

# Advancing Supply Chain & Logistics in Hamilton- Niagara Region: Forum Summary

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## 1.0 Executive Summary

Over the Summer of 2020, a series of virtual forum events (five over three months), hosted by the McMaster Institute for Transportation and Logistics, took place to investigate the theme of Advancing Hamilton-Niagara Supply Chains. The virtual forum was a replacement for an in-person event that was to have been held in late March 2020 but was postponed due to the COVID-19 pandemic. The purpose of this brief summary report is to provide a high-level overview of Forum results and also to provide access to the detailed materials that were assembled as part of the process. The event titles, dates and session moderators involved in the Forum are captured in Figure 1.



**Figure 1: List of Events in 2020 Forum**

The event featured participants and contributors from a diverse range of organizations, some of which were external to Hamilton-Niagara. This diversity of perspectives proved useful. During the Forum, participants heard about many aspects linked to advancing supply chains. Examples included but were certainly not limited to:

- The sense of momentum developing around the Port of Hamilton as its multimodal capabilities get continually enhanced and as relevant data sources are increasingly being leveraged.
- The prominence of multi-modality in the significant industrial developments taking place in the City of Hamilton.
- The COVID-19 effect in Niagara region and some indications about supply chain trends (e.g. nearshoring) that were being influenced as a result.
- Pre-COVID-19 survey results in Niagara revealing a focus on regional traffic congestion as a dominant issue for local firms and insights on supply chain capabilities and know-how to make firms more effective.
- Challenges of running a major freight carrier/logistics firm in a highly competitive environment where threats such as cyberattacks loom.
- How we may just be scratching the surface on the use of certain important data sources (e.g. Marine AIS data)

A high-level tabular summary of each of the first four events is included in Tables 1 to 4 below, beginning on page 6.

As a brief summary of the final roundtable event, it emerged that issues surrounding data were perceived simultaneously as the biggest opportunity and challenge for Hamilton-Niagara. Improving data collection and transparency via data was seen as the biggest opportunity while identifying the ideal neutral 3<sup>rd</sup> party to host data was seen as the biggest challenge. The precise identification and ranking of other important opportunities and challenges is attached below and is worth detailed review.

The roundtable featured a valuable presentation from Dale Thulin from the Vancouver Fraser Port Authority. He detailed some of the lessons that had been learned from working with a wide range of stakeholders on visibility issues at the Port of Vancouver. Perhaps the clearest insight that emerged was that the challenges of managing diverse and even competing stakeholders was

viewed as much more difficult than technology/data issues. It was noted in the roundtable discussion that accessing data for the greater good requires a lot of collaboration and stakeholder engagement. Another theme in the discussion is that data is a powerful means to generate solutions and to make the case for change/improvements in an evidence-based manner.

Near the conclusion of the roundtable discussion, it was certainly emphasized that there is a lot of marine-centred multi-modal momentum that has been gathering in the region, given initiatives that are under way. It was noted by multiple parties that Hamilton International Airport is a critical goods movement hub in the region and that significant infrastructure pressures are building as e-commerce continues its meteoric rise. There was general consensus that stakeholders linked to air cargo in the region have an important role to play in advancing Hamilton-Niagara supply chains and that there is a need for greater collective engagement of this group within the region, and in support of the region.

To conclude this brief summary document, we at MITL would like to thank all participants and contributors in helping to make the 2020 Forum a success. We would particularly like to thank each of our session moderators: Justin Terry, Ken Albright, Keith Robson, Chad Schella and Richard Koroscil for their support and guidance of their respective events.

**Table 1: High Level Summary of Event #1: Supply Chain Oriented Insights from Recent Hamilton/Niagara Research/Initiatives**

Niagara Trade and the COVID-19 Effect (Blake Landry, Niagara Region)	Better Understanding the Supply Chains of Niagara Region Firms (Mark Ferguson, MITL)	Data-Driven Precision Policy in Transportation Planning (Omar Shams, City of Hamilton and Amir Sayegh, Geotab)
Niagara a trading region with trading surplus but 90% of exports stay within North America. Manufactured goods account for 90% of export value	General GTHA congestion (not local) rated as most important desired improvement but not via “pricing” solutions	2010 - first unified truck route master plan for the City of Hamilton. Now a data-driven, evidence-based update is taking place
Niagara region imports are more geographically diversified than exports	Surveyed Logistics Costs of sampled firms are high; worry about high costs in the supply chain is prevalent	GEOTAB: Commercial vehicles like “sensors on wheels” leading to: “dynamic, always on, truck route master planning technology”
Recent COVID survey trends: reshoring, stockpiling, protectionism, being proactive to avoid future disruption	Evidence that more “accomplished” firms are more likely to outsource and export (beyond the US)	Geotab data has identified 8 million commercial vehicle trips with connections to Hamilton

**Table 2: High Level Summary of Event #2: Increasing the Competitiveness of Regional Supply Chains**

Total Logistics Cost in Canada (David Jacques)	Planning for an Integrated Economic Zone (Marcy Burchfield, Toronto Region Board of Trade, Economic Blueprint Institute)	Supply Chain Trends and Potential Impacts on Shippers and Carriers (David Short, Challenger Motor Freight Inc.)
Total estimated costs: <b>\$187.6 B</b> composed of <b>\$127.7 B</b> Transport, <b>\$52.6 B</b> carrying costs and <b>\$7.2 B</b> admin costs	“Toronto-Waterloo Innovation Corridor” an “Integrated Economic Zone.” Need to <b>collectively</b> address pain points and competitiveness issues.	Empty miles – only half of what is trucked to Vancouver comes back in loads. 60,000-person driver shortage in US another kind of “emptiness”
<b>\$103 B</b> trucking, <b>\$15B</b> rail, <b>\$5 B</b> freight forwarders, <b>\$2.9 B</b> marine, <b>\$1.6 B</b> Air	Growth Strategy has pivoted to Recovery but overall we occupy a very fast-growing region	Especially with Electronic Logging Devices – concern with trucks being “hacked” -- “Fictitious Pickups” also
Canada ranks 52 <sup>nd</sup> among nations in relative logistics costs	Flexible, Multi-modal strategic vision for the region (e.g. address issues like “lack of co-ordination” across sub-regions)	Average length of haul has been decreasing as goods staged closer to end-markets

