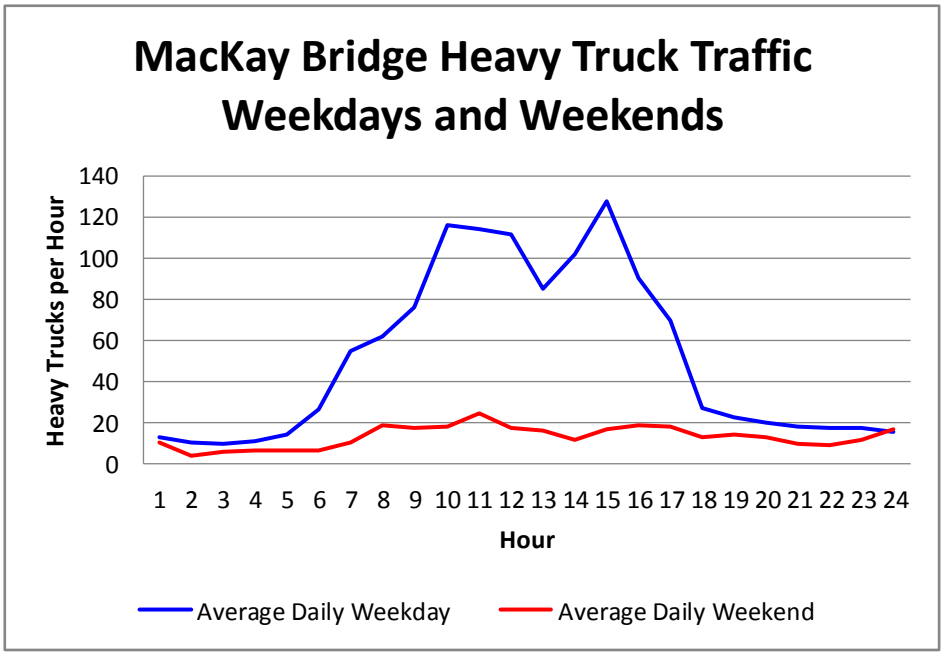
The Barrington traffic counts clearly show a relationship to the truck gate hours at Halterm. Gate hours at both Halterm and Ceres are from 0800 to 1700 hrs Monday through Friday[32], with a one-hour lunch break at noon. The inbound traffic (southbound on Barrington) shows a gradual

[32] The gates close for inbound movements at 1630.

build-up from 0700 as trucks begin to line up at the terminal gates. The outbound traffic plunges between noon and 1300 hrs when trucks are not being processed on the terminal.

Heavy truck[33] traffic on the MacKay Bridge shows a similar pattern in both directions. On a 24-hour basis, the Barrington southbound truck counts amount to 49% of bridge traffic westbound, and the Barrington northbound traffic accounts for 54% of bridge traffic eastbound.

The contribution of port-related truck traffic to bridge traffic is also evident in the variation between heavy truck traffic on the bridge on weekdays and weekends. Average hourly patterns for weekdays and weekends are shown below. The average weekend traffic is only 25% of the average weekday volume. It seems apparent that over half of the heavy truck traffic on the MacKay Bridge is related to port activity.



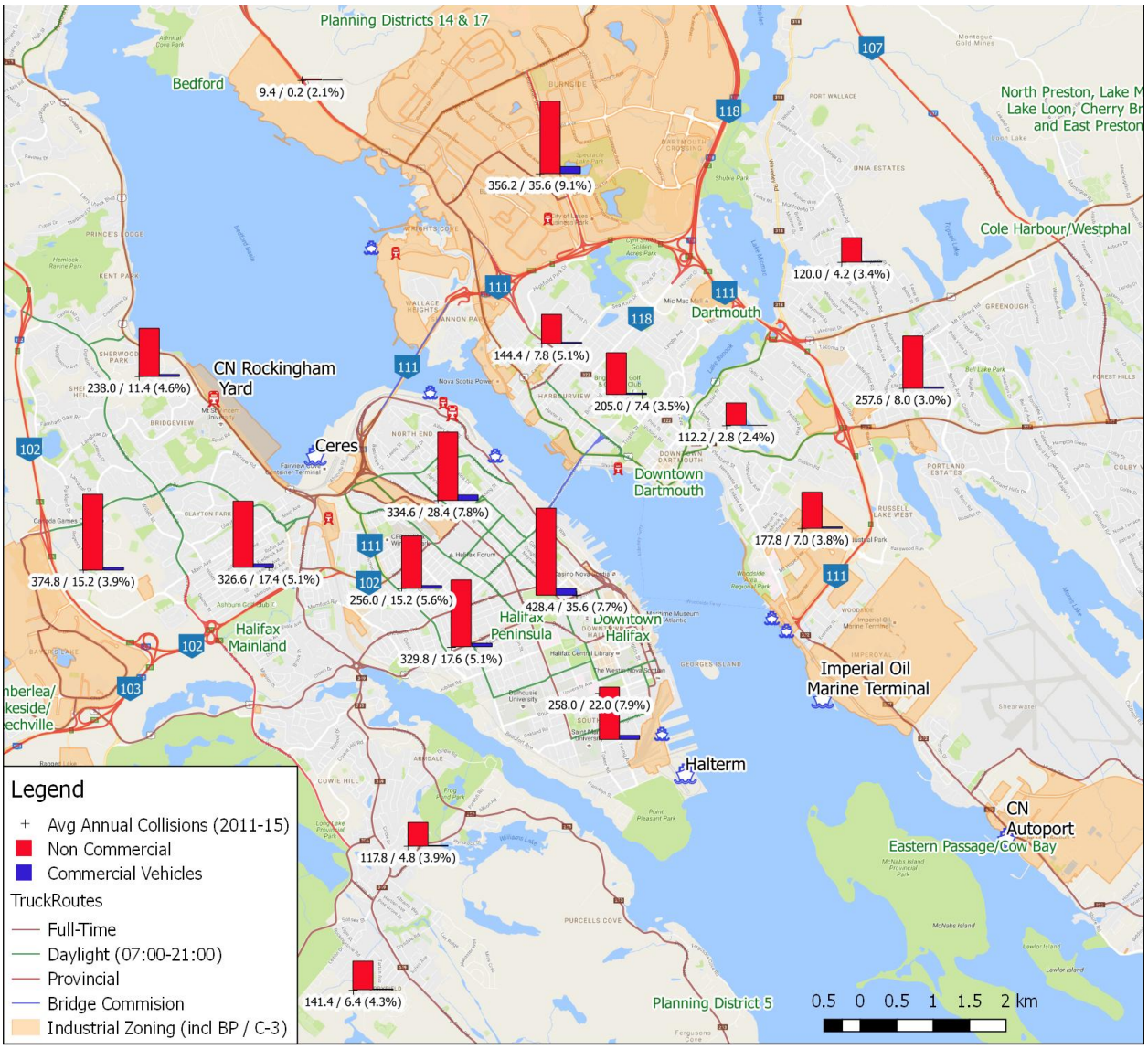
7.2 Safety

Data on crashes involving commercial vehicles in HRM was obtained from both HRM Police and Nova Scotia Transportation and Infrastructure Renewal (TIR). The police data included geocoded (data for all collisions recorded from 2005 to 2015, and whether a commercial vehicle was involved.

[33] Base on Halifax Harbour Bridges data on vehicles with 5 or more axles.

The TIR data contained more detailed data on collision causes and severity. However, as the data was not geocoded, and there appears to be no reliable cross-reference between the police and TIR data, we have had to rely on the police data for analyzing the locations of truck collisions.

The distribution of collisions involving autos and commercial vehicles in HRM is shown below. The data indicates that commercial vehicles account for a larger share of collisions in the downtown area and along the port truck routes (7.7% to 7.9%) than in HRM as a whole (4.9%).



8 POTENTIAL SOLUTIONS - OPERATIONAL IMPROVEMENTS

8.1 Diversion to Ceres / Fairview Cove Terminal

The primary issue related to goods movement that was identified by stakeholders, is trucks travelling to and from the Halterm terminal through downtown Halifax. Traffic through the downtown could be reduced by shifting container traffic from Halterm to Ceres.

However, there are a number of obstacles to this solution. The first is the commercial interests of the terminal operators and shipping lines. The terminal operators' revenue depends on the volume of traffic they handle. The shipping lines choose their terminal operator on the basis of commercial agreements negotiated to minimize their costs and other considerations.

The second is the inability of Ceres to handle large post-Panamax vessels due to height restrictions under the two harbour bridges, currently 49 m. The Angus L. Macdonald Bridge is being raised by 2 m, but this will still be inadequate to enable passage of the larger post-Panamax vessels.

Rumours (as of September 2016) of a potential merger or consolidation of Halterm and Ceres are causing a great deal of concern amongst many stakeholders. One scenario would see all traffic concentrated in the south end, while the other scenario would see large (8,500 TEU+) post-Panamax ships handled at Halterm and smaller vessels handled at Ceres. For many reasons, the preferable scenario is the latter, because Ceres provides easier access to the highway network and MacKay Bridge. If all container traffic was concentrated in the south end, then truck traffic into and out of downtown would virtually double.

