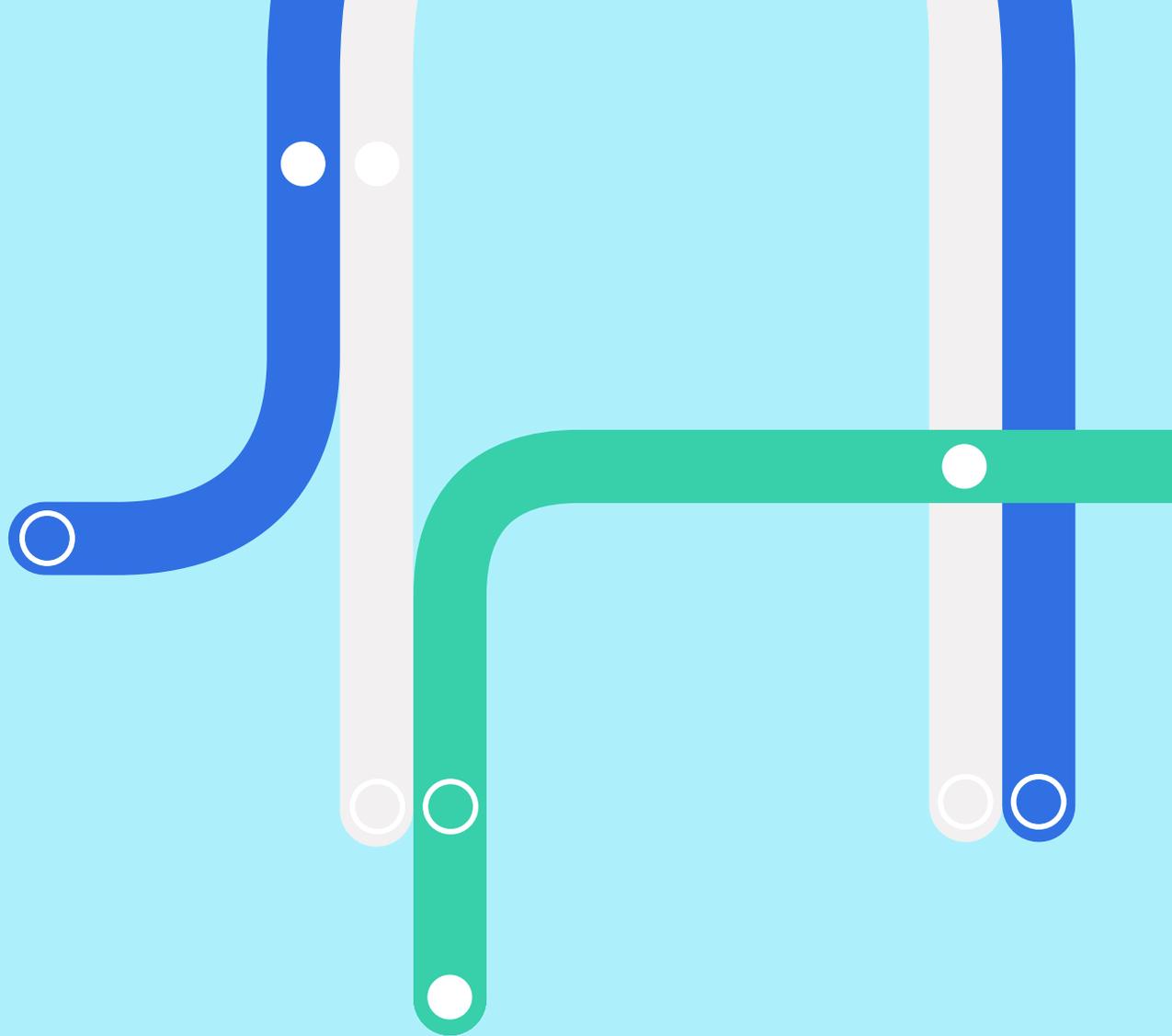


BACKGROUND TO REPORT ARE WE THERE YET?

The state of transit
investment in the Greater
Toronto & Hamilton Area



M O V E
THE G T H A



This background report was prepared by Transport Action Ontario on behalf of the Move the GTHA collaborative and provides details and calculations to support the information given in the Move the GTHA report cited in the title.

