



METROLINX

GO Transit Rail Improvements Benefits Case Analysis (BCA)

Barrie – Milton – Richmond Hill – Bowmanville Extension

**Metrolinx Board of Directors Meeting
May 19, 2010**

Background

- November 2008 – *The Big Move* identified Top 15 Priority Projects, including improvements on GO rail corridors
- November 2008 – former Metrolinx Board directs staff to undertake Benefits Case Analyses (BCA) on all Top 15 projects except for those with pre-existing funding commitments (e.g., ARL/Georgetown Corridor, Spadina Subway extension)
- December 2008 – former GO Transit Board adopts *GO 2020 Strategic Plan* outlining priority GO rail and bus improvements to 2020
- March 2009 – Metrolinx retains joint consultant team led by Halcrow, with Hatch Mott MacDonald and Delcan, to conduct BCA for GO Rail improvements

Context







- BCA's focused on evaluating case for GO improvements identified as Top 15 Priority Projects in *The Big Move*
- *However*, GO already facing significant short-term capacity issues, including:
 1. Union Station
 2. Peak period trains
 3. Rail corridors
 4. Parking
 5. Rail Storage and Maintenance Facilities
- Need to continue focus on addressing short-term needs to meet today's service requirements while continuing to plan and build towards longer-term vision for GO in *The Big Move* and *GO 2020 Strategic Plan*