With only three berths, there could be some vessels waiting to get on a berth at times, particularly as vessels tend to "bunch" in Halifax on weekends. If traffic at Halterm was to double, then, assuming it is operating at 30% capacity, this would become 60% or slightly more, and an expansion would have to be contemplated with the type of growth experienced in 2016 (+16% to end September).

HPA is currently undertaking an update of their Port Master Plan. They have indicated that one priority is expanding the port's capacity by developing two 400 m berths to handle two large vessels simultaneously. In the short term, Halterm is the only location which could accommodate this requirement, either by expanding northwards or southwards.

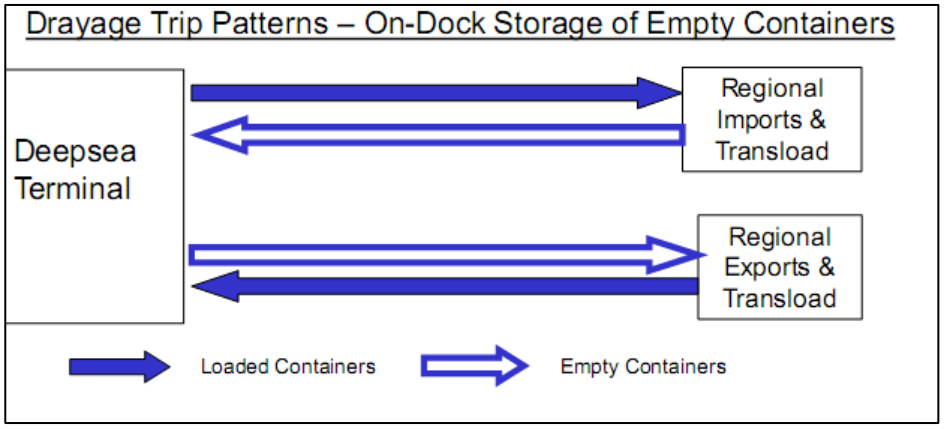
8.2 Current Port-Related Truck Trips

The number of truck trips generated by container terminal operations depends on the mode split for import and export container movements, and on the balance between import and export containers.

No detailed data on truck traffic to and from the port terminals was available for this study. A high level estimate has been developed based on HPA data on the origins and destinations of containerized import and export shipments.

In general, truck movements are not competitive with rail over long distances. Consequently we can assume that only imports destined to Atlantic Canada, and those originating in Atlantic Canada, are transported by truck.

In the drayage sector, truck trips are required to move laden and empty containers, and to reposition chassis. Efficient asset utilization requires minimization of empty chassis repositioning trips. Traditionally this has been achieved at North American terminals with on-dock storage of empty containers at the port terminals. This remains the dominant scenario in Halifax.



With on-dock storage, each import container delivered from the port terminal by truck generates two truck “gate moves” at the container terminal: delivery of the loaded container to its destination and return of the empty container to the port terminal. Similarly each export container received by truck generates two gate moves: pickup of an empty container at the port terminal and delivery of the loaded export container.

The actual number of truck trips required will depend on the percentage of trucks visiting the port terminals which are loaded (i.e. carrying and empty or full container) both ways. If the truck is only loaded in only one direction, it will be hauling an empty chassis in the other. Anecdotal evidence suggests that on average around 80% of trucks visiting the port terminals are loaded both ways, so to estimate the number of truck trips the number of container movements must be divided by .8 to account for empty chassis movements.

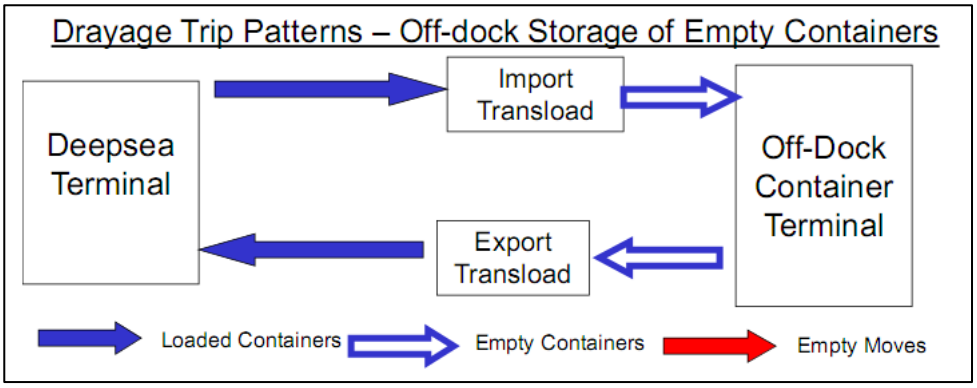
Estimates of annual one way truck trips to and from the HPA container terminals from 2012 to 2015 are shown below. On the basis of these estimates, truck trips to and from the container terminals have declined slightly over the last four years. Daily truck trips are based on 250 days per year to account for weekends and holidays when the container terminal truck gates are closed.

Estimated Annual and Daily Truck Trips - HPA Container Terminals

	Annual Truck Imports (Units)	Annual Truck Exports (Units)	Annual Import Gate Moves	Annual Export Gate Moves	Annual Gate Moves	Annual One Way Truck Trips	Daily Weekday One Way Truck Trips
2012	31,047	60,646	62094	121292	183385	229231	917
2013	29,673	63,208	59347	126417	185763	232204	929
2014	29,384	58,764	58767	117528	176295	220369	881
2015	30,834	57,416	61668	114832	176501	220626	883

8.3 Off-Dock Storage of Empty Containers and Triangulation

Elsewhere in the world, and increasingly in North America, terminal operators are limiting on-dock storage at port terminals to maximize throughput capacity. The Port of Vancouver is the leader among North American ports in embracing off-dock storage of empty containers. Since 2004, off-dock storage of empty containers has become the norm.



This can reduce the number of truck trips to the port terminals: by reducing the movement of empty containers in and out of the terminals. Theoretically, container movements could be reduced by half.

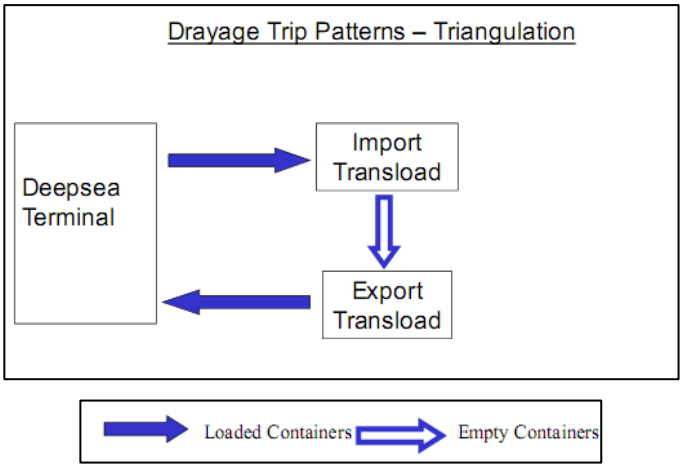
Additional costs due to off-dock storage may include:

- Additional storage and gate charges at off-dock facilities paid by shipping lines.
- Additional trucking costs due to an increased number of empty trips, more Vehicle Miles Travelled (VMT) due to “detours”, and costs for additional queuing delays and turn times.

Some stakeholders consulted in the course of this project indicated that the use of off-dock storage is unpopular because it makes it more difficult for truckers to achieve balanced trips (i.e. results in more empty chassis moves). Others have embraced the concept and several container hauliers have established their own off-dock facilities.

Storage of empty containers at off-dock locations makes management of shipping lines’ container inventories more complicated as they have to track and manage containers at multiple locations instead of just at the dock. When off-dock storage is used, the shipping lines typically contract with a small number of off-dock facilities for storage; this can exacerbate the problem of efficient trip patterns for the drayage sector as drivers may have to travel a considerable distance to pick up a container for a specific line. Off-dock operating hours must also be aligned with container terminal gate hours to maintain efficiency in truck movements.

The most efficient pattern for drayage trips is “street turns” or triangulation, where after an empty container is unloaded it is transferred directly to an export facility for reloading.



Trucking firms try to achieve this, but it is usually difficult to match the import and export shipments within the free time allowed before the shipping line imposes financial penalties for late return of a container. “Street turns” are easier to achieve when import unloading and export loading facilities are clustered together.

8.4 Terminal Appointment Systems

If the major problem related to downtown truck traffic is congestion during peak traffic times, an appointment system could be used to influence truck traffic patterns. Spreading activity more evenly throughout the day can mitigate the impact of peak period congestion on the local road network, with additional potential advantages to the drayage sector resulting from lower travel times.

Truck appointment systems are commonly used at port terminals to mitigate congestion during peak periods by controlling arrival rates. Container terminal reservation systems offer a number of potential advantages to terminal operators, by eliminating peaks and improving the predictability of truck processing transactions. They can reduce the capital investments required for deployment of machinery to load and unload trucks by ensuring more effective utilization of the capital stock. They can also facilitate more efficient scheduling of longshore labour, the largest component of terminal variable costs.