**Table 3: High Level Summary of Event #3: Leveraging and Integrating Data for the Marine Sector**

<b>Automatic Identification System (AIS) Data and Marine Connectivity, (Marin Kress, United States Army Corps of Engineers)</b>	<b>Leveraging and Integrating Data for the Marine Sector (Ken Carey, St. Lawrence Seaway Management Corporation)</b>	<b>Ontario Supply Chain Visibility Project (Ian Hamilton, HOPA Ports)</b>
Real time shipboard broadcast system (ship to ship and ship to shore) - temporal resolution of 6 seconds and detailed locational	The Seaway is linked to 41 Ports with cargo volumes only down 10-12% this year on average	HOPA leading a multimodal integration pillar that will push data/analytical insights out for better decisions (answers to questions)
Many applications apart from tracking where vessels go (e.g. dwell times, port efficiency, dredging, fog impacts etc.) – just “scratching the surface”	Data on Seaway Delays: 60% due to pilotage issues, 32% environmental (e.g. high winds)	Access to varied data including through two other GTHA pillars; Solution-based packages; no need for stakeholders to manage large data
An exploration with AIS showed how HOPA-linked vessel interactions with Seaway are prominent in Western Lake Ontario	Advanced technologies: 3D navigation and draft optimization to max out cargo; vessel self-spotting; hands free mooring	Bring people together Make new and better supply chain solutions Robust governance to protect proprietary information

**Table 4: High Level Summary of Event #4: Infrastructure Improvements and the Supply Chain**

<b>CBSA Perspectives on Advancing Hamilton-Niagara Supply Chains (Fred Gaspar, Canada Border Services Agency)</b>	<b>Economic Development &amp; Transportation Planning and Infrastructure (Norm Schleehahn and Steve Molloy, City of Hamilton)</b>	<b>Greater Golden Horseshoe (GGH) Transportation Plan (Michael Casey, Ontario Ministry of Transportation)</b>
Strong sense of digital infrastructure and its importance to the supply chains of tomorrow – “where does the risk lie?” (reside)	One of busiest industrial development periods in Hamilton of the past 30 years – 1.5 million sq. feet of developments city wide	Seeking an integrated multi-modal system to support a competitive economy and communities; act as a platform for building partnerships & common objectives
Legacy systems with “patchwork” remain heavy but moving from paper Supported by data-driven decision-making with aim to “cut down the time we need with data”	Pronounced AM/PM peaks on local highways have disappeared this year – telecommuting and other forms of TDM promising for efficient and sustainable outcomes	GGH accounts for 2/3 of Ontario GDP with \$1 Trillion of goods moving over GGH highways
Pilot programs – “access systems of couriers to look at their data”; deliver CBSA officers into the pre-clearance commercial stream	Multi-modality a strong theme in Airport Employment Growth District and at Port of Hamilton re-developments	A “Strategic Goods Movement Network” being identified and “gap analysis” shows current infra will not suffice over time

## 2.0 Appendices

Detailed forum materials in the form of comprehensive session video recordings, PDF versions of slide presentations and in-depth event summaries are available on MITL's Forum web page:

<http://mitl.mcmaster.ca/mcmaster-hamilton-niagara-forum>.

Attached below are two important sources of insights from the Forum. For events 1 to 4, detailed event briefs are attached that offer good coverage of the Forum in a fairly portable and quickly reviewed format. Secondly, a brief report prepared by NeOlé Inc. (the facilitator of the workshop at the rountable event) is included to assist in detailed review of opportunities and challenges. We would like to thank Laura and Ginny from NeOlé for their assistance in making this report possible.

# McMaster Forum Event #1: Supply Chain Oriented Insights from Recent Hamilton-Niagara Initiatives/Research (June 17<sup>th</sup>, 2020)

## Overview

This June 17<sup>th</sup> virtual event hosted by the McMaster Institute for Transportation and Logistics (MITL), and moderated by Justin Terry of Transport Canada, was the first in a series of five events linked to the McMaster Forum (which was originally scheduled to take place in-person in March 2020). The first few minutes of the event were dedicated to introducing participants to the Forum, offering an overview of strategic priorities, and reminding people of outcomes from the March 2019 McMaster Forum. Subsequently, there was a series of three presentations that highlighted some of the recent work that has been taking place in the region to assist supply chains. Whether collected via survey, through sensors or other means, data collection and analytics were quite central to some of these recent initiatives in Hamilton-Niagara Region and this is consistent with a theme that emerged from the 2019 Forum process. Due to time constraints, the event concluded with a brief discussion session and some brief thoughts from each of the main presenters.

## Introductory Remarks

- **Saiedeh Razavi, Director of MITL**
  - a. Welcomed all Forum participants, outlined Forum objectives and process and gave a preview of the June 17<sup>th</sup> proceedings
  - b. Noted that Forum series has been created to promote and foster collaborative, integrative and innovative approaches to advance supply chain logistics in Hamilton-Niagara Region
- **Louis-Paul Tardif, Transport Canada:**
  - a. Transport Canada has spent several years studying multimodal integration in supply chains
  - b. Transport Canada is seeking greater transparency for data that it hosts and the newly founded Canadian Centre on Transport Data is testament to this focus
  - c. There is currently a Hamilton-Oshawa Port Authority Supply Chain Visibility initiative underway and MITL will play a role this summer in getting relevant marine oriented data sets in a form suited for public release by October 2020
  - d. Looking at creating as near a real time database as possible that will be living, assisting the Port Authority, and the region, to evolve toward a multi modal supply chain concept
  - e. Transport Canada fully supports the partnership initiatives within Hamilton-Niagara that ultimately should lead to improved functioning supply chains in the region
  - f. Looking forward to discussing these and other aspects at the September roundtable virtual event that will conclude the current Forum series of events

## Key Learnings from 2019 Forum (Mark Ferguson, MITL)

- 2019 Forum process for Hamilton-Niagara outlined, including 24 stakeholder organizations that were interviewed and March 27, 2019 Forum event was held at McMaster
- Primary issues: high costs in the supply chain, shortages (e.g drivers), congestion linked to road and rail, infrastructure concerns and others
- Takeaways: the needs for collaboration and a collaborative environment; an integrated, multi-modal focus; funding to plan; focus on SME development; harnessing technology and data

