

ATTACHMENT 1

TRANSIT EXPANSION PROGRAM – STATUS UPDATE

This attachment provides an update on the status of each project currently underway to expand Toronto's transit network, including the next major milestone for each project. Projects are in different stages of the project lifecycle, as depicted in Figure 1 below.

Attachments 2-5 in this report provide more detailed analysis on the following projects, each of which is at a decision gate in this report:

- Line 2 East Extension;
- Waterfront Transit Network – Union Station-Queens Quay Link;
- Eglinton East LRT; and
- Eglinton West LRT.

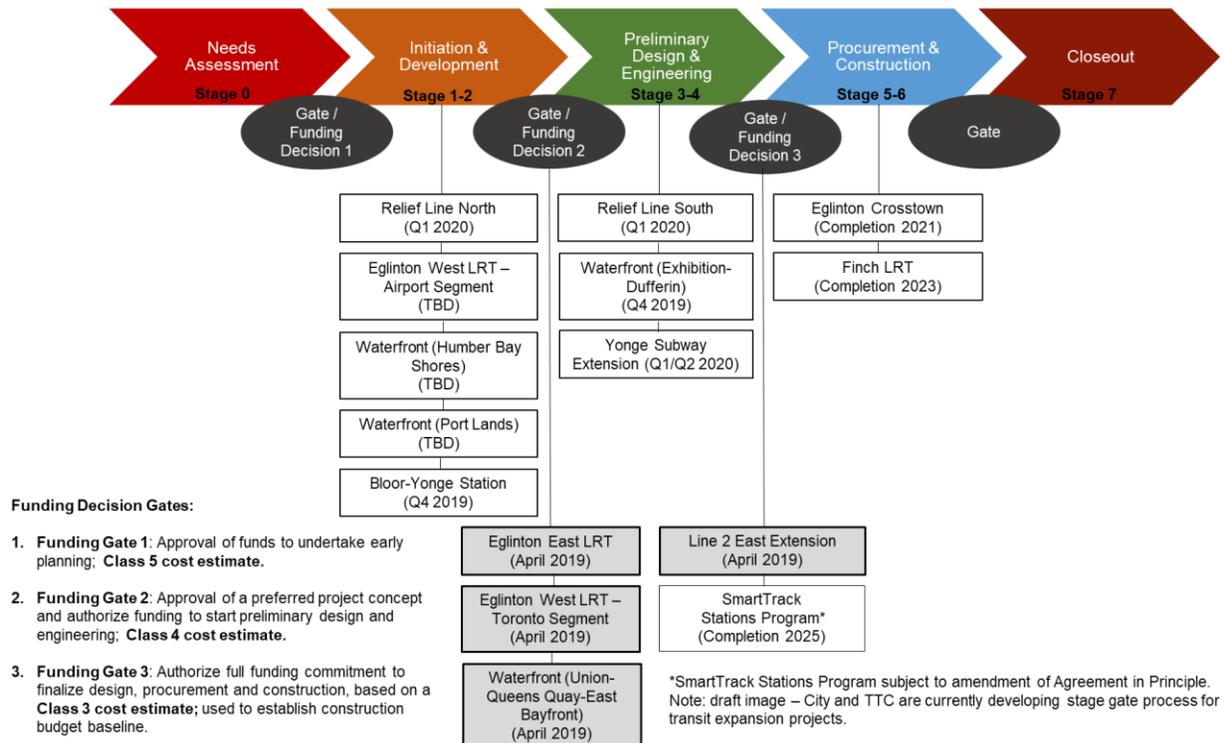


Figure 1. Status of Transit Expansion Projects in the Project Lifecycle

The transit expansion project lifecycle generally comprises three major phases of work, and three key funding decisions, described as follows:

- **Initiation and Development Phase:** a problem or need is identified and options are developed and refined to recommend a specific project concept (e.g., station locations and alignment) for preliminary design and engineering. During this phase, pre-environmental assessment/Transit Project Assessment Process (TPAP) work

and planning studies are undertaken. At the end of this phase, a Class 5/4 cost estimate is developed based on a low level of project design. Public consultation during this phase is focused on the options (including technology, corridor and station options) to address the transit need. By the end of this phase, a preferred project concept alternative would be ready to move into preliminary design and engineering, subject to funding.