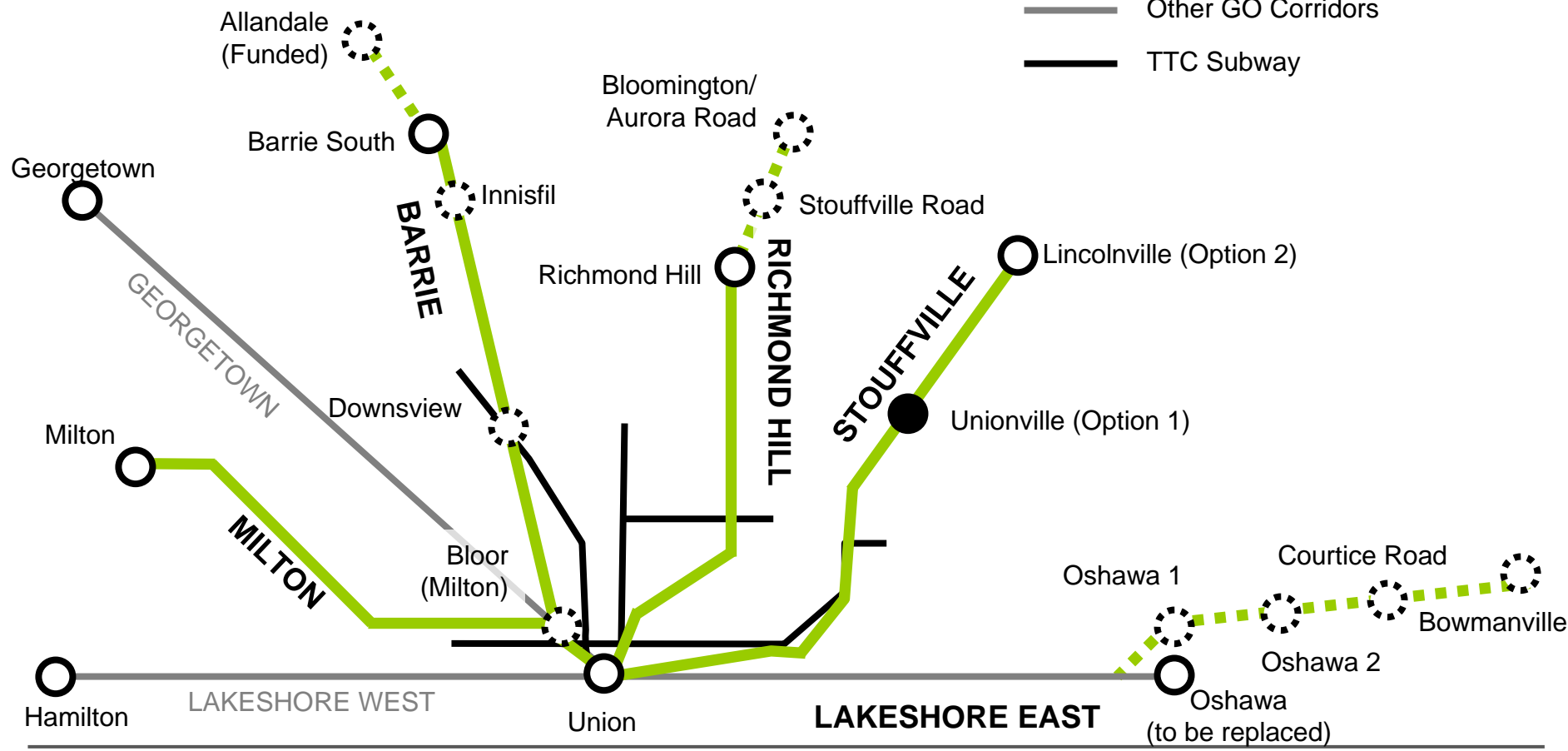
GO BCA Objectives

- Assess incremental benefits & costs for GO rail improvements identified as Top 15 Priority Projects on the following five corridors:
 - Barrie
 - Lakeshore East extension to Bowmanville
 - Milton
 - Richmond Hill
 - Stouffville (under development – final report in June 2010)
- BCA provides high level evaluation of incremental costs and benefits of ultimate service build-out on each corridor
 - Refined cost estimates, implementation staging and phasing strategies for each corridor to be further developed through planning, design and engineering (PDE) work by Metrolinx
 - Implementation timelines in BCA report are assumed for analysis purposes only and would be subject to funding and PDE work

Proposed Corridor & Service Improvements

LEGEND

-  Proposed 2-way, all-day service
-  Proposed line extension
-  Current line terminus
-  Proposed new stations
-  Other GO Corridors
-  TTC Subway



Basis for Cost Estimates

- Close collaboration with GO Corporate Infrastructure and Operations to develop capital and operating cost estimates
 - Relied on cost estimates developed through recent EA/feasibility and planning studies wherever possible to ensure consistent capital cost estimates
 - Consultant team worked closely with GO Rail Operations to update all-day service operating cost assumptions developed for RTP
 - GO Bus Operations Planning provided estimates of annual variable Train-Bus operating cost savings in each corridor
- Worked closely with Policy and Planning staff on modelling assumptions and development of ridership forecasts

Service Assumptions

- Scenario A – assumes 2-way/all-day service and extensions on each corridor in 2021, consistent with GO 2020 plan
 - Half-hourly service in off-peak periods and half-hourly service in counter-peak direction during peak periods
 - Replaces existing Train-Bus services in each corridor
- Scenario B – assumes peak period service is expanded to 10-minute headways on each corridor in 2031
 - Report acknowledges Union Station capacity issues and makes reference to Union Station Capacity and Downtown Access studies underway by Metrolinx
- Assumed continued use of clean diesel technology in each corridor
 - Future diesel equipment assumed to be compliant with Tier-4 emission standards
 - Reference to Electrification Study to examine longer-term technology options

Key Findings

- Barrie and Milton Corridors tied for highest C/B ratios at 1.7
 - Among the best BCA results for any Metrolinx project evaluated to date
- Richmond Hill Corridor also a strong performer, with C/B ratio of 1.3 (drops to 1.1 with Yonge Subway extension in place)
- Costs outweighed benefits for two-way, all-day service extension to Bowmanville with C/B ratio of 0.6
 - Indicates that extension may not warrant same service intensity as the remainder of the Lakeshore East Corridor
- Results reflect projected high levels of auto congestion in parallel highway corridors in the western and northern areas of the GTA (based GGH Model projections)
 - Strong results for Milton, Barrie and Richmond Hill corridors driven by significant travel time savings for both auto and transit users