## Niagara Trade and the COVID-19 Effect (Blake Landry, Niagara Region)

- Reinforced that Niagara region is a trading region and trade with the US is very important. Niagara region actually has a significant trade surplus
- 90% of Niagara region exports by value stay within North America

- Manufactured goods constitute 90% of Niagara region exports by value but only 54% of imports by value -- machinery is an important component
- There is a general theme that imports are more geographically diversified than exports as it relates to Niagara Region
- The Welland Canal, and under-utilized employment lands nearby, seen as an important opportunity to better leverage in the future -- new short line rail investments in the vicinity are helping in this regard along with Niagara Region collaborations with other agencies
- Importance and uses of late 2019 business survey results obtained in partnership with MITL outlined
- Also, Niagara Region has carried out two surveys with its businesses in 2020 in relation to the COVID crisis. The second survey has revealed that there are trends toward: reshoring of supply chains, stockpiling rather than just-in-time, finding ways to avoid future disruption, protectionism, higher capital requirements to operate and others.
- Full survey results and report are available at:  
<https://niagaracanada.com/covid-19/updates/economic-rapid-response-team-completes-second-survey-of-niagara-businesses/>

### Better Understanding the Supply Chains of Niagara Region Firms (Mark Ferguson, MITL)

- A sampling of results from an extensive Pre-COVID (Fall 2019), on-line survey of Niagara businesses that originate freight movements was presented (103 complete survey responses and 98 partial responses)
- Among a wide range of results and findings are a few main outcomes:
  - a. Logistics elements emerge as a significant cost of doing business and there is worry among businesses about these high costs
  - b. Traffic congestion (especially in the Greater Toronto Area) is rated as the most important desired improvement but "pricing solutions" are not favoured by firms
  - c. Niagara firms are more internationalized on the sourcing side than the revenue side but less difference in the manufacturing sector
  - d. Outsourcing logistics appear as a strong differentiating variable -- firms that master this appear more accomplished
  - e. Firms that have accomplished some export diversification (beyond the United States) are more optimistic about it and have a higher opinion of what it can do for a firm
  - f. SMEs predominate in Niagara region (and indeed much of Canada) and it seems clear that intangibles such as ambition and momentum really affect the trajectory of businesses
- The report underlying this presentation is available at:  
<http://mitl.mcmaster.ca/portfolio/exploring-goods-movement-and-export-diversification-niagara-region-firms>

### Data-Driven Precision Policy in Transportation Planning (Omar Shams, City of Hamilton and Amir Sayegh, Geotab)

- Good overview offered of the various aspects and issues that are play as the City of Hamilton seeks to update the Truck Route Master Plan. 2010 was the first year that this plan was unified within the amalgamated City of Hamilton and now there is great interest to use an evidence-based/data driven approach to assist with the current update.
- Relevant data sources include: some from City of Hamilton, MTO commercial vehicle survey, Geotab, Census, and qualitative stakeholder inputs
- Noted that the City of Hamilton is paying close attention to how disruptive supply chain technologies (e.g. drones and others) may play a role and how this might affect planning processes in the future
- Geotab is highlighted as a key partner and provider of an important "big data" source to assist in planning
- Commercial vehicles with Geotab technology built in can be thought of as "sensors on wheels"
- Noted that 8 million commercial vehicle trips with connections to Hamilton have been identified in the data and this type of information forms the basis for a "dynamic, always on, truck master planning technology."

# McMaster Forum Event #2: Increasing the Competitiveness of Regional Supply Chains (July 8th, 2020)

## Overview

This July 8th virtual event hosted by the McMaster Institute for Transportation and Logistics (MITL), and moderated by Ken Albright of McMaster University, was the second in a series of five events linked to the McMaster Forum. The session highlights that competitiveness is a multi-faceted topic and that perspectives on competitiveness in the supply chain depend on the organizational context. The Forum offers an opportunity to improve our understanding.

## Introductory Remarks

- Saiedeh Razavi, from MITL, welcomed participants, outlined the series of events associated with the Forum, and offered a few highlights that emerged from the first event.
- Louis-Paul Tardif, from Transport Canada, offered a summary of more detailed remarks offered at Event #1 by outlining the range of visibility projects sponsored by Transport Canada across Western, Central and Eastern Regions. Reinforced the role of partnership and highlighted the new “Canadian Centre on Transportation Data.”

## Total Logistics Cost in Canada (David Jacques, Transport Canada)

- The purpose of the research has been to determine, over time, how much is spent on logistics in Canada. Characterized as essentially an accounting exercise using information collected from a variety of sources (e.g. Statscan surveys, data reported by Ports and others).
- Total estimated costs: \$187.6 B composed of \$127.7 B Transport, \$52.6 B carrying costs and \$7.2 B admin costs
- Aggregate transport costs appeared to decline during the Great Recession of 2008-2009 and then rebounded rapidly to 2014 before levelling off.
- The share of carrying costs has been increasing recently (in inflation-adjusted terms).
- Components of transport costs: \$103 B trucking, \$15B rail, \$5 B freight forwarders, \$2.9 B marine, \$1.6 B Air
- Adjusted for inflation, the total logistics cost has hit new highs in recent years but has been more stable as a percentage of GDP (recently about 8.4%) – could decline in current environment.
- Noted that recent Niagara Survey results yielded higher relative logistics costs, though comparable on transport costs. The fact that the service sector is not included in the Niagara Survey is one explanatory factor.
- Several advanced countries appear to have lower relative logistics costs than Canada (which ranks 52<sup>nd</sup>) but there are also many countries with beyond 15 or 20% of GDP linked to logistics.