- **Preliminary Design and Engineering Phase:** the preferred project concept alternative is further refined to develop the project to a state of procurement readiness. This would include going through the formal environmental approvals process/TPAP, undertaking an assessment of procurement options, further planning studies, and engineering and design to mature the project definition. The design work is then used as an input to develop a cost estimate suitable for budgeting purposes (i.e., Class 3 cost estimate). Public consultation during this phase is focused on refining the preferred concept and identifying potential impacts on property. The project's level of design at the end of the phase would depend on the recommended procurement method (10-30%). By the end of this phase, the project is ready to move into detailed design, procurement and construction, subject to funding.
- **Procurement and Construction Phase:** all activities and tasks related to project procurement and construction. This includes issuing the request for proposals (RFP), awarding the contract, and project implementation/construction. Strong community relations and communications throughout the project delivery phase are key components to minimize community and stakeholder impacts and to undertake property acquisition. Reporting back to City Council/TTC Board during this phase would consist of periodic status updates and as-needed reports if there are major changes to the original project budget, scope, and schedule (e.g., if the procurement process results in market price higher than estimated, schedule slippage, or cost overruns).

Prior to each phase of the project, a decision must be made on whether to allocate funding needed to undertake the associated work. At the conclusion of each phase, Council would be presented with recommendations based on the most current information (e.g., cost estimates based on current design). Staged decision-making allows the City and TTC to make more informed decisions as projects advance through the lifecycle.

City and TTC staff are currently refining existing decision-support tools. A report back to City Council on these decision-support tools will be provided.

See Appendix A to this Attachment for further information on cost estimate classifications.

The following projects are included in this attachment:

- Bloor-Yonge Capacity Improvement 4
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Bloor-Yonge Capacity Improvement

Current Phase: Initiation and Development

Description

The Bloor-Yonge Capacity Improvement is a TTC project that includes:

- Building an additional platform at Line 2 Yonge Station;
- Modifications to the Line 1 Bloor Station platform;
- Increasing vertical circulation elements and fire ventilation upgrades to the station; and
- Constructing a new substation.

Currently more than 200,000 passengers use Bloor-Yonge Station each day. Expanding capacity and improving circulation is required to safely accommodate future transit expansion and projected growth in demand. Other benefits of the project include less frequent overcrowding, reduced train dwell time (customers get on and off more quickly), and more frequent trains on Line 1 and Line 2.

TTC and City staff are developing forecast demand projections for TTC's Line 1 that incorporate expected population and employment growth, along with future transit expansion projects and other initiatives. This work indicates that capacity improvements are required to Line 1 to accommodate the forecast demand.

TTC has commenced analysis of the capacity constraints for Line 1 and identified 19 key elements and associated requirements to achieve the required service capacity targets. The improvements have been aligned to target horizon years (i.e., 2021, 2023, 2028, 2031 and beyond 2031) in order to keep pace with demand and provide the required trains per hour on the subway line.

The expansion of Bloor-Yonge Station has been identified as one of the 19 key elements because this location frequently experiences overcrowding and has extended dwell times for trains affecting the throughput of the line. Modelling of the station indicates that this work is required before 2028. Considering the time required to complete construction of a second platform type project (similar to Union Station), and the complex staging with its inherent impact on passenger flows, design should continue unimpeded so that construction could commence as soon as possible. This will minimize the number of customers impacted by the work and constraints on Line 1 capacity as ridership grows.

The Line 1 Capacity needs have been reflected in the TTC's 15-year Capital Investment Plan.