DISCLAIMER:

The costs and calculations in this workup are approximate, and are based on high-level estimates provided by government that are not always directly consistent with each other. Minor inconsistencies and errors are possible in this workup, but should not detract materially from the final conclusion. Cost overruns (for example, the Toronto-York Subway extension) were not considered.

1. KILOMETRES OF RAPID TRANSIT PLANNED AND BUILT

The [Big Move](#) report released by Metrolinx in 2008 indicated that the current (2008) rapid transit network was 500 km and would grow by 1225 km (new transit lines as well as improvements to existing lines) if the 25-year plan is implemented. We were able to closely verify these totals by adding up all the lengths of the proposed projects (please see spreadsheet in Section 4 for more information). In our compilation, the total km in place as of 2008 totalled 511 km and the planned new transit (new lines + improvements) after 25 years was 1242 km.

As the differences are small, and for ease of understanding, this report will use the Metrolinx number of 1225 km new transit. To this would be added 61 km (3 existing subway lines with no improvements planned) for a network total of 1286 km.

In 2014 and 2015, the province announced that Regional Express Rail will be implemented on all GO Rail corridors, including the full GO Barrie, Kitchener and Stouffville corridors, rather than stopping at an earlier point on those corridors as assumed in The Big Move. This adds a total of 109 additional km to the planned network total, which is therefore 1395 km, of which 1334 km is new transit.

The spreadsheet also breaks down the various projects into four groups summarized below:

Pre-2008 — no work since	Completed post-2008	Funded	Not funded	TOTAL
61 km	52 km	519 km	763 km	1395 km
4%	4%	37%	55%	100%

Total km of new or upgraded transit post-2008 = 1334 km.

2. WHY SHOULD WE INVEST?

The Move the GTHA report quantifies several of the benefits from implementing the 25-year rapid transit plan, taking data from The Big Move report, the modeling backgrounder and other references.

2.1 Saving Time, Saving Money — Time and Value of Time

- Per page 59, average time spent commuting per person per day will be 32 minutes (0.53 hrs) less in 2031 if the 25-year plan is implemented, versus current trends. Based on a careful read of the backgrounders, this appears to be “per person”, not “per commuter.”
- The average value of time as cited in Metrolinx Benefit Case Analyses is \$13.02 per hour for transit users and automobile users, i.e. “per commuter”. In an email, Metrolinx advises that this value has now escalated to be \$16.13 per hour in 2014 dollars.
- If this value of time is to be used, it is necessary to estimate the population of transit and auto commuters in 2031.
- Transit trips in 2031 will be 1.1 million during the morning peak period, representing 26.3% mode share. Total morning peak period trips are therefore 4.18 million.
- Walking and cycling represent 12.5% (0.52 million trips), leaving 3.66 million morning trips by transit and auto users.¹
- Total commuting days is 260 per year.
- Total time saved by transit and auto users is 504 million hours per year.
- Average value of time saved for transit and auto users is \$16.13 per hour.

Value of time saved by commuters in 2031 if 25-year RTP is built (versus current trends)

260 days * 0.53 hours per day * \$16.13 per hour * 3.66 million commuters = **\$8.1 billion per year**

2. *The Big Move*, pg. 58

3. *The Big Move*, pg. 58

2.2 Saving Time, Saving Money — Reduced Distance Traveled by Cars in 2031²

- Average distance travelled by car each day per person is 19 km under the RTP forecast versus 25 km under the current trends, for a savings of 6 km per day.
- Annual savings is $6 \times 365 = 2190$ km per person.
- This can also be calculated using the vehicle kilometres travelled information in the morning peak hour from the modeling background report in The Big Move report:
 - Total vehicle kilometres travelled in peak hour is 14.4 million under the 25-year RTP scenario versus 19.5 million under current trends, for a savings of 5.1 million km.
 - The expansion factor to convert peak hour to annual is about 3.0 (peak hour to peak period) \times 1160 (peak period to annual) = 3500
 - Total annual vehicle kilometres travelled reduction is 5.1 million \times 3500 = 17.9 billion. Dividing by population of 8.6 million yields a per capita reduction of 2080 km per year.

Reduced distance traveled by cars if 25-year RTP is completed

2100 km per year per capita

2.3 Driving the Economy

CivicAction, in their “Your32” campaign, indicates that The Big Move plan is estimated to increase the region’s GDP by \$110 to 130 billion from 2012 to 2031. As numerous economic studies have indicated that investment in transit has a GDP multiplier of 2–3 fold, and as the updated rapid transit investment is expected to be \$68.1 billion, the CivicAction estimate appears reasonable and was accepted as is.