Appointment systems can also provide benefits to the drayage sector if they result in a reduction in queuing delays and in-terminal turn times. However, the additional complexity of operations can impose additional costs, including larger fleet requirements for drayage operators, additional administrative and management costs, and capital investment requirements for more sophisticated dispatch and trip planning systems. The ability to coordinate container pick-up and drop-off within the same appointment window is also critical to maximizing trucking efficiency by balancing inbound and outbound loads. For these reasons, appointment systems remain unpopular among drayage operators and can lead to higher port trucking costs.

Reservation systems and peak period surcharges (such as OffPeak) appear to be competing solutions to peaking of truck movements. Both solutions provide opportunities to transfer activity to off-peak periods, but the use of reservation systems arguably imposes a larger burden on the trucking industry as opposed to the broader port community.

9 POTENTIAL SOLUTIONS – TRUCK ROUTE IN THE RAIL CUT

The 6.9 km CN “rail cut” between Ocean Terminals and Fairview Cove has been mooted as a possible solution to the issue of trucks moving into and out of Halifax’s historic and gentrifying downtown. The rail cut was built between 1913 and 1918, as part of the Ocean Terminals development.

Blasted Rock in the “Cut”, April 1915

Source: Halifax Port Authority

With only one freight train in each direction per day and three Via Rail trains in each direction per week, the cut is an underutilized corridor, with potential to be used for commuter rail, a freight rail shuttle (see next section), a truckway, a busway and/or for active transportation.

The “cut” had two separate tracks running through it until the last decade. Photos for the Halifax Inland Terminal and Trucking Options Study in 2005 show a double track from mile 1.4 (Marlborough Woods) to 2.5 (Conrose Field) and from mile 4.4 to Rockingham; photos taken for

the present study show a double track only south of Marlborough Woods and north of Bayers Road.

Rail Cut at Coburg Road

Source: James Frost

9.1 Case Studies

Development of a truck route through the rail cut can be considered as a variant of improvement strategies for port access roads which have been pursued at many ports. In general, these are designed to facilitate direct access to major highways or freeways, bypassing local streets and mitigating impacts on other road users.

Examples from our Case Study reviews include:

- The I-564 Intermodal Connector Project at the Port of Norfolk , which received Federal Highway Administration funding to build 2.82 miles of four lane limited access highway to connect the existing I-564 to both the navy base and the largest container terminal, NIT.
- The Port of Tacoma Road/I-5 interchange project to improve access to the Port and reduce AM travel times on the I-5 freeway.

- Construction of the South Fraser Perimeter Road in BC's Lower Mainland to provide high speed access to the TransCanada Highway from port terminals at Roberts Bank in Delta.

Due to the location of Halterm in downtown Halifax, the rail cut appears to be the only feasible option for substantially improving road access.

9.2 Previous Halifax Studies

A number of studies undertaken since 2004 are summarized below.

The Halifax Railway Cut Investigation Study[34] was undertaken to examine the potential to use the rail cut to avoid trucks using downtown Halifax streets to and from the south end shipping terminals. The study examined conversion of the CN rail cut to a truck and busway and looked at several options: 1) a one-way roadway with an exclusive rail line; 2) a one-way roadway with rail embedded in the roadway; 3) a two-way roadway with rail embedded in the roadway. Variations included one-way 24 hours per day, reversing lanes as demand warranted, and no separation between the roadway and rail lines with no vehicles allowed in the roadway when trains are present.

It also suggested a truck staging area could be built at the former CN Roundhouse location near Kempt Rd., as well as building a flyover from the rail cut to the south end of Robie St. in the interim before full implementation. This option would remove trucks from Lower Water and Hollis Streets but deposit them in front of a university, an elementary and junior high school and two hospital zones. The study also considered an elevated expressway built over the cut and a truck ferry across the harbour. The cost estimates for the truckway concept ranged from $40-50M, with a $10-17M option for a Robie St. connector. The benefits of the rail cut option include a reduction in downtown truck traffic, a reduction in truck transit times, a direct connection to Highway 102 and the MacKay Bridge and minimal impact on rail operations during construction. Negative impacts include its unidirectional route (for one option); its cost vs operational savings; opposition from adjacent landowners; potential noise, emissions and vibration impacts on adjacent residents; and the fact that a truck breakdown could shut the entire route. There could also be disruptions to rail operations due to truck traffic and snow clearing activities.

[34] Halifax Railway Cut Investigation Study Marshall Macklin and Monahan et al for HRM February 2004.

The Integrated Transportation Corridor (ITC): Phase 1 Feasibility Study[35] was undertaken in 2009. In looking at trucking effects on downtown congestion, the study concluded that average truck travel times would improve only slightly if they were diverted to the ITC.[36] Truck traffic going to and from the south end terminals did not appear to be a major contributor to overall congestion and delay during morning and afternoon peaks, and it represented a small percentage of overall traffic downtown.

Considering stakeholder feedback from the 2004 Railway Cut Investigation Study, the ITC study mandate was to provide options that would provide "positive separation between the roadway and rail operations, and operational flexibility." It was also important to avoid developing a facility that added travel time for trucking.

Integrated Transportation Corridor Concept

Source: MRC, Integrated Transportation Corridor, NS TIR, 2009

As with the previous study, a long list of options was considered. The short list included: 1A) rail lines and a two-lane two-way road with rural drainage; 1B) rail lines and a two-lane two-way

[35] Integrated Transportation Corridor (ITC): Phase 1 Feasibility Study McCormack Rankin Corporation et al for the Province of Nova Scotia February 25, 2009.
[36] Ibid., p. 11.

road with urban drainage; 2A) one rail line and a two-lane two-way road with rural drainage; and 2B) one rail line and a two-lane two-way road with urban drainage. The costs for these four options ranged (in reverse order) from $205-270M, not counting land acquisition costs or any costs relating to the use of the CN right-of-way. The two highest scoring options, based on a range of considerations, were options 1B and 2B, which have cost $225M and $205M respectively. Option 1B was selected as the preferred alternative because of the additional flexibility it offered and the potential to incorporate commuter rail.

A recent study has also examined the feasibility of commuter rail, which would make extensive use of the rail cut. The Commuter Rail Feasibility Study[37] concluded that commuter rail service between Halifax and Windsor Junction could be introduced with the addition of passing sidings and centralized traffic control in key areas, including in the rail cut. It would need to be accommodated during peak hours of 0600-0900 and 1500-1800 hrs during weekdays.

9.3 Recommendations for Further Study

During our consultations, use of the rail cut to alleviate truck traffic downtown was suggested by a variety of stakeholders. There was no consensus, however, as to "how". As we have described above, it could be used for a rail shuttle, a truckway or commuter rail, or some combination thereof.

Given the recent commuter rail study, and ongoing discussions with Via Rail, it seems prudent to await their outcome. In terms of community impact and cost, a rail shuttle to either Rockingham or Burnside seems to hold some promise. We recommend, therefore, that the previous Distripark study be brought up to date, and that it consider both commuter rail and a rail shuttle operation for containers.

[37] Commuter Rail Feasibility Study CPCS for HRM August 31, 2015.

10 POTENTIAL SOLUTIONS - RAIL SHUTTLE

A rail shuttle for containers is one alternative for using the rail cut for removing truck traffic from downtown streets. This approach could offer lower capital costs than construction of a truck route, and environmental benefits from shifting traffic from rail to truck. The biggest issues are the impact on the cost competitiveness of the Halifax Gateway, and "who pays".

10.1 Case Studies

We found numerous examples of rail shuttles being use to move cargo to and from cargo terminals to off-dock locations.

10.1.1 Auckland, New Zealand

Auckland's main port terminal is located adjacent to its downtown, similar to Halifax. It is close to capacity and port-related traffic is a big issue. Over the past 5-10 years, Ports of Auckland has targeted the development of rail shuttles and intermodal terminals away from the port to address major "first mile, last mile" delivery issues. Until recently, its sole inland terminal at Wiri, about 28 km from the port, was little more than an empty container depot. Other terminals are being built at Longburn, 528 km away, Mount Maunganui, near Tauranga in the Bay of Plenty region, 220 km from Auckland and Northgate, 90 km from the port. These will be operated by third-party logistics companies such as Nexus Logistics and Toll Holdings.

All shuttle moves are carried out between 1800 and 0600 hours. "This saves time and money and is a great way to help reduce pollution caused by vehicle emissions". One of the big challenges was persuading shippers to use the terminal. One incentive that has been tried is increasing the demurrage charged at the port and reducing it at the inland terminal. In marketing the facility, the port concentrates on the shipper rather than the shipping line, because the shipper is the major beneficiary of better access to their cargo and containers.

10.1.2 Gothenburg

Gothenburg has 70 daily rail shuttles to a total of 24 inland destinations. One of the port's rail shuttles is operated by Green Cargo AB to their intermodal facility 10 km from the port at Gullbergsvass. This shuttle operates two times per day, 5 days per week, morning and afternoon. Each train carries 90-100 containers. The rationale for operating the shuttle is simple: it removes traffic from congested roads, eliminates issues getting into and out of the port and is "the best way to do it", because otherwise they would have to truck 100 containers into and out of the city each day. The shuttle takes 30-40 minutes each way whereas trucking can take up to

two hours with waiting times. The total cost is also less than trucking, at $110 vs $220 round trip.[38] We have recently learned that the Green Cargo intermodal terminal is being move closer to the ort and its adjacent logistics park, to allow for new housing to be built in downtown Gothenburg.