Projected 2031 Congestion Levels

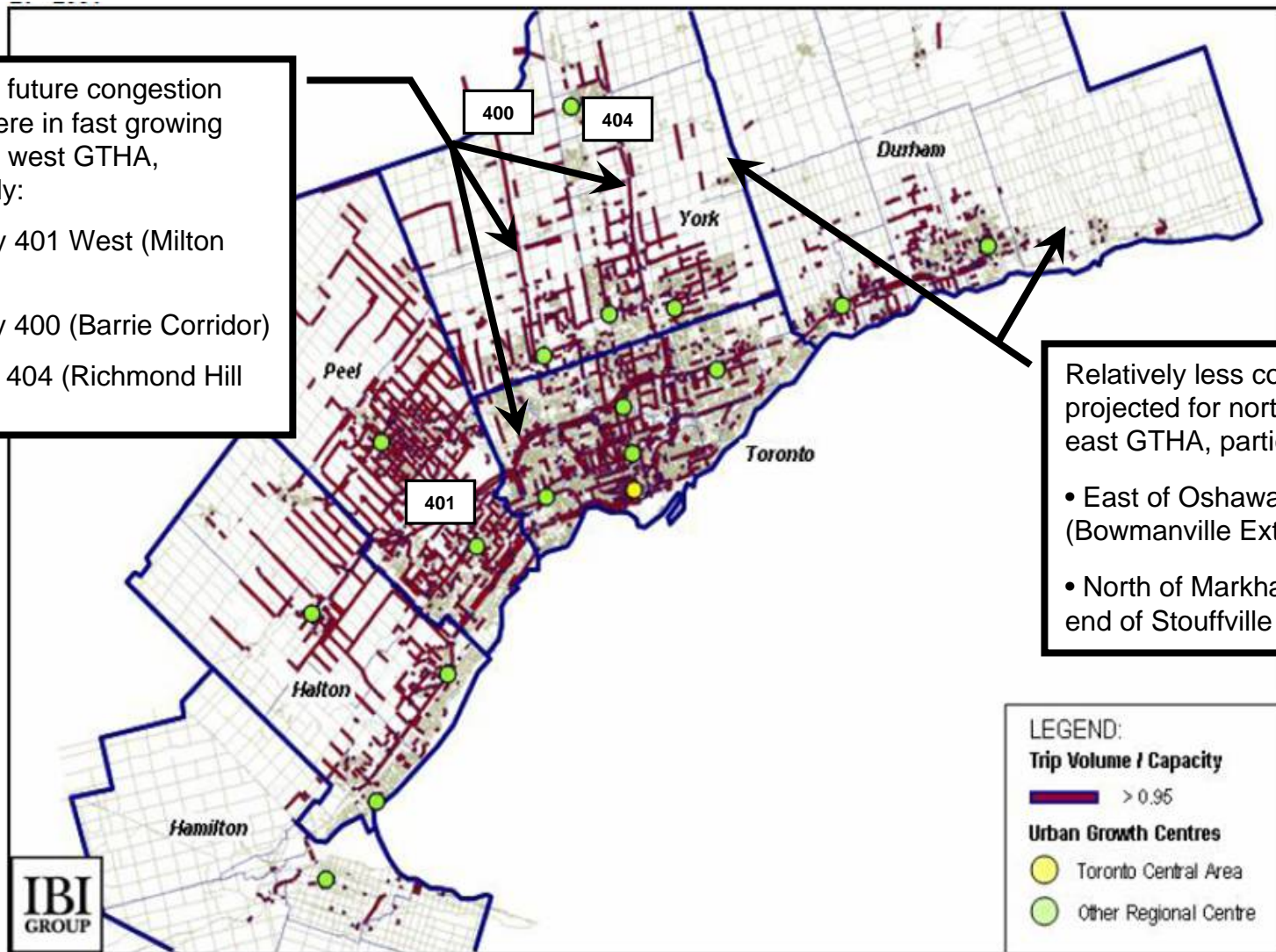
“Business-as-Usual”

Projected future congestion most severe in fast growing north and west GTHA, particularly:

