

Niagara Falls Rail Service Extension

Initial Business Case Update
November 2019

Disclaimer

This Initial Business Case evaluates the case for implementing two-way all-day service to Niagara Falls on the Lakeshore West corridor through various service patterns. The options presented are based on Metrolinx's initial view of an achievable service pattern on a shared rail corridor, the infrastructure requirements to enable the service increase, and the timeline to deliver the program. Variations on the service pattern, infrastructure scope, and schedule will be assessed through a Preliminary Design Business Case.

This business case uses the Lakeshore West corridor service to Niagara Falls as of January 2019 as the baseline for analysis. Since then, preliminary discussions with CN have achieved weekend service increases in September 2019 that exceed the assumed business-as-usual service levels. The text of this business case does not reflect these latest weekend service increases. As this project advances through the business case lifecycle, future analyses will consider the effects of re-baselining the existing service levels.

All figures within this Initial Business Case represent preliminary results. Forecasted costs, revenues and ridership figures are at a high level and will be subject to refinement as analysis of the Niagara Falls Rail Extension proceeds to the Preliminary Design Business Case phase, and later analyses in the Business Cases lifecycle.

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Executive Summary

Introduction

With the GO Expansion program, Metrolinx is moving forward on a significant investment that will transform transit access across the Greater Toronto and Hamilton Area (GTHA). Beyond GO Expansion, as described in the GO Expansion Full Business Case from November 2018, Metrolinx is advancing additional rail programs including the GO Rail extension to Niagara Falls. This investment will add new rail service and connectivity to the Lakeshore West GO Rail Line.

Implementing year-round GO Rail services between Niagara Falls and Toronto has been a long standing goal of Niagara Region and local municipalities looking to grow and improve existing population and job centres through sustainable transportation modes. Niagara Region's population along with the ridership of GO Bus services in the Region have shown consistent growth that is projected to continue. The increase in population and transit demand needs to be accommodated through the provision of improved and expanded GO Rail service in Hamilton and Niagara Region. This proposed extension has been subject to several studies from various public and private authorities going back many years showing strong interest in the project.

The first step of this rail service was achieved in January 2019 with the introduction of commuter service from Niagara Falls GO Station to Toronto Union in the morning and returning in the evening. But work remains on expanding this initial service.

On June 28th 2016, The Province of Ontario announced that Metrolinx, the Province's regional transportation authority for the GTHA, would extend its daily Lakeshore West rail services to Niagara Falls. In the time since the Provincial announcement new factors and information have materialized necessitating an updated Initial Business Case to the previously announced project. These factors and information include an enhanced relationship with Canadian National Railway (CN), updated information on local rail capacity, GO Expansion operations and ridership projections including the examination of tourist demand in the region.

Options for Analysis

The Niagara Falls Rail Extension Initial Business Case Update assesses three extension options in a study area spanning the existing West Harbour GO Station in Hamilton to downtown Niagara Falls in the east of Niagara Region. The options are as follows:

- **Base Case:** A 'Business as Usual' scenario with no increase to rail service beyond GO's current single daily train and seasonal summer service. Rather, operation of GO Bus route 12 services between Burlington and Niagara Region will continue with increases in service when and where demand dictates. GO Rail Lakeshore West services will extend to Confederation GO Station once infrastructure is completed to provide peak-only services.
- **Option 1:** Operation of four extension trains per peak period with two trains beginning/terminating in Niagara Falls GO Station and two beginning/terminating at Confederation GO Station to/from Union. GO's seasonal summer rail service would be extended to year-round daily operations of seven trips to provide service during off-peak hours.
- **Option 2:** Service between Niagara Falls GO Station and Union identical to Option 1. In addition, GO Rail would operate up to hourly all day between Confederation GO Station and Union week round.
- **Option 3:** Daily half-hourly rail service between St. Catharines GO Station and Union with every second train continuing onward to/from Niagara Falls GO Station to provide the City with hourly two-way, all-day rail services.

Associated Stations

- **Confederation GO Station:** Station in Stoney Creek/Hamilton is currently under construction and will provide access to GO Rail and bus services once completed.
- **Grimsby GO Station:** Station will be pursued through the transit oriented development, market-driven approach adopted by Metrolinx.
- **St. Catharines GO Station:** Station already exists and currently provides access to VIA rail services and seasonal GO Rail services.

- **Niagara Falls GO Station:** Station already exists and currently provides access to VIA rail services and seasonal GO Rail services.

Stations would either see a minimal-build of infrastructure or minimal investment to existing facilities in Option 1 and 2, while Option 3 would require a full suite of station access measures and capital improvements.

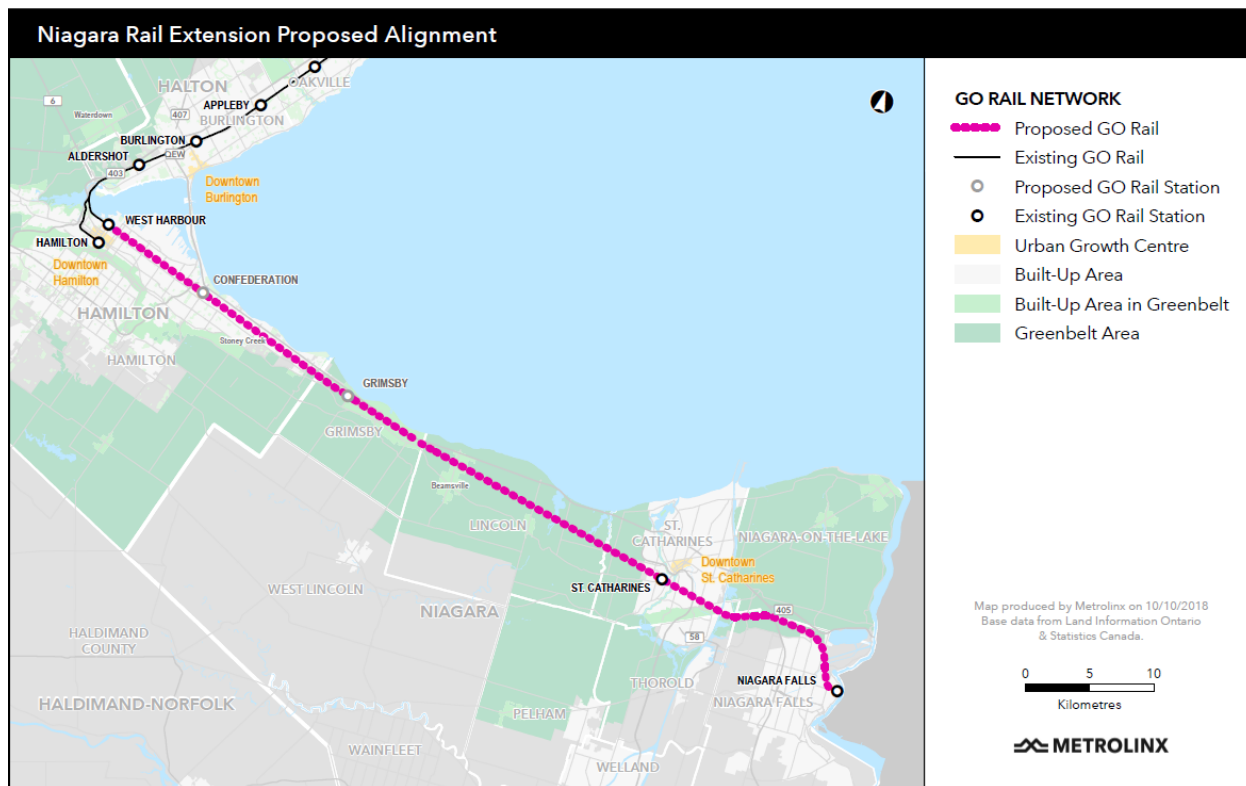


Figure E.1: Study area overview including rail alignment and stations under review

Method of Analysis

An Initial Business Case Update was developed for the Niagara Falls Rail Extension. This approach follows Metrolinx's Benefits Management program and project evaluation best practice as per our Business Case Guidance. This Initial Business Case Update is the first of four Business Cases (Initial, Preliminary Design, Full, Post-implementation) to analyze

the potential project, recommend a path forward and track results over the lifecycle of the investment.

The Initial Business Case will analyze the Niagara Falls Rail Extension through four cases to best understand policy alignment, project benefits, costs and impacts of the investment and constructability. The four cases in this evaluation are:

- **Strategic Case** - Determines the value of addressing a problem or opportunity based on regional development goals, plans and policies.
- **Economic Case** - Assesses the economic costs and benefits of the proposal to individuals and society as a whole, and spans the entire period covered by the investment.
- **Financial Case** - Assesses capital and resource requirements, the overall financial impact of the proposal and financial value for money.
- **Deliverability and Operations Case** - Provides evidence on the feasibility and constructability of project options and considers delivery risks; establishes what is required to deliver and operate the project.

Ridership

Ridership forecasts for the year 2031 were determined using outputs from the Province’s regional demand model (Greater Golden Horseshoe Model) and the GO Expansion Full Business Case Model. Forecasts were generated for all options. The service provided in Option 3 attracts the highest annual ridership (shown below). This option would offer the most rail services at the highest frequency. Option 1 and 2 provide fewer total trips and less frequent service and result in lower annual forecasts.

Table E.1: 2031 Total Annual Boardings

Station	BAU	Option 1	Option 2	Option 3
Confederation	444,000	544,000	808,000	846,000
Grimsby	-	339,000	339,000	1,788,000
St. Catharines	2,000	498,000	498,000	549,000
Niagara Falls	1,000	181,000	181,000	184,000

TOTAL	447,000	1,562,000	1,826,000	3,367,000
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Business Case Results

A final decision between Option 1, 2 and 3 must be made with total costs, benefits, operability, policy alignment and stakeholder considerations in mind. All options in this analysis have Benefit Cost Ratios (BCRs) in the range of 1.1 to 1.2, indicating similar performance. These options all have identical alignments, providing direct GO Rail access to the same total population and employment opportunities located adjacent to the proposed station locations. Alignment options would also result in similar travel time reductions and improvements to the local and regional transit network system. However, the options produce different levels of commuter and tourist ridership as they propose varying levels of service.

Option 1 has the lowest costs but also the lowest ridership and net benefits to society. Option 2 generates higher Net Benefits of \$161M versus \$66M for Option 1 and is forecasted to generate approximately 260k in additional annual ridership by 2031. Option 3 has the highest forecasted demand as well as total project benefits over Option 1 and 2. The downside of this option are operational challenges at the Welland Canal and high costs attributed to the operating and maintenance of running half-hourly GO Rail services between St. Catharines GO Station and Union.

Both Option 1 and 2 align well with strategic objectives including regional and local government policy, serve commuter and tourist markets, attract ridership, are constructible and more likely to be operationally feasible with the Welland Canal than Option 3. Given that Option 2 provides a greater level of GO Rail service, results in higher net benefits and ridership over Option 1, and the highest BCR of all options, it is recommended for advancement to the Preliminary Design Business Case stage.

Table E.2: Business Case Summary

		Option 1	Option 2	Option 3
Strategic Case				
Ridership	2031 Annual	1,562,000	1,826,000	3,367,000
	2031 Average Tourist Weekend Boardings	200	200	660
Connectivity		11,200 people and 9,300 jobs within 800m of a station along the Niagara Extension with direct access to rail services by 2031. Improved connections to the local and regional transit networks in the Niagara Region and Hamilton with four GO Rail stations.		
Sustainable Development		Three of the four proposed stations are centrally located, and would promote non-auto station access		
Economic Case*				
Total Costs (\$2018 M)		\$(522)	\$(651)	\$(1,632)
Total Benefits (\$2018 M)		\$588	\$812	\$1,804
Benefit Cost Ratio (BCR)		1.1	1.2	1.1
Net Benefits (NPV)		\$66	\$161	\$172
Financial Case*				
Total Capital Costs		\$(312)	\$(312)	\$(374)
Total Operating and Maintenance Costs		\$(234)	\$(366)	\$(1,200)
Total Revenue Impacts		\$74	\$139	\$239
Net Present Value (NPV)		\$(472)	\$(539)	\$(1,335)
Operating Cost Recovery		32%	38%	20%

Ratio (R/C Ratio)			
Deliverability and Operations Case			
Constructability	✓	✓	✓
Deliverability	✓	✓	✓ **

*All totals rounded

**Successful delivery of proposed service plan contingent on extensive operating agreement with the St. Lawrence Seaway Management Corporation at the Welland Canal due to the option's high frequency of proposed rail services.

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1

Introduction



Background

Today, Niagara Falls GO Station is serviced with one trip to Toronto Union Station in the morning and one trip back to Niagara GO Station in the evening Monday to Friday, plus seven seasonal weekend summer trips. Extending this seasonal rail service to year-round operations is a long-standing goal for Metrolinx, Niagara Region and the Province of Ontario. This vision has been subject to several studies by and for Metrolinx, including a draft 2009 Feasibility Study, a 2011 Environmental Study and most recently an Initial Business Case (IBC) in 2015.

On June 28, 2016, The Province of Ontario announced that Metrolinx, the Province's regional transportation authority for the Greater Toronto and Hamilton Area (GTHA), would implement weekday GO Rail service between the future Confederation GO Station in Stoney Creek/Hamilton and Niagara Falls. The original service plan proposed phasing in service starting at Grimsby in 2021 and ultimately to Niagara Falls by 2023. The service proposed one new station in Grimsby plus improvements to two existing stations in St. Catharines and Niagara Falls. The announced service concept included two morning peak trains with protections and consideration for future service expansion.

The first step of this rail service was achieved ahead of schedule in January 2019 with the introduction of morning commuter rail service from Niagara Falls GO Station to Union returning in the evening.

In 2018 it was determined by Metrolinx that an updated Initial Business Case for this investment was necessary for several reasons. The rationale included further development and refinement of the GO Expansion program (formerly referred to as Regional Express Rail or RER) which impacts Niagara Falls extension capacity and operations. Second, the IBC would serve to validate the work done in 2015 within the larger Regional Transportation Plan, incorporate analysis on the case for Confederation GO Station and assess how the tourism market impacts and drives Niagara Falls demand and ridership. The update (this document) accounts for the new context. Further in 2018 Metrolinx and Canadian National Railway (CN) were able to enter into an enhanced collaborative relationship that has enabled the long envisioned expansion on the corridor to be achieved to benefit Ontarians and the Region.

Business Case Overview

Business cases are required by Metrolinx's Capital Projects Approval Policy for all capital infrastructure investments. As projects develop in scope and construction, business cases are completed to define the rationale and requirements for delivering said investment. The Initial Business Case is the first of four business cases completed in an investment's lifecycle. It reviews variations of the preferred investment and selects a preferred option for further design and analysis.

This document is the Niagara Falls Rail Service Extension Initial Business Case update. The IBC update builds on the work completed in the 2015 IBC. This analysis takes the recommended option from the original IBC and applies new context and direction, along with two new options for analysis. This business case clarifies project scope, preliminary design, ridership demand, service patterns, benefits and costs at a high level.

This business case will examine the options through four distinct lenses: strategic (how the investment supports organizational and regional public policy and objectives), economic (the investment's benefits to individuals and society), financial (costs of the investment to Metrolinx), and deliverability and operations (construction viability and timelines, operating plans and risks). This four chapter analysis concludes with a recommendation for a preferred investment option which will be advanced for a Preliminary Design Business Case (PDBC) analysis.