## Planning for an Integrated Economic Zone (Marcy Burchfield, Toronto Region Board of Trade)

- While TRBOT itself is now 175 years old, there has emerged a recent focus on the wider region; goods movement became an active policy issue in 2016 at TRBOT and a “Movement of Goods Council” is convened by TRBOT. The work of the Economic Blueprint Institute (EBI) is the new data and research arm of the TRBOT
- The TRBOT “Integrated Economic Zone” refers to the “Toronto-Waterloo Innovation Corridor,” which includes five contiguous census metropolitan areas the Toronto, Oshawa, Hamilton, Guelph, and Kitchener-Cambridge-Waterloo. The geography aligns with the Innovation Corridor Business Council, a coalition of the region’s 11 largest chambers of commerce that come together to jointly advocate for better connectivity. While Niagara Region is not directly included in the Innovation Corridor, EBI is collecting data to include areas adjacent to the Corridor to inform issues like goods movement.
- Up until March, EBI’s research and data analysis focused on the need for an economic strategy for growth, but COVID-19 has caused a pivot and reframing to a recovery strategy
- Central point is that the economy is a regional economy and there is a need to collectively address pain points and competitiveness issues - the need for a multi-modal strategic vision for goods movement is noted.
- The region is well-connected but there is a lack of co-ordination on logistics management among modes – noted that MTO is emphasizing multi-modal for the long term.
- A lot of emphasis in the work is related to “economic structure” – state, scale and make-up of production especially; the scale and location of transportation and warehousing jobs is presented.
- Noted that the Toronto Pearson Employment Zone is highly dependent on the automobile.

- A new partnership between TRBOT and Transport Canada described – It is around data sharing and improving the predictability of supply chains in the region – dashboard a likely outcome; there is a lack of granular, sector-specific data for the movement of goods.

### Supply Chain Trends and the Potential Impacts on Shippers and Carriers (David Short, Challenger Motor Freight Inc.)

- Challenger is a full-service firm with asset and logistics capabilities. The firm operates 1000 trucks and 3000 trailers with significant capabilities related to warehouse, intermodal, air and ocean and offices in the US.
- The basic objective is to use technology to allocate the shipments of partners with available carrier capacity.
- Inventory to Sales Ratios have risen dramatically in the current COVID environment after rising gradually since about 2012. Low interest rates imply that the costs to hold inventory are lower and just-in-time delivery is less cost effective than it would have been otherwise.
- Rates are influenced by how close customers are located to where the trucks generally go.
- Empty miles a challenge: noted that only half of what is trucked out to Vancouver from Ontario comes back in terms of loads and this puts a lot of downward pressure on the rates that can be charged. Meanwhile, air is taking a lot of e-commerce shipments moving east from Vancouver.
- Average length of haul has been decreasing and warehousing closer to end markets has been increasing as goods are staged closer to end markets.
- 400-500 miles is a key radius defining the range that a driver can cover in a day – important demarcation.
- The rise of Omni-Channel is emphasized – customers want data from every entity they deal with.
- There is a 60,000 person driver shortage in the United States which is expected to worsen in the next 10 years
- The job of driver is not appealing for many as the lifestyle can be difficult and it has not attracted many women
- Electronic Logging devices will be mandatory in Canada by June 2021 and this will impact capacity; noted that about 15% of competitor firms are not fully compliant with the new regulations.
- “Fictitious pickups” becoming more of a concern and certain shipment types are theft prone (e.g. food and beverage, cannabis products).
- Concern is expressed about security deficiencies for ELDs deployed in small fleets – malware could simultaneously “shut down” multiple vehicles; have been working with the U of Waterloo to make sure that Challenger trucks cannot be hacked.

### Discussion Session led by Ken Albright, McMaster University

- David Jacques noted that Logistics Costs work is being updated every year but some of the policy implications are still being evaluated; was hesitant to say that it is good for logistics costs to go down since it depends on the perspective from which it is viewed.
- Marcy Burchfield noted that Peel Region freight movements are a very important contributor to TRBOT Pearson Airport Hub but they consider that this hub crosses into the City of Toronto and Vaughn – suggested that the Hub could use its own kind of “district plan.” Peel is noted as a leader in local logistics planning and seen as an outlier relative to some areas within the Integrated Economic Zone.
- Marcy notes a big strategic concern that we are at the centre of the fastest growing region in North America (100,000 additional population per year) and the conflicts between land uses and the relationship with congestion must be managed well through proactive (and less reactive) planning.
- In terms of public policy and land use planning, Marcy noted that there needs to be flexibility to make course corrections in response to new and better data and that the information has to flow properly between the organizations that need it.
- David Short notes an opportunity for northbound consolidated shipments coming across the border because most US carriers would prefer to drop their load (i.e. in Niagara) and immediately pick up a US load.
- David S. notes that Challenger is seeing nearshoring and onshoring but also notes high infrastructure requirement to support – may result in more local drayage (containers on trucks).
- David S., on strategic concerns, notes that margins are very tight (about 3%) and their business is capital intensive; some concern about the emergence of non-asset based competitors who might cause rates to go up.
- Dina Carlucci from John C. Munro Hamilton International Airport responded to a question about airport-related infrastructure and noted the need to improve access between the airport and Hwy 403 through improved capacity and lighting. Capacity improvements to Hwy 403 also seen as desirable.

# McMaster Forum Event #3: Leveraging and Integrating Data for the Marine Sector (July 29th, 2020)

## Overview

This July 29th virtual event, which was moderated by Keith Robson (JKR Associates and Chair of MITL Advisory Board), explored the potential for data to play a more prominent role in expanding marine and multi-modal freight movements in the supply chains tied to the region. The session featured a presentation that showed the potential for data associated with a specific technology (AIS), one that explored how the St. Lawrence Seaway leverages data and finally an overview of how the Hamilton-Oshawa Port Authority is at the heart of a new multi-modal integration pillar centred on leveraging data.