- Highway 401 West (Milton Corridor)
- Highway 400 (Barrie Corridor)
- Highway 404 (Richmond Hill Corridor)

Relatively less congestion projected for northeast and east GTHA, particularly

- East of Oshawa (Bowmanville Extension)
- North of Markham (northern end of Stouffville Corridor)



Sources: IBI Group model run of 2006 and 2031 using the GTAH Travel Forecast Model

Stouffville Corridor Options

- Metrolinx currently undertaking analysis for Stouffville Corridor options
 - Assumes enhanced peak period services and two-way, all-day service between Union Station and Unionville (Option 1) and Union Station and Lincolnville (Option 2)
- Analysis underway with completion anticipated in June 2010

Benefits Case Results

	Barrie	Milton	Richmond Hill	Bowmanville Extension
Capital Cost (\$m)	798	782	696	496
Scenario A 2021 Scenario B 2031*	+160	+128	+160	+128
Capital & Incremental Operating Costs (PV, \$m)	1,505	1,230	1,118	1,104
Transportation User Benefits (PV, \$m)	2,598	2,130	1,441	662
Benefit-Cost Ratio	1.7	1.7	1.3	0.6
Emissions Reduction (PV, \$m)	16	14	10	4
Jobs During Construction (direct + indirect, person-years)	14,500	14,000	12,800	9,400
2031 GDP Impact (PV, \$m)	113	94	69	37
Social Community Impacts	Additional services will contribute to: <ul style="list-style-type: none"> - reduced auto dependency, - increased walking & cycling activity, and - will stimulate residential development around accessible services 			

* Incremental costs from Scenario A to B assumes enhancements to peak period service using additional trainsets

Staff Recommendation to Metrolinx Board








- **RESOLVED:**
 - THAT the Metrolinx Board receive and publicly release the GO Transit Benefit Case Analysis (BCA) report for rail service improvements in the Barrie, Milton and Richmond Hill corridors, and the Bowmanville extension
 - THAT the Board direct staff to:
 - Input the BCA findings into the Metrolinx Project Prioritization Framework and Metrolinx Electrification Study of the GO Transit rail system
 - Continue to work on planning, design and engineering (PDE) and Environmental Assessment (EA) requirements to strengthen the cost confidence process and maintain these projects in a high state of implementation readiness
 - Report back on the BCA results for the Stouffville corridor in June 2010

Appendix: Detailed Results by Corridor

Barrie Corridor – Proposed Upgrades



LEGEND

-  Existing station
-  Proposed station
-  Current line terminus
-  Double-tracking and signal upgrades
-  Proposed line extension
-  Current GO service
-  Existing subway

Barrie Corridor – Proposed Upgrades








	Base Case	Barrie Option	
	March 2009	2021 Scenario	2031 Scenario
Service Termini	Union – Barrie South	Union – Allandale	Union - Allandale
AM Peak Period Service	Local: 4 inbound Express: N/A	Local: 8 inbound Express: N/A	Local: 6 inbound Express: 6 inbound
AM Peak Period Ridership	6,400	8,700	10,800
Counter Peak Service	N/A	Every 30 minutes	Every 30 minutes
Off-peak Service	N/A	Every 30 minutes	Every 30 minutes
Train Type	Diesel Bi-level, 10-car	Diesel Bi-level, 10-car	Diesel Bi-level, 10-car
Infrastructure Improvements	<ul style="list-style-type: none"> Allandale station (funded through federal-provincial GO TIP investment announced February 2009) 	<ul style="list-style-type: none"> New Stations: Innisfil, Downsview (replaces York U) New second track and full double track bi-directional signalling system 	<ul style="list-style-type: none"> Fleet expansion