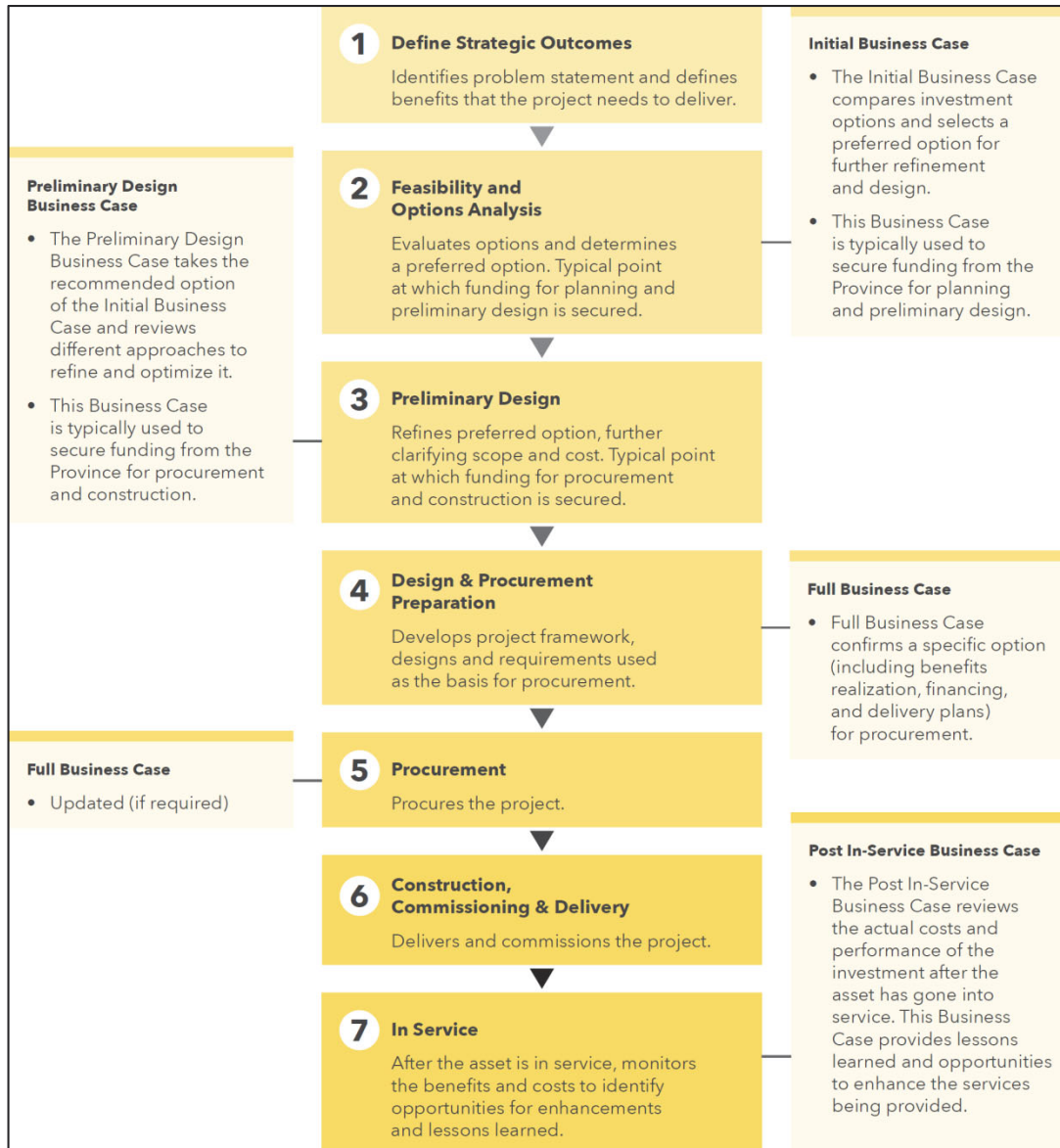


Figure 1: Metrolinx Business Case Development Process

2

The Case for Change



Introduction

This chapter defines the case for change, which is used to guide the evaluation of investment options considered within this business case.

Case for Change

Problem Statement

“How can transit service be developed in the Niagara - Hamilton corridor to best meet the short, medium and long term transportation needs of the local communities?”

Thousands of people currently commute between Niagara Region, Hamilton and other parts of the GTHA by car, with the number projected to increase as the population of Niagara Region continues to grow. The Region is also a popular destination for tourists. Metrolinx currently offers a popular GO Bus service connecting Niagara Region and Hamilton. This route has consistently shown growth in ridership that is projected to continue to grow. Population and ridership increases will need to be accommodated through the provision of improved and expanded GO service in Hamilton and the Niagara Region in order to reduce auto-dependency and further encourage growth and tourism in the Region.

Key Drivers

The following table outlines the key issues and considerations, both internal and external, for the current and future state of transportation in the Niagara - Hamilton corridor that both shape the opportunity, and support the case, for this investment.

Table 1: Key Driver Analysis

Driver		How does this Driver influence the problem/opportunity?	What is the impact of not addressing the problem/opportunity?
Internal	Organization Policy	<ul style="list-style-type: none">The delivery of peak-period rail service to Niagara Falls and Confederation GO Station are identified as 'Projects in Delivery' in Metrolinx's 2041 Regional Transportation Plan	<ul style="list-style-type: none">Not constructing an announced rail service extension threatens to cast the organization's reputation in a negative light unless the case for not proceeding is strong
	Transport Service Provision	<ul style="list-style-type: none">Niagara Falls and St. Catharines are currently served by summer rail	<ul style="list-style-type: none">Maintaining the current operation of GO Bus route 12 services will allow

		<p>services on weekends only. GO Bus route 12 connects these communities (but does not directly serve St. Catharines GO Station) during weekdays and the remainder of the year. Ridership on route 12 has displayed growth of 10 per cent or more year-over-year demonstrating large demand for GO services in this region</p>	<p>ridership to continue to grow, however, the expansion of GO Rail services in the Region has the potential to further increase GO ridership, due to its higher capacity.</p> <ul style="list-style-type: none"> • GO Bus operations are slower than rail operations. Not improving rail service to year-round operation does not take advantage of these travel time savings • Failing to address service provision (ensuring that enough services go where people want to go, when they want to go there) means that regional growth will be constrained or remain auto reliant
	Travel Behaviour	<ul style="list-style-type: none"> • According to the 2016 Transportation Tomorrow Survey, 37,000 Niagara Region residents commute daily to Hamilton and Halton regions by car with nearly 9,000 going onwards to Peel and Toronto • Survey results show that several hundred Niagara residents commute daily to Hamilton, Halton, Peel and Toronto via local transit and GO services • Survey results show large commuter flows in and out of Niagara Region with auto demand outpacing local transit and GO services likely due to minimal transit options • Statistics Canada data shows that tourists overwhelmingly travel to and from Niagara Region by car and bus • Expanding rail services throughout these regions will alleviate pressure on the road network 	<ul style="list-style-type: none"> • Niagara Region residents and tourists alike will continue to commute by auto for inter and intra-regional trips, thus increasing local road congestion, emissions and urban sprawl • People continue to spend more time travelling, lowering their quality of life
	Transport Infrastructure and Technology	<ul style="list-style-type: none"> • While not yet at capacity, bus services in this region are proving to be popular. Rail services would offer more capacity at faster speeds to commuters than current transport infrastructure and technology provides • Summer weekend GO Rail services have exhibited strong growth year over year, growing by 25 per cent from 2017 to 2018 	<ul style="list-style-type: none"> • Maintaining the current operation of GO Bus services in the Region of Niagara will allow ridership to continue to grow, however, the extension of year-round GO Rail services has the potential to further increase GO ridership in the Region, due to higher speeds and capacity
External	Congestion	<ul style="list-style-type: none"> • According to the 2016 Transportation 	<ul style="list-style-type: none"> • Regional travel times will continue to

	<p>Tomorrow Survey, over 55,000 Niagara Region residents drive from the region on an average weekday to destinations in Hamilton, Halton Region, Peel Region, Toronto and beyond</p> <ul style="list-style-type: none"> Increasing congestion, particularly along the QEW as per highway count data, on the regional network is leading to decreasing reliability. This pressures Niagara Region residents to travel longer and further than previously required. A long term solution is needed to mitigate these negative trends 	<p>increase without addressing the problem statement and providing alternative mobility options to alleviate pressure on the road network. This could result in reduced accessibility, limited economic development opportunities, increased greenhouse gas emissions and could negatively impact overall quality of life</p>
Demographic Change	<ul style="list-style-type: none"> Niagara Region's population is forecasted to increase from 454,000 to 540,000 or greater by 2041. This growing population puts pressure on the transportation network, contributing to increased congestion and pollution, particularly from automobile use 	<ul style="list-style-type: none"> Not addressing the problem and providing sustainable mobility options will limit the Niagara - Hamilton corridor from becoming a more attractive place to live, work and do business - which will lower the overall quality of life and prosperity of the region
Economic Activity	<ul style="list-style-type: none"> Growth in jobs and changes in the nature of work, primarily brought about by automation and communication technologies, affect the demand for transit Niagara Region is well-positioned as a tourism market being home to several points of interest including Niagara Falls. This and other attractions bring a large year-round tourist market of millions to the Region that often come from outside the GTHA 	<ul style="list-style-type: none"> Improving the transit network will allow Niagara Region to better accommodate the expected growth in jobs, a thriving tourism market, or provide the quality of mobility that fosters productivity and economic development
Government Policy and Planning	<ul style="list-style-type: none"> Niagara Region and local municipalities have identified this service extension as a priority project and have incorporated it into regional and transportation plans to anticipate and allow for future growth and accessibility 	<ul style="list-style-type: none"> Municipal secondary plans and site plans for proposed station sites such as Grimsby will be compromised without GO Rail stations; the core of several of these plans
Land Use	<ul style="list-style-type: none"> Transportation investment policies and programs must be intrinsically linked with land use policies and programs to plan for sustainable future communities 	<ul style="list-style-type: none"> Previous transport developments contributed to urban sprawl - potential solutions in the Niagara - Hamilton corridor should be planned carefully to limit further contributions to sprawl

-
- Enhancements to the transit network should be planned accordingly with urban growth centres
-

Business as Usual

If this investment is not pursued Niagara Region will continue to be served by one daily GO train operating between Niagara Falls GO Station and Union, hourly GO Bus route 12 services year-round and by seasonal weekend rail services from June – Labour Day (including Victoria Day and Thanksgiving weekends). GO Rail Lakeshore West services will extend to Confederation GO, once the station infrastructure is completed, serving new communities in the Stoney Creek area.

Strategic Value

The Metrolinx 2041 Regional Transportation Plan (2041 RTP) was adopted by the Metrolinx Board of Directors on March 8, 2018. The 2041 RTP presents a vision for the future of the GTHA:

“The GTHA will have a sustainable transportation system that is aligned with land use, and supports healthy and complete communities. The system will provide **safe, convenient and reliable connections**, and support a **high quality of life, a prosperous and competitive economy**, and a **protected environment**.”

The GTHA is undergoing rapid growth and development. Its population is forecasted to grow from nearly seven million today to nine million by 2031, alongside a strong increase in the number of jobs. Niagara Region’s population is forecasted to reach 540,000 by that same year from 454,000 in 2016.¹ While growth presents opportunities for the region it can also create challenges. Without investment, the GTHA’s regional transportation system will be unable to support a high quality of life, increased prosperity, and environmental sustainability.

Extending GO Rail services year-round between Niagara and Toronto via Hamilton will support the RTP goals of creating strong connections, complete travel experiences and sustainable and healthy communities. These goals will be achieved through the rail extension’s ability to seamlessly connect transit modes in Hamilton and the Niagara Region, get commuters and tourists out of cars and reduce carbon emissions, support regional secondary plans, and by placing commuters and

¹ Statistics Canada

tourists in closer access to regional employment, commercial and educational centres.

Strategic Objectives and Goals

As identified in the GO Expansion Full Business Case, there are three main areas in which a rail service enhancement and/or extension can benefit the GTHA. Extending GO Rail services to Niagara Region year-round will benefit the entire Region in the following ways:

High Quality of Life

The Niagara Extension will improve quality of life by:

- Improving user experience and reducing the stress of daily travel by increasing transit travel speeds and reliability while expanding the range of destinations people can reach across Niagara Region.
- Reducing transport related collisions, deaths and injuries by attracting travellers from the auto network and onto the rail network by providing new stations and improved services.
- Enabling the use of active modes of transportation such as walking or cycling to access transit facilities by providing station locations in or near residential areas or areas of planned medium to high density land use.

Prosperous Economy

The Niagara Extension will support prosperity and development by:

- Improving connectivity between homes, jobs, businesses and tourist attractions in Niagara Region via new services that decrease current travel times, increase reliability and increase year-round service.
- Creating new connections between areas that are proposed for new residential and commercial development, including station sites such as Grimsby GO Station, near which the municipality has plans for medium and high density mixed-use developments, as well as existing economic and tourist activity centres.

Sustainable Development

The Niagara Extension will increase sustainability by:

- Reducing transport emissions by attracting travellers off of the auto network to the rail network by providing new stations and services in areas previously not serviced or underserved by GO Bus and rail throughout the Niagara and Hamilton Regions.

Alignment with Goals

The proposed investment recommended through this IBC should directly support the realization of the three goals in the 2041 RTP.

Strong Connections

The proposed investment should create an improved transit connection in Hamilton and the Niagara Region. The key strategic objectives under this goal include:

- Increasing the number of people and jobs within walking distance (800m) of a station with access to GO Rail service.
- Increasing GO transit ridership in Hamilton and Niagara Region.

Complete Travel Experiences

The proposed investment should provide faster and more reliable travel times for transit users through the extension of rail service year-round into the Niagara Region:

- Improving the transit network through the proposal of new stations and the enhancement of GO Rail services to existing stations that are well integrated into Niagara Region and Hamilton's local and regional transit networks.
- Decreasing transit travel time through the provision of express services and eliminating the need for passengers to transfer between rail and bus services when travelling to and from Niagara Region.
- Increasing the reliability of transit through the provision of transit services that would not be impacted by congestion on the road and highway network.
- Providing improved GO station facilities.

Sustainable and Healthy Communities

The proposed Niagara Falls Rail Extension investment should support sustainable land use and transportation patterns. The key strategic objectives under this goal include:

- Reducing auto vehicle trips by shifting demand from the auto network to the rail network along the Niagara – Hamilton corridor.
- Encouraging active modes of transportation through the provision of GO stations in or near residential areas, employment clusters, or areas of planned medium to high density land use in Niagara Region and Hamilton.
- Ensuring negative environmental impacts are minimized.

Alignment with Broader Policy

Through their plans and policies, project stakeholders at the Provincial, regional and municipal levels are aiming to improve the quality of life and safety, guide economic growth and development and achieve environmental sustainability for their respective regions.