## Introductory Remarks

- Saiedeh Razavi, from MITL, welcomed participants, outlined the series of events associated with the Forum, and offered a few highlights that emerged from the prior event in the Forum,
- Louis-Paul Tardif, from Transport Canada, expressed excitement about the supply chain initiatives unfolding in this region and noted that Transport Canada has been involved in similar efforts elsewhere in Canada; Noted that the Golden Horseshoe is at the heart of the Canadian economy and stressed the opportunities available; Noted that reform of the Transportation Act has induced efforts towards more transparency on supply chain information

## Automatic Identification System (AIS) Data and Marine Connectivity (Marin Kress, United States Army Corps of Engineers)

- AIS stands for Automatic Identification System
- A real time shipboard broadcast system - ship to ship and ship to shore - originally a safety technology -- transmission frequency every 6 seconds (i.e. high temporal resolution)
- "GPS with more" - speed, direction heading and vessel identifiers, some data elements are not dynamic
- Required for most commercial vessels in US and used by many recreational vessels
- US coast guard enforces AIS standards
- On-shore signals received through a series of towers - excellent coverage given the effective radius around towers -- good coverage around Great Lakes but the lower St. Lawrence is not covered well within the U.S tower network.
- There are various applications beyond tracking where vessels go (e.g. dwell time, port efficiency, resiliency, fog impacts, accidents and impacts on operations and others)
- Shoreline erosion - while there are high water levels now in the Great Lakes, AIS assists with assessing vessel activity in relation to dredging requirements
- Understanding waterway usage is a big focus -- visualize vessel traffic densities
- Heatmaps show a lot of vessel "hotspots" in vicinity of western Lake Huron, for example
- Create a vessel trackline -- where do vessels go? Vessels can be sorted by types: tugs, tankers etc.
- Cargo vessels traverse the lakes while recreational vehicles quite localized to western Lake Ontario; tug and towing patterns clearly show Hamilton linkages with Toronto/Oshawa and secondarily to Welland Canal
- Movements can be colour coded by speed -- how are vessels interacting with different circumstances? Are they going too fast and breaking the speed limits?
- Results shared of a Port of Hamilton case study for 2019 traffic - 24 hour movements of vessels that passed near the Port are shown
  - For example, a lot of tug and towing activity between Hamilton and Oshawa
  - Tankers mostly moving to and from St. Lawrence - cargo vessels seem to cover a little wider area and more of a linkage to Welland Canal
- Port Pair Analysis is possible, and this facilitates origin-destination matrices
  - A lot of movements from Hamilton to/from Welland Canal and secondarily to/from Toronto
- Overall, AIS offers an important source of information in helping to understand regional supply chains and also offers a host of potential applications

## Leveraging and Integrating Data for the Marine Sector (Ken Carey, St. Lawrence Seaway Management Corporation)

- Hwy H<sub>2</sub>O - 3700 km marine highway that also consists of a large network of partners (though some Ports are competitors)
- Seaway linked to 41 ports and acts as the gateway to the heartland; Supports 238,000 jobs
- A vessel into Hamilton could be an outbound load out of a US partner
- Cargo volumes down 10-12% year-to-date but for rail movements, some commodities are down much more (given the trying current circumstances)
- Predictability - is important and shippers want to know what they can count on (e.g. advance notices of Seaway opening and closing dates)
- Big challenge is the Seaway closure due to winter (end December to March) but about 10 days has been added to navigation season on average since year 2000
- Severe ice problems two years ago towards Montreal
- Reliability - once open, we stay open (some locks in Mississippi may be more in the "60% open" range versus 99.5% in Seaway -- but complications do happen even in the Seaway)
- Advanced technologies have been important:
  - 3D navigation and draft optimization-- now it is a time of high water but there is always a need to max out cargo,
  - vessel self-spotting
  - hands free mooring -- good for managing COVID (not originally anticipated)
- Data analytics used to characterize Seaway delays: 60% due to pilotage issues, 32% environmental (high winds), and other elements are less prevalent (e.g. system unavailable due to maintenance)
- Fluidity - currently at 50% of capacity - there is an aim to attract more traffic from road and rail; traffic data are leveraged to maintain efficiency and fluidity
- Resiliency - the Great Lakes market has been very resilient; Hands Free Mooring has shown adaptability to market needs
- Our Catalyst Role - we work with a wide range of partners (carriers, ports/terminals, government, 3PLs, shippers)
- Organization is not-for-profit but we do charge a toll for transiting locks
- Interesting 4 minute information video on Seaway shown for participants
  - Great Lakes St. Lawrence Region would rank as 3rd largest economy in the world if it were a country
  - Draft information system - 3D model of channel
  - Each lock has 3 Hands Free Mooring units - safe and less wear and tear on locks, less need for special vessel fittings

## Ontario Supply Chain Visibility Project (Ian Hamilton, HOPA Ports)

- Cargo associated with HOPA worth about \$3.5 billion per year
- Data is the new currency - develop other transportation systems through better use of data
- HOPA is leading development of the multimodal integration pillar for the data side of things - (useful schematic diagram available in PDF presentation)
- 3 pillars noted for the Ontario Supply Chain Visibility Project:
  - Planning/Policy (led by University of Toronto - Smart Freight Centre).
  - Business (led by Toronto Region Board of Trade)
  - Multimodal Integration with HOPA as data stewards
- Can draw info from eight data sources and put in one data warehouse (rail, marine etc.) - break down historic silos of how this information is held
- Worth noting that there is a lot of capacity availability linked to **existing** vessel movements - how do we leverage the data that we have to improve matters?
- Considerable focus on the Golden Horseshoe - \$6B estimated annual cost to economy of congestion - better data understanding can help address
- Project Goals:

- Increasing Transparency within the Southern Ontario market
  - Make good infrastructure decisions
  - Bring people together to make supply chain solutions
  - Conversations/collaboration to help create "better mousetrap"
  - Create governance model that helps to protect proprietary information
- Modal optimization
  - Ontario does not have a fully developed modal plan
  - Modes compete but we are not talking about modal shift so much as better modal balance
  - Create new transport products and services
  - Reduce congestion cost and greenhouse gases
  - No longer look at things in isolation -- look at all modes in the data hub
  - Address aspects like driver shortages
  - Work closely with trucking and rail - 500,000 truck trips a year linked to HOPA properties
- 10 main stakeholders (3 modes, municipalities/regions, province, seaway, companies and shipping lines)
- HOPA role
  - Responsible steward -- push info out to enable good decisions
  - Kick start some analytical projects
  - Research projects that address real problems
  - All groups will become more innovative in addressing challenges
  - MITL is a main partner for more in-depth projects; HOPA will look more at ad hoc/smaller projects and noted that Seaway Management Corporation has a good analytical team
- Benefits to stakeholders by putting together the data hub
  - Access to various sources of data including through the other two pillars
  - Results provided in solution-based package (as an answer to a question)
  - No need to manage large data - can ask HOPA for what is required
- Plan for remainder of 2020
  - Governance and sharing (3rd quarter)
  - Data structure and analytics (Q3)
  - Complete public data access (Q4)
  - Provide data to Canadian Centre on Transportation Data (Q4)