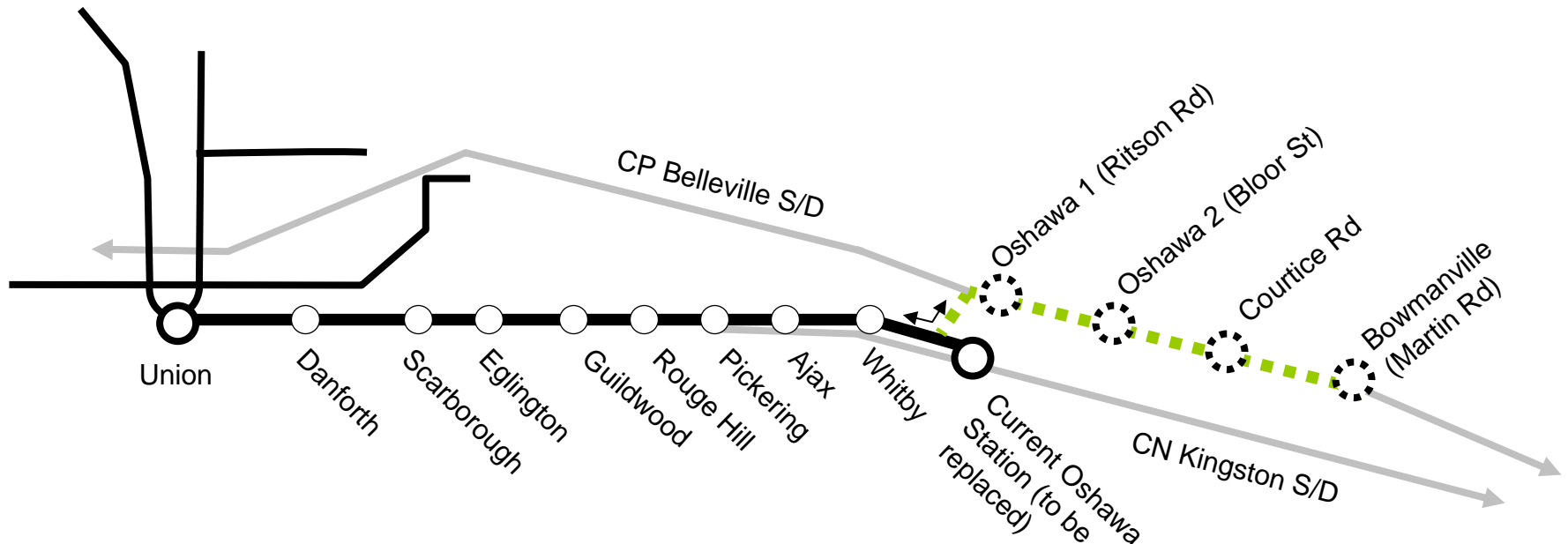
Summary of Barrie Corridor Assessment

	Barrie
Transportation User Account	
Transportation user benefits (PV \$m)	2,598
Qualitative user benefits	✓✓
Financial Account	
Capital cost to 2031 (\$m)	958
Annual operating cost (\$m)	94
Costs (PV \$m)	1,505
Benefit-Cost ratio	1.7
Environmental Account	
Tonnes GHG emissions saved annually	33,000
Monetized GHG emissions saved over 25 years (PV \$m)	16
Economic Development Account	
Economic Impacts During Construction (PV \$m)	545
Long-term Economic Impacts (PV \$m)	113
Development Potential	✓
Social Community Account	
Land Use Shaping	✓✓
Health	✓✓
Accessibility	✓✓

Lakeshore East Corridor – Bowmanville Extension

LEGEND

-  Existing station
-  Proposed station
-  Current line terminus
-  New track and signal upgrades
-  Current Lakeshore East Corridor
-  Existing rail corridors
-  TTC subway