10.1.3 Sydney, Australia

Along with an inland terminal at Enfield, 18 km from the Botany Bay container terminals, Sydney is introducing rail shuttles to connect both facilities. Each train will carry 60-80 TEUs and operate at least daily in both directions. About 80% of Sydney's cargo originates or is destined to within 40 km of the city and only 20% presently moves by rail. With the development of the inland Intermodal Logistics Centre it is expected to increase to 40%.

It is expected that the Intermodal Logistics Centre will resulting a competitive alternative to moving containers by truck and that "delivering containers closer to their origin and destination improves delivery cycle times and reduces trucking costs".[39] Empty container storage on site can further reduce costs and unnecessary truck movements, compared to current practice, where empty containers are generally trucked back to the Port Botany area. It is expected to reduce the reliance on road transport to and from Port Botany.

10.2 Previous Halifax Studies

The Halifax Inland Terminal and Trucking Options Study[40] was undertaken to examine ways to remove container traffic from downtown Halifax streets through better use of the "rail cut" that connects Ocean Terminals / Halterm and the CN mainline. At the time of the study HPA was handling 530,000 TEUs, and the port was considered to be approaching its current container handling capacity of 800,000 TEUs per year. The number of trucks handled at both terminals averaged 686 one-way moves per day. Development of an inland terminal at Rocky Lake, 12.7 km from the port, was proposed as a lower cost alternative to port terminal expansion. A $60M inland terminal could provide 250,000 TEUs of handling capacity, compared with an estimated $300M for an additional 550,000 TEUs of port terminal capacity. Only local cargo would have been handled at Rocky Lake, and cargo from both terminals would be handled there. Guiding principles of the study were that both terminals would be treated equally and that no net

[38] Interview with Jonas Borjesson, Strategic Account Manager, Green Cargo, 29 September 2016.
[39] NSW Government, "NSW Freight and Ports Strategy", November 2013, p. 11.
[40] Halifax Inland Terminal and Trucking Options Study MariNova Consulting for HRM and HPA 2006.

increase in costs to the carriers serving Halifax would result. The terminal would also have provided a facility for storage of empty containers. The Rocky Lake concept encountered opposition from the port as well as local residents.

The Atlantic Gateway Distripark Study[41] (MariNova, 2007) shifted the focus from reducing truck traffic on local roads, to helping speed the flow of import and export containers to and from transload facilities, and providing synergies for a proposed transportation hub in Burnside Industrial Park. It proposed an inland terminal adjacent to the transportation hub. Containers for local delivery would have been shuttled from terminals on Halifax Peninsula to Burnside Industrial Park.

Distripark Shuttle Route

Source: MariNova Consulting Ltd., Atlantic Gateway Distripark Study

The capital cost for the 32 acre terminal in Burnside Phase 13 was projected to be $14.6M, (excluding land costs), 25% of the cost of the Inland Terminal option. An optional highway

[41] Atlantic Gateway Distripark Study MariNova Consulting et al for HRM March 2008.

interchange connecting it to Highway 107 and the proposed Burnside Express would add $6M. Annual shuttle operating costs were projected at $2M, while terminal operating costs were $1.9M. On this basis, total cost of a one-way trip between the terminals and the Distripark was estimated at $75-100, approximately 40% less than current trucking rates.[42]

Critics were concerned about the shuttle adding cost to the system because it would add an extra move. *The study suggested that this expense could be offset by lower trucking costs due to the shorter distance between the Distripark and warehouses in Burnside, as well as the resultant better utilization of trucks and chassis*.

The proposed site also had the potential to accommodate rail yard activity currently carried on at CN's yard in downtown Dartmouth, and domestic intermodal operations from Halifax Intermodal Terminal

10.3 Ceres-Halterm Shuttle

With the potential merger or consolidation of Ceres and Halterm, there may be some potential to use Ceres as the truck gate for Halterm, and to operate a rail shuttle in the existing rail cut. Depending on how much business continues to be carried out at Fairview Cove, rail cars could be staged on the terminal, or moved under the Bedford Highway overpass to where CN's roundhouse used to be, and then loaded for the short trip to and from Halterm.

Containers could be moved container on flat car (COFC), or trailer on flatcar (TOFC) (piggyback), or as a Railrunner.

Railrunner Technology

Source: http://railrunner.com/

[42] Ibid., p. 66.

Costs for a rail shuttle would be similar to the Distripark except the distance would be shorter and there would be no need to build a terminal. Fuel costs would be less for the locomotive, but perhaps shorter, more frequent trains would operate.

10.4 Recommendations for Further Study

In the aftermath of the Distripark study and the subsequent Integrated Transportation Corridor Study done for NS TIR, it was recommended that a more detailed assessment of costs and benefits, and the conditions that would need to exist in order to make the Distripark concept viable, be carried out. Given the changing circumstances in 2016, it may be useful to review the concept. The financial model constructed for MariNova's Inland Terminal and Trucking Options Study could be used as a starting point.

The potential merger or consolidation of Ceres and Halterm and the resultant movement of significant additional volumes through Halterm present an opportunity to examine a Ceres – Halterm shuttle. This option may now have more potential than the Distripark concept, especially if more traffic becomes concentrated at Halterm and the two terminals are merged. It may also be useful to review the Railrunner technology and assess the potential for its use in Halifax.

11 POTENTIAL SOLUTIONS: CROSS HARBOUR FERRY

A cross-harbour ferry could potentially be used to transport containers between between Halterm and Woodside. There are three ro-ro ramps at Halterm and a virtually empty marine terminal at Woodside at the end of the Circumferential Highway (111). Given the importance of exporters located in northern Nova Scotia and New Brunswick, the Woodside terminal would provide very easy access to major highways and transload business in Burnside.

A similar ferry, owned by a Nova Scotian, operates between Windsor and Detroit. The trip takes 20 minutes at a cost of US$115 for a tractor and trailer unit. (Because of the U.S. Harbor Maintenance Tax (HMT) imposed on all import cargo entering a U.S. port, there is very little traffic moving to Detroit, so the service has to recover most of its costs in the direction of Windsor).

11.1 Case Studies

11.1.1 Port of New York/New Jersey

Red Hook Terminals operates the only terminal handling containers on the New York side of the harbor at the Port of new York/New Jersey. Red Hook Terminals is a multi-product terminal, capable of bulk and breakbulk cargoes, containers, yachts, heavy lifts, autos, or special project cargoes. The Red Hook terminal cannot handle large container ships due to draft limitations (42 ft). The company also operates a barge terminal in Newark, New Jersey and a cross-harbor rail barge.

New York officials are seeking a tenant to reactivate the South Brooklyn Marine Terminal, which is close to the Red Hook terminal. Both sites have recently been designated as part of the U.S. Maritime Administration's Marine Highways initiative, which may facilitate federal subsidies for expansion of rail and container barge services. A new cross-harbour barge service between Red Hook and Port Newark Container Terminal began operations in September 2016. The new service is in addition to an existing two-barge service linking Red Hook with its sister Newark terminal, which currently handles about 40,000 containers on its barges, each of which has capacity of more than 400 twenty-foot-equivalent units.[43]

[43] "New York seeks to reactivate South Brooklyn terminal" Joseph Bonney Journal of Commerce June 30, 2015 http://www.joc.com/port-news/us-ports/port-new-york-and-new-jersey/new-york-seeks-reactivate-south-brooklyn-terminal_20150630.html

11.1.2 Other Studies

For the *Canadian Transportation Act Review* in 2015[44], MariNova examined the potential for short sea shipping in the Great Lakes / St. Lawrence region. We looked at some best and emerging practices in Europe, where very short distance container on barge operations are becoming quite prevalent for avoiding congested roads and to address "first mile, last mile" delivery issues. We visited the Wallhaven short sea terminal in Rotterdam which operates its own barge between a deepsea terminal and its own location 34 km away. The barge trip takes two hours, while trucking can take three hours and is more costly. We were asked to speculate on developments well into the future and In the Great Lakes context, we speculated there might be some potential to eventually move cargo via tug and barge around the GTAA, between Oshawa and Hamilton.

11.2 Previous Halifax Studies

The Railway Cut Investigation Study briefly considered this concept.[45] It concluded that time-related issues would determine whether the idea would be of interest to the trucking industry i.e. time to load the vessel, cross the harbour and unload the barge on the other side and make the containers and chassis available to drivers would be significant and not competitive with trucking through the city. The study authors thought the concept might be of more interest to long distance truckers than local ones.

11.3 Recommendations for Further Study

We recommend that further analysis be conducted on the potential for a cross-harbour ferry operation to transport containers to and from Halterm.

The operation could be "lift on, lift off" (LO/LO); "drop trailers" (RO/RO container on chassis), or . "load and go" drive on, drive off (RO/RO truck ferry). The terminal in Woodside could become the Halterm "gate" or simply be a marshalling area for trucks waiting to get to Halterm.

The advantage of LO/LO service is that it maximizes the capacity of each trip of the barge; potential disadvantages include relatively high stevedoring costs, and loading and unloading operations are relatively slow.

