

# GO RAIL BOWMANVILLE SERVICE EXTENSION

INITIAL BUSINESS CASE  
NOVEMBER 2015



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## Glossary of Terms

<b>Appraisal</b>	Analysis of a program, investment or intervention that has not yet been implemented and focuses on estimated or forecasted evidence.
<b>Benefits Case Analyses (BCA)</b>	Reports produced by Metrolinx between 2008 and 2012 focusing on select economic impacts and financial costs of major proposed Metrolinx transit projects. BCAs have subsequently been replaced by the new Business Case framework.
<b>Business Case</b>	A collection of a suite of evidence on the potential strategic, economic, financial, deliverability and operational impacts of a proposed program, intervention or investment to inform decision-making throughout the project lifecycle. Metrolinx Business Cases are an enhancement and replacement of Metrolinx's former Benefits Case Analyses reports.
<b>Cost Benefit Analysis</b>	A form of evaluation that focuses on comparing certain economic impacts (generally benefits) to the cost of an investment. Cost Benefit Analysis is used in the Economic section of Metrolinx's Business Case framework and was also used to inform previous Benefits Case Analyses.
<b>Economic Case</b>	One component of the Metrolinx Business Case that examines or reviews the impacts of proposed investments or interventions. Economic impacts include transportation user benefits (journey time impacts, road decongestion impacts, safety/accident reductions, etc.), environmental impacts (changes in emissions levels, vibration, etc.), social and community impacts (the distribution of benefits among populations, severance/isolation impacts, etc.), wider economic benefits (agglomeration/productivity impacts, etc.) and public funding impacts (property tax revenues, etc.). The Economic Case generally includes a cost-benefit ratio.  Economics is a branch of science that studies the production, distribution and consumption of goods and services.
<b>Financial Case</b>	One component of the Metrolinx Business Case that examines the lifecycle costs and revenues of proposed investments or interventions.
<b>Delivery and Operations Case</b>	One component of a Metrolinx Business Case that examines the impacts of proposed investments or interventions on operations, the delivery of the proposal, potential risks, procurement and related commercial or management issues.
<b>Strategic Case</b>	One component of a Metrolinx business case that examines the alignment of proposed programs, investments or interventions with Metrolinx strategic plans and goals. It involves the presentation of transportation planning information, including traffic forecasts, related travel patterns, drivers and interdependencies.

## Acronyms

<b>BCR</b>	Benefit cost ratio
<b>LRT</b>	Light Rail Transit
<b>BRT</b>	Bus Rapid Transit
<b>ALM</b>	Automated Light Metro

<b>MAE</b>	Multiple Account Evaluation
<b>NPV</b>	Net Present Value
<b>PV</b>	Present Value
<b>RTP</b>	Regional Transportation Plan, <i>The Big Move, 2008</i>
<b>SOV</b>	Single Occupant Vehicle
<b>TTS</b>	Transportation Tomorrow Survey
<b>VKT</b>	Vehicle Kilometres Travelled

# 1 EXECUTIVE SUMMARY

The potential to extend GO rail service to Bowmanville has been a long standing aspiration of the local community and the subject of several studies by Metrolinx/GO Transit, most recently in Environmental Assessment work in 2008/09, and Benefits Case Analysis work in 2010. This report presents updated information for the single option to provide four peak period, peak direction GO rail diesel trains to/from Bowmanville via a new rail bridge crossing Highway 401 just west of Oshawa GO station connecting with the CP Belleville subdivision, with service running express to/from Pickering.

The evidence suggests there is a feasible engineering concept; however, there are operations issues associated with sharing track with the freight sector that require further evaluation with the railway. In addition, the economic and financial return on investment associated with the Commuter Rail service concept tested is low. There is some potential for this project to contribute to Metrolinx strategic objectives by extending service closer to the majority of Oshawa demand, as well as to Bowmanville.