*CP Belleville S/D requires additional track from Oshawa 1 to Bowmanville

Lakeshore East Corridor – Bowmanville Extension

	Base Case	Bowmanville Extension Option	
	March 2009	-2021 Scenario	-2031 Scenario
Service Termini	Union – Oshawa	Union – Bowmanville	Union - Bowmanville
AM Peak Period Service	Local: 6 inbound Express: 5 inbound	Local: 6 inbound, Express: 6 inbound	Local: 6 inbound Express: 6 inbound
AM Peak Period Ridership	18,900	19,600	23,200
Counter Peak Service	Local: 4 outbound Express: 1 outbound	Local: 4 outbound Express: 2 outbound	Local: 4 outbound Express: 2 outbound
Off-peak Service	Hourly service	Every 30 minutes	Every 30 minutes
Train type	Diesel bi-level, 10-car	Diesel bi-level, 10-car	Diesel bi-level, 10-car
Infrastructure Improvements	<ul style="list-style-type: none"> • Infrastructure improvements west of Oshawa not included 	<ul style="list-style-type: none"> • New Stations: Oshawa 1 & 2 (replaces existing Oshawa station), Courtice Road, Bowmanville • New layover facility near Bowmanville • New mainline track 	<ul style="list-style-type: none"> • Fleet expansion

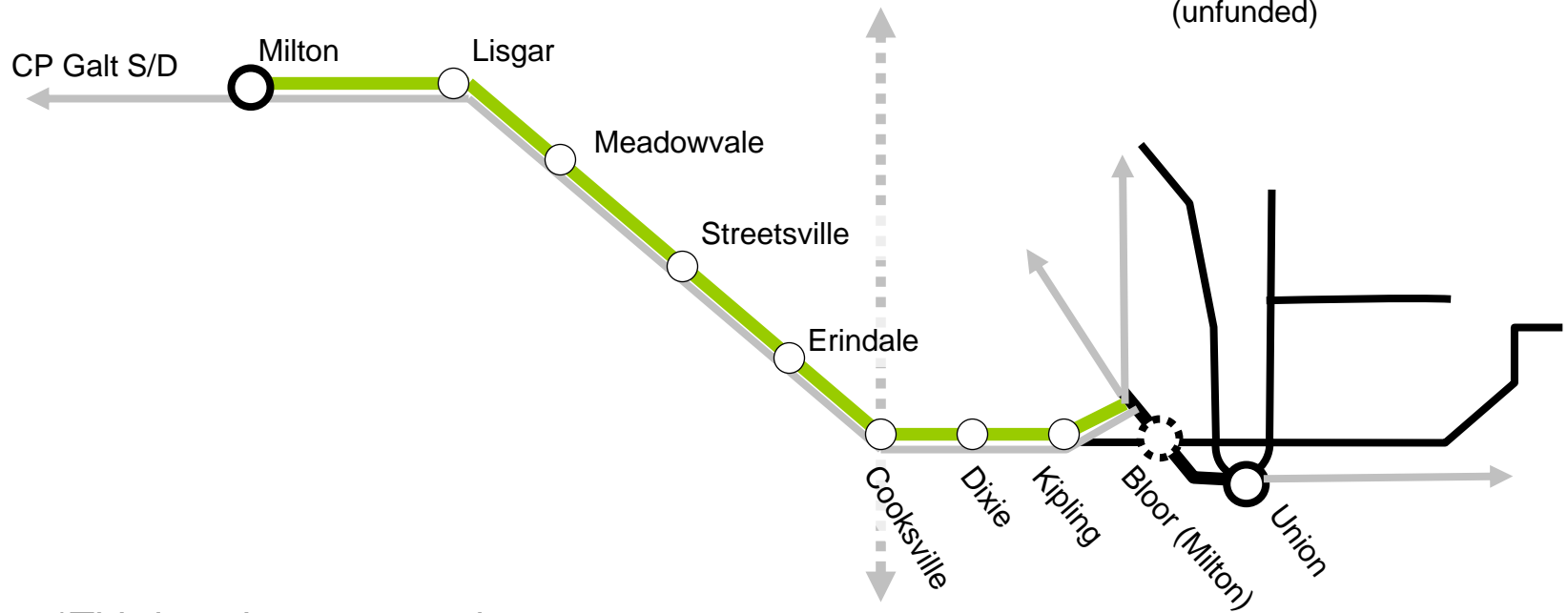
Summary of Lakeshore East – Bowmanville Extension Assessment