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[44] MariNova Consulting Ltd., "Analysis of Short Sea Shipping and Extending the Seaway Season", Canadian Transportation Act Review, September 2015.
[45] [45] Halifax Railway Cut Investigation Study p 11.

The RO/RO container on chassis option would result in a lower capacity for each trip than a LO/LO operation, but could result in lower stevedoring costs and faster loading and unloading.

The RO/RO truck ferry third option is similar to the container on chassis option. A similar vessel would be used, however the increased length of the truck/trailer combination would reduce the per trip capacity. Potential advantages of this option include minimization of stevedoring costs and very fast loading and unloading. The disadvantage "is that the driver remains "on the clock," and unless ferry transit times can meet or beat the highway times, a net loss to the driver is experienced, and he/she is unlikely to use the service."[46]

Traffic at the terminal tends to bunch up early in the morning and after lunch, which leads to long wait times. A ferry operation could potentially smooth out the processing of containers at both ends. Ideally, Woodside could be used as Halterm's truck gate so that containers are only processed once. There are three ro-ro ramps inside Halterm's gates which could accommodate this type of operation. There is no infrastructure at Woodside so the cost to develop a terminal there would need to be determined.

[46] NY/NJ Cross Harbor Freight Study Alternatives p. 4-13.

12 POTENTIAL SOLUTIONS: RELOCATION OF HALTERM

The issue of relocating terminal operations currently carried on at Halterm has been discussed since at least 1996, and has elicited much comment from the Spring Garden Rd. Business Commission and various bloggers.[47]

HPA's current Master Planning process and the planned Cogswell Interchange demolition and redevelopment have brought the issue to the fore once again.

12.1 Case Studies

Our case studies provided two good examples of ports which moved cargo operations outside of the central city to new locations. These included Sydney, Australia and Helsinki, Finland. These two ports made the decision to move away from central city locations to free up land for residential development and ongoing gentrification. In the case of Sydney, the impact of its "new" location now requires the development of rail shuttles and inland terminals to ameliorate its negative effects.

In North America, Vancouver built Roberts Bank in the 1980s and Montreal has had ongoing ambitions to develop a new terminal complex at Contrecoeur, about 50 km downstream from its current operations.

12.2 Previous Studies

The Greater Halifax Multi-modal Study[48] began as an examination of the potential for two airports in Halifax, one at the Shearwater air force base and one at existing HIAA. It was determined that a second airport was not viable but the site could be a potential container terminal and logistics park.

The site was viewed as an ideal location for a container terminal for several reasons: 1) location on deep water; 2) unencumbered by bridges; 3) the potential to build a very long berth; 4) rail ran right through the site; 5) its close proximity to the Circumferential Highway 111; and 6) the potential development of up to 3,000 acres of back up land for use as a logistics park. Booz Allen estimated a new container terminal could be built at Shearwater for $375-$425 million.

[47] http://newstartns.ca/2012/03/foghorn/
[48] Greater Halifax Multi-modal Study Booz Allen for the Greater Halifax Partnership, 1996.

Critics of the scheme were not convinced the water available along the shore was deep enough, nor the turning basin wide enough. There were other concerns regarding increasing rail traffic through downtown Dartmouth[49] and the Navy's requirement to maintain a "nuclear jetty" at Shearwater. Presumably, these issues will be re-examined as part of the development of HPA's new Port Master Plan.

The principal of MariNova also examined the potential of Shearwater in 2002.[50] At the time, it was understood that the Shearwater site includes about 2,000m of shoreline, from the site of Imperial Oil to Autoport in Eastern Passage. The potential for a phased private-sector-led development was examined, with the first phase including two post-Panamax berths and a feeder berth, encompassing at least 60 hectares, and 1,000m of quay. It would be large enough to accommodate two post-Panamax and one feeder ship, at least 6 post-Panamax container gantry cranes, and have a total capacity of 600,000 TEUs. The terminal would be expandable to 2,500m of quay, and at least 15 container gantry cranes on a 400 acre site, with total capacity of at least 1.2m TEUs. It was potentially a US$1B project.

It was recognized that the location is not without its problems. However, it is in a heavily industrialized area and the development would have few adverse impacts on the surrounding neighbourhood. Some concerns were voiced over the turning basin at the southern edge of the site between Shearwater and McNab's Island, but it was felt this berth could be reserved for feeder vessels, and it was noted that much larger ports such as Hamburg, Antwerp and Los Angeles thrive despite having tight turning basins.

There was also a concern about rail access. Many residents of downtown Dartmouth would like to see the existing railway line converted to hiking trails and re-routed behind Shearwater and out to Windsor Junction. A UMA study estimated costs for this option at $150 million in 1995.[51]

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[49] In 1995, the City of Dartmouth examined relocating the Dartmouth Yard. See Relocation Feasibility Study: Downtown Dartmouth CN Rail Marshalling Yards UMA Engineering Ltd. for the City of Dartmouth, October 1995.

[50] The Development of a Gateway Hub at the Port of Halifax MBA thesis, James D. Frost, Saint Mary's University, 2002.

[51] We have not been able to locate this study to verify this estimate.

12.3 Recommendations for follow up

As of September 2016, the HPA has engaged WSP Parsons Brinkerhoff to develop a new Port Master Plan. HPA has indicated that one of the priorities is expanding container terminal infrastructure to accommodate 2 “ultra- large” container vessels of up to 400 metres in length simultaneously.[52] There are probably four options to consider: 1) expanding Halterm southwards; 2) expanding Halterm northwards; 3) building a new terminal in Shearwater; or 4) building a new terminal on the former Esso refinery lands.

The first option would result in additional encroachment on Point Pleasant Park. Whether this could be accomplished with a simple berth extension is not clear; some infilling might be necessary to work a ship efficiently, but this needs to be studied.

The second option expands Halterm’s existing footprint and would probably increase volumes through this facility, with concomitant impacts on traffic etc. If the rail cut comes into play in the meantime, then these issues might be mitigated somewhat.

The third and fourth options involve developing a new terminal on the Dartmouth shoreline, either in Shearwater or on the former Esso refinery lands.

A number of items should be considered in these discussions and in any future analysis:

- Can the Halterm lands be leased to property developers and the rent applied to a new terminal on the other side of the harbour? (We understand this is not a simple question and involves HPA’s Letters Patent).
- Does it make sense to invest in existing facilities on the Halifax side when there could be an opportunity to build new state-of-the-art facilities in Dartmouth? (sunk costs vs greenfield or brownfield development).
- Does it make sense to invest in infrastructure to mitigate the impacts of Halterm’s downtown location when those funds could be invested in a new terminal on the other side of the harbour?

[52] “Halifax Port Days 2016 Go Global - Karen Oldfield” https://www.youtube.com/watch?v=lsN0sY98DK4

13 HALIFAX GOODS MOVEMENT SCENARIOS

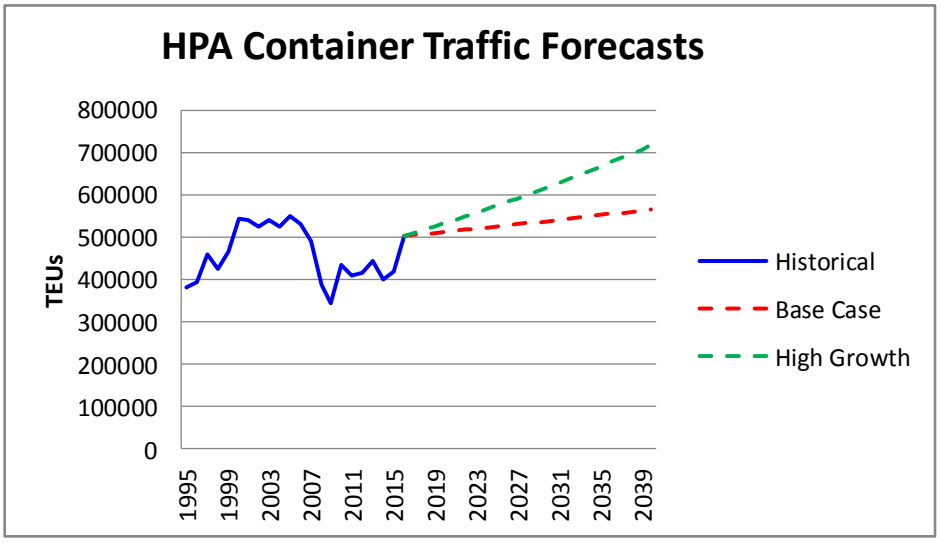
Stakeholder consultations conducted for this study indicate that the major issue related to goods movements within HRM is the impact of port-related truck traffic in downtown Halifax. The limited data which is available suggests that this activity is the primary source of heavy truck traffic on the Peninsula, and on the MacKay Bridge.

The scope of this project includes analysis of scenarios for the future of goods movement in HRM. Since port-related activity is the major influence on truck traffic, the scenarios developed for analysis are based on different levels of container traffic at HPA terminals, and used to analyze the impacts of potential changes in the external environment and of potential changes in operations of the port terminals.