2.4 Environment — Reduced GHG Emissions from Passenger Transportation

Ontario’s challenges in reducing GHGs in the face of population increases are substantial. The Modeling Forecast table in The Big Move report³ indicates the following:

Annual greenhouse gas emissions from passenger transportation per person

Today	2.4 tonnes
RTP Forecast	1.7 tonnes

This represents a per capita reduction of 30%.

3. DETAILED WORKUP ON SIZE OF FUNDING GAP

3.1 Summary

Capital Funding Gap (billion dollars)

Required	From Prov.	From Fed. (firm)	From Fed. (probable)	From Muni.	Gap
68.1	30.9	5.3	1.2	1.9	28.8

Yearly Operating and Rehabilitation Cost Gap (billion dollars per year)

2014	2022	2032	2042
Small	1.6	3.8	4.6

Cumulative Operating and Rehabilitation Cost Gap (billion dollars)

2014	2022	2032	2042
Small	6	33	78

4. *The Big Move*, pg. 68

5. *The Big Move*, pg. 71

6. *Metrolinx Investment Strategy*, pg. 23–29. Total capital cost is indicated as \$16 billion. Specific costs on each project were not given but can be estimated from other sources: TYSSSE (2.6), Eglinton LRT (5.3), Scarborough RT (1.8 — note this is before the technology changed and extra funds supplied by the feds and City), Finch LRT (1.0), Sheppard LRT (1.0), Mississauga BRT (0.3), York Viva (1.4), UP Express (0.5), GO Georgetown corridor (1.5), Union Station Upgrades (0.7)

7. *Metrolinx Investment*, pg. 30–36. Capital costs were: Relief Line (7.4), Yonge North Subway Extension (3.4), GO Rail Expansion (4.9), GO Lakeshore Express Rail Ph 1 (1.7), Electrification of GO Kitchener Line and UP Express (0.9), Brampton Queen RT (0.6), Dundas Street BRT (0.6), Durham Scarborough BRT (0.5), Hamilton LRT (1.0), Hurontario-Main LRT (1.6), for a total capital cost of \$22.6 billion

8. *Hemson Report “2015 Development Charges Amendment Background Study: Transit Service Scarborough Subway Extension”*, April 7, 2015 prepared for City of Toronto. Table 9, pg. 19

3.2 Background

The Big Move was approved by the Metrolinx board and the provincial government in 2008. In 2013, Metrolinx published an [Investment Strategy](#) report that provided further detail on costs of some of the rapid transit projects, as well as detail on government financial commitments to date. These two documents, plus other city, provincial and federal announcements in 2014–2015, allow us to calculate what funding is needed for the full 25-year regional rapid transit program and how much has been committed to date.

There are two types of costs normally used for new rapid transit projects — capital costs and “all-in” costs. The latter includes capital, operating, maintenance and lifecycle rehabilitation. Metrolinx typically quotes capital costs, but uses all-in costs when determining the size and duration of new required revenue streams. This report will calculate the funding gaps for both capital and operating/rehabilitation costs.

3.3 Capital Cost Requirements, Committed and Gap

3.3.1 Initial Metrolinx Figure for Capital Cost Requirement

The capital costs for The Big Move projects were estimated at \$50 billion,⁴ in 2008 dollars.⁵ This was over and above funded projects at that time (for example, Spadina Subway Extension, Mississauga Transitway, Acceleride).

3.3.2 Capital Cost Requirement — Adjustments and Final Amount

In the 2013 Investment Strategy document, Metrolinx provided a cost summary on the ten First Wave projects⁶ and detailed costs on each of the Next Wave projects.⁷ There were small differences in the costing basis versus that in The Big Move:

- The Investment Strategy included the Spadina Subway Extension (\$2.6 billion) and Mississauga Transitway (\$0.3 billion) as First Wave projects. These were cited in The Big Move but not included in the \$50 billion.
- The Metrolinx Investment Strategy included the Union Station Upgrade (\$0.7 billion) as a First Wave project, despite not being cited in The Big Move.