	Lakeshore East
Transportation User Account	
Transportation user benefits (PV \$m)	662
Qualitative user benefits	✓✓
Financial Account	
Capital cost to 2031 (\$m)	623
Annual operating cost (\$m)	79
Costs (PV \$m)	1,104
Benefit-Cost ratio	0.6
Environmental Account	
Tonnes GHG emissions saved annually	7,000
Monetized GHG emissions saved over 25 years (PV \$m)	4
Economic Development Account	
Economic Impacts During Construction (PV \$m)	351
Long-term Economic Impacts (PV \$m)	37
Development Potential	✓
Social Community Account	
Land Use Shaping	✓✓
Health	✓✓
Accessibility	✓✓

Milton Corridor – Proposed Upgrades

LEGEND

- Existing station
- ⊙ Proposed station
- ⦿ Current line terminus
- ▬ Additional tracks and signal upgrades
- ▬ Existing USRC/GO Galt S/D
- ▬ Other rail corridors
- ▬ TTC subway
- ⋯ Proposed Hurontario RT (unfunded)



*Third track constructed

Milton Corridor – Proposed Upgrades









	Base Case	Milton Option	
	March 2009	-2021 Scenario	-2031 Scenario
Service Termini	Union – Milton	Union – Milton	Union - Milton
AM Peak Period Service	Local: 6 inbound Express: N/A	Local: 4 inbound, Express: 4 inbound	Local: 6 inbound Express: 6 inbound
AM Peak Period ridership	10,800	15,500	19,800
Counter Peak Service	N/A	Local: 4 outbound Express: N/A	Local: 4 outbound Express: N/A
Off-peak Service	N/A	Every 30 minutes	Every 30 minutes
Train Type	Diesel bi-level, 12-car	Diesel bi-level, 10-car	Diesel bi-level, 10-car
Infrastructure Improvements	N/A	<ul style="list-style-type: none"> • New additional tracks and full four track bi-directional signalling system 	<ul style="list-style-type: none"> • Fleet expansion