13.1 Container Traffic Growth at Halifax Port Authority

Historical container traffic at the two HPA terminals from 1995 to 2015 is shown below. From 1998 to the peak in 2005, traffic grew at an average annual rate of 3.6%. Traffic was adversely affected following the financial crisis which began in 2007, and has been relatively stable at slightly over 400,000 TEUs per year since 2011. HPA statistics for 2016 show traffic up roughly 20% for the first half of 2016 over 2015.

For purposes of the scenario analysis, we have developed two alternative demand scenarios. The Base Case assumes that the 20% growth in traffic for the year to date will be sustained throughout 2016, and that subsequently growth will continue at an annual average rate of .5% per year. The High Growth Case assumes a gorwth rate of 1.5% per year.



Each of the demand forecasts is examined under three potential scenarios related to port terminal operations:

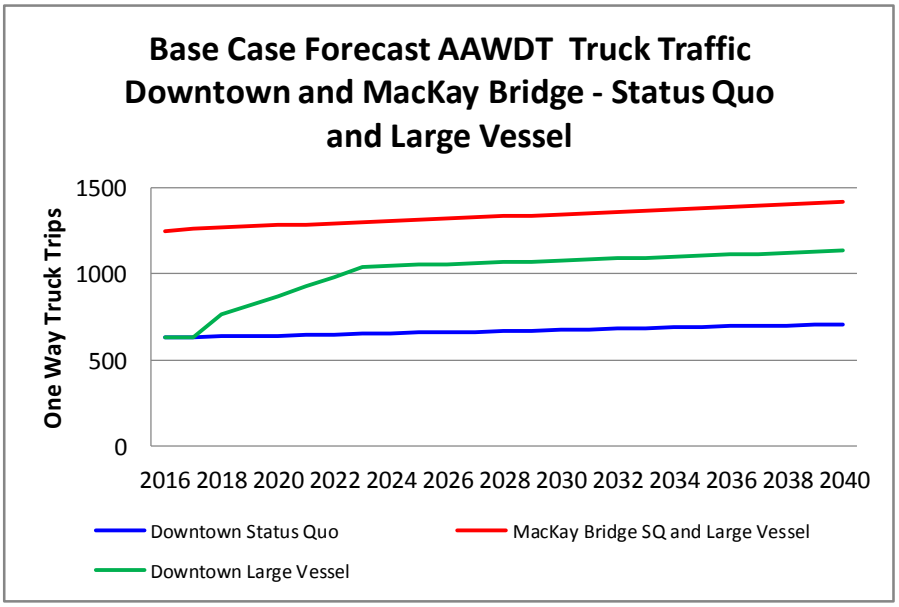
- A Status Quo scenario where traffic continues to be dvidied more or less equally beween Halterm and Ceres.
- A Large Vessel scenario where rapid deployment of large post-Panamax vessels forces concentration of container terminal activity at Haltern due to the air draft constraints under the harbour bridges; alternatively traffic may be shifted from Ceres to Halterm through changes in the commerical arrangements amongst Halterm, Ceres and HPA. It is assumed that Ceres remains in operation and 20% of traffic (which would consist of smaller vessels) continues to call at Fairview.
- A New Terminal scenario where all traffic is concentrated at a new terminal built at Shearwater or Imperial Oil on the eastern side of the harbour. To allow for the time required for planning and construction, it has been assumed that the new terminal would commence operations in 2025.

13.2 Base Case Forecast

The estimates of the potential impacts of the changes in port terminal operations on downtown and MacKay Bridge truck traffic are based on the following assumptions:

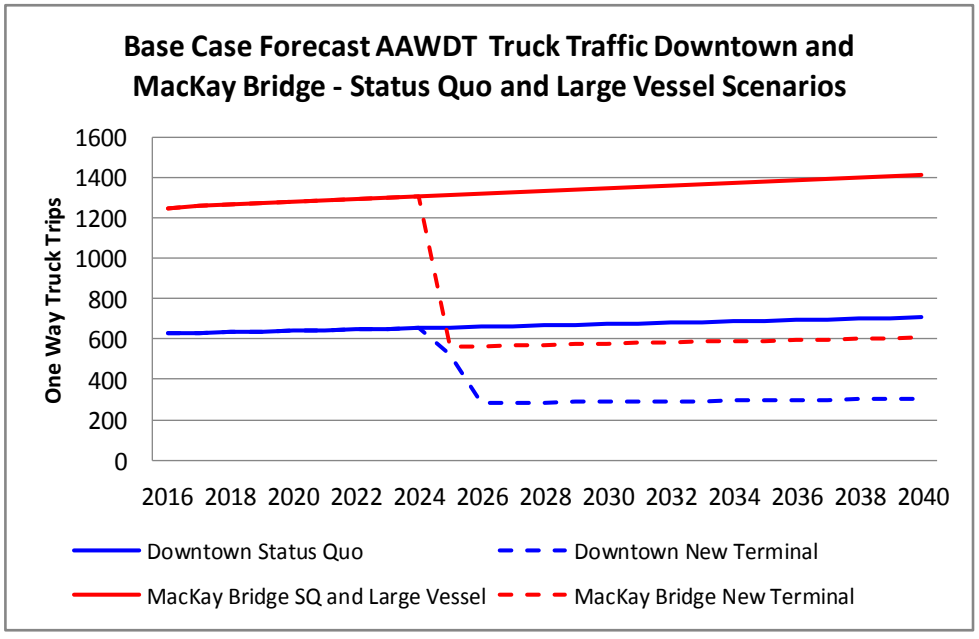
- Current port-related (one-way) truck trips total 880, and are predicted to grow at the same rate as overall port traffic.
- Port-related trips account for 70% of heavy truck traffic on the MacKay Bridge. For the New Terminal case, it is assumed that all of this traffic is diverted to the new terminal on the eastern side of the harbour and does not need to cross the harbour.
- Under the Status Quo scenario, traffic remains equally distributed between Halterm and Ceres. Under the Large Vessel scenario, the share of container traffic handled at Halterm grows by 4% per year, reaches a peak of 80% in 2023 and remains at that level until the end of the forecast period.

Under these assumptions, potential impacts on heavy truck traffic in downtown Halifax and on the MacKay Bridge are shown below.



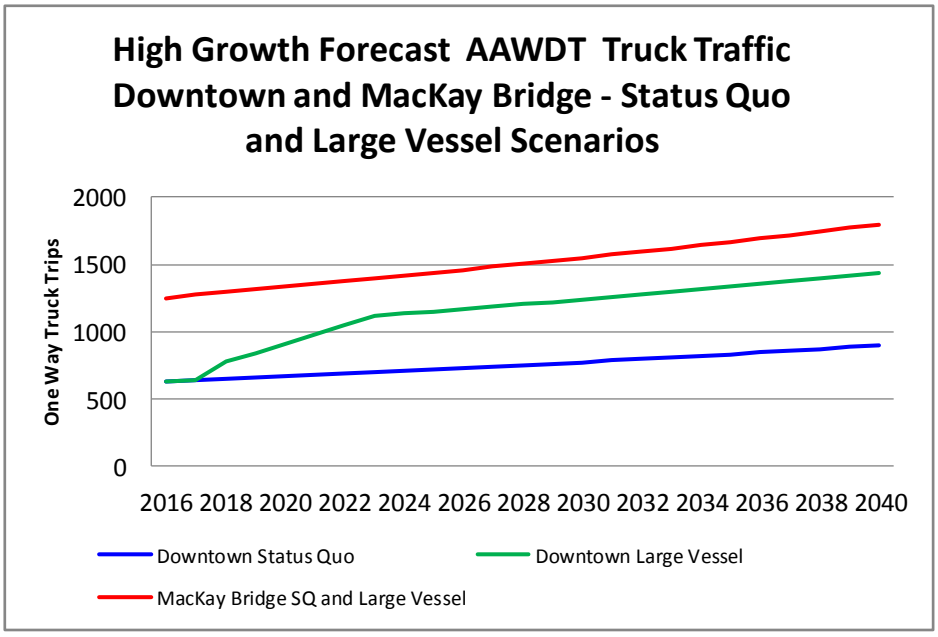
Bridge traffic is unaffected by the distribution of traffic between Halterm and Ceres. Under the Status Quo scenario, Annual Average Weekday Traffic (AAWDT) for heavy trucks in downtown Halifax increases from 629 trips in 2016 to 657 trips in 2015 and 709 trips in 2040. Under the Large Vessel scenario, downtown truck traffic increases from 629 trips in 2016 to 1052 trips in 2025 and 1100 trips in 2040.

Under the New Terminal scenario, in which all container-truck related traffic is transferred to a new terminal on the eastern side of the harbour, both downtown and MacKay Bridge heavy truck traffic would decline substantially. This would reduce any truck-related bridge congestion, and also reduce toll revenue for the Bridge Commission.