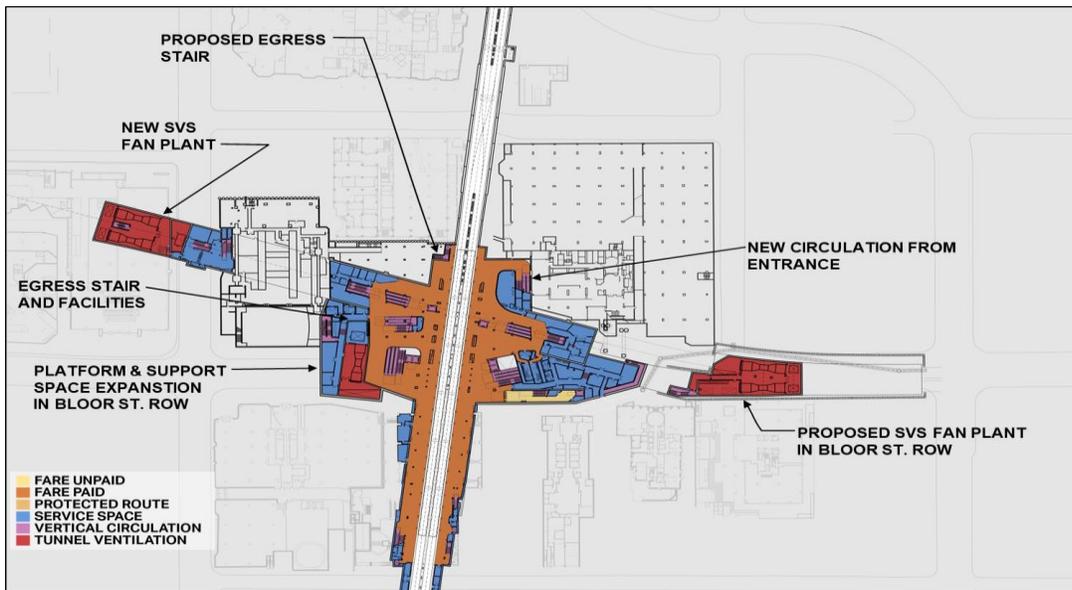


Figure 2. Line 1 Platform Improvements

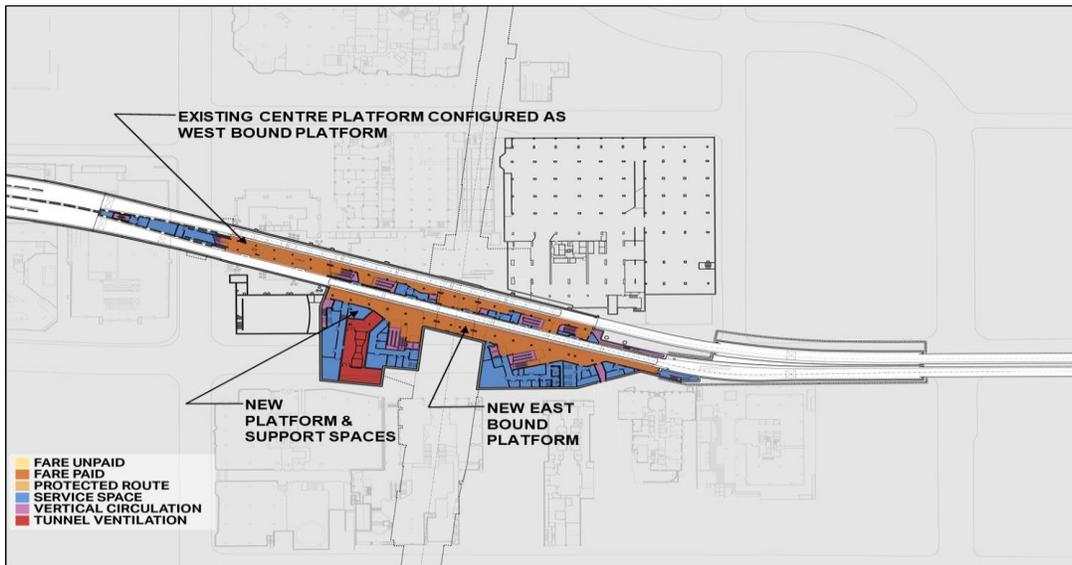


Figure 3. Line 2 Second Platform and Improvements

Recent History

In May 2017, City Council requested the TTC to report on the status of plans to expand Bloor-Yonge interchange station, including estimated costs, timelines and potential capacity added to Line 1.¹ At that time, City Council also confirmed the expansion of the station as a priority project for City Council and for Provincial and Federal Funding.

¹ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.EX25.1>

Status

Finalization of the preferred concept design (10% design) continues to be on target for completion in 2019 with a Class 4 cost estimate, updated schedule and procurement options analysis.

Key Facts	Current Available Information
Project Governance	Asset Owner: TTC Project Manager: TTC Operator: TTC
Delivery Model	To be determined – Procurement Options Analysis Required
Environmental Assessment/TPAP	To be determined
Current Phase in Project Lifecycle	Initiation and Development – to be completed in Q4 2019

Current Cost and Schedule Estimates

	Capital Cost Estimate
Schedule	2026 – To be confirmed by Level 2 schedule
Cost	\$1.05 B ¹ (Less than Class 5; not for budgeting)
Note: (1) Order of Magnitude Estimate is provided for discussion purposes only, not for budget, and is not reflecting a full risk evaluation of schedule or costs. Forecast completion date and budget will be confirmed in a Stage Gate 3 report to City Council factoring in delivery strategy, property acquisition and schedule risk analysis.	