Therefore the revised capital cost is \$50 billion + \$2.6 billion + \$0.3 billion + \$0.7 billion = \$53.6 billion in 2008 dollars.

Construction cost escalation between 2008 and 2014 would be at least 15%, resulting in a capital cost for the above projects of \$61.6 billion in 2014 dollars.

In 2013, Toronto decided to replace the Scarborough RT project identified in The Big Move with a subway extension at higher cost. The incremental capital cost in 2014 dollars was estimated at \$1.6 billion, to be funded by the feds (\$660 million) and the City (\$910 million).⁸

In 2014 and 2015, the province committed \$13.5 billion to Regional Express Rail. The scope of RER is larger than was contemplated in The Big Move/Next Wave, where only \$7.5 billion was estimated (= \$8.6 billion in 2014 dollars), resulting in an incremental need for an additional \$4.9 billion.

Total capital funding requirements = \$61.6 billion + \$1.6 billion + \$4.9 billion = **\$68.1 billion** in 2014 dollars.

3.3.3 Provincial Capital Funding Committed

Per Metrolinx Investment Strategy, \$16 billion has been committed for 10 projects in the First Wave, \$13 billion from the province.³ We assume this is for capital costs in 2008 dollars. Inflating these to 2014 would result in a provincial commitment of \$14.9 billion.

A ten-year provincial funding commitment of \$16 billion was announced in 2014–2015. Assume this is applied to capital funding. This money has been fully directed to GO RER, Hurontario LRT and Hamilton LRT.

Total provincial capital funding committed = \$14.9 billion + \$16 billion = \$30.9 billion

3.3.4 Federal Capital Funding Committed and Probable

The \$3 billion balance of First Wave capital funding not provided by Ontario was largely from the federal government, although both York (\$350 million) and Toronto (\$530 million) contributed to the Spadina Subway Extension.⁸ Toronto also contributed to

9. Hemson Report “2015 Development Charges Amendment Background Study: Transit Service Scarborough Subway Extension”, April 7, 2015 prepared for City of Toronto. Table 9, pg. 19

10. *The Big Move*, pg. 73

11. *Metrolinx Investment Strategy*, pg. 57

the Union Station project. Assume total federal funding for First Wave projects is \$2 billion in 2014 dollars.

In 2013, the feds committed \$660 million to the Scarborough Subway Extension.⁹

In 2015, the feds announced a commitment of \$2.6 billion for SmartTrack. SmartTrack is an enhancement of the approved and funded RER program. The enhancements, involving additional stations, higher frequencies and TTC-level fares, have not been approved and are therefore not included as capital requirements in this workup. Optimistically, assume the federal funds will be applied to base case RER or other projects already cited above.

The Federal Public Transit Fund initiated by the Harper Government in 2015 planned to ultimately direct \$1 billion per year in new funding to public transit, commencing in 2017–18. However, the 2016 budget by the Trudeau Liberals basically cancelled this program, as it would “transfer remaining uncommitted funds from older federal infrastructure programs to municipalities through the Gas Tax Fund”. As nothing had been committed, there are no funds to transfer.

Instead, the 2016 Budget by the Liberals promises to invest \$11.9 billion over 5 years to infrastructure, of which \$3.4 billion is for public transit and will be dispensed in the first 3 years. The funding will be allocated based on transit ridership, with Ontario receiving \$1.487 billion. Assuming 80% of this goes to GTHA, this works out to about \$1.2 billion. It is assumed that this new federal funding is *over and above* the earlier federal commitments.

Total federal capital commitment (firm) = \$2.0 billion + \$0.66 billion + \$2.6 billion = \$5.3 billion

Probable additional federal capital commitment = \$1.2 billion

3.3.5 Municipal Commitments

Total municipal commitments are estimated at \$1 billion for First Wave projects (see 3.3.4) and \$0.9 billion for the Scarborough Subway Extension.

Total Municipal capital commitment = \$1.0 billion + \$0.9 billion = \$1.9 billion

3.3.6 Total Committed Capital Funds

\$30.9 billion + \$6.5 billion + \$1.9 billion = \$39.3 billion

The thirteen projects for which this capital is earmarked, namely the ten First Wave projects, GO RER, Hurontario LRT and Hamilton LRT, will largely be completed by about 2023.

3.3.7 Capital Funding Gap

\$68.1 billion – \$39.3 billion = \$28.8 billion

As per the section above, this capital infusion should be for projects to be constructed in the period about 2023–2032.