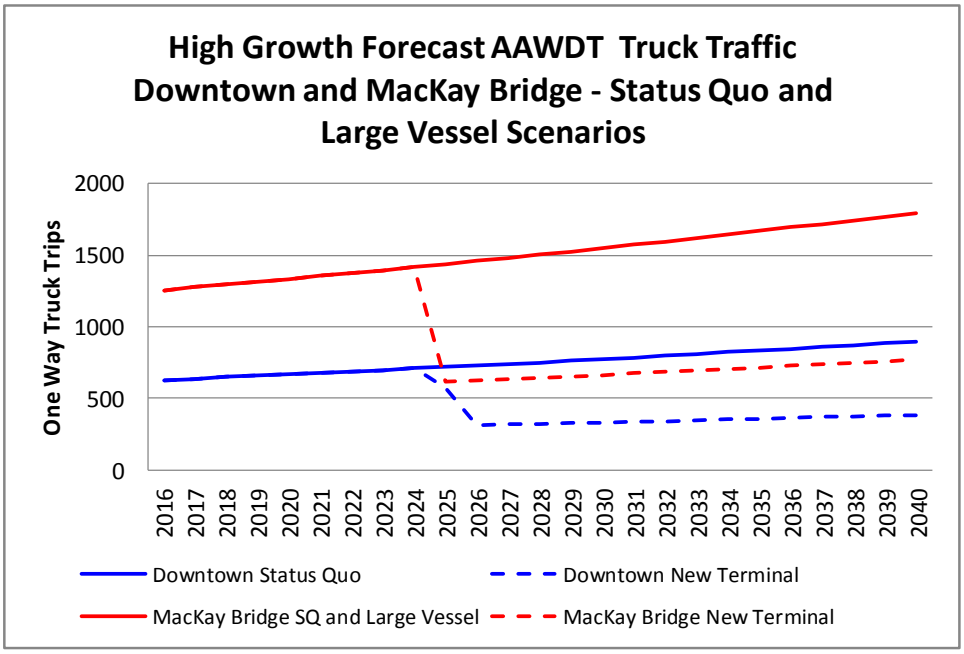


13.3 High Growth Forecast

Under the High Growth forecast, total port traffic will reach approximately 720,000 TEUs by 2040. Under the Status Quo scenario, Annual Average Weekday Traffic (AAWDT) for heavy trucks in downtown Halifax increases from 629 trips in 2016 to 719 trips in 2025 and 900 trips in 2040. Under the Large Vessel scenario, downtown truck traffic increases from 629 trips in 2016 to 1150 trips in 2025 and 1458 trips in 2040.



Under the New Terminal scenario, downtown heavy truck traffic would decline to half the current level by 2026, and heavy truck traffic on the MacKay Bridge would be similarly affected.



14 OPPORTUNITIES FOR IMPROVING GOODS MOVEMENTS IN HRM

14.1 Trade Hub/Gateway Issues

In our discussions with industry and community stakeholders about goods movement challenges in HRM, one issue dominated: port-related truck traffic in downtown Halifax. The problem arises from Halifax's role as a trade gateway, and dates back to the opening of the Halterm container terminal in 1969. When the terminal was built, it was anticipated that road access would be provided via Harbour Drive, an elevated freeway which was planned to replace Upper and Lower Water Streets and extend over the Northwest Arm. Construction of the freeway was abandoned because it would have required demolition of many historic buildings and permanently alter the distinctive character of the city. The existing issue can be seen as a long term consequence of a lack of goods movement planning; port trucks serving Halterm have been transiting downtown Halifax for almost 50 years. The current heightened awareness of the issue is also due in part to the impending demolition of the Cogswell Interchange, the only part of the freeway which was completed before the plan was abandoned.

Public recognition of the vital economic role of the Port of Halifax has been a factor in public tolerance. However, the realization of HRM's plans to create a more densely populated and liveable urban core in the downtown area is likely to result in increased public pressure for resolution.

The solutions must maintain the competitiveness of the Port of Halifax as an international trade gateway. The impact of environmental and social concerns on port competitiveness has been amply demonstrated in Southern California, where they have resulted in rising transportation costs and long delays in infrastructure investment. HRM needs to play a key role as a champion for the Port; the focus at the provincial level has been diluted due to competing proposals for new port facilities at Sydney and Melford. It is particularly important to maintain the diversity and scale of container shipping services to support local and regional export industries in the future. The problems experienced by exporters in Portland, Oregon following the reduction in container services calling at the Port of Portland provide a cautionary lesson for Halifax.

The competitiveness of trade gateways is dependent on a variety of factors, including:

- Location (distance from major freight origins/destinations by ocean transport).

- The local population base, which provides a market for imported commodities.
- The availability of export loads to balance inbound cargo flows.
- Cost and service quality of inland transportation.
- Availability of value-added services (warehousing, etc.).

Of these, the last two are the factors most amenable to HRM influence.

At many trade gateways, decentralization and consolidation of logistics facilities has resulted in "logistics sprawl" with increased local transportation costs and traffic congestion. HRM has the advantage of ready availability industrial land in the Burnside area, relatively close to port facilities. Progressive expansion of the logistics sector in Burnside, coupled with efficient and flexible transportation linkages to port facilities, can be a key competitive advantage for the Halifax gateway in the future. The Port of Savannah has successfully leveraged its accessibility to industrial land to become one of the fastest growing North American container ports, in spite of draft limitations on the Savannah River and channel linking it to the Atlantic Ocean.

14.2 "Last Mile" Urban Delivery Issues

Halifax is subject to congestion due to last-mile/first-mile problems related to local deliveries and pick-ups to or from businesses or residences. With the planned demolition of the Cogswell Interchange, and the potential consolidation of port traffic at Halterm, there is a sense among the business community in the downtown core that Halifax will be impacted with congestion even more than is currently the case. Even at current levels, the traffic is causing an increased interest in exploring solutions, including potential 'time-of-day' restrictions on local deliveries to form at least part of the solutions.

15 RECOMMENDATIONS

15.1 Integrating Goods Movement Considerations in the Planning Process

HRM's Integrated Mobility Plan is being developed to expand the focus of regional transportation planning. The traditional focus on people's need to move about the region will be supplemented to encompass issues including goods movement, higher-order transit, parking management, active and healthy communities, connected and autonomous vehicles, emerging options for ride sharing (such as Uber and Lyft), and the long-term potential for car sharing.

Currently there is no formal mechanism within HRM's planning process to ensure that goods movement issues are considered in planning decisions.

There is currently great interest in "Complete Streets" policies and design. For example, the State of California has passed legislation requiring communities to plan multimodal networks which allow for all users to effectively travel by motor vehicle, foot, bicycle, and transit to reach key destinations within their community and the larger region. In planning for goods movements, it is critical that the "users" include trucks, which are critical for the economic vitality of a region.

Los Angeles County has developed a new planning tool specifically to integrate goods movement considerations into a Complete Streets network. The County undertook a study to identify and designate a Countywide Strategic Truck Arterial Network (CSTAN). The study used truck count data from previous studies, Caltrans automated count stations, and the SCAG heavy duty truck model supplemented by new classification counts at 65 locations in 31 different cities. It also assembled data on truck crashes and GIS data on zoning to ensure that industrial areas are adequately served by the truck network. The CSTAN was overlaid with bike/path data to identify potential conflict locations between trucks, bicycles and pedestrians.

For HRM, a first step towards integrating goods movement considerations into planning decisions could be development of a checklist to ensure that all users' issues and interests have been considered. For goods movements this could include information on whether or not the location is on a major truck route, local land use patterns, and potential safety or economic impacts from changes to the volume or mix of traffic.

Typically major elements for development of a Goods Movement Strategy include needs identification, plan development, project programming, and project development and implementation. This process, along with its supporting functions, has proven effective in

helping states and Metropolitan Planning Organizations in the U.S. identify transportation needs, develop long-range mobility strategies, and target transportation investments. There are two key functional requirements for developing these elements.

15.2 Input from Key Stakeholders

Traditionally transportation planning has focused on the technical aspects of managing traffic flows. Decisions related to goods movement flows are based primarily on the commercial objectives of the participants, and planners are often unaware of potential economic impacts of transportation investments and policies. To bridge this gap, some mechanism for exchanging information and consulting on the impacts of transportation decisions must be developed; this is particularly critical for international gateway cities.

There are numerous examples in U.S. gateway cities:

- In Puget Sound (Seattle/Tacoma), the Puget Sound Regional Council hosts the Regional Freight Mobility Roundtable, a nationally recognized public-private forum to define and recommend actions serving freight mobility needs in and through the region. Private sector participants include rail, marine, air cargo and trucking carriers, and shippers such as Boeing and Weyerhaeuser. Public sector participants include local governments, the ports of Seattle, Tacoma and Everett, state agencies, and federal agencies within the U.S. Department of Transportation (including rail, highway, maritime) and the Department of Defense.
- In Portland Oregon, the Portland Freight Committee (PFC) serves as an advisory group to the Bureau of Transportation and City Council on issues related to freight mobility. The PFC was formed in February 2003 and includes both citizen volunteers and public agency representatives at the local, state, and federal level. The PFC meets on the first Thursday of each month.
- In Norfolk, Virginia the Hampton Roads Transportation Planning Organization has created the Freight Transportation Advisory Committee to advise the TPO Board on regional freight transportation requirements.