A review of the following provincial, regional and municipal policies and plans examines how extending rail services to Niagara Falls aligns with policies in the following documents:

- Provincial Policy Statement Under the Planning Act (2014)
- Growth Plan for the Greater Golden Horseshoe (2017)
- Metrolinx 2041 Regional Transportation Plan (2018)
- Regional Official Plan – Niagara Region (2014)
- Niagara Region Transportation Master Plan (2017)

Table 2 summarizes key policies from these documents that align with the expansion of GO Rail services to Niagara.

Table 2: Summarizing Alignment with Broader Policies and Plans

Stakeholder	Document	Specific Policy and Key Considerations
Government of Ontario – Ministry of Municipal Affairs and Housing	Provincial Policy Statement Under the Planning Act	<ul style="list-style-type: none"> Section 1.6.7 on Transportation Systems states the need to expand transit that optimizes existing infrastructure, crosses jurisdictional boundaries, supports land use density, minimizes the length and number of vehicle trips and supports current and future use of transit and active transportation Section's 1.1.4.1 and 1.7 speak to providing opportunities for sustainable and diversified tourism and providing long-term economic prosperity through tourism development
	Growth Plan for the Greater Golden Horseshoe	<ul style="list-style-type: none"> Articulates support for an integrated, multi-modal, regional transit network as key to economic growth, reduced air pollution and improved public health along with a vibrant tourism industry
Government of Ontario – Ministry of Transportation	Metrolinx 2041 Regional Transportation Plan	<ul style="list-style-type: none"> The RTP's vision calls for the GTHA's transportation system to provide a high quality of life, a prosperous economy and a protected environment – all strategic outcomes of this investment – with the goals of strong connections, complete travel experiences and sustainable and healthy communities to pursue the vision
Regional and local municipalities	Regional Official Plan – Niagara Region	<ul style="list-style-type: none"> Vision to attract investment, promote employment growth and develop built-up locations with existing urban centres through intensification Objectives for the development of complete communities that will focus on mixed-use land use that supports transit and active modes while reducing automobile dependence Objective 9.A.4: To actively support the continuation and improvement of railways for the movement of passengers and goods Policy 9.E.3 encourages improved transit access to the Region from the GTHA and aims to explore how transit facilities for tourists, employees and residents can be improved
	Niagara Region Transportation Master Plan	<ul style="list-style-type: none"> Vision for Niagara Region to be supported by a transportation network that will help establish Niagara as a leader in: building, preserving and enhancing livable communities; economic development; tourism; sustainable transportation practices; and the emerging shared economy Section 6.2 of the Executive Summary states support for “the expansion of GO Transit passenger rail service to Niagara Region, and the development / redevelopment of rail stations to serve as major transit station area

Constructing new stations and extending GO Rail services to Niagara Falls year-round aligns with these plans and policies as this enhanced transportation service will unlock development potential around station sites and their immediate neighbourhoods, enable the use of more environmentally sustainable modes of access and egress to GO stations, expand access to employment opportunities and offer more choices for tourists to access Niagara Region's many destinations. How the proposed investment options individually align with these broader plans and policies will be discussed in the Strategic Case chapter.

3

Investment Options



Introduction

This chapter describes three defined, well-scoped and defensible investment options for consideration and evaluation in the Strategic, Economic, Financial, and Deliverability and Operations Cases.

For an IBC, options should focus on investments of differing scope, whether that difference lie in the technology, service or alignment under consideration, so long as the option can address the problem or opportunity under consideration.

Study Area

As displayed below, the area of study in this IBC is the Niagara-Hamilton corridor. This corridor contains two main transportation routes. The Queen Elizabeth Way (QEW) is the primary transportation corridor connecting Niagara Region to Hamilton and the Greater Toronto Area for regional motorists and bus services. The other route for study is CN's Grimsby Subdivision rail line. The line runs along the south shore of Lake Ontario, parallel to the QEW between Hamilton and Grimsby. It heads southeast into St. Catharines and crosses over the Welland Canal, at bridge 6, and then the QEW continuing into the Niagara Falls historic downtown. In Hamilton, the line connects to the GO Lakeshore West rail corridor at West Harbour GO Station in the City's north end.

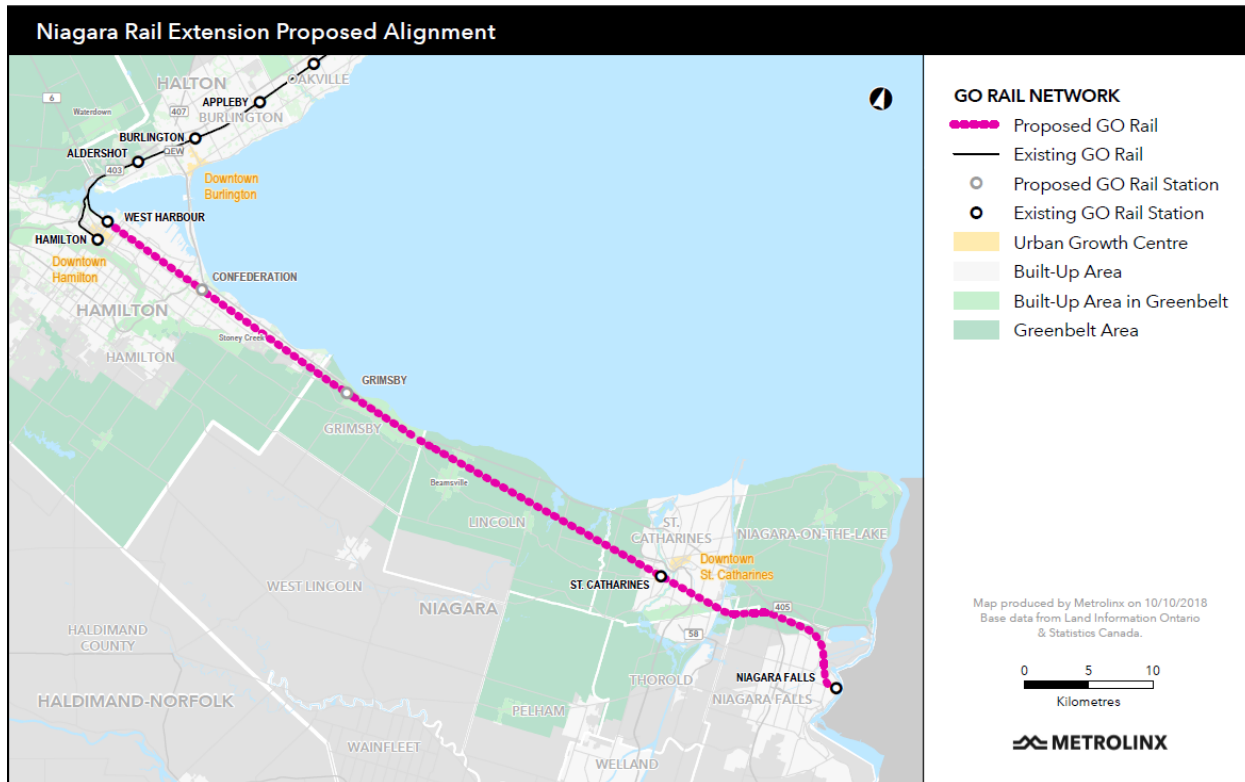


Figure 2: Study area overview including rail alignment and stations under review

Option Development

The 2015 IBC analyzed one option which assumed two morning and two evening peak direction trains. In the morning peak, the service would depart Niagara Falls GO Station stopping at St. Catharines, Grimsby and terminating at Confederation GO Station where passengers could transfer to Union-bound Lakeshore West Line rail services. The opposite routing, back to Niagara Falls GO Station from Confederation GO Station, would occur for two evening peak trips.

Since the 2015 IBC and subsequent Provincial commitment in 2016, Metrolinx has discussed the infrastructure required to facilitate this service with Canadian National Railway (CN), the owner of all track on the Grimsby Subdivision upon which the service would operate. Simultaneous to this work, new rail operations information has materialized that necessitated a revised analysis and recommendation for service to Niagara Falls be conducted through an update to the 2015 Initial Business Case.

Rationale for this IBC update includes the following: further development and refinement of the GO Expansion program which impacts Niagara Extension operations and capacity, a desire to validate the work done in 2015 within the larger RTP, incorporating analysis on the case for Confederation GO Station and to assess how tourist demand drives ridership. This document accounts for these factors and other recent developments to the environment in which this project will operate.

Option Scoping

Options for analysis in this Initial Business Case Update were developed by the Metrolinx project team. After taking into account the GO Expansion program, CN operations, geographical constraints, policy and timeline considerations, local transit demand and differing transit modes, three extension options were established.

Metrolinx will continue to refine and optimize the service patterns through the design phases to satisfy corridor constraints, deliver greater benefits and/or reduce project costs. This could include changes in train frequencies, run times, fleet configurations, or stopping patterns.

Base Case: A 'Business as Usual' scenario with one daily GO train operating between Niagara Falls GO Station and Union. In addition, seasonal summer services continue to operate between Union and Niagara Falls GO Station from the end of June until Labour Day, including Victoria Day and Thanksgiving long weekends. Niagara Region will be served by GO transit via GO Bus route 12 on weekdays and weekends year-round with increases in service when and where demand dictates. Additional expansion of current GO Rail services to Niagara Region does not occur in this scenario. GO Rail services will extend to the newly built Confederation GO Station for peak only services once the station infrastructure is completed.

Option 1: Modification of the announced 2016 service plan; year-round daily service of four bi-level 12-car diesel trains per peak period to/from Union with two starting/terminating at Niagara Falls GO Station and two starting/terminating at Confederation GO Station. Seasonal summer rail services (seven trains; three departing from Union Station and four departing from Niagara Falls GO Station) extended to year-round daily operations to support tourism and recreational markets. This leads to 11 daily trains to/from Niagara Falls GO Station. Union-bound trains would operate all stops to Oakville GO minus Appleby and Bronte GO stations, running express between Oakville GO and Union. New stations at Confederation in Hamilton and Grimsby (Casablanca Boulevard) would

see a minimal-build of access infrastructure to support this service while St. Catharines and Niagara Falls GO stations see minimal investment to existing facilities. Any remaining gaps in off-peak service would be served by GO Bus route 12.

Option 2: An identical service pattern at Grimsby, St. Catharines and Niagara Falls GO stations to Option 1. In addition, hourly two-way, all-day Lakeshore West Line trains are extended to/from Confederation GO Station and Union all week. This leads to 11 daily trains to/from Niagara Falls GO Station. Union-bound trains would operate all stops to Oakville GO minus Appleby and Bronte GO stations, running express between Oakville GO and Union Station. New stations at Confederation in Hamilton and Grimsby (Casablanca Boulevard) would see a minimal-build of access infrastructure to support this service while St. Catharines and Niagara Falls GO stations see minimal investment to existing facilities. Any remaining gaps in off-peak service would be served by GO Bus route 12.

Option 3: Weekday service of half-hourly trains to/from St. Catharines GO Station (operating hourly on weekends) and hourly trains to/from Niagara Falls GO Station. Peak bi-level 12-car diesel trains and off-peak eight-car trains would make all stops to/from Oakville, minus Appleby and Bronte GO Stations, operating express between Oakville GO and Union Station. Every second eastbound train arriving at St. Catharines GO Station would continue to Niagara Falls GO Station allowing for hourly service. Stations at Confederation, Grimsby, St. Catharines and Niagara Falls would see a full suite of station access measures and capital improvements including turnback capabilities for trains at St. Catharines GO Station to protect for potential service delays at the Welland Canal. The high frequency of train movements proposed over the Welland Canal (two train movements every weekday hour) exposes this option to a higher potential for frequency of delays if an agreement is not reached with the St. Lawrence Seaway Management Corporation (SLSMC), the operators of the Welland Canal. Track infrastructure in addition to Option 1 and 2 would be required on the CN Grimsby Subdivision to enable this service. This service pattern would remove the need for seasonal summer rail service and have impacts on the frequency and routing of GO Bus route 12.

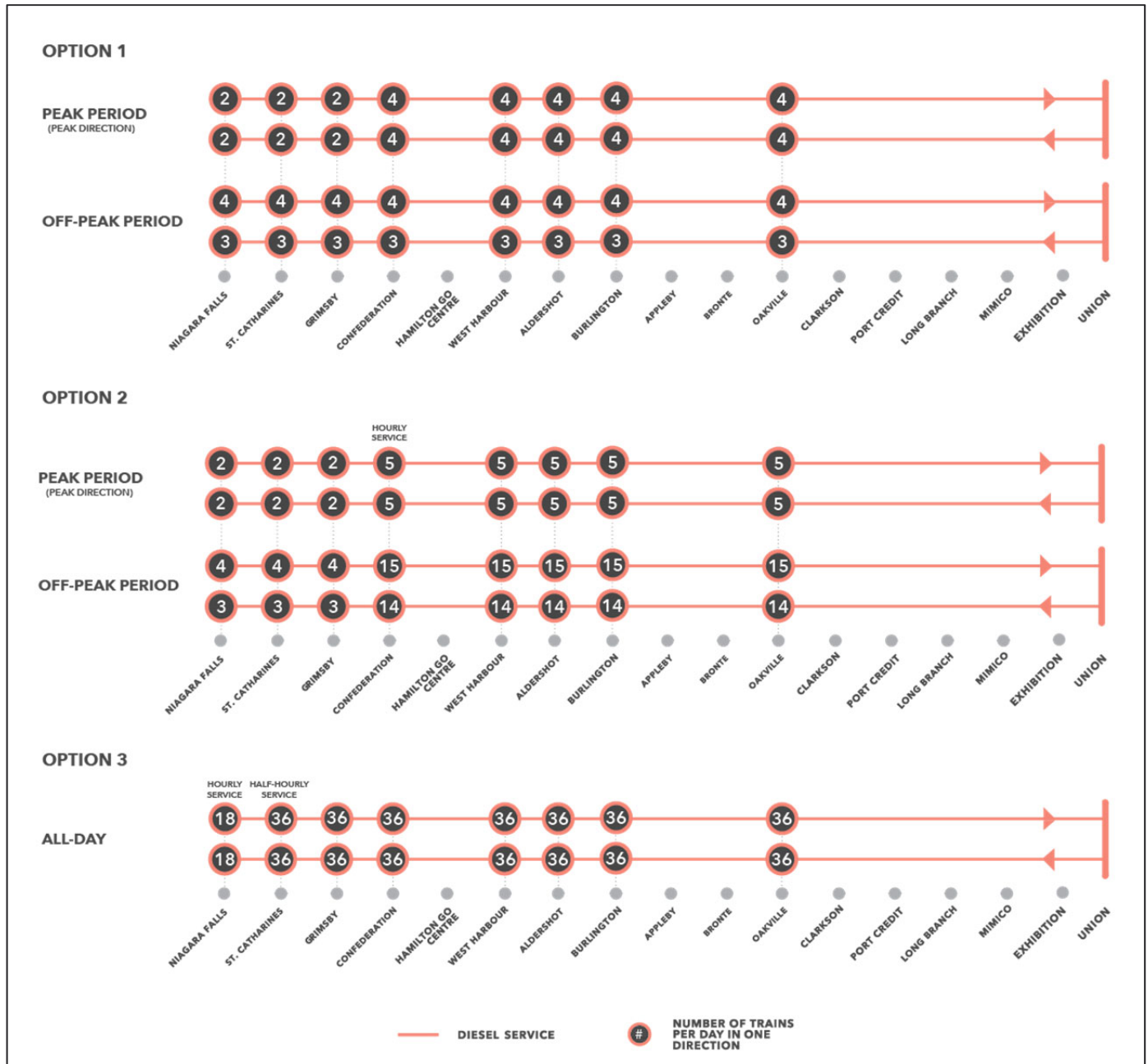


Figure 3: Weekday service diagrams for proposed options

4

Strategic Case



Introduction

The Strategic Case summarizes the performance of the options against the identified strategic objectives to indicate if the investment addresses the Problem Statement and the goals of the 2041 RTP.