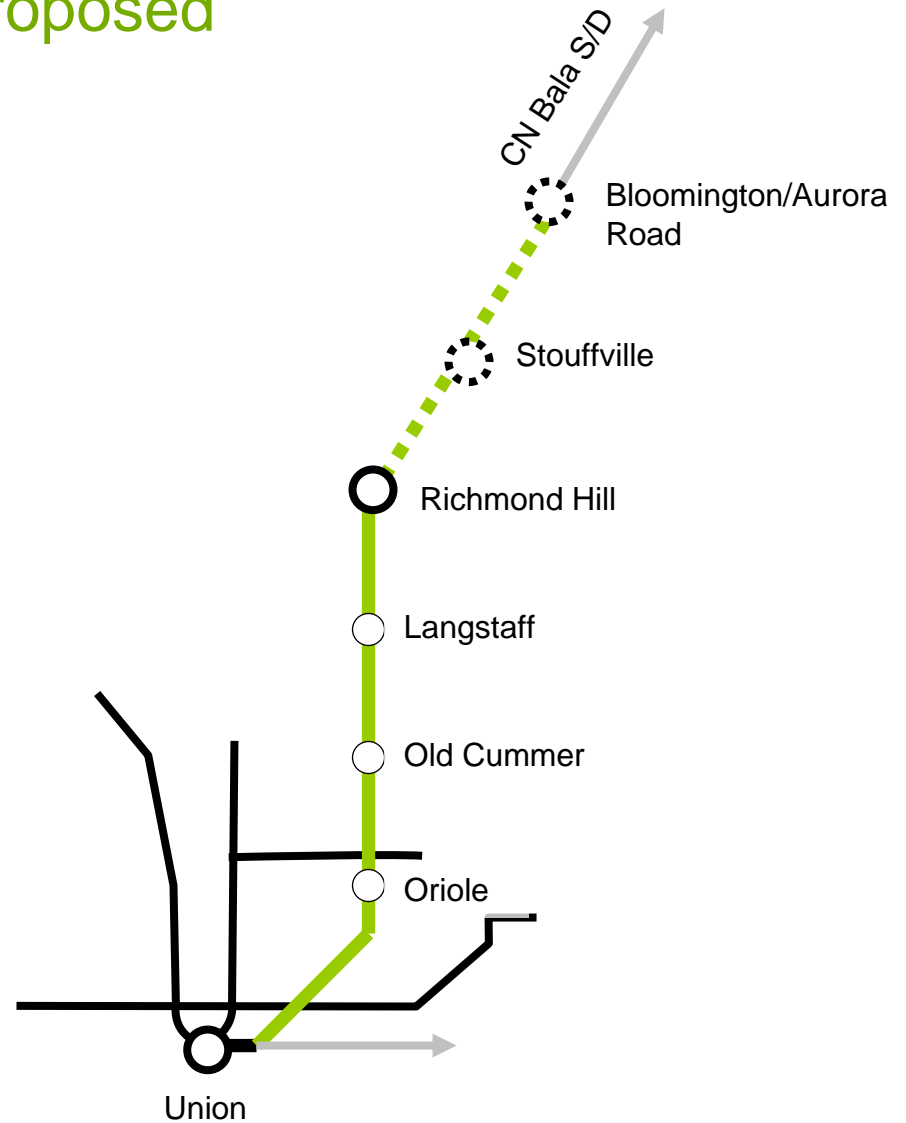
Summary of Milton Corridor Assessment

	Milton
Transportation User Account	
Transportation user benefits (PV \$m)	2,130
Qualitative user benefits	✓✓
Financial Account	
Capital cost to 2031 (\$m)	910
Annual operating cost (\$m)	54
Costs (PV \$m)	1,230
Benefit-Cost ratio	1.7
Environmental Account	
Tonnes GHG emissions saved annually	30,000
Monetized GHG emissions saved over 25 years (PV \$m)	14
Economic Development Account	
Economic Impacts During Construction (PV \$m)	528
Long-term Economic Impacts (PV \$m)	94
Development Potential	✓
Social Community Account	
Land Use Shaping	✓✓
Health	✓✓
Accessibility	✓✓

Richmond Hill Corridor – Proposed Upgrades

LEGEND

-  Existing station
-  Proposed station
-  Current line terminus
-  Double-tracking and signal upgrades
-  Proposed line extension
-  Existing USRC
-  TTC subway
-  Other rail corridors



*New track constructed from Union to Bloomington

*Service extension from Richmond Hill to Bloomington

Richmond Hill (Bloomington) Corridor

	Base Case	Richmond Hill Option	
	March 2009	-2021 Scenario	-2031 Scenario
Service Termini	Union – Richmond Hill	Union – Bloomington	Union - Bloomington
AM Peak Period Service	Local: 4 inbound Express: N/A	Local: 6 inbound Express: N/A	Local: 6 inbound Express: 6 inbound
AM Peak Period ridership	4,800	7,000	8,700
Counter Peak Service	N/A	Local: 4 outbound Express: N/A	Local: 4 outbound Express: N/A
Off-peak Service	N/A	Every 30 minutes	Every 30 minutes
Train Type	Diesel bi-level, 10-car	Diesel bi-level, 10-car	Diesel bi-level, 10-car
Infrastructure Improvements	N/A	<ul style="list-style-type: none"> • New additional tracks and bi-directional signalling system 	<ul style="list-style-type: none"> • Fleet expansion

Summary of Richmond Hill line assessment

	Richmond Hill
Transportation User Account	
Transportation user benefits (PV \$m)	1,441
Qualitative user benefits	✓✓
Financial Account	
Capital cost to 2031 (\$m)	856
Annual operating cost (\$m)	56
Costs (PV \$m)	1,118
Benefit-Cost ratio	1.3
Environmental Account	
Tonnes GHG emissions saved annually	20,000
Monetized GHG emissions saved over 25 years (PV \$m)	10
Economic Development Account	
Economic Impacts During Construction (PV \$m)	482
Long-term Economic Impacts (PV \$m)	69
Development Potential	✓
Social Community Account	
Land Use Shaping	✓✓
Health	✓✓
Accessibility	✓✓