## Discussion Session led by Keith Robson, JKR Associates

- (Marin Kress) Regarding AIS (terrestrial versus satellite receivers) -- lose recreational movements with satellite as can't transmit to that altitude; Also, satellite is more like 15 minutes temporal resolution (as opposed to seconds) – which could be fine for some studies; Regarding AIS potential: Just scratching the surface -- new groups of people always come back with innovative new applications
- (Ken Carey) -- what missing data elements are most keenly wanted?
  - Where we struggle is with shippers and carriers (upstream in the supply chain) cautious to share plans or still working out details (e.g. shipping and order plans/purchase orders)
- What barriers remain?
  - Ken Carey touched on the willingness to take the risk to share information
  - Ian Hamilton notes the equation of short-term risk for long term opportunity among some actors -- there remains some resistance to change
  - Ken Carey provides an example of how Home Depot dealt transparently with CP and CN Rail in selecting a vendor; his view was that Home Depot learned a lot in the process and benefitted from dealing transparently with both parties
- Where is the Province in all of this?
  - (Louis-Paul Tardiff) Fully supportive and have had this support over many years
  - (Ian Hamilton) Province is doing commercial vehicle study for the vicinity; There has been a jurisdictional challenge -- and the province can further bring multimodal concepts into their planning. Hopefully, the multimodal pillar can "open eyes" to the potential opportunities
- Louis-Paul Tardiff Comment: All the pieces are falling into place -- and quite pleased to hear mention of MITL partnership with HOPA

# McMaster Forum Event #4: Infrastructure Improvements and the Supply Chain (August 19th, 2020)

## Overview

This August 19<sup>th</sup> virtual event, which was moderated by Chad Schella of Canada Post, offered a good overview of how infrastructure is intimately intertwined with supply chains. Presentations from the federal, provincial and municipal levels highlighted unique perspectives on the process of moving supply chain performance forward in Hamilton-Niagara and some of the related opportunities from the infrastructure perspective.

## Introductory Remarks

- Saiedeh Razavi, from MITL, welcomed participants, outlined the series of events associated with the Forum, and offered highlights that emerged from the prior Forum event
- Louis-Paul Tardif, from Transport Canada, noted that infrastructure is an important focus of a recently released Federal 2030 plan and that supply chain visibility is a cornerstone of Transport Canada interests (i.e. fluidity, resilience, variability); After a series of initiatives across the country, the main focus is now in the economic heart of Canada with the Greater Toronto Hamilton Area including Hamilton-Niagara; The pieces for Smart Freight Centre have been put into place and also the Canadian Centre of Transportation Data will promote greater transparency

## Advancing Supply Chain and Logistics in Hamilton Niagara – CBSA Perspective (Fred Gaspar, Canada Border Services Agency)

- Front and centre - quality and robustness of supply chain and logistics (more so than in the past)
- Overview of CBSA - comprehensiveness and selectiveness - we engage in choice
- Security and prosperity protected - Fred responsible for goods movement
- Also have export controls in a lot of areas - responsible for revenue integrity
- 3 prongs of a triangle -- done through a wide variety of physical infrastructure
- Widely dispersed delivery model for services which makes things challenging
- Trusted traders - certain facilitated services - e.g. auto industry
- If your Amazon package is late, the CBSA may have played a role
- E-commerce has absolutely exploded -- air cargo dried up out of China -- we started seeing use of the marine mode as a substitute and it caused CBSA complications
- 87% is courier and postal - this is a big change since it used to be brokers and intermediaries ordering large amount of goods for distribution
- Mail volumes are way up ("mops, brooms and back scratchers") - unprecedented
- Challenges
  - Dynamic ongoing discussion with Canada Post -- product needs to move, the more volume the more risk in terms of what gets through that should not
  - Legacy systems that respond to how things used to work - need to adapt
  - Variable resource demands versus a finite model - too many patchwork solutions at present
  - Tradeoffs are inherent and meanwhile there are social distancing protocols that complicate how staff can operate
- Modernization
  - Who, what, where - leads to effective targeting - advanced data and analytics needed
  - Keep swine fever and certain pork products out of the country
  - Try to screen out the low risk - e.g. via trusted trader
- E-commerce Strategy
  - Deal with the volume by leveraging data, technology and harmonization with partners, where does the risk lie?
  - Goods are often transshipped through a 2nd country and to a third
  - Need to address from just-in-time model -- cut down the amount of time that we need with the data - the right information at the right time -- need to work with partners to find solutions e.g. AI

- Courier Analytical Portal
  - Pilot program in Hamilton -access systems of couriers to look at their data (with the right controls) -- can lead to streamlining - low hanging fruit
  - Models that are mutually beneficial are the ones that stand the test of time
  - CBSA login is coming - your business number - what you have in the system, outstanding duties and taxes -- powerful info at disposal to minimize the "back and forth"
- Postal Modernization Initiative - automated system and improved tech (Toronto and Montreal mail centres) - let's take our common interests take them to the fore
- Cargo pre-clearance (similar to air passenger pre-clearance)
  - Screen products before they arrive at the border (arrive pre-cleared)
  - Trucks will hopefully not have to wait as long
  - Deliver CBSA officers into the commercial stream in a pre-clearance environment for the first time ever
  - e-manifest - portal for the transmittal of data, replace paper-based processes
- Methodical traceable means that indicate they have secured their supply chains
  - Understanding when failures do happen (trusted traders)
  - Recognize custom standards of other countries (export controls help us to understand risk profiles of goods)
- Future Solutions
  - Legacy systems are very heavy - committed to move away from paper
  - Analytics data driven decision-making (blockchain, AI, analytics)
  - Move through the risk environment iteratively -- best way for lumbering government