This chapter answers the following questions:

- What strategic benefits are envisaged?
- How do options contribute to strategic objectives and goals?
- What impact do the different options have on how people use the transit network and move around the region?
- What challenges exist that could jeopardize the achievement of strategic outcomes?

Strategic Evaluation: Alignment with Objectives

The following section synthesizes each option against the identified strategic outcomes and answers the question: does the investment address the problem statement and realize meaningful benefits? These strategic outcomes come from the GO Expansion Full Business Case and serve as a guide for overarching strategic objectives that this investment, an addition to GO Expansion, should align with.

Does the investment realize a High Quality of Life?

Expanding and enhancing GO services in Niagara Region will help residents and visitors achieve a higher quality of life whether they utilize the service or not. All options will reduce transit travel times to and from Niagara Region while increasing transit reliability. The construction of two net new GO train stations near residential areas will reduce GO rail access times for Niagara and Hamilton residents. Enhancing GO service to Niagara would also benefit the tourist market as the Niagara Falls Station is located in close proximity to the City of Niagara Falls' downtown and tourist centres. New and enhanced stations and enhanced services will also attract net new customers to GO services, removing them from the local road network, thus reducing congestion for other drivers. This will lead to a higher quality of life in the Niagara - Hamilton corridor compared to before expanded services were in place. Once the investment is built, these identified benefits should be realized for the medium to long term in Hamilton and the Niagara Region as it is forecasted that ridership will grow into 2031 and beyond.

Does the investment realize a Prosperous Economy?

Providing a dedicated year-round rail service to Niagara Region will better connect population centres in Niagara, Hamilton and Toronto to jobs and multiple tourist attractions. Niagara Region's natural features, festivals, wineries and entertainment destinations produce thousands of jobs and revenue for the local economy through tourist demand.

Niagara Falls is known around the world and consistently ranks among the top visited tourist sites in North America. Many of these international tourists come via Toronto. Enhanced rail service would better connect the tourist market to destinations they want to visit, thus supporting, growing and realizing a prosperous local economy.

The enhancement of GO services, particularly in urban areas, will improve connectivity between employment clusters, urban growth centres and residential areas. Linking people and businesses with reliable and fast transport services will make it easier to connect, invest, and innovate in the Niagara - Hamilton corridor for years to come. This will open opportunities for residents in Niagara Region and Hamilton as access to jobs served by a frequent rapid transit network, particularly for those without automobile access, will expand. Conversely, it will be easier for GTHA residents to commute to jobs and opportunities within the Niagara - Hamilton corridor.

The GO station in Niagara Falls is located adjacent to the City's historic downtown and within 2-4 km of attractions in the City's tourist centre. The existing St. Catharines Station is also located in an area with developable land adjacent to the station. Adjacent to Grimsby GO Station, the municipality has plans for medium and high density mixed-use developments nearby; some of which have already been built for residential use. All the options would serve these station locations, however, Option 3 performs particularly well in this regard as it would provide all-day service.

Does the investment realize Sustainable Development?

This extension will foster reduced auto dependency on travel to and from Niagara Region. The same impact should be felt on GO station access as the majority of stations for consideration will be and are near residential areas, areas of planned medium to high density land use, or tourist attractions. Reduced automobile use will decrease emissions from vehicles and result in fewer accidents on local roads that often can lead to serious injury or death.

Some options better ensure these benefits than others. By the nature of its enhanced service pattern, Option 3 would attract more riders than Options 1 and 2. This option removes the greatest amount of vehicle traffic off of the local road network, resulting in the greatest environmental and safety improvements for the Region.

Strategic Evaluation: Alignment with Goals

This section of the Strategic Case looks at the rationale for extending GO Rail services year-round in the Niagara - Hamilton corridor and how each of the proposed options meets the goals of Metrolinx's 2041 Regional Transportation Plan.

Strong Connections

Regional Connectivity

Niagara Region's tourist attractions and entertainment destinations produce thousands of jobs and revenue for the local economy through tourist demand, with Niagara Falls being consistently ranked as one of the top tourist sites in North America. The expansion of GO Rail services to serve the Niagara Region year-round will better connect population centres in Toronto and Hamilton to jobs and multiple tourist attractions. This enhanced rail service would better connect commuters and the tourist market alike to their destinations, thus supporting, growing and realizing a prosperous local economy.

The construction and enhancement of rapid transit stations, particularly in urban areas, will improve connectivity between employment clusters, urban growth centres and residential areas. The planned Grimsby GO Station at Casablanca Boulevard is in a location that the municipality has planned for medium and high density mixed-use developments nearby; some of which have already been built for residential use. Further, the station in Niagara Falls is located adjacent to the City's historic downtown and within 2-4 km of attractions in the City's tourist centre. The existing St. Catharines Station is also located in an area with developable land adjacent to the station.

Linking people and businesses with reliable and fast transport services will make it easier to connect, invest, and innovate in the Niagara - Hamilton corridor for years to come. This will open opportunities for residents in Niagara Region and Hamilton as access to jobs served by a frequent rapid transit network, particularly for those without automobile

access, will expand. Conversely, it will be easier for GTHA residents to commute to job opportunities within the Niagara - Hamilton corridor.

Table 3: Total Population and Employment Along the Niagara Falls Extension Options in 2016 and 2031

Investment Options	2016 Population	2031 Population	2016 Employment	2031 Employment
Options 1-3	9,300	11,200	7,800	9,300

Table 3 indicates the total population and employment figures that would be serviced by the proposed options. It is informed by the forecasted population and employment within 800m of each rail station. As can be seen, all options have the same population and employment forecasts as their alignments are identical. Option 3 would serve these population and employment centres most frequently through hourly all-day operations to/from Niagara Falls.

Ridership: Demand and Forecasts

Seasonal summer GO Rail services began in 2009. It operates from the end of June until Labour Day, including the Victoria Day and Thanksgiving long weekends, between Union and Niagara Falls GO Station. Figure 4 below shows that in the past five years this service has seen significant growth. Total annual ridership has doubled in size from approximately 21,400 in 2013 to 43,500 in 2018, all while service levels have remained constant. These figures show that there is strong and growing demand that makes the case for increased rail services to/from Niagara Region at a minimum during weekends and the summer months.

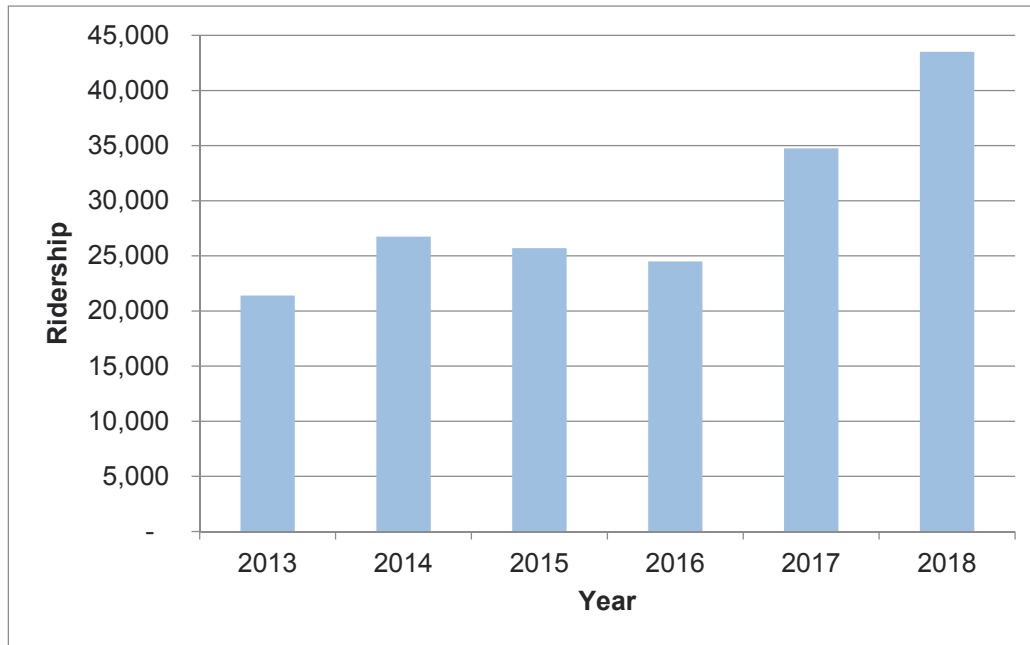


Figure 4: GO Rail Seasonal Niagara Service Ridership 2013 - 2018

Utilizing the above data and looking into future years, ridership forecasts for this business case were calculated for the entire 60-year lifecycle under analysis. Results are highlighted for 2031, as this year serves as a future baseline in GTHA transportation demand modelling. Boardings are totaled and displayed for the three-hour AM peak period (6 - 9AM) in Table 4 as well as annual results in Table 5. Note that these figures include estimations for tourist demand which was initially calculated outside of the GO Expansion Full Business Case (discussed further in 'Tourism Demand' in the next section).

Table 4: 2031 AM Peak Period Average Daily Boardings

Station	BAU	Option 1	Option 2	Option 3
Confederation GO	930	960	1,060	1,060
Grimsby GO	0	590	590	2,410
St. Catharines GO	10	740	740	740

Niagara Falls GO	5	100	100	100
TOTAL	945	2,390	2,490	4,310

Table 5: 2031 Total Annual Boardings

Station	BAU	Option 1	Option 2	Option 3
Confederation GO	444,000	544,000	808,000	846,000
Grimsby GO	0	339,000	339,000	1,788,000
St. Catharines GO	2,000	498,000	498,000	549,000
Niagara Falls GO	1,000	181,000	181,000	184,000
TOTAL	447,000	1,562,000	1,826,000	3,367,000

Forecasts show sizeable demand for year-round GO Rail service to and from Niagara Region. Option 1 generates the lowest peak-period and annual demand; while Option 2 performs better, with near identical AM peak boardings, but greater than 15 per cent more annual ridership. The similar totals between Option 1 and 2 are a reflection of the service patterns tested between the scenarios, with the difference between them being the addition of hourly service to/from Confederation GO Station in Option 2.

Option 3 has the highest forecasted demand in the 2031 AM peak period and annually as it proposes all-day hourly, or greater, rail service.

In Option 1 and 2, Confederation GO Station has the strongest annual demand followed by St. Catharines GO Station. This pattern shifts in Option 3 where Grimsby GO Station demonstrates the highest demand of any station in all option, then followed by Confederation GO Stations. Niagara Falls GO Station demonstrates the lowest demand across all options. Grimsby GO Station also shows low demand in Option 1 and 2.

When compared to the single train service in the Base Case, operating all-day year-round rail services to Niagara Falls increases 2031 annual GO boardings by 1.1 - 2.9M depending on the option. Ridership at St. Catharines GO Station sees a noticeable annual increase across all options while Confederation GO Station sees a large growth in Option 2 and 3. Option 1 sees a smaller annual increase in ridership at Confederation GO Station compared to Business as Usual.

Past business cases completed by Metrolinx and external parties on this project contain demand forecasts which are a useful benchmark for these forecasted results. Metrolinx's 2015 IBC forecasted 390 total AM boardings in 2021 and 780 boardings in 2031.² These totals excluded Confederation GO Station and assumed a shuttle rail service operating only twice in the peak periods between Niagara Falls and Confederation GO stations. These forecasts were influenced by another business case completed in 2015 by Niagara Region.

The 2015 Niagara Region business case forecasted approximately 680 AM peak period, peak direction boardings in 2021 and 1,190 by 2031. These totals assumed an all-day shuttle service between Niagara Falls and West Harbour GO Stations.³ The updated analysis in this document forecasts 1,430 bi-directional boardings in the AM peak for Option 1 and 2 and 3,250 boardings in Option 3 for Grimsby, St. Catharines and Niagara Falls GO stations combined by 2031.

Niagara's 2015 forecasts are based only on home based work and school trips and do not include other trip purposes such as tourist travel whereas this updated analysis does include tourist figures. Thus, demand forecasts in this analysis are in part higher than those from Metrolinx's 2015 work and Niagara Region's business case.

Tourism Demand

The models that informed forecasted future rail demand are commuter-based, thus they do not fully account for and capture the tourist market which travels to and from Niagara Region. For this IBC, it was imperative that the tourist market's impact on ridership be incorporated as Niagara Falls alone is one of the largest tourist attractors in North America; aiming to attract 20 million person visits by 2022.⁴ Preferences and peak travel times of the tourist market differ from those of local commuters. Thus, additional research was conducted for the IBC to best understand the past travel patterns and current demands of the tourist market so as to inform scheduling for future Niagara services.

To quantify this market, GO Rail's seasonal service ridership totals for previous years, along with GO Bus data, was tallied and forecasted into future years for increased rail service patterns. Forecasting was also informed by previously observed seasonal usage figures at Niagara

² Pg. 8., GO Rail Niagara Service Extension - Initial Business Case, Metrolinx. 2015

³ Pg. 6., Niagara GO Rail: A Case for Weekday GO Train Service Between Niagara and the GTHA, Niagara Region. 2015

⁴ Pg. 3., Niagara Falls Tourism Business Plan 2017/2018

Region tourist attractions, highway counts and parking utilization at select tourist sites. This was done to determine the seasonality of utilization, how demand changes by season, along with annual growth rates. Once this demand pattern was understood, expansion factors were calculated which properly applied previously observed GO Rail and bus ridership to future years by season. This was to account for the fact that the summer months are tourist high seasons and have the highest observed visit rates.

Table 6 displays forecasted average weekend (Saturday and Sunday) tourist boardings for future year 2031. Figures come from observed ridership expanded to an annual figure using the mentioned tourism data sources. These figures were then forecasted into the future using observed corridor growth rates for the Lakeshore West Line. Forecasted tourism demand figures are embedded within all ridership totals reported in this document and inform option benefit totals.

Table 6: 2031 Tourist Market Average Weekend Day Total Boardings

Station	Option 1	Option 2	Option 3
Confederation GO	-	-	-
Grimsby GO	-	-	-
St. Catharines GO	90	90	300
Niagara Falls GO	110	110	360
TOTAL	200	200	660

Forecasts for Option 1 and 2 are identical as service patterns within Niagara Region do not change between the options. These two options display marginal gains in weekend day ridership in 2031. Demand in Option 3 is triple that forecasted for Option 1 and 2 and best serves the tourist market. This can be attributed to the greater service frequency provided to Niagara Region visitors, with hourly two-way, all-day trains at Niagara Falls.