3.4 Operating, Maintenance and Rehabilitation Costs (excluding debt financing)

3.4.1 Operating/Rehabilitation Funds Required

As capital projects come on stream, there starts to be a need for funding to cover operating, maintenance and rehabilitation costs. *Figure 2* of *The Big Move*¹⁰ shows that, for a capital investment program of \$50 billion (uninflated dollars) over 25 years, operating expenditures at full buildout are about \$1.4 billion per year and rehabilitation costs are \$1.9 billion per year. Operating costs commence immediately after completion of the capital project, while rehabilitation costs for a particular project commence about 5 years after completion.

Consistent with this, the Investment Strategy document observed¹¹ that to build the Next Wave projects (\$34 billion per year capital) would require a stable revenue stream of about \$2.0 billion per year in perpetuity.

Some of the First Wave projects are already operating (UP Express, Mississauga Transitway, some GO improvements, parts of VIVA, parts of Union Station). To date, operating costs have been covered from general revenues by government, which is either the province or the municipality. Rehabilitation costs to date are minimal.

The balance of the thirteen First Wave and committed Second Wave projects will be completed between now and the early 2020s, with major projects as follows:

- Toronto-York Subway Extension (2017)
- Eglinton LRT (2020)
- Finch West LRT (2021), Sheppard LRT (2025)
- GO RER (2022/2023)
- Scarborough Subway Extension (2025)
- Hurontario LRT (2021)
- Hamilton LRT (2021)

Therefore, for the total committed capital funding of \$39.3 billion, a small amount of operating cost funding is needed now, growing to \$1.1 billion per year at full buildout. Rehabilitation funding will be needed starting about 5 years after first project completion, growing to \$1.4 billion per year.

If an additional tranche of capital funding is found in 2023–2032 to cover the remaining capital gap (\$28.8 billion), an additional operating fund stream will be needed, growing to \$0.9 billion per year and a rehabilitation stream will be needed starting about 5 years after completion and growing to about \$1.2 billion per year.

3.4.2 Operating/Rehabilitation Funds Committed

There has been no commitment as yet by government to develop revenue streams to cover this large pending operating/rehabilitation cost requirement. Unless this is done, the funds will need to come from general government revenue.

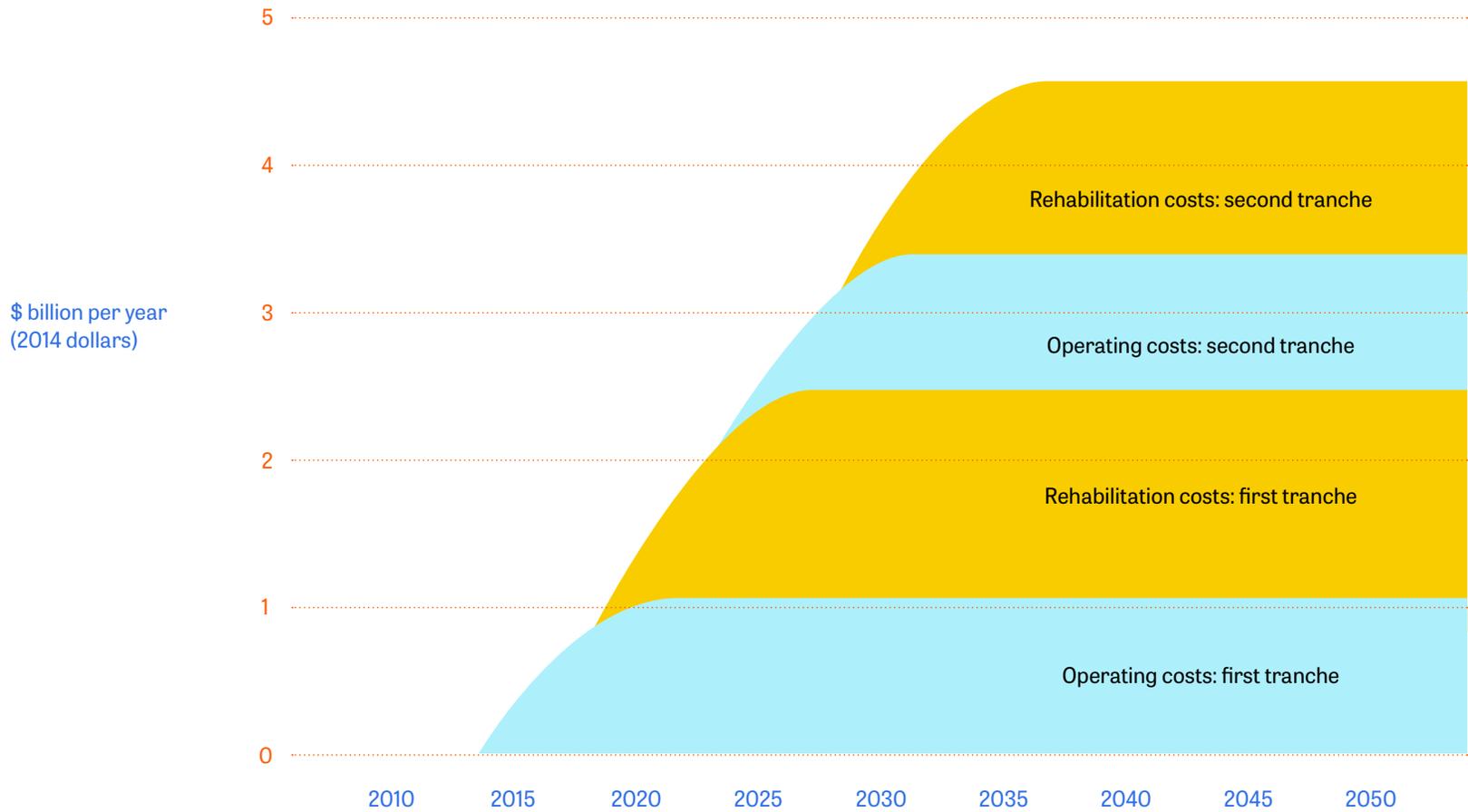
3.4.3 Calculation of Yearly Operating and Rehabilitation Costs