## Economic Development and Transportation Planning Updates Focused on Supply Chain and Logistics Infrastructure (Norm Schleeahn and Steve Molloy, City of Hamilton)

- (Norm's Section) Despite pandemic, this has been one of the busiest industrial development periods of the last 30 years
- Hamilton is a multi-modal city with relatively lower traffic congestion
- City wide there is: 1.5M sq. feet of developments associated with L3 Harris, DHL, and Panattoni Development
- The **Hamilton International Airport** has invested \$38M in infra: runways, taxiways and LED lighting for airfield
- New DHL sort facility - will process 15,000 packages per hour
- Panattoni has broken ground on a 270,000 square foot facility
- **Airport Employment Growth District (AEGD)** - 555 hectares - last two years has been active and over 600 acres has been purchased - could be 3500-4500 employees associated; 7 million sq feet of development applications
- Several re-development opportunities around the **Port of Hamilton** - strategic investments on their lands to encourage multi-modal
- \$60M into Pier 10 to allow berthing of seaway vessels -- covered storage facility to reduce truck trips from off-site locations, P&H added a second flour mill
- Max Aicher (steel products) - 24 ha of land for new business
- All redevelopment involved in moving product through truck, rail or water
- Stelco acreage - up to 8M sq feet of new buildings in the north end
- Overall: Talk of potential development in Hamilton has been transforming into reality
- (Steve's Section) AEGD - a lot of development in the last 18 months but the form of development is "larger parcel" than was anticipated
- Mini-review of the transportation network in vicinity is taking place - minor network adjustments
- Steve's work considers individual land parcels, sites plans and zoning and the interplay with traffic impact studies
- Transit to serve these developments is an important focus
- How do we avoid interim issues/bottlenecks as things unfold? Will help to take care of those organizations that have invested heavily in Hamilton.
- Some Environmental Assessments are underway in the vicinity of AEGD
- Potential to widen or add HOV lanes to Red Hill Valley Parkway or Lincoln Alexander Parkway -- future public engagement
- A-line - "Port to the Airport" is a significant focus at present

- A lot of construction is expected by the 2024-2025 time period
- GRIDS 2 - 2041 planning horizon - impacts of pop and growth -- what is required to support growth?
- Pronounced AM and PM peaks have disappeared in Hamilton this year - telecommuting offers great opportunity along with other demand management tools - to achieve sustainable and efficient outcomes

### Greater Golden Horseshoe Transportation Plan (Michael Casey, Ontario Ministry of Transportation)

- Michael Casey's new role at MTO is to be responsible for multi-modal transportation and policy -- he looks forward to engaging on related policy issues
- 2020 traffic patterns: peak traffic changes are being followed closely; Commute distances have declined on average - a shift with local roads placed relatively under more burden than provincial highways
- Greater Golden Horseshoe (GGH) Transportation Plan (to 2051)
  - A priority for current government
  - Seeking an integrated system to support competitive economy and support communities
  - Southwest Ontario Plan was released in Jan 2020
  - Plan will provide direction for highways and transit, and move toward readiness for connected and autonomous vehicles
  - Platform for building partnerships and working toward common objectives
- GGH region accounts for 2/3 of Ontario GDP - Over \$1 trillion in goods moves annually over GGH highways
- Significant and growing demand but with a reprieve experienced in 2020
- Expect projections for future to hold but there is not much space for new transportation infrastructure in the GGH
- Technology change could alter our use of the transport system (e.g. what are the barriers to working from home?)
- We are in a period of significant economic restructuring in Ontario but goods movement will remain an essential driver despite changes
- Nearing release of final GGH plan (commenced work in 2017) -- long range scanning to 2071 to look at resiliency - how would the system react to different scenarios?
- Gap analysis - where will problems exist without new investment? Opportunities?
- Working with municipalities to look at transportation improvement options with consideration of "best bang for the buck."
- By early winter, a draft of the plan for engagement is expected
- Goals and objectives: Are linked to how we evaluate infra and policy solutions (e.g. connected, integrated, prosperous) tied to performance measures -- (e.g. how far can you travel within an hour?)
- A number of objectives for the plan tie to goods movement (a core element to be addressed)
- Gap analysis shows that current infra will not be sufficient, especially around intermodal hubs
- "Strategic Goods Movement Network" is being identified - multi-modal and multi-jurisdictional and data-driven-routes and connections to key facilities - which routes are the most important for goods movement?
- The network will help co-ordinate what we need from infra and policy perspectives - (e.g. minimize conflicts with transit, common standards across jurisdictions)
- Accounting for pandemic - has enhanced focus on certain things and accelerated others - (e.g. digital permitting (contactless), ancillary infrastructure to support needs of trucking sector)
- Seeking to finalize a plan that works across major shocks to the system

### Discussion Session led by Chad Schella , Canada Post

- (Michael Casey) With regard to congestion and telecommuting, travel peaks are down and trip distances are shorter - congestion problems are less; But lacking info on the "hit" that companies are taking from work at home -- where's the "sweet spot" between travel benefits and any negative impacts on companies? Telecommuting important to leverage in those sectors where it works.
- (Steve Molloy) – Notes that transit has come back a little bit recently but generally there is a need for more data to come in on some of the pandemic-induced changes and implications (echoed by Norm)
- (Michael Casey) - Expects that the current transit downturn will not be a systemic shift for the long-term

- d. (Norm Schleeahn) Regarding the next major phase of development for AEGD -- preliminary looks are taking place especially since there has been a shift of developer interest to the airport - infra and servicing needs to be put in place first - Part of upcoming Ec Dev Action plan and part of GRIDS2 planning
- e. (Steve and Norm) Regarding transportation pain points in City of Hamilton: Hwy 5&6 at Waterdown which is also an area of significant development (e.g. Stryker, L3); Connection of AEGD via Hwy 6 and Hwy 403; Red Hill Parkway and Lincoln Alexander and need for improvements.
- f. (Michael Casey) with regard to GGH plan notes that plan to be presented in likely in early winter with consultation thereafter. Some engagement on plan in early autumn via Engage Ontario on-line survey
- g. (Saiedeh Razavi) Offered concluding marks in relation to the this and the prior three sessions and set the stage for the final roundtable event (September 33<sup>rd</sup>, 2020)