Complete the Travel Experience

Transit Network Connectivity

All options provide daily connections to Hamilton and Niagara Region's transportation networks to varying degrees. Existing transportation options for the growing Hamilton and Niagara Region commuter base include private automobile, private bus, local transit, GO Bus route 12 services, walking and cycling. All options add a new mode of transportation at Grimsby and Confederation GO stations and provide residents with a direct extension of Lakeshore West rail services. This enables users to seamlessly travel to and transfer with other municipal transportation service providers at multiple station stops between Niagara Falls and Union Station.

Figures 5 and 6 depict the existing and proposed local transit routes in Hamilton and Niagara Region in comparison to the existing and proposed GO Rail stations. As can be seen, the stations would all be well integrated into the local transit networks, with the exception of Grimsby GO Station which would not be directly serviced by the existing local transit network. However, as previously noted, there are plans for medium and high density mixed-use developments near the proposed station location, indicating a possibility of the extension of Niagara's local transit network to service the area.

As indicated in Figure 6, the transit network shown for the Niagara Region includes the current routes for Niagara Region Transit, Niagara Falls Transit, Niagara Falls' WEGO Transit, and St. Catharines Transit Commission. WEGO is a transit system providing visitors with connections to tourist attractions throughout the City of Niagara Falls, Niagara Parks, and Niagara-on-the-Lake. This service provides bus routes with direct connections to the Niagara Falls GO Station, offering tourists travelling to Niagara Region using GO transit with convenient access to their destinations.

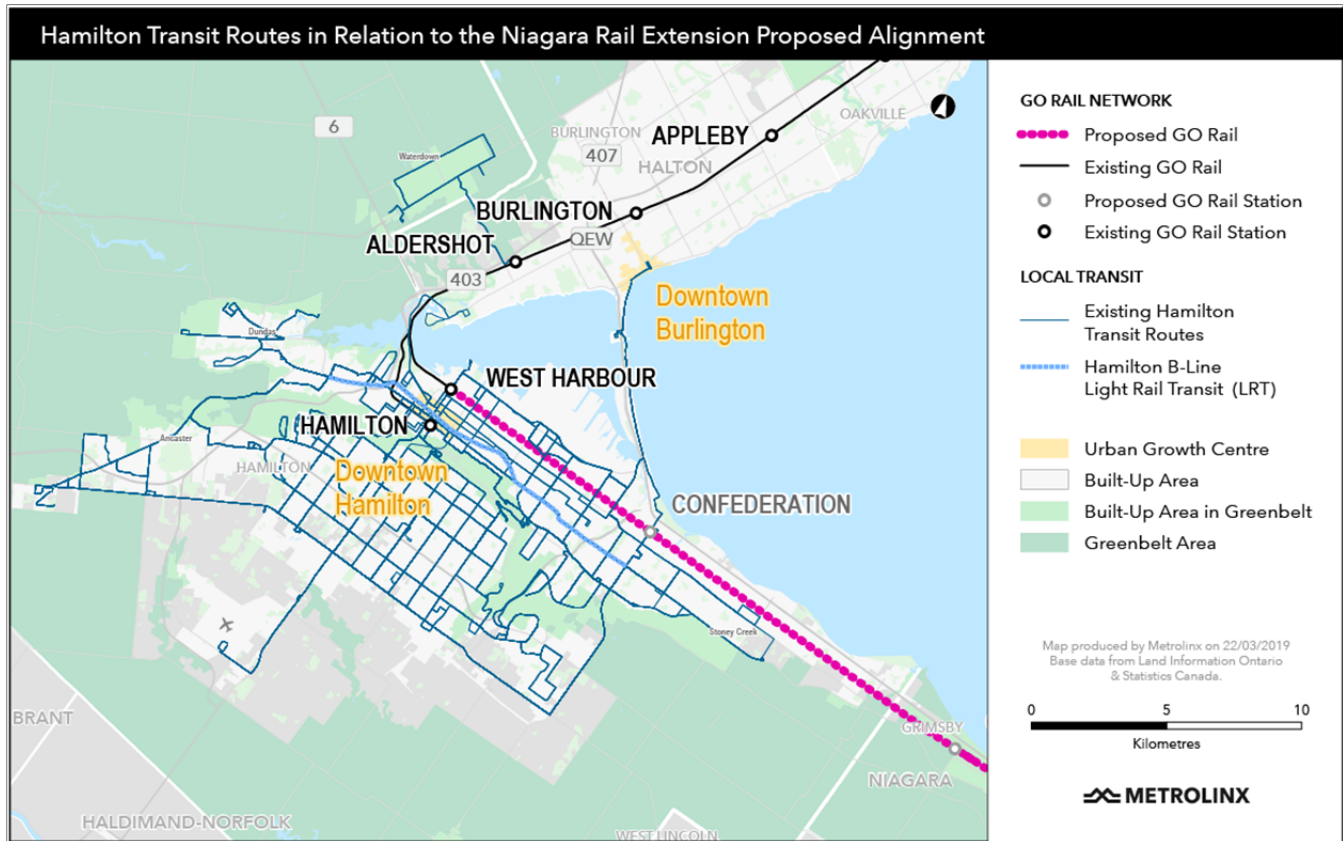


Figure 5: Existing and Proposed Stations in Relation to the Hamilton Local Transit Network

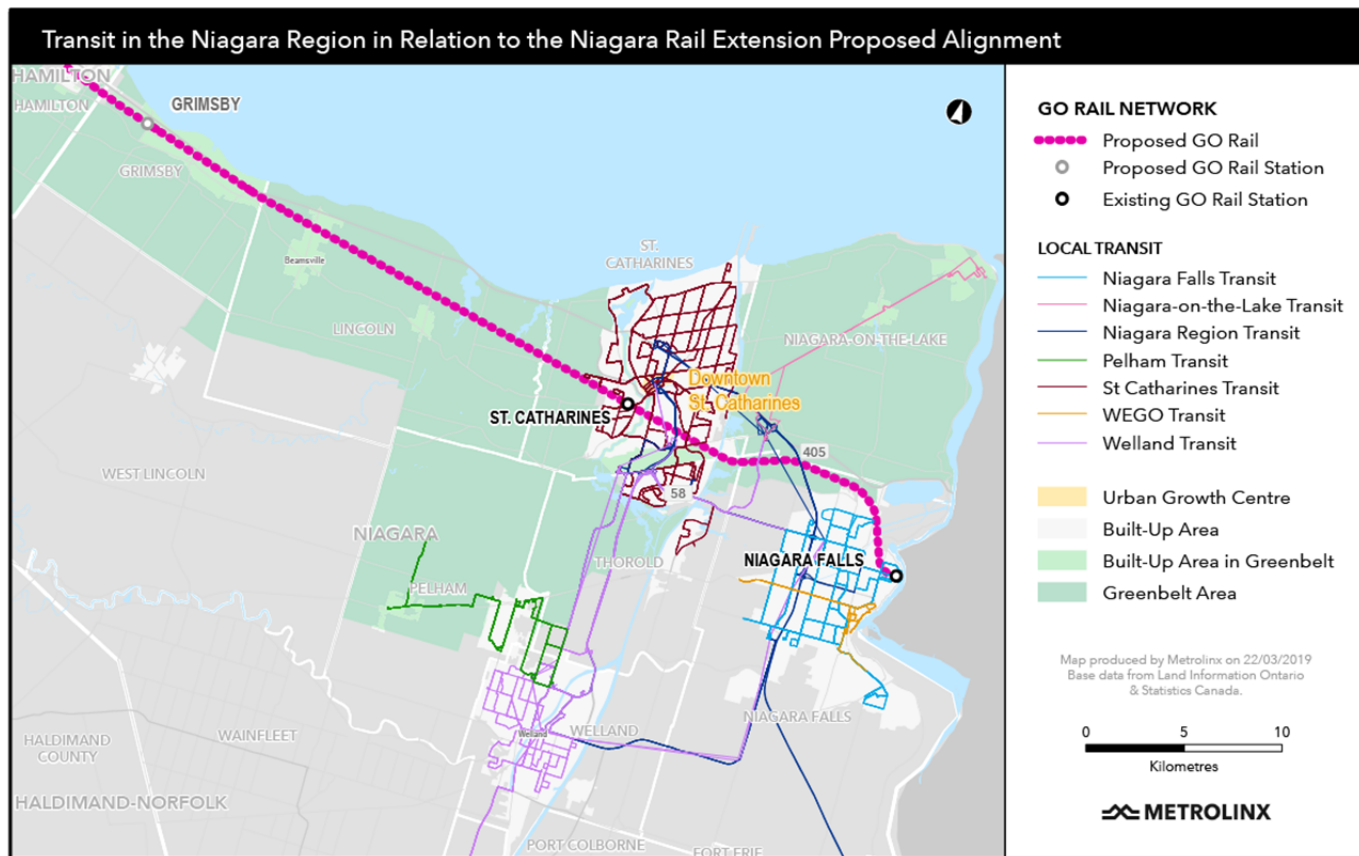


Figure 6: Existing and Proposed Stations in Relation to Niagara Region Local Transit Network

Data from the 2016 Transportation Tomorrow Survey shows that the primary non-Niagara based destination of commuters from Niagara Region is Hamilton. This market needs to be well connected to Hamilton if this investment is to be successful. Growing communities in Grimsby and locations further west in Niagara Region will continue to grow and feed travel flows to and from Hamilton. Enhanced GO services in this corridor would better connect these commuters to Hamilton as they have two stations in the City at Confederation and West Harbour.

As can be seen in Figure 5, these stations would be served by Hamilton's existing local transit network, with the future Hamilton LRT running parallel to the rail corridor. The potential also exists to extend the proposed Hamilton LRT from Eastgate Square mall at its eastern terminus a kilometer and a half north to Confederation GO station, further integrating and serving Hamilton's transit services with Niagara Region commuters.

Conversely, if Option 3 is advanced then the hourly frequency of GO Bus route 12 may be reduced. This could lead to negative connectivity impacts at Niagara College and Fairview Mall; current GO Bus stops which would not be serviced by rail. Removing or decreasing service to these stops may force some GO users who currently rely on the bus to drive or take alternative means of transport.

Transit Travel Time

All options would eliminate or reduce the need for GO passengers to transfer between Lakeshore West rail and GO Bus services when traveling to or from Niagara Region. These options would also operate express between Burlington, Oakville and Union Station, providing further travel time reductions for passengers travelling to Union Station.

Current peak hour trips between Downtown Niagara Falls and Toronto can be just shy of three hours in journey length, and at their fastest are approximately two hours 40 minutes between the cities.

As can be seen in Table 7 below, the implementation of any tested option would result in travel time reductions compared to current GO Bus-rail trips for passengers boarding and alighting at all GO stations in Niagara Region. The options would not result in reduced travel times for existing summer rail service as these trips currently have fewer station stops. In Option 1 and 2, a full single-seat rail trip would take approximately two hours and 20 minutes, while in Option 3 it would reduce to around two hours 10 minutes depending on the speed improvements undertaken.

Table 7: Current and Proposed In-Vehicle Travel Times (minutes)

Station	Current Bus-Rail Service	Proposed Rail Service
Confederation GO	-	80-85
Grimsby GO	100-120	90-95
St. Catharines GO	-	110
Niagara Falls GO	160-180	130-140

The travel times for passengers boarding at Niagara Falls, St. Catharines, and Grimsby GO stations under all options would be comparable to the travel time of individuals driving to a GO station on the Lakeshore West GO Line. An example of this trip pattern can be seen with commuters who currently drive from Niagara Region to Burlington GO Station and board the Lakeshore West GO train from this station to continue eastbound to Union Station during morning peak hours. Expanding GO Rail services year round to the Niagara Region would provide these commuters with comparable travel times and eliminate transfer and wait periods by providing a continuous trip option between Union Station and Hamilton and Niagara Region.

Despite their differences in service patterns, all options reduce travel times for GO transit users of the extension, providing a faster mode of travel and more frequent services.

Transit Reliability

The proposed extension of GO Rail services to the Niagara Region would provide transit services and operations that would not be impacted by congestion on the road and highway network.

The reliability of rail service in the proposed service alternatives may be impacted due to the rail crossing at the Welland Canal. This crossing could prove to be a major impediment to maintaining scheduled service to/from Niagara Falls as ships cross through the canal for the majority of the year, apart from winter, and currently have priority over rail movements at this crossing. In such instances the rail bridge must be raised to allow ships to pass underneath. A confirmed GO rail timetable must be reached with the SLSMC (the operators of the Welland Canal), otherwise rail service to and from Niagara Falls will be subject to delays. The crossing has the potential to impact reliability of all options; however, these impacts would be especially prevalent in Option 3 due to the high number of train movements.

Delays at the canal bridge are far more likely to impact service in Option 3 which would have two train movements crossing the bridge every weekday hour between the morning peak period until midnight; Option 1 and 2 would see only 11 trains cross over the bridge per weekday. Any delay to a Union-bound train would have serious impacts on downstream service on the Lakeshore West Line. A theoretical 10-minute delay at the bridge would leave the corridor out of sync, delaying Union-bound services downstream. Potential delays at the Welland Canal and their

impacts on option results are further analyzed as a sensitivity test in the Appendix.

An operational contingency to this problem is proposed for the service pattern in Option 3. If a train to or from Niagara Falls is severely delayed at the canal then the next half-hourly St. Catharines train will depart the station early to replace the stalled Niagara train. This contingency requires further study as this project progresses, especially if Option 3 is selected for delivery.

Sustainable Communities

Energy Use

The GTHA's transport network is a major source of greenhouse gas (GHG) emissions and is one of the region's major contributors to climate change. Expansion of rail services to Niagara is forecasted to shift demand from the auto network to the rail network and reduce annual auto trips. This will result in greenhouse gas emission reduction benefits valued between \$4-9M across the three options (see Economic Case).

This reduction in automobile use benefits not only users switching to GO but also users of the local road network who still drive. Remaining auto user commutes will temporarily be subject to reduced congestion levels post-intervention in all options, with the greatest reduction coming from Option 3.

Health

This extension will foster reduced auto dependency on travel not only to and from Niagara Region, but to GO stations themselves as the majority of stations for consideration will be and are in or near residential areas or areas of planned medium to high density land use.

Table 8 indicates the target modal split percentages for GO station access in 2031 as per the *Station Access Plan* for the Niagara Service Extension stations.

Table 8: Station Access Plan Active Transportation Targets (2031)

Station	Walking Target	Cycling Target
Confederation GO	8-10%	3-5%
Grimsby GO	6-8%	1-2%
St. Catharines GO	6-8%	1-2%
Niagara Falls GO	52-54%	8-10%

As can be seen in Table 8, the targets for the Niagara Falls Station are particularly high, with the majority of the passengers (52-54 per cent) targeted to access the station by walking. These targets have been assigned due to the location of the station in proximity to the City's downtown core and therefore population, job centers, and tourist attractions. As previously noted and can be seen in Figure 7, Niagara Falls Station is located adjacent to the City's historic downtown and within 2-4 km of the City's tourist centre. The station also has minimal customer parking. Despite having lower walking and cycling targets, the locations of St. Catharines and Grimsby stations in residential areas can be expected to encourage GO passengers to use more sustainable modes of transportation in accessing the stations.