This expenditure profile has been plotted in the graph on the following page.

Cumulative costs can readily be calculated by determining the area under the graph for any year of interest.

	Yearly Operating Costs	Yearly Rehabilitation Costs
Costs from projects constructed with first tranche of \$39.3 billion capital	Near-zero in 2014, growing linearly to \$1.1 billion per year by 2022 and then remaining at \$1.1 billion per year.	Zero in 2019, growing linearly to \$1.4 billion per year by 2027 and remaining at that level.
Costs from projects constructed with new injection of \$28.8 billion capital (second tranche)	Near-zero in 2023, growing linearly to \$0.9 billion per year by 2032 and then remaining at that level.	Zero in 2028, growing linearly to \$1.2 billion per year by 2037 and remaining at that level.

3.4.3.1 Operating & Rehabilitation Expenditure Profile (2014 dollars)



4. STATUS OF VARIOUS PROJECTS OF THE BIG MOVE

Based on project numbering from Schedules 1 and 2 in *The Big Move*, pg. 96.

Unless indicated, projects are BRT/LRT.

Project lengths from *Modeling Backgrounder* (December 2008) or by measurement

Project Name	km	Existing 2008	km completed post-2008	km funded	km not funded
Lakeshore Hamilton to Oshawa Express Rail	116	yes	-	116	-
Brampton-Union Express Rail	32	yes	-	32	-
Milton to Union/Summerhill RR	50	yes	-	-	50
Georgetown-Brampton RR	16	yes	-	-	76
Richmond Hill GO to Union RR	26	yes	-	-	26
Scarborough RT (Kennedy to Malvern)	11	yes	-	11	-
Bloor-Danforth Subway	26	yes	-	-	-
Yonge-University-Spadina Subway	30	yes	-	-	-
Sheppard Subway	5	yes	-	-	-
Barrie (Bradford to Union) RR	99	yes, to Barrie	-	131	-
Mount Joy to Union RR	51	yes, to Lincolnville	-	68	-
James Street to Stoney Creek RR	10	-	-	10	-
Pearson-Union RR	25	-	25	-	-
Bolton-Union RR	36	-	-	-	36
Crosstown RR (Dundas Street to Summerhill)	7	-	-	-	7
Aurora Road to Richmond Hill GO RR	20	-	-	15	5
Locust Hill to Union/Summerhill RR	33	-	-	-	33
Seaton to Union/Summerhill RR	40	-	-	-	40
Lakeshore Oshawa to Bowmanville RR	18	-	-	18	-
Spadina Subway Extension (Downsview to Vaughan CC)	8	-	-	8	-
Yonge Subway Extension (Finch to Richmond Hill)	7	-	-	-	7
Hamilton James (Downtown-Airport)	15	-	-	-	15
Hamilton King/Main (McMaster to Eastgate)	14	-	-	14	-
Burlington Connector (Fairview GO to Burlington)	2	-	-	-	2
Dundas Street (Brant Street to Kipling)	41	-	-	-	41
Trafalgar (Hwy 407 to Midtown Oakville)	9	-	-	-	9
Hwy 403 Transitway (Midtown Oakville to Renforth/Airport)	25	-	12	8	5
Hwy 10 (Mayfield West to Downtown Brampton)	7	-	-	-	7