Options that could better utilize the assets created through this project and improve return on investment have not been tested. There are several options that would make better use of the infrastructure assets and these will be assessed in future iterations of the Business Case. These include alternative service and infrastructure scenarios, including partial electrification of the new CP right of way through central Oshawa to allow for all day 15-minute frequency RER service, with the existing Oshawa GO station either used for peak-only Diesel express, or closed completely.

*The overall business case for this investment in GO rail service is low. There may be more cost effective (and overall effective) alternative solutions that could help address the issues outlined in the problem statement. It is anticipated that significant regional economic benefit could be realised if links between Bowmanville, Oshawa and Toronto were strengthened.*

**Table 1: Summary Information**

Indicator	Option 1 (\$M, 2015)
<b>Nominal Capital Costs (Total)</b>	\$572
<b>Nominal Annual Operating Costs (2031)</b>	\$12.9
<b>Nominal Annual Revenue (2031)</b>	\$3.91
<b>Operating Cost Ratio (2031)</b>	30%
<b>Total Costs (PV)</b>	\$750
<b>Benefits (PV)</b>	\$420
<b>Net Benefits (PV)</b>	(\$330)
<b>BCR</b>	0.56

# 2.0 INTRODUCTION

Currently, Lakeshore East GO rail service ends at Oshawa GO station south of Highway 401, with bus service connections to Bowmanville. The RER service plan (Scenario 5.1) offers electric off-peak and counter peak service to Oshawa station, with peak express/local service. The option studied would provide four morning inbound and four afternoon outbound express (from Pickering) trains serving two new stations in Oshawa north of Highway 401, one station at Courtice Road, and one station near the centre of Bowmanville. Diesel trains would run along the northern CP corridor, with the existing Oshawa GO station maintained as the terminus for other train service. GO bus service to Bowmanville would be reduced during peak periods and maintained during off-peak periods.

Providing expanded service on Lakeshore East would provide service through downtown Oshawa, a designated urban growth centre, supporting use of alternative station access modes and growth in the area. This option would require a rail bridge over Highway 401 to connect the CN and CP tracks with a preliminary estimated capital cost of \$400M. Operating agreements with CP Railway are also required for use of their tracks. An additional \$150M has been assumed for additional capital cost requirements (stations, track, etc.).

The following map illustrates two possible alignments that have been studied in the past as part of “The 2010 GO Rail Options Benefits Case Assessment” and “The Oshawa to Bowmanville GO Train Service Expansion and Maintenance Facility Environmental Assessment”. The northern alignment, following the CP track through Downtown Oshawa, is considered to be more useful to the local communities and markets that could be served by this proposal and has therefore been selected as the preferred alignment for study within this business case.

**Figure 1: Potential Route – North CP Route tested for Option 1.**



The stations along the northern section are the stations used to conduct the analysis. From east to west:

- Oshawa 1 at Thornton Rd
- Oshawa 2 at Ritson Rd
- Courtice Rd
- Bowmanville near King St.

# 3.0 PROBLEM STATEMENT AND OPTIONS

## **Problem Statement**

How can transit service be developed in the Oshawa to Bowmanville corridor to best meet the short, medium and long term transportation needs of the local communities?

## **Options**

*Do Minimum:* RER Scenario 5.1, including electrified four trains per hour making all stops to Oshawa GO station throughout day, with additional service during peak periods. No changes are envisaged to GO bus service.