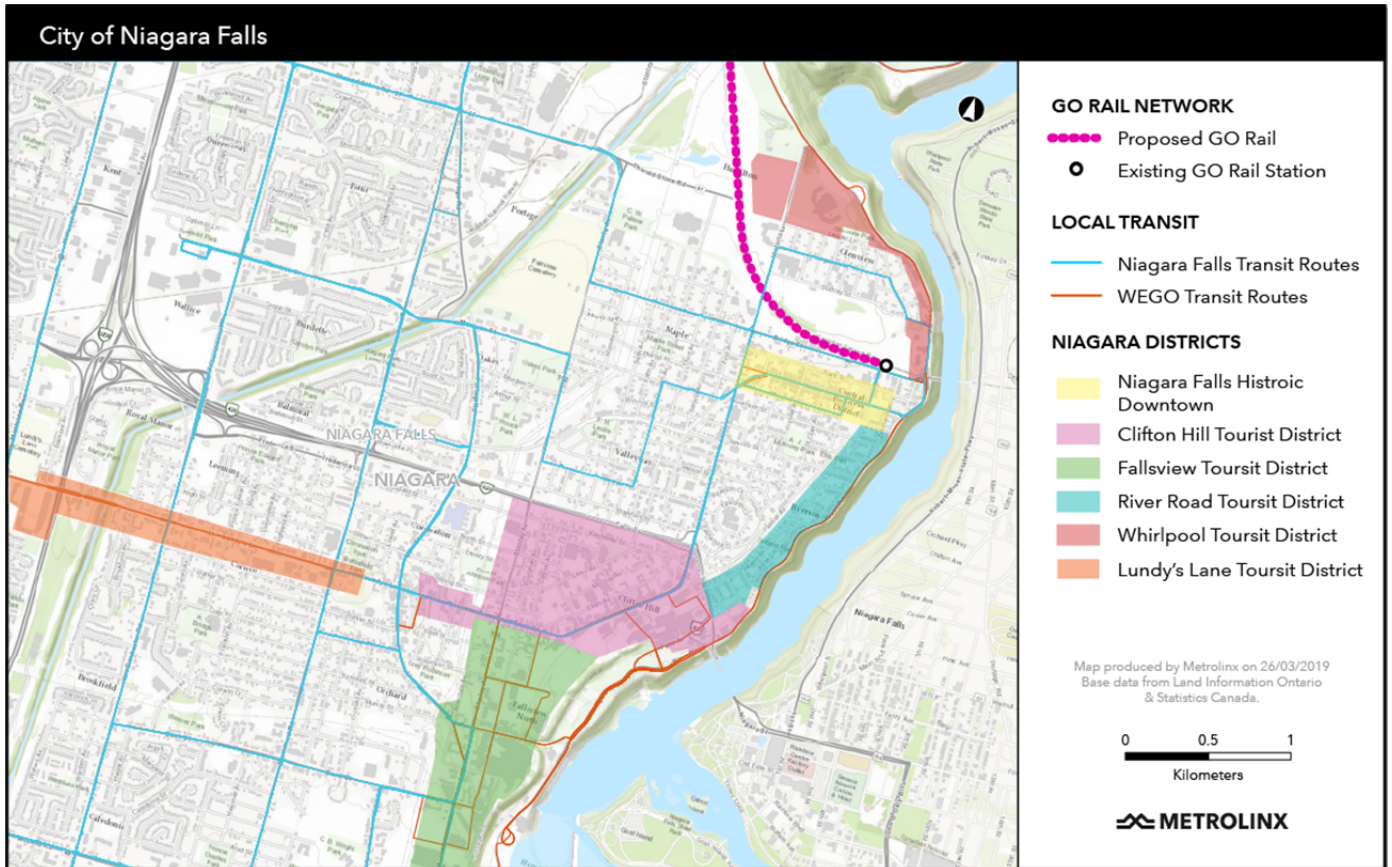


Figure 7: Tourist Districts and Transit Network within the City of Niagara Falls

The GO Rail stations are generally located in easy to access areas. Confederation GO Station is in close proximity to the Queen Elizabeth Way and Red Hill Parkway in a commercial and industrially developed area. Despite the station not being surrounded by residential land uses, its location would provide GO passengers with a convenient connection to employment opportunities.

Extending rail services to operate year round may result in increased noise pollution for residential areas adjacent to the rail corridor. While CN's rail corridor predominantly passes through industrial and agricultural lands between Hamilton and Niagara Falls, there are concentrations of residential lands uses that would experience increased noise. Areas of Hamilton, Grimsby, St. Catharines and Niagara Falls would be subjected up to hourly GO trains and the sounding of whistles when passing through grade crossings seven days a week in Option 3.

Natural Habitat Impact

Environmental considerations must also be considered when constructing the extension. Across the options all potential infrastructure is on or adjacent to existing rail infrastructure, thus minimizing the impact to the local environment. New station lands for development at Casablanca Boulevard for Grimsby GO Station and Centennial Parkway North for Confederation GO Station are previously disturbed areas where limited vegetation and habitats currently exist. Overall this means little expected negative impacts to the study area's natural environment.

While not studied in detail at this time, there exists the potential for land acquisition and expropriation, particularly in Option 3. The required construction to enable the planned service in this option would require additional tracks in select locations of CN freight corridor.

Track expansion at GO's Lewis Road Layover facility would also be required in any option selected. These expansions could have property impacts that would require Metrolinx to acquire adjacent properties. Property impacts, if there are any, will be further analysed in the Preliminary Design Business Case.

Strategic Case Summary

2041 RTP Goal	Strategic Outcome	Option 1	Option 2	Option 3
Strong Connections	Population and jobs served by Niagara Rail Extension	11,200 people and 9,300 jobs within 800m of a station along the Niagara Extension with direct access to rail services by 2031		
	Increase GO ridership in Hamilton and the Niagara Region	2031 Annual Ridership of 1,562,000	2031 Annual Ridership of 1,826,000	2031 Annual Ridership of 3,367,000
		Average weekend day ridership of 200	Average weekend day ridership of 200	Average weekend day ridership of 660

2041 RTP Goal	Strategic Outcome	Option 1	Option 2	Option 3
Complete Travel Experiences	Improve the Transit Network	Improved connections to local and regional transit networks in Niagara Region and Hamilton with four GO Rail stations		
	Improve Transit Travel Time	Significant travel time reductions from Union Station to Niagara Falls of up to 15-45min from current train-bus services		
	Improve Transit Reliability	Transit service will have a separate ROW from road vehicles, but will share the corridor with freight traffic. Contingent on Welland Canal crossing agreement with the SLSMC Operation of all-day GO Rail would provide more reliable service throughout the day, but trains will share the rail corridor with freight traffic. Contingent on extensive Welland Canal crossing agreement with the SLSMC		
	Reduce Auto Vehicles Trips	Three of four proposed stations are centrally located and would promote non-auto access to GO stations and provide direct GO Rail access for Hamilton and Niagara Region		
	Encourage Active Modes of Transportation	Three of four proposed station locations would be in residential areas, encouraging active modes of station access		
Sustainable Communities	Natural Habitat Impact	EA completed	EA completed	EA completed but additional study required

5

Economic Case



Introduction

The Economic Case is one of two chapters focused on the rationale for pursuing an investment (the other being the Strategic Case). While the Strategic Case evaluates options based on a project specific policy/plan oriented evaluation framework, the Economic Case determines if the expected benefits of this investment exceed the costs required to deliver it, and articulates the overall benefit to society and economic viability of each investment option.

This analysis considers the magnitude of costs and benefits over a 60-year lifecycle (the evaluation period) and determines the following metrics:

- **Benefit Cost Ratio (BCR)** - the present value of benefits divided by the present value of costs, which is used to indicate benefits realized per dollar spent.
- **Net Present Value (NPV)** - the present value benefits minus present value of costs, which is used to indicate total net benefits to the region.

The Economic Case uses real values and a social discount rate, as opposed to nominal values and a financial discount rate used in the Financial Case. Real values do not include the impact of general inflation, but do consider real growth. A social discount rate reflects society's time value preference for consumption - a benefit or cost incurred tomorrow may be less 'valuable' than the same benefit or cost incurred today.

All results included in the Economic and Financial Case chapters are incremental to the BAU scenario - meaning they are the new benefits that can be realized and the new costs required to provide enhanced GO Rail services to Niagara Region.

This chapter answers the following questions:

- What are the benefits and costs associated with the investment options in real terms?
- What is the overall impact to society, as indicated by the Benefit Cost Ratio (BCR) and Net Present Value (NPV) of the investment options?
- How sensitive is economic performance to key assumptions used in option scoping and evaluation?

Assumptions and Parameters

The Economic Case makes use of assumptions and parameters throughout the social cost benefit analysis, as noted in Table 9. The assumptions and parameters used within this Business Case come from Metrolinx's Business Case Guidance, as of April 2018. All analysis is presented in real terms in 2018\$ and assumes an economic discount rate of 3.5 per cent⁵.

Table 9: Economic Case Inputs and Assumptions

Input	Detail
Analysis Approach	<ul style="list-style-type: none"> All benefits/costs are expressed in real terms in 2018\$ Appraisal begins in 2018. It assumes five years of construction (2019-2023), with a hypothetical opening year of 2024, and 60 years of operation (2024-2083)
Evaluation Period	60 years
Economic discount rate	3.5%
Inflation Rate	2.0%
Real Inflation	0%
Value of Time (VoT)	\$17.71/hour (2018\$)
VoT Growth Rate	0%
Auto occupancy	1.077
Auto operating cost savings	\$0.09/km (2018\$)
Decongestion benefit	0.01 hours/km (peak) 0.0013 hours/km (off-peak)
Safety improvements (accident mitigation)	\$0.10/km (2018\$)
GHG value	\$0.011/km

⁵ Real values, used in the economic case, reflect the increase in the value of goods and services in terms of purchasing power from the base year. Nominal values, used in the financial case, reflect the expected cost of a good or service in the year of expenditure. These values include both the general inflation rate as well as the increase for the good/service in real terms

A key metric which impacts project benefits are the proportion of Niagara Region riders who make trips to Toronto. It is unreasonable to assume that all Niagara Region boardings would travel to and from Union Station. With this in mind, 2016 Transportation Tomorrow Survey (TTS) data was pulled to determine which upper-tier municipalities Niagara Region transit users travel to. Only those upper-tier municipalities along the Lakeshore West Line were examined, excluding Niagara Region so to not capture intra-region travel.

Survey results show that for the AM peak period 79 per cent of Niagara Region local transit users are destined for Toronto, 10 per cent for Peel Region, one per cent for Halton Region and 10 per cent for the City of Hamilton. These percentages were applied to results to properly attribute benefits to those users travelling the full distance of the Lakeshore West Line and others only utilizing partial segments of it.

Costs

Costs or “required investment” to deliver the Niagara Falls Rail Extension are divided into two categories:

- **Capital Costs** - fixed one-time costs incurred during the implementation of the investment. Capital costs include the labour and materials required for construction, however, property costs are excluded from the economic analysis.
- **Operating and Maintenance Costs** - ongoing costs required to operate the service, provide day to day maintenance and complete major rehabilitations throughout the lifecycle of the project.

The capital and operating and maintenance costs for the entire project 60-year lifecycle of the Niagara Extension are listed below. These costs are incremental to the Business as Usual (BAU) scenario and have been discounted based on the approach defined earlier in this chapter.

Costs include a 10 per cent contingency allowance based on the conceptual level of engineering utilized for this assignment, an additional indirect cost of 15 per cent, agency cost of 18 per cent and flagging costs. A more detailed breakdown of capital costs is provided in the Financial Case.

Table 10: Economic Costs Summary (NPV Millions 2018\$)*

Cost Category	Option 1	Option 2	Option 3
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Total Costs	\$(522)	\$(651)	\$(1,632)
Capital Costs	\$(296)	\$(296)	\$(354)
Operating and Maintenance Costs	\$(226)	\$(355)	\$(1,278)
Fleet capex, disposals, refurb and lifecycle	\$0	\$0	\$0
Terminal Value	\$0	\$0	\$0

*All totals rounded

Capital costs for Option 1 and 2 are identical as the physical infrastructure required in these options does not change. Option 2 accumulated over \$130M in additional operating and maintenance costs however due to operating hourly services to and from Confederation GO Station. Capital cost wise Option 3 is around \$50M more than Option 1 and 2, costs that enable two-way, all-day rail operations between St. Catharines and Niagara Falls GO Stations. While this increase in capital costs is sizeable, it is minimal in comparison to the significant operating and maintenance costs that would be required to operate hourly all-day trains to and from Niagara Falls GO Station. Thus Option 3 total costs exceed those of Option 1 and 2 by approximately \$900M-1B over the project lifecycle.

Benefits: User (Internal) Impacts

User Impacts are a key area of analysis for transport investments. They represent how the investment will improve the welfare of transport network users or travellers. This includes both travellers who will and will not make use of the Niagara Rail Extension as both groups benefit from travellers switching to use GO Rail from other modes.

User impacts considered in this business case were determined using outputs from the Province's regional demand model. Modelling outputs enable benefit and ridership calculation for the 60-year project lifecycle under analysis. User benefits are considered through the lens of changes in costs, or 'willingness to pay' for a trip. The Niagara Extension will change the cost of travel to three main groups:

- **Existing GO Bus/Rail Passengers** - The Niagara Extension will reduce the generalized cost⁶ of travel below the current cost of travel for some GO users coming to/from Niagara. This investment will thus provide a direct benefit to existing users.
- **New GO Rail Passengers** - The Niagara Extension will reduce the generalized cost of travel on GO in Niagara and Hamilton Regions. This will attract new users to GO that previously travelled via other modes. These new users will receive a benefit equal to the difference in what they were willing to pay and the new generalized cost of travel on GO.
- **Auto Users** - The Niagara Extension will attract some auto users off of local roads. This leads to decongestion of said roads which in turn reduces the travel time and operating cost for travellers who remain on the auto network.

All user impacts included in this analysis are 'net impacts' across the investment; a sum of benefits and disbenefits.

Table 11: User Impacts Summary (NPV Millions 2018\$)*

Impact Type	Option 1	Option 2	Option 3
Existing and New Transit User Time Savings	\$402	\$458	\$1,303
Auto User Time Savings	\$64	\$122	\$146
Average (Total) Auto Operating Cost Reduction	\$34	\$64	\$81
Fare Revenue Adjustment**	\$73	\$137	\$235
TOTAL	\$572	\$781	\$1,765

*All totals rounded

**See Metrolinx Guidance 2 page 107 "Step two"

Across options Existing and New User Time Savings account for the largest share of User Impacts. This benefit category shows that both existing and new users to the GO Rail network will experience time

⁶ Generalized cost is the sum of the monetary (e.g. public transit fare) and non-monetary (i.e. time spent travelling - time is monetized using a Value of Time factor) costs of a journey.

savings when taking GO Rail services to and from Niagara Region. Option 3 generates the greatest amount of benefits for users of the transportation network over Option 1 and 2. Primary drivers of internal benefits for Option 3 include time savings for a combination of existing and new transit users, road user time savings and incremental fare revenues generated.

Benefits: External (Societal) Impacts

Every auto trip taken can contribute negative impacts to society – whether it is emissions that pollute the air or injuries that can occur from collisions. These impacts are called external impacts, or the “social cost of transport”. Transportation investments are an opportunity to reduce these social costs by improving the economic efficiency of the transportation system – meaning less impact for the same amount of travel (measured in impact per passenger kilometre).