## Supplement: Previously Held Discussion Session with Fred Gaspar (CBSA)

- **Regarding Data driven decision-making, is there an opportunity to use data to allocate CBSA resources better?**
  - Fred notes that there are many "known unknowns" and suspects that through improved use of data, knowledge about current "unknowns" will increase and they will be better managed
  - Generally, historical trends have been used to allocate and it has worked ok but there is more that could be done
- **From CBSA perspective, what elements are unique to Hamilton-Niagara when it comes to infrastructure?**
  - Economic power of airport and its unique position
  - Significant cost advantage over Pearson
  - e-commerce and courier firms very interested in this type of environment
  - International product in and out of Canada -- good opportunity
- **What is CBSA's greatest manpower challenge as it relates to identifiable modes for e-commerce?**
  - Problems are distinct depending on the mode
  - Fentanyl - low dosage retail volumes risk -- i.e. large number of packages
  - With the marine mode probably pre-cursor chemicals smaller number of shipments but huge volumes per shipment
  - Different posture for the two contexts in terms of - intelligence, detection tech, inspection models, safety protocols for officers
  - Bad actors are really good at responding to newly found gaps or openings
  - CBSA cannot press too hard on one part of the spectrum relative to another
  - CBSA approach is to apply a baseline of oversight across modes and sometimes there are marginal resources that are deployed in a more ad hoc manner (responding to intelligence and audits)
- **Challenges/Opportunities in Hamilton-Niagara region?**
  - Noted the challenge of delivering on a mandate in the context of another agency's infrastructure - open and frank discussions have helped for things to go well between CBSA and Canada Post
  - A lot of traffic at Ambassador Bridge - makes Queenston/Niagara crossings quite interesting; degree to which Hamilton is well- positioned with regard to fluidity and relative to other road and rail networks - time is money
  - Shorten lag time between warehouse and Canada Post facility - Hamilton has a low-cost environment and a road network advantage in relation to serving the GTA



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## Challenges

Challenges Add a new card for every challenge you can think of	Score
Lack of a neutral third-party data holder to enable multimodal, multi industry supply chain data integration for potential coordination and optimization	13
Finding best practices and sharing that information for a digital platform. How do we share information on a digital platform that is suitable for all parties (industry, gov't) (similar to what Port of Vancouver noted)  <i>Comments:</i> This is definitely a key challenge. Port of Vancouver's dashboard looks great :)	11
Access to Hamilton Airport and 403 exits to the link to reduce congestion into TO	8
Mid-penn corridor	8
All levels of government (officials, public servants) to understand the challenges with transportation and appreciate how important it is Prioritization from political leaders	8
Limited rail access, new rail lines connecting all modes, ie: airport, port, passenger GTA	6
Improve HOPA and HIA working together	6
Getting collaboration across stakeholders	6
Road infrastructure, HWY 6 improvements (lighting and road widening)	5
Competing with other municipalities for Provincial infrastructure investments	5

Data sharing challenges: - Willingness of data owners to share (perceived business risk), lack of consistent industry-wide standards and broad integration tools; - Public multi-modal transportation options connections between Hamilton, Niagara, KW, London - Current inter-regional public transportation systems do not have freight cars (e.g. GO train)	5
Encouraging the regional stakeholders to share data to enable optimization/improvement of regional supply chains	5
Managing conflicts among land uses	4
Reduce empty return trips - greater collaboration between businesses to encourage shared truck trips	3
Underutilized rail and seaway	3
Truck congestion - lots of empty miles contributing to this Last mile congestion Last mile issues, need funding from Prov and Feds	3
Widening 403 and better connectivity	2
Data availability, currency and accessibility	2
Low level use of load boarding - trucks, etc. running partially empty	2
Lack of predictability (esp. during crisis) for freight crossing board at bridges	2
Dedicated infrastructure funds/assistance within dedicated timelines.	2

Keeping GTHA core accessible from across the region	1
Collaborations/partnerships to look at system as a whole. Reduces competitiveness and environment	1
Infrastructure requirements associated with nearshoring/onshoring	1
Investment in transportation infrastructure to accommodate residential, commercial, and industrial development	1
Multi-layer governmental integration to move technology implementation forward - municipalities can specific expertise, bandwidth, and funding.	1
Trucks on major highways -- add truck lanes	1
Various transportation costs increasing due to things such as elogs, not enough drivers, pilotage (marine) etc	
Regulatory environment and control for drone delivery	

## Opportunities

Opportunities Add a new card for every opportunity you can think of	Score
Improve data collection and transparency in the region to identify opportunities to improve supply chain efficiency  <i>Comments:</i> My NRC program would be interested in collaborating around the logistics data R&D aspects of this.	15
Use of big data power to support multimodality and enhance supply chain visibility, to inform local and regional strategic decisions, leverage physical internet.	14
Portal to share truck type information (empty loads) to leverage cost savings, trips reductions and environmental benefits  <i>Comments:</i> NRC IRAP has a Canadian client who is a leader in this space. Let me know if you would like information.	9
Opportunity to pilot alternative delivery solutions to reduce GHG emissions and improve road congestion, like micro-consolidation hubs or cargo bikes	8
Better modal optimization opportunities	8
Properly co-operating to leverage data (e.g AIS)  <i>Comments:</i> I like working with AIS data :)	5
Opportunities to prevent land use conflicts using predictive power of data analysis	5
Utilize datasets from the CITM Smart Mobility Network into broader datasets to track components of the supply chain - vehicle, traffic, environmental	4
Hamilton International Airport Cost Advantage	4
Better supporting firms in maximizing their supply chains	4

Trial autonomous vehicle technology into key components of the road-based supply chain - first mile, last mile, mid-mile	2
Niagara Consolidation of northbound shipments from US Carriers	2
Identify strategic locations in the City to locate urban consolidation centers	2
Funding to plan	2
Leveraging "omni-channel"	2
Accelerate adoption of EV based smart trailer dolly solutions	1
Focus on "private roads" opportunities for automation & EVs for first mile and last mile of goods movement	1
Integrate union based and skilled labour that may be replaced by technology innovation in the process early	