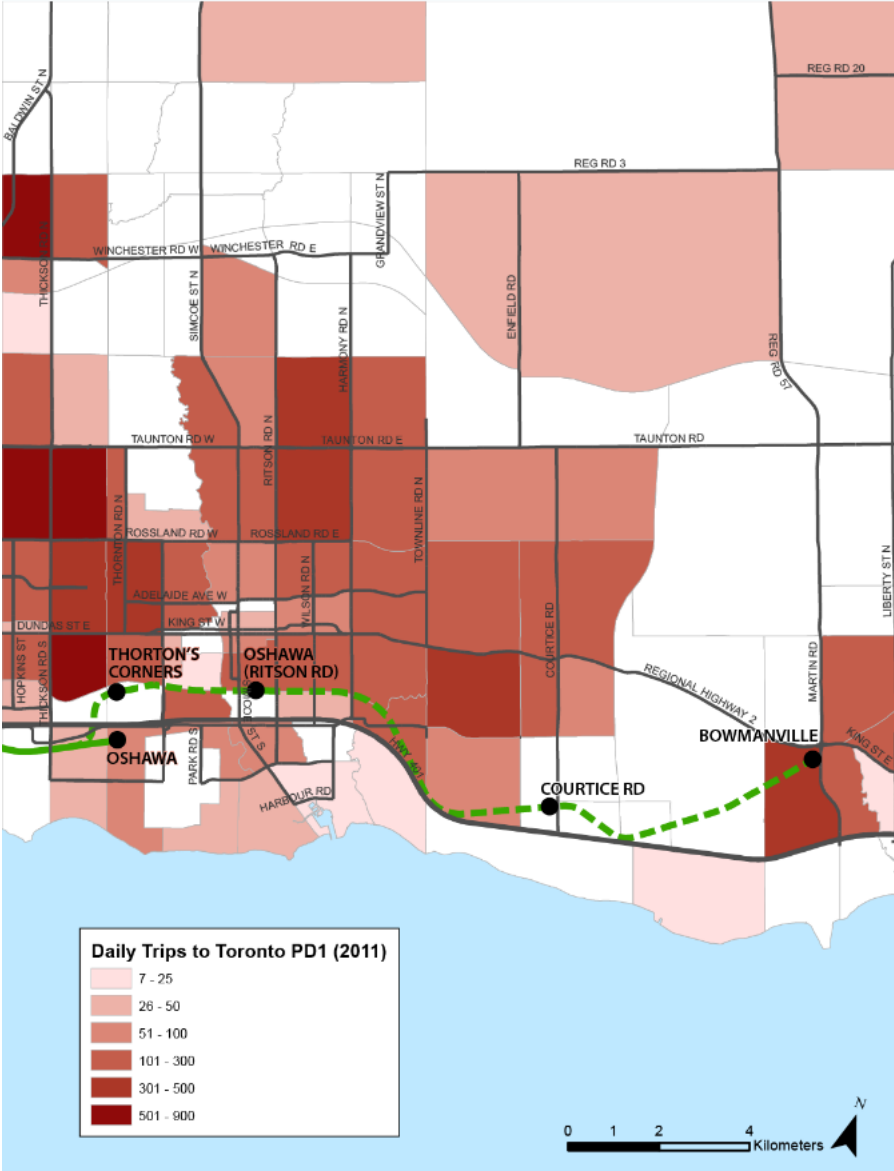
*Option 1:* Do Minimum plus four diesel locomotive 12-bilevel car trains inbound to Union Station in the AM and outbound from Union Station in the PM (running express to/from Pickering) serving four new stations on the CP Track north of Highway 401 beginning/ending at Bowmanville. These trains replace current express 12 car electric-locomotive hauled bilevels currently going to the existing Oshawa station. GO bus service would be curtailed during peaks and maintained during the off-peak. New train trips would not serve the existing Oshawa GO station.

It is intended that this business case provide a reference point against which further refinement of costs, revenues and benefits is undertaken. Alternative options that enhance the performance of the investment may also be worth considering.

# 4.0 STRATEGIC CASE

There is considerable demand in Oshawa and Clarington (of which Bowmanville is a part) for improved GO service. The following map highlights demand to downtown Toronto (Planning District 1) from the area surrounding the proposed intervention:

**Figure 2: Daily Trips to Downtown Toronto (Planning District 1), Source: 2011 Transportation Tomorrow Survey**



The purpose of the improved service would be twofold:

1. Increase the GO Transit mode share to PD1 (% of all trips made on GO Transit to Toronto’s central business district).
2. Improve access to GO Transit through increased parking and more accessible stations.