For instance, motorists switching to GO Rail decreases the number of trips on the GTHA’s road network. This will lead to fewer car collisions and emissions emitted, thus making the GTHA’s transportation network safer and society healthier.

One type of external impact is estimated for this investment:

- **Mode Change** – if travellers move from a less efficient mode to GO Rail then there is an impact equivalent to the externalities per trip on GO Rail, minus the externalities on their previously used mode. These benefits are based on the change in automobile vehicle kilometres travelled (VKT). These benefits are calculated in two ways:
 - Number of automobile trips that switch to GO Rail
 - Trip length for trips that used auto and now use GO Rail (i.e. the reduction in VKT)

Table 12: External Impacts Summary (NPV Millions 2018\$)*

Impact Type	Option 1	Option 2	Option 3
Safety Benefits	\$12	\$23	\$30
Environment Benefits	\$4	\$7	\$9
TOTAL	\$16	\$30	\$39

*All totals rounded

Shown above, safety benefits from reduced automobile collisions due to reductions in VKT make up the majority of external benefits. Environmental benefits derived from greenhouse gas emission reduction also have some effect to the external benefits. Both safety and environmental benefits are tied to ridership totals. Thus Option 3 which has the highest overall ridership, at 3.4M per year by 2031, produces the largest external benefits to society while Option 2 has the second highest ridership and benefit total.

Economic Case Summary

Results indicate that Option 2 generates the greatest return on investment per dollar spent. For every dollar spent \$1.2 of benefits are returned to society. This BCR of 1.2 is the highest of the three options analyzed.

Option 1 has a BCR close to Option 2 of 1.1. This option has the lowest costs of all three, but in turn generates the lowest net benefits to society at \$66M. Lower benefit totals in Option 1 are a result of the reduced service pattern provided compared to Option 2 and 3.

Total benefits for Option 3 more than double totals for Option 1 and 2. However, the costs of Option 3 are much higher than Option 1 and 2. This is due to the operation and corresponding maintenance requirements of half hourly rail service to St. Catharines GO Station and hourly service to Niagara Falls GO Station. While having the highest net benefit total of all options at \$172M, the substantial costs of this option bring into question the viability of the proposed service and give the option a BCR of 1.1, lower than Option 2.

Table 13: Economic Case Summary (NPV Millions 2018\$)*

Impact Type	Option 1	Option 2	Option 3
Total Costs (Present Year \$) (A)	\$(522)	\$(651)	\$(1,632)
Capital Costs	\$(296)	\$(296)	\$(354)
Operating and Maintenance Costs	\$(226)	\$(355)	\$(1,278)
Fleet capex, disposals, refurb and lifecycle	\$0	\$0	\$0
Terminal Value	\$0	\$0	\$0
Benefits: Total Impacts (Present Year \$) (B)	\$588	\$812	\$1,804
User Impacts	\$572	\$781	\$1,765
External Impacts	\$16	\$30	\$39
BCR (B/A)	1.1	1.2	1.1
NPV (Present Year \$) (B+A)	\$66	\$161	\$172

*All totals rounded

6

Financial Case



Introduction

The Financial Case assesses the overall financial impact of proposed investment options. While the Strategic Case and Economic Case outline how an investment achieves organizational goals and social value, the Financial Case is one of two cases (the other being the Deliverability and Operations Case) that focuses on the requirements to successfully deliver an investment. This includes a review of total revenue (fares) gained and expenditures (capital, operating and maintenance) required over the lifecycle of the investment incremental to the base case scenario.

This chapter answers the questions on the following:

- How much does the investment cost? What are the capital costs, operating costs, revenues, net financial effect, and financial cost recovery ratios?
- How are costs allocated?

Dollar figures for the 60-year evaluation period from the hypothetical service start date of 2024 through to the end of 2083 are in nominal dollars (i.e., the dollar figure expected to be paid or received expressed in the year of the payment). Nominal dollars are calculated assuming an annual inflation rate of two per cent. The annual costs and revenues are discounted back to a single value using a nominal discount rate of 5.5 per cent. Once discounted, total costs are compared against incremental revenues to derive the net present value in 2018\$ for the financial case as well as the operating cost recovery ratio.

The hypothetical service start date of 2024 has been assumed as a basis for completing the economic and financial analysis. Actual delivery time of the program will depend on funding decisions and required time to complete environmental assessments, design and construction. This will be further refined and developed through the preliminary design phase.

Capital Costs

The capital cost of the proposed options forms the largest component of overall project costs. Estimates of probable capital costs were estimated in 2018\$.

They include a 10 per cent contingency allowance based on the conceptual level of engineering utilized for this assignment. Further, an additional indirect cost of 15 per cent, agency cost of 18 per cent and flagging costs are incorporated to account for the completion of designs, procurement activities, and support activities during construction.

Capital costs for Option 1 and 2 comprise of infrastructure at stations and track work in select areas of CN's Grimsby Subdivision to meet the tested service patterns. Option 3 has the highest capital costs. Operating half-hourly rail services on the corridor will require sections of net new tracks, extensive re-signalling, on-corridor work across CN's Grimsby Subdivision to enable increased services, larger stations to handle increased demand and expansion to the existing Lewis Road Layover facility. Cost values do not include the acquisition of rolling stock as it was assumed for this analysis that existing spare GO diesel trains would be utilized for services to and from Niagara Falls.

The sums of capital costs reported here differ from those listed in the Economic Case. The below figures are in nominal terms discounted to 2018\$ values using a 5.5 per cent discount rate and include property costs should they exist. While the Economic Case uses real values with a 3.5 per cent discount rate.

Table 14: Capital Costs in Financial Terms (NPV Millions 2018\$)*

Line Item	Option 1	Option 2	Option 3
Total Capital Cost	\$(312)	\$(312)	\$(374)

*All totals rounded

The construction of new structures, bridges, tracks between West Harbour and Niagara Falls GO stations along with the full buildout of new and existing stations and the Lewis Road Layover facility in Option 3 leads to the highest construction costs of all options at \$374M.

Option 1 and 2, with identical infrastructure, have a reduced scope compared to Option 3. Major infrastructure improvements would primarily occur between West Harbour and St. Catharines GO Stations, a smaller amount of track than in Option 3, while the Lewis Road Layover Facility and existing GO/VIA stations in St. Catharines and Niagara Falls would see minor capital improvements. This smaller construction scope leads to anticipated capital costs of \$312M for Option 1 and 2.

The Ministry of Transportation has asked Metrolinx to assess the status of all current transit projects and determine the feasibility of applying a market-driven approach that leverages third party investment in transit to help reduce the cost to provincial taxpayers. All scenario costs assume that the proposed GO station in Grimsby along Casablanca Boulevard will be paid for by third parties under this market-driven strategy

approach. Due to this assumption the costs for this station (while accounted for in the Economic Case as construction costs as a societal cost) are not included in reported totals in the Financial Case for any option. If no alternative funding source can be secured to deliver this station, then alternatives in Grimsby should be considered. One such alternative solution calls for stopping at Grimsby’s existing VIA station. The proximity of this station to the town centre remedies the constricted parking supply at this site and makes the case for a station that would see similar ridership and benefits to the Casablanca Boulevard site.

Operating and Maintenance Costs

The operation and maintenance of additional GO Rail service, particularly under an all-day service pattern in Option 3, will bring additional project costs. Operating and maintenance costs cover all aspects of keeping the investment running including staffing, fuel, vehicle and track upkeep and other state of good repair costs.

Table 15: Operating and Maintenance Costs in Financial Terms (NPV Millions 2018\$)*

Line Item	Option 1	Option 2	Option 3
Operations and Maintenance	\$(234)	\$(366)	\$(1,200)
GO Bus Cost Reduction	\$84	\$84	\$204

*All totals rounded

Operating and maintenance costs increase proportionally to rail service increases across the three options. With this in mind the large operating and maintenance costs in scenario 3 are understandable compared to Option 1 and 2. At the low end of service, Option 1 would only have 15 services per day. While operating half-hourly trains all-day between St. Catharines GO Station and Union leads to 64 trips per day.

With the expansion of rail services between Hamilton and Niagara Regions, GO Bus route 12 will see reductions in service and operating pattern under all three options. Under Option 1 and 2 GO route 12 would reduce service by 11 trips per day as these timeslots in the peak and off-peak would be serviced by rail. This leads to an \$84M reduction in operating and maintenance costs over the project lifecycle for Option 1 and 2.

Option 3 sees a far greater reduction in route 12 operations, approximately 40 daily trips, as rail services will operate all-day at hourly or shorter intervals. This reduces operating and maintenance costs to the route by approximately \$204M. This potential reduction in service would be a disadvantage to users of GO Bus stops in Beamsville, St. Catharines Fairview Mall and Niagara College which are on the bus route but not along the rail corridor.

Revenue Impacts

All options are forecasted to increase demand for GO transit services leading to a corresponding increase in fare revenues for GO. With the largest forecasted ridership and most extensive service pattern, Option 3 is anticipated to generate the highest fare revenues of all options at approximately \$239M over the 60-year lifecycle. Option 1 has the lowest projected incremental ridership increase and thus sees the lowest incremental fare revenues of \$74M. Extending all-day services to Confederation GO Station in Option 2 increases this total by approximately \$65M to a total of \$139M over the project lifecycle. These figures include the impact of GO Bus users switching to rail services.

Table 16: Fare Revenues in Financial Terms (NPV Millions 2018\$)*

Line Item	Option 1	Option 2	Option 3
Fare revenue	\$74	\$139	\$239

*All totals rounded

Financial Case Summary

Option 1, with the lowest capital and operating and maintenance costs, has the smallest Net Present Value of -\$472M and an Operating Cost Recovery Ratio of 32 per cent. Option 2 has a NPV of -\$539M and the highest R/C Ratio of 38 per cent. Despite generating the largest fare revenue totals over the project lifecycle, Option 3 operating and maintenance costs prove to be substantive, thus leading to the lowest NPV of -\$1,335M.

Table 1: Financial Case Summary (NPV Millions 2018\$)*

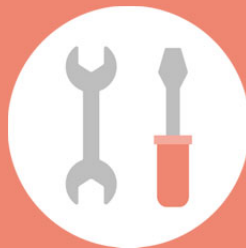
Financial Case Metric	Option 1	Option 2	Option 3
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Total Capital Costs (A)	\$(312)	\$(312)	\$(374)
Total Operating and Maintenance Costs (B)	\$(234)	\$(366)	\$(1,200)
Total Revenue Impacts (C)	\$74	\$139	\$239
Net Present Value (NPV) (A+B+C)	\$(472)	\$(539)	\$(1,335)
Operating Cost Recovery Ratio (R/C Ratio) (C/B)	32%	38%	20%

*All totals rounded

7

Deliverability and Operations Case



Introduction

The Deliverability and Operations Case is an analysis of investment delivery, operations and maintenance, service plans and any other issues that may prevent the realization of an option. This includes delivering the project from original concept through planning, design, environmental assessment, stakeholder engagement, procurement, construction and operations. The Deliverability and Operations Case is one of two cases (the other being the Financial Case) focused on requirements for delivering the investment.

This chapter answers the questions on the following:

- Major project components and constructability
- Environmental assessment requirements
- Construction impacts
- Main project risks and stakeholder dependencies
- Milestone dates

Option Feasibility

Option 1 and 2

These options would see the operation of four trains per peak period with two starting/terminating at Niagara Falls GO Station and two at Confederation GO Station, with hourly two-way, all-day services provided to Confederation GO Station in Option 2. The tourism and off-peak markets would be served by the operating pattern of the seasonal summer rail service, consisting of seven daily trains (three from Union Station and four from Niagara Falls GO Station), which would be extended to operate year-round. GO Bus route 12 would operate in the remaining daily service gaps.

To achieve this service, some new on-corridor infrastructure is required. Track work will be necessary at Confederation GO Station to allow for access on both the north and south sides of the new station platform. As well, expansion of the Lewis Road train layover facility and double tracking of sections of the Grimsby Subdivision. This option also requires major on-corridor infrastructure work. Impacts from off-corridor work will be limited to the construction of Confederation and Grimsby GO Stations and minimal investments at the existing St. Catharines and Niagara Falls GO stations. Station works consist of the following infrastructure at each site:

Confederation GO

A minimal infrastructure scenario was scoped for this station. This do minimum build includes the following:

- Small station building
- 147 space northern parking lot with pick-up drop-off area and GO Bus loop
- One 12-car island platform with four heated shelters, two elevators and pedestrian tunnel access with the potential for a side platform if CN agrees

Grimsby GO

A minimal infrastructure scenario was scoped for this station in the scenario with only four daily trains stopping at the station. This scenario involves the costs of all necessary enabling works to build out the fully scoped station at a later date when service and demand dictate the need. This “do minimum” build includes the following:

- 221 space gravel parking lot
- Two concrete side platforms
- One pedestrian tunnel
- Self-serve PRESTO machines

St. Catharines GO

Minimal additional infrastructure is required at this station site as a station building, platform and parking already exist. For this option, new self-serve PRESTO machines were costed to be provided in addition to the existing PRESTO infrastructure on site in anticipation of increased demand.

Niagara Falls GO

As with St. Catharines GO Station, minimal additional infrastructure is required at this station site as a station building, platform and parking already exist. For this option, new self-serve PRESTO machines were costed to be provided in addition to the existing PRESTO infrastructure on site in anticipation of increased demand.

Environmental Assessment requirements have been completed under the 2011 Niagara Service Expansion Environmental Study Report (ESR) and other subsequent studies for the majority of investment

components. This report recommended the current station sites for Confederation and Grimsby GO Stations.

There are two dependencies the potential implementation of either of these options hinge upon: operating agreements with CN Rail and the SLSMC at the Welland Canal.

Reliable and timely rail services between Niagara Falls and St. Catharines is dependent on consistent unobstructed access to cross the Welland Canal via CN's Bridge 6. Currently, summer rail services are exposed to delays by upwards of 20 minutes from ships passing in the canal, which necessitates raising the rail drawbridge over the canal. From an operational standpoint, the Welland Canal crossing could prove to be a major impediment to maintaining scheduled service along the Lakeshore West and East lines for the majority of the calendar year when shipping in the canal is active.

The SLSMC, who are responsible for operations of the canal, have indicated that a two train schedule of AM/PM trains crossing the canal is achievable and that they support rail services through Niagara Region. This would give the proposed peak services in these options dedicated crossing times that would not be impeded by freight movements within the canal.

As noted, delays are not uncommon at the canal with 21 recorded incidents between rail and shipping traffic occurring during the operation of 2018 season summer service. Delays lasted an average length of 17 minutes, or 1.3 delays per weekend serviced last year. The frequency and length of delays must be reduced to ensure reliable and consistent operations. Given that only 1.3 delays occurred at the bridge per weekend, and that summer rail services have been in operation since 2009, it is feasible to assume that an agreement can be reached with CN to extend the summer service pattern to a year-round daily format.

Other rail operators currently run on this corridor that will have to be accounted for during scheduling. VIA and Amtrak share a passenger service, that has one train in the morning leaving from Union Station to the United States, and one returning in the evening from New York to Toronto that travel through the Niagara Region.