The most expeditious means to develop a similar capability in Halifax may be through an expanded focus for HRM in their participation in the existing Halifax Gateway Council. The Gateway Council membership includes representatives for a broad spectrum of private and public sector stakeholders including Halifax Port Authority, Halifax Stanfield International Airport,

CN, other service providers and shippers, as well as economic development agencies and federal and provincial agencies. The inclusion of regular discussions on HRM's transportation policy and investment decisions as a regular item in Council's agenda could enable the organization to be used as a more effective mechanism for exchanging information and consulting on potential impacts.

15.3 Data and Analytical Tools

Data and analytical tools are required to identify needs and assess effects of potential goods movement strategies. In general, the data currently available on the goods movement system in HRM is inadequate for these purposes.

Trucks are the lifeblood of the goods movement system in urban areas ("If you bought it, a truck brought it"). An understanding of truck traffic patterns is indispensable in understanding the dynamics of the system. A knowledge of freight (commodity) flows is useful in exploring the linkages between truck traffic and other activities, such as marine cargo volumes; however any attempt to estimate truck traffic volumes based on the magnitude of freight flows is subject to error due to technical challenges (for example determining average truck payloads and the number of empty truck moves included in trip patterns).

For this reason, we recommend that HRM explore options for conducting systemwide truck counts to gather data on the number and types of trucks on the regional truck route network.

Experience in Metro Vancouver provides a useful example. In 1999, a comprehensive study of the trucking industry and goods movement in the Greater Vancouver/Fraser Valley was jointly commissioned by TransLink, Transport Canada, British Columbia Transportation Financing Authority, British Columbia Ministry of Transportation and Highways, Insurance Corporation of British Columbia, Vancouver Port Authority, Vancouver International Airport Authority and the Fraser River Port Authority. The scope of the Lower Mainland Truck Freight Study included data collection through truck driver trip diaries, truck traffic volume and clssification counts, and specific surveys for special generators such as the Port terminals and for externally generated trips. The data was used for the development of a truck demand forecasting model that was incorporated into the EMME2 regional transportation demand model, and was incorporated into a province-wide study on goods movements by Transport Canada published in 2002. Updates of the truck classification counts were conducted in 2008 and in 2014 with funding assistance from Transport Canada and the BC Ministry of

Transportation and Infrastructure. These efforts have provided the key data and modelling capability for incorporation of goods movement considerations into regional transportation planning, and in developing Business Cases in support of funding opportunities.

The success of the Metro Vancouver program is attributable to:

- The cooperation of all of the major transportation service providers and transportation agencies in undertaking the project.
- The availability of funding from senior governments, particularly Transport Canada.

We recommend that Halifax work with major regional stakeholders to develop a program for collection of truck traffic data, and explore the possibilities for senior government funding for collection of data and modelling of truck traffic, and assembly of other key goods movement data to support the continuing competitiveness of the Halifax Gateway. There may also be potential for expanding the existing traffic modeling partnership between HRM and the Dalhousie Transport Collaboratory.

15.4 Truck Traffic in Downtown Halifax

HRM is not the primary decision maker in planning for port infrastructure and operations, but the city has a major stake in the outcome, and current decisions will affect the regional transportation system for decades to come. Close cooperation between HRM, HPA and other stakeholders is critical. The current Master Planning project being undertaken by HPA may provide an effective mechanism for this cooperation to take place.

Our consultations with stakeholders, and analysis of the limited data available, have identified port-related truck traffic in downtown Halifax as the major issue related to goods movement in Halifax. Solutions adopted by other gateway cities were reviewed in a number of case studies, and an extensive review of previous Halifax studies related to this issue was conducted. As a result of that review, we recommend further exploration of two potential solutions.

15.4.1 Cross-Harbour Ferry

This concept has been suggested as a potential alternative for container movements from Halterm. We recommend that further analysis be conducted on the feasibility of load on/load off (LO/LO) and roll on/roll off (RO/RO) options for a cross-harbour ferry operation to transport containers to and from Halterm.

A thorough examination of the feasibility of a short sea shipping solution should encompass the following elements:

- **Market Definition**

The need to ensure that solutions to downtown truck traffic do not result in reduced competitiveness of the Port of Halifax is widely acknowledged. Benchmarking of current drayage operations is essential to understanding the service parameters for a short sea shipping service to be competitive, and the scale of operations which may be achievable. In turn, the scale of operations is a key determinant of costs.

This analysis will require the assembly of detailed data on current drayage volumes and trip origins and destinations, along with service parameters such as terminal turn times, travel times and trucking costs. With this data, potential market demand can be estimated. In the event HRM wishes to consider subsidizing a short sea shipping operation as part of its transit system, this analysis will provide an indication of the level of subsidy which would be required (or in transit performance terms, the cost effectiveness and fare recovery of the service).

- **LO/LO Option**

A LO/LO cross-harbour ferry would typically use a tug and barge combination with containers loaded and stacked on the barge by cranes at each of the terminals (Halterm and a new terminal across the harbour; for purposes of demonstration, we have assumed a new terminal at Woodside). The advantage of this type of service is that it maximizes the capacity of each trip of the barge by stacking containers. Potential disadvantages include relatively high stevedoring costs, and loading and unloading operations are relatively slow.

LO/LO Container on Barge Service Fraser River 2014

Analysis of the costs of providing the service would encompass the following items.

LO/LO Cost Analysis			
	Halterm	**Woodside Terminal**	**Barge**
Operating Costs	Direct Labour Costs	Direct Labour Costs	Direct Labour Costs
	Labour Overheads	Labour Overheads	Labour Overheads
	Terminal Charges		Fuel
			Maintenance
Capital Costs	None	Land	Tug Cost
		Site Preparation	Barge Cost
		Container Handling Equipment	
		Road Access	

- **RO/RO Container on Chassis Option**

For this option, containers would be loaded onto chassis and driven onto the vessel. This option would result in a lower capacity for each trip than a LO/LO operation, but could result in lower stevedoring costs and faster loading and unloading. The photo below shows a RO/RO ferry used on the West Coast, the Carrier Princess, in Vancouver in 1986.

Carrier Princess RO/RO Ferry

This ferry is still in service with Seaspan Ferries between the Lower Mainland and Vancouver Island.

Analysis of the costs of providing the service would encompass the following items.

RO/RO Container on Chassis Cost Analysis			
	Halterm	**Woodside Terminal**	**Barge**
Operating Costs	Direct Labour Costs	Direct Labour Costs	Direct Labour Costs
	Labour Overheads	Labour Overheads	Labour Overheads
	Terminal Charges		Fuel
			Maintenance
Capital Costs	None	Land	Ferry Cost
		Site Preparation	
		RO/RO Ramp	
		Road Access	

- **RO/RO Truck Ferry**

A RO/RO truck ferry would be similar to the container on chassis option, except that the ferry would transport trucks (tractors) and chassis with the drivers between the terminals. A similar vessel would be used, however the increased length of the truck/trailer combination would reduce the per trip capacity. Potential advantages of this option include minimization of stevedoring costs and very fast loading and unloading. The disadvantage is that the driver remains "on the clock," and unless ferry transit times can meet or beat the highway times truckers are unlikely to use the service. Consequently the impact of the service on trucking costs would also have to be explored.

RO/RO Truck Ferry Cost Analysis			
	Halterm	**Woodside Terminal**	**Barge**
Operating Costs	Direct Labour Costs	Direct Labour Costs	Direct Labour Costs
	Labour Overheads	Labour Overheads	Labour Overheads
	Terminal Charges		Fuel
			Maintenance
Capital Costs	None	Land	Ferry Cost
		Site Preparation	
		RO/RO Ramp	
		Road Access	

For all of these options, costs are highly dependent on the scale of operations. Operating parameters would also have to be explored, including transit times and cycle times for the containers relative to the drayage options. For terminal costs at Halterm, it may be more product

to undertake discussions with Halterm management over potential terminal charges for the various options than to estimate costs.

15.4.2 Ceres – Halterm Rail Shuttle

The merger or consolidation of Ceres and Halterm and the potential movement of significant additional volumes through Halterm present an opportunity to examine the potential for a Ceres-Halterm shuttle. In effect, Ceres would become the truck gate for Halterm. Containers could move (container on flat car) COFC, TOFC (trailer on flat car) or use RailRunner technology. Halterm-bound units could be marshalled on the existing terminal, at Rockingham, in the area near the CN Maintenance facility or across Africville Rd where many containers are currently stored in an informal off-dock facility.

To further explore the concept of a Ceres-Halterm shuttle, the rail operating costs developed for the Atlantic Distripark concept are a useful starting point. The distance is shorter, but greater frequency of service would be possible. It may also be necessary to re-install the second track between Bayers Rd and Marlborough Woods.

Impacts on terminal operating costs would also need to be assessed. The truck gate and container yard capacity at Ceres would also have to be assessed to determine if capital investments would be required for additional infrastructure.

The overall costs to the system will also need to be assessed. These were estimated to be relatively low in the Distripark study. Trucks would not spend as much time driving into and out of downtown, which should positively affect their asset utilization. The benefits to downtown property owners and the city itself should also be assessed.

Management of both terminals would need to be consulted, as would shipping lines currently using Halterm, and major shippers using Halterm. CN is obviously key to any discussion, but there may be some interest from other potential operators of such a shuttle.

Potential options for recovering the cost of the service would also have to be explored.