The current mode share to PD1 from municipalities on the Lakeshore East corridor can be seen in Table 2:

**Table 2: Mode split to Downtown Toronto (Planning District 1), Source: 2011 TTS**

Mode	Origin				
	Pickering	Ajax	Whitby	Oshawa	Clarington
<b>Auto (Driver or Passenger)</b>	39%	32%	31%	44%	47%
<b>Local Transit</b>	7%	6%	3%	6%	2%
<b>GO Rail</b>	54%	62%	66%	50%	50%

Oshawa and Clarington, where the improved service would operate, have the lowest GO rail mode splits to downtown Toronto in the region. Similar municipalities in Durham, like Whitby, experience considerably higher mode splits to PD1 by GO Transit. If Oshawa and Clarington were able to achieve Whitby levels of GO mode split, each day there would be an additional 730 trips from Oshawa and 400 trips from Clarington. (TTS 2011)

A major constraint on Oshawa's and Clarington's capability to achieve higher GO Transit mode split to PD1 is the lack of station facilities. The current Oshawa GO station, which currently serves the entire populations of Oshawa (Population ~ 150,000) and Bowmanville (Population ~ 80,000) is located on the south western edge of Oshawa, as seen in Figure 1. Due to Oshawa GO's distance from major population centres, parking is the primary access mode to the station, with over 70% of Oshawa GO station users parking at the station (2013 GO rail Passenger Survey). Furthermore, the parking lot at Oshawa (Capacity ~ 2,400) operates at 102% capacity. This means that on an average weekday the entire parking lot at Oshawa GO station is full.

Connecting the current GO corridor to the CP corridor north of Highway 401 would move stations much closer to population centres in Oshawa, and make it easier for riders to access the station by more sustainable modes than driving. Thornton Road station would also be closer to future land developments proposed by Oshawa. Options that continued peak services to the existing GO station would maintain the existing parking supply for peak users. The preliminary design report for GO Transit Bowmanville expansion envisaged 1,525 parking spots at Thornton Road (new Oshawa 1 station) on the south side, and 1,225 parking spots at Ritson Road (new Oshawa 2 station) on the south side, increasing the total number of parking spots by 2,750 in Oshawa. Courtice Road, with 1,100 parking spots would enable more rural GO train riders from east of Oshawa easy access to a station, and Bowmanville, with 800 parking spots would offer commuters a shorter drive or bus ride to a GO train station.

Demand forecasting for this option was performed using the Dalton Model (2010 GO Rail Benefits Case Assessment), and the 2013 GO rail passenger survey. The estimated 2013 ridership using this method is presented in the following table:

**Table 3: Estimated Ridership (Source: Dalton Model, GO Service Planning)**

Station	2013 Expansion Ridership	Net New Riders
<b>Bowmanville</b>	114	10
<b>Courtice</b>	466	78
<b>Oshawa East (2 stations)</b>	2123	354
<b>Totals</b>	2703	442

This information has been used to populate the Financial and Economic Cases.

# 5.0 FINANCIAL CASE

Preliminary estimates of the capital costs for Option 1 is \$550M, including \$400M for a rail bridge over Highway 401. Annual incremental operating costs in 2031 are forecast to be \$9.4M, with annual incremental revenues of nearly \$3M. From this an operating cost recovery ratio of approximately 30% is estimated. The operating cost recovery ratio of 0.30 is lower than the 2014-15 GO rail system average of approximately 0.76, meaning that this will result in an overall decrease in the operating cost recovery of GO service.

The low financial performance of this option is due to the fact that many users would be existing GO customers and therefore limit the benefits attainable due to few new riders. In addition, there is a low utilization of this capital intensive asset, which would only be used by peak GO rail service. Schemes that would offer all-day, two-way service into central Oshawa would be expected to perform better as these would attract new travel markets, better connect to existing services and destinations in Downtown Oshawa and make far more intensive use of an expensive infrastructure asset.

**Table 4: Financial Information**

Indicator	Value (\$M)
<b>Nominal Capital Costs (Total)*</b>	\$572
<b>Nominal Annual Operating Costs (2031)</b>	\$12.9
<b>Nominal Annual Revenue (2031)</b>	\$3.91
<b>Operating Cost Ratio</b>	30%

*\*Costs include inflation. In real terms, the capital costs are \$550M (2015 \$).*

## 6.0 ECONOMIC CASE

Information from the strategic and financial cases was used to derive the economic case. Ridership numbers from the strategic case (see Table 3) were extrapolated over a 60 year timeframe to provide a long-run forecast for these values. The growth rate for ridership was the growth rate used in the RER Initial Business Case (2.7% per annum for Lakeshore East).