Option 3

This option would see the operation of half-hourly trains all-day between St. Catharines GO Station and Union, with every second train operating to/from Niagara Falls GO Station forming hourly service. As with Option

1, trains would run express from Union to Oakville stopping at Oakville GO, Burlington GO, Aldershot GO, West Harbour GO and all new stations on the CN Grimsby Subdivision.

A major project component for this investment is stations. Of the four new stations to be serviced on this extension two are net new, (Confederation and Grimsby), and two are existing which will undergo retrofitting works (St. Catharines and Niagara Falls). Station works consist of the following infrastructure at each site:

Confederation GO

- Small station building
- 147 space norther parking lot with pick-up drop-off area and GO Bus loop
- One 12-car island platform with four heated shelters, two elevators and pedestrian tunnel access with the potential for a side platform if CN agrees
- A 300-325 space south parking lot with passenger pick-up drop-off (PPUDO) area in addition to parking and bus loop infrastructure provided on the north side of the station could be included to the station build for this option but is not included in current cost estimates.

Grimsby GO

Infrastructure for Grimsby GO Station in Option 3 is assumed to be identical as in Option 1 and 2.

A previous functional site plan for Grimsby identifies a greater build that could contain the following; pending on a third party market-driven strategy agreement:

- 12 vehicle PPUDO spaces
- Bus loop with bays for five buses
- Two side platforms servicing both tracks with canopies
- Two platform access tunnels with stairs and elevators (four each)
- A small station building for ticketing and information

St. Catharines GO

- 165 space parking lot (four additional barrier free)
- 16 vehicle PPUDO spaces

-
- Bus loop with bays for four-five buses
 - An opening day side platform serving the north track
 - Future island platform with canopy located between the south mainline and a potential pocket track
 - Two future platform access tunnels with stairs and elevators (four each)
 - Station facilities

Niagara Falls GO

The Functional Site Plan for Niagara Falls GO Station is currently in-progress. At this time the site plan is likely to include:

- Parking, PPUDO, and bus loop provided by Niagara Region
- An opening day island platform serving the north track with a refurbished south side platform
- Two future platform access tunnels with stairs and elevators (four each)
- Station facilities

Off-corridor station construction could impact the operation of GO's seasonal rail and VIA/Amtrak services at the existing St. Catharines and Niagara Falls VIA stations. Further, vehicular traffic and parking will be affected at all Niagara Region existing and future station sites during construction.

Construction impacts on the rail corridor consist of a suite of investments to allow for the operation of half-hourly trains on track that currently sees only a half dozen rail trips per day. Required infrastructure investments and improvements include the following:

- Double tracking of sections of the Grimsby Subdivision plus new siding tracks at GO Stations
- Expansion of Lewis Road Layover yard
- Extensive upgrading of signalling system to be in line with Transport Canada Guidelines
- Extensive grading work
- Over 60 at grade crossings will require speed increases and infrastructure upgrades
- Deferred Maintenance and/or upgrades may be required on bridge and culvert structures in order to accommodate increased service

-
- Construction of turn-back capabilities at St. Catharines GO Station to protect for potential services delays at the Welland Canal crossing

Along the rail corridor there are several areas of historical, cultural and archaeological significance from the War of 1812. This along with other potential finds may make the staging and construction of these works more delicate and time consuming. As well any work in Hamilton is highly complex due to restricted space and Metrolinx track operating beside a high traffic, functioning rail yard. Potential conflicts with existing, aging bridge overhead infrastructure with new track infrastructure in Hamilton also exist.

The original Environmental Assessment completed in 2011 was the Niagara Service Expansion ESR. Environmental due diligence studies are required to supplement the 2011 ESR at all the station sites. These include the following: Air Quality, Noise and Vibration, Natural Environment, Phase 1 ESA, Stage 1 Archaeological Assessment.

As the owner of the corridor, CN Railway is responsible for its own environmental due diligence.

As with Option 1 there are two dependencies that the potential implementation of this option hinges upon, agreements with CN Rail and the SLSMC at the Welland Canal.

Reliable and timely rail services between Niagara Falls and St. Catharines is dependent on consistent unobstructed access to cross the Welland Canal via CN's Bridge 6. Currently, summer rail services are commonly delayed by upwards of 20 minutes from ships passing in the canal, which necessitates raising the rail drawbridge over the canal. From an operational standpoint, the Welland Canal crossing could prove to be a major impediment to maintaining scheduled service along the Lakeshore West and East lines for the majority of the calendar year when shipping in the canal is active.

The SLSMC has indicated that a two train schedule of AM/PM trains crossing the canal is achievable where these trains would have dedicated crossing times that would not be impeded by freight movements within the canal. Increasing services from 2 per peak period to hourly trains is a large task that will require extensive coordination and negotiation between the SLSMC and Metrolinx. There is no guarantee that the SLSMC will agree to the request for hourly trains.

The operation of summer rail services has occurred annually since 2009. Given this decade-long working relationship it is reasonable to assume that an agreement can be reached with CN to extend rail services to a year-round daily format with increased frequency from current operations. The large unknown however with Option 3 regards frequency; unlike Option 1 and 2 the service pattern in Option 3 proposes two train movements per hour over the canal. It remains to be seen if an agreement can be reached to operate GO services at a two-way half-hourly frequency as this would have a significant impact on the future ability to run freight through this corridor.

Other rail operators currently run on this corridor that will have to be accounted for during scheduling. VIA and Amtrak share a passenger service, that has one train in the morning leaving from Union Station to the United States, and one returning in the evening from the US to Toronto that travel through the Niagara Region. Further, CN operates approximately six train movements during a typical 24 hour period on the Grimsby Subdivision. These movements typically occur between Hamilton and the Stamford Subdivision near Niagara Falls.

These daily movements are low in quantity. A desired increase in GO train service to half-hourly in both directions on the majority of the corridor would have to avoid conflict with these existing movements. Agreement with VIA/Amtrak and CN will have to be reached to appropriately schedule all future rail services so that no conflicting rail movements occur that could delay one another's operations.

With significant infrastructure requirements, agreements from CN, the SLSMC and scheduling issues with VIA/Amtrak, Option 3 will take several years to fully implement.

Operations, Maintenance Plan and Depot/Stabling Arrangements

The existing Lewis Road Layover Facility can accommodate and store up to four trains overnight. The yard will see capital improvement including the construction of an eastern connection to the Grimsby Subdivision, which currently only has a western connection into the yard. This investment along with the yard's current storage capacity will help facilitate the proposed service between Confederation and Niagara Falls GO Stations.

The facility at Lewis Road does not currently include Progressive Maintenance Bays. Therefore train consists must be cycled back to the Willowbrook Maintenance Centre in Etobicoke approximately every

three to four days for waste removal and other maintenance procedures. Trains scheduled for maintenance can run a Niagara service between Confederation GO Station and Union, then deadheading from Union to Willowbrook for this weekly servicing.

Deliverability and Operations Case Summary

All three proposed options are technically feasible for GO Rail operations. Option 1 and 2 require a medium amount of investment to existing and new infrastructure. Reduced station and corridor infrastructure scope equals forecasted nominal capital costs of \$312M. While stakeholder risks exist, the movement of only 11 trains per day over the Welland Canal in Option 1 and 2 makes an operational agreement with the SLSMC achievable.

Option 3 proposes a full build of station and corridor infrastructure at a nominal cost of \$374M. Stakeholder agreements would be required with CN, VIA/Amtrak and the SLSMC. Operating two trains per hour weekly over the Welland Canal will require a thorough agreement with the SLSMC and likely lengthy negotiations. This last point is the main risk to achieving the proposed service in Option 3.

8

Business Case Summary



Introduction

This chapter summarizes the findings of the four-case evaluation, provides a recommendation on the option to be advanced for preliminary design, highlights additional work or investigations that are required to confirm the findings of this business case and next steps.

Investment Review

Extending daily GO Rail service beyond Hamilton to Niagara Region has been a long standing goal of the local community and region. This project has been subject to multiple studies by Metrolinx and other authorities culminating in this updated Initial Business Case. This analysis shows a good business case for these services in a peak plus tourism focused, or a half-hourly two-way, all-day, service scenario.

Of the three studied options, Option 1 and 2 align well with regional policy, attract ridership, are operationally feasible, and produce benefits above their overall cost. Option 2 delivers higher ridership, benefits over costs and net benefits to Niagara Region than Option 1 through increased services in Hamilton to Confederation GO Station. Option 3 has higher capital costs of approximately \$90M and extensive operating and maintenance costs over the investment's 60 year lifecycle. The return in benefits and ridership produced by Option 3 does not likely justify the significant increase in costs compared to Option 1 and 2.

For these reasons Option 2 is recommended for further development in the Business Case lifecycle. However, it should be noted that Option 3 is not precluded from future development due to the selection of Option 2.

Next Steps

Once an option is agreed to for development by Metrolinx, the Province and impacted stakeholders, a Preliminary Design Business Case following Metrolinx's stage-gate process will begin assessing the preferred option at a more detailed level of analysis further refining project scope, service pattern, benefits and costs.

APPENDIX - Sensitivity Analysis

Several tests were conducted on key input assumptions and parameters to determine the range of benefits and disbenefits possible for each investment option. Tests were conducted on the following items:

- Delay disbenefit to passengers if no operating agreement with the St. Lawrence Seaway Management Corporation (SLSMC) is reached regarding dedicated times for Welland Canal crossing
- Purchase of new rolling stock to operate extension services (no rolling stock purchase assumed in reported results)
- Track User Fees
- Value of Time growth rate of 0.75 per cent (zero per cent growth rate utilized in reported results)

Delay Disbenefit: Welland Canal Crossing

Reported results in this IBC assume that trains going to and from Niagara Falls will not be delayed at the rail bridge crossing over the Welland Canal between St. Catharines and Niagara Falls. An expanded operating agreement with the SLSMC is required to ensure that ship and rail movements do not conflict with one another at this crossing. If no agreement is reached regarding dedicated slots for trains to cross at Bridge 6 then rail operations will face delays. The canal is typically operational from mid-March to late December depending on ice levels in the Great Lakes. At these times, ship movements get priority over train movements thus necessitating the rail bridge to be raised.

Delays are not uncommon at the canal. 21 incidents were recorded between rail and shipping traffic during the operation of 2018 GO Rail season summer service. Train delays lasted an average length of 17 minutes. With 243 trips operated last summer this averaged to a delay per every 11.6 GO Rail trips operated.

This delay data was used to model the disbenefit to new and existing users both on a train and downstream/upstream from said train should delays continue at this frequency. As well increases in operating costs were estimated. Disbenefits from these calculations reduced overall project benefits in the realm of -\$67M for Option 1 and 2 to -\$406M in Option 3. This reduction impacted BCRs, noticeably for Option 3, to the first decimal place as seen in table 18.

If delays continued at this frequency there would be major knock-on impacts to the timely operation of the GO Rail network. A delayed Lakeshore West train could halt trains behind it if the disruption were

long enough and cause other issues if the train were scheduled to interline into a Lakeshore East Line service upon arrival at Union. These network impacts were not examined in this sensitivity test which focused only on the impact to users of the delayed service and increased operational costs.

Table 18: Welland Canal Crossing Impact to Benefit Cost Ratios

	Option 1	Option 2	Option 3
BCR	1.0	1.1	0.8

Rolling Stock Purchase

The IBC assumes that no new rolling stock is required to purchase in order to operate Niagara Extension services. As parts of the GO Rail network are electrified through the GO Expansion program, diesel locomotives may become available in the mid to late 2020s. However, in the case that excess rolling stock is not available for operations to/from Niagara Falls, tests were run to see BCR impacts when five new 12-car diesel bi-level trains are purchased for Option 1 and 2, and 10 trains for Option 3.

Table 20: Rolling Stock Sensitivity Test Benefit Cost Ratios

Rolling Stock Purchased	Option 1	Option 2	Option 3
5 Trains	1.1	1.2	-
10 Trains	-	-	1.1

With additional rolling stock costs BCRs decrease for all options. However, the decrease is only to the second decimal place, and thus not visibly different to the main IBC results. This decrease is expected as costs for these options increase while benefits remain stationary.

Track User Fees

Metrolinx incurs track user fees from CN for each kilometer operated on their rail corridor. These fees do not pay for maintenance and operating costs to our freight partners, but rather are fees incurred for the opportunity to use the company's corridor. As this cost is not a resource payment, but rather a transfer payment, it can be argued that this cost

should only be accounted for in the financial case analysis and not the economic case.

Removing these costs from the economic case will impact option benefit cost ratios. A sensitivities test was considered on this cost. The test assumes no user fee, on the premise that no additional resource costs are utilized when accessing a freight operator's track.

Table 21: Track User Fees Sensitivity Test Benefit Cost Ratios

All-day Service Pattern	Option 1	Option 2	Option 3
No Fee	1.2	1.4	1.2

With user fees removed BCRs increase for all Options. This is expected as costs for these options fall when the lower fee is implemented. When no user fee is charged, BCRs rise across all options with Option 2 performing best going from a BCR of 1.2 to 1.4.

Value of Time Growth Rate

Sensitivity tests were conducted on reported BCRs with the Value of Time annual growth rate set to 0.75 per cent, whereas it is recommended that it be set to zero per cent as done in the IBC reported results.

Table 22: VoT Growth Rate Sensitivity Test Benefit Cost Ratios

VoT Growth Rate	Option 1	Option 2	Option 3
0% VoT Growth Rate (Main IBC results)	1.1	1.2	1.1
0.75% VoT Growth Rate	1.3	1.4	1.3

Glossary

Term	Definition
Benefit Cost Ratio (BCR)	Present value of benefits divided by present value of costs, which is used to indicate benefits realized per dollar spent.
Business Case (BC)	A generic term for a collection of evidence which, when assembled in a logical and coherent way, explains the contribution of a proposed investment to organizational objectives. It supports decision-making process to sift options, select a preferred option and optimize the preferred option.
Business as Usual Scenario (BaU)	The baseline against which options are compared where the intervention has not occurred and existing business practices, committed plans and general trends continue into the future.
GO Expansion Program	Capital program to implement electrified two-way, all-day service across the GO rail network.
Greater Toronto and Hamilton Area (GTHA)	The combined area of the Cities of Hamilton, and Toronto; and the Regions of Durham, Halton, Peel, and York.
Initial Business Case (IBC)	This first Business Case in the Business Case process that compares investment options and selects a preferred option for further refinement and design. This Business Case is typically used to secure funding from the Province for planning and preliminary design.
Net Present Value (NPV)	Present value of benefits minus present value of costs, which is used to indicate total net benefits to the region.
Preliminary Design Business Case (PDBC)	The Preliminary Design Business Case takes the recommended option of the Initial Business Case and reviews different approaches to refine and optimize it. This Business Case is typically used to secure funding from the Province for procurement and construction.
Vehicle-Kilometres Travelled (VKT)	A measure of roadway use, commonly used in estimating congestion, that reflects the distance that an individual drives, or, more typically, the cumulative distance driven by all vehicles in an urban region during a specified period of time. Vehicle kilometres travelled can reflect the link between land use and transportation. Land uses that are further away from each other result in longer trip lengths, more traffic on roadways and more vehicle kilometres travelled, for example