Project Name	km	Existing 2008	km completed post-2008	km funded	km not funded
Main Street Acceleride (Downtown Brampton to Hwy 407)	6	-	-	6	-
Hurontario (Hwy 407 to Port Credit)	19	-	-	19	-
Waterfront West (Port Credit GO to Union)	21	-	-	-	21
Queen St. Acceleride (Downtown Brampton to Peel-York boundary)	8	-	-	-	8
VIVA Hwy 7 (Peel/York boundary to Locust Hill)	46	-	10	14	22
Finch West (Pearson to Finch Station)	24	-	-	11	13
Eglinton (Pearson to Kennedy)	31	-	-	19	12
Hwy 427 (Pearson to Kipling Station)	12	-	-	-	12
Jane (Vaughan CC to Bloor)	17	-	-	-	17
Don Mills (Hwy 7 to Bloor)	20	-	-	-	20
VIVA Yonge (Richmond Hill to Newmarket Centre)	28	-	-	13	15
Sheppard East (Don Mills Stn. to Meadowvale/Scarborough Centre)	17	-	-	13	4
Hwy 2 (Scarborough Centre to Downtown Oshawa)	34	-	-	-	34
Brock Road (Downtown Pickering to Hwy 407)	7	-	-	-	7
Oshawa Connector (Oshawa GO to Downtown Oshawa)	2	-	-	-	2
Highway 407 BRT in mixed traffic (Halton to Durham)	-	-	-	-	-
Cooksville to Union Express Rail	-	-	-	-	-
Richmond Hill to Union Express Rail	-	-	-	-	-
Downtown Relief Subway (Bloor West - Downtown - Danforth)	13	-	-	-	13
Hamilton Mohawk (Centre Mall to Ancaster)	17	-	-	-	17
Brant (Fairview GO to Dundas Street)	7	-	-	-	7
Trafalgar/Main (Downtown Milton to Hwy 407)	16	-	-	-	16
Steeles Acceleride (Lisgar GO to Hwy 427)	28	-	-	-	28
Hwy 427 North (Pearson to Queen Street)	11	-	-	-	11
Hwy 407 Transitway (Hwy 427 to Markham Centre)	35	-	-	-	35
Steeles (York U to Milliken GO)	16	-	-	-	16
VIVA Yonge North (Newmarket Centre to Green Lane)	5	-	5	-	-
McCowan (Markham Centre to Scarborough Centre)	13	-	-	-	13
Scarborough-Malvern (Kennedy Station to Malvern)	14	-	-	-	14
Steeles/Taunton (Milliken GO to Downtown Oshawa)	48	-	-	-	48
Simcoe (Downtown Oshawa to Hwy 407)	9	-	-	-	9

TOTALS	km	Existing 2008	km completed post-2008	km funded	km not funded
Total new projects per 2008 RTP	1303				
Total "new transit" = 1303 - 61 km	1242				
Total including Kitchener, Barrie, Lincolntonville (109 km)	1412	61	52	526	773
Prorate our 1242 km "new transit" number to Metrolinx "new transit" number of 1225 km and add 109 km additions + 61 km existing = 1395 km	1395	61	52	519	763



This background report supplements the report *Are We There Yet?* which is available at: movethegtha.com

MOVE THE GTHA

This report was compiled and released by Move the GTHA, a diverse group of organizations from health, labour, business, policy, environment, and citizen advocacy working together to build awareness, engagement and education in support of investment in our region's transportation system.

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