Because the forecast model does not generate time savings for each rider or station, a range of estimated time savings were used to attempt to understand the value of the project. Time savings are represented in Generalised Journey Time (GJT), which weights real time differently according to observed preferences for time spent in transit, accessing transit, and waiting for transit:

- Transit In-vehicle time = 1
- Access Time = 2
- Wait Time = 2.5

A series of average time savings have been estimated to understand the magnitude of impact required to make the Bowmanville service economically viable. Using these estimates, the Benefit Cost Ratio of Option 1 is expected to range between 0.24 and 0.8, with a central estimate of 0.56. Under all assumptions, this project option has low economic performance, with costs outweighing benefits.

**Table 5: Economic Information**

Indicator	GJT Savings = 1 Minute	GJT Savings = 5 Minutes	GJT Savings = 15 Minutes	GJT Savings = 25 Minutes
<b>Approximate Real Time Savings</b>	1 minute in a transit vehicle.	5 Minutes in a transit vehicle	15 minutes in a transit vehicle	25 minutes in a transit vehicle
	OR	OR	OR	OR
	0.5 minutes accessing a station.	2.5 minutes accessing a station	7.5 minutes accessing a station	12.5 minutes accessing a station
	OR	OR	OR	OR
	0.4 Minutes waiting at a station	2 minutes waiting at station	6 minutes waiting at a station	10 minutes waiting at a station
<b>Total Costs (PV)</b>	\$0.75 B	\$0.75 B	\$0.75 B	\$0.75 B
<b>Benefits (PV)</b>	\$0.18 B	\$0.25 B	\$0.42 B	\$0.59 B
<b>Net Benefits (PV)</b>	- \$0.57 B	- \$0.50 B	- \$0.33 B	- \$0.15 B
<b>BCR</b>	0.24	0.33	0.56	0.80

# 7.0 DELIVERABILITY AND OPERATIONS

## **Delivery**

A delivery timeframe of 7—8 years has been proposed, with the objective of beginning with the construction of the rail bridge across Highway 401. The municipality is supportive of the northern extension over the 401. Agreement is still required with CP Railway for the use of their corridor north of Highway 401. There may be impacts to users of Highway 401 during construction.

## **Operations**

There are significant challenges associated with the freight interface on the Bowmanville corridor that will require detailed and sensitive negotiation with the railway. There are also operational impacts associated with the move away from an “all electric” Lakeshore East fleet plan as envisaged under the GO RER scheme. These issues require further review.

The current service plan envisages swapping out 4 of the electric express trains in the peak hour going to the current Oshawa station and replacing them with the diesel service that goes further out to Bowmanville.

## 8.0 CONCLUSION AND NEXT STEPS

GO rail service extension to Bowmanville has the potential to improve service quality to Oshawa and Bowmanville. The project would provide considerable benefits to these communities, and align with strategic plans that designate downtown Oshawa as an urban growth centre. It would allow for sustainable access modes, and lead to a reduction in auto trips to downtown Toronto.

The high capital costs of the project (building a bridge across the 401) entail a large financial outlay to offer this improved service. The estimated capital costs are \$550 M. The additional service would see an operating cost recovery ratio of approximately 30%, below the normal GO Transit operating cost recovery ratio.

The service is expected to generate an additional 450 net new riders, due to Oshawa and Bowmanville already having a reasonable GO Transit mode share. The economic benefits have been estimated as a range, with a central estimate Benefit Cost Ratio of 0.56.

The Bowmanville extension is deliverable. There are however several stakeholder considerations that would need to be the subject of appropriate negotiation. This includes negotiations with CP for construction close to their services and shared use of their infrastructure, and with MTO for construction and use of the rail bridge over the 401.