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Eglinton Crosstown Light Rail Transit (LRT)



Figure 4. Eglinton Crosstown Project Map

Current Phase: Construction

Description

The Eglinton Crosstown is a 19-kilometre light rail transit line that will run along Eglinton Avenue between Mount Dennis (Weston Road) and Kennedy Station. The 19-kilometre corridor includes a 10-kilometre underground portion between Keele Street and Laird Drive. The project is currently under construction and will be known as Line 5 Eglinton when it opens.

The Crosstown will provide fast, reliable transit by carrying more passengers in a dedicated right-of-way separate from traffic. The LRT will connect to 54 bus routes, three subway stations (Kennedy, Eglinton and Eglinton West [Cedarvale]), and three GO stations (Mount Dennis, Caledonia, and Kennedy), providing an important east-west link. Service levels and hours of operation are anticipated to be similar to existing TTC subway lines.

Recent History

On November 28, 2012, Metrolinx, the City of Toronto and the TTC signed a Master Agreement for the implementation of the Metrolinx Toronto Light Rail Transit Program.² The agreement formalizes the construction and future operation of the Eglinton Crosstown, Finch West and Sheppard East LRTs. Metrolinx will own and deliver the LRT lines and the TTC will operate.

²http://www.metrolinx.com/en/projectsandprograms/transitexpansionprojects/Master_Agreement_Nov_28_2012.pdf

In April 2014, City Council requested Metrolinx to include a Public Realm Amount for the Eglinton, Sheppard and Finch rapid transit lines in order to plan, design and construct improvements to the streetscape requested by the City.³

In July 2015, Metrolinx and Infrastructure Ontario selected Crosslinx Transit Solutions (CTS), a consortium of SNC-Lavalin, EllisDon, AECOM, and ACS Infrastructure Canada to complete the Crosstown project. CTS has been awarded a contract by Metrolinx to:

- Design, construct and finance an integrated transit system consisting of 25 stations/stops, track work, signaling, communications and other required infrastructure; and
- Maintain the LRT system for 30 years, including lifecycle repair and renewal of building and system components.

In November 2016, City Council considered the report *2016.EX19.1 Transit Network Plan Update and Financing Strategy*,⁴ and approved principles associated with cost-sharing and future roles and responsibilities on the Eglinton Crosstown, Finch West and Sheppard East LRTs. An Agreement in Principle⁵ ("AIP") was entered into that specified the following:

- The TTC will operate the LRTs located in the City of Toronto on behalf of Metrolinx;
- The City and the TTC will establish service levels and set fares;
- The City and TTC will be responsible for operating and regular maintenance costs of the LRTs, as well as retain farebox revenue and non-fare box revenue; and
- Metrolinx will continue to retain asset ownership and control of LRTs in the City of Toronto, and will be responsible for lifecycle maintenance costs.

Status

Construction of the Crosstown began in 2011 with advance utility work and tunnel construction works. The line is anticipated to be open by 2021. The City and TTC continue to work closely with Metrolinx on all aspects of the delivery of the LRT projects in Toronto, including construction mitigation and business support. A report on business supports being implemented along Eglinton will be brought forward to Council in Q2 2019.

The TTC and Metrolinx are currently undertaking work to finalize an operating agreement for the Crosstown LRT prior to the line being ready to move into revenue service.

³ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.EX41.2>

⁴ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.EX19.1>

⁵ <http://smarttrack.to/agreement-in-principle/>

Key Facts	Current Available Information
Project Governance	Asset Owner: Metrolinx Project Manager: Metrolinx and Crosstown Transit Solutions (CTS) Operator: TTC Capital Funding: Province of Ontario
Delivery Model	Alternative Financing and Procurement – Design, Build, Finance and Maintain (DBFM)
Environmental Assessment/TPAP	Complete – 2010 ⁶ ; EPR Addendum 2013 ⁷
Current Phase in Project Lifecycle	Construction – to be completed in 2021
Project Website	http://www.thecrosstown.ca/

The Crosstown is a \$5.3 billion (2010\$) investment from the Province of Ontario.

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⁶ <http://thecrosstown.ca/the-project/reports/EglintonCrosstownLRTEnvironmentalProjectReport>
⁷ <http://www.thecrosstown.ca/the-project/reports/epr-addendum-report>

Finch West Light Rail Transit (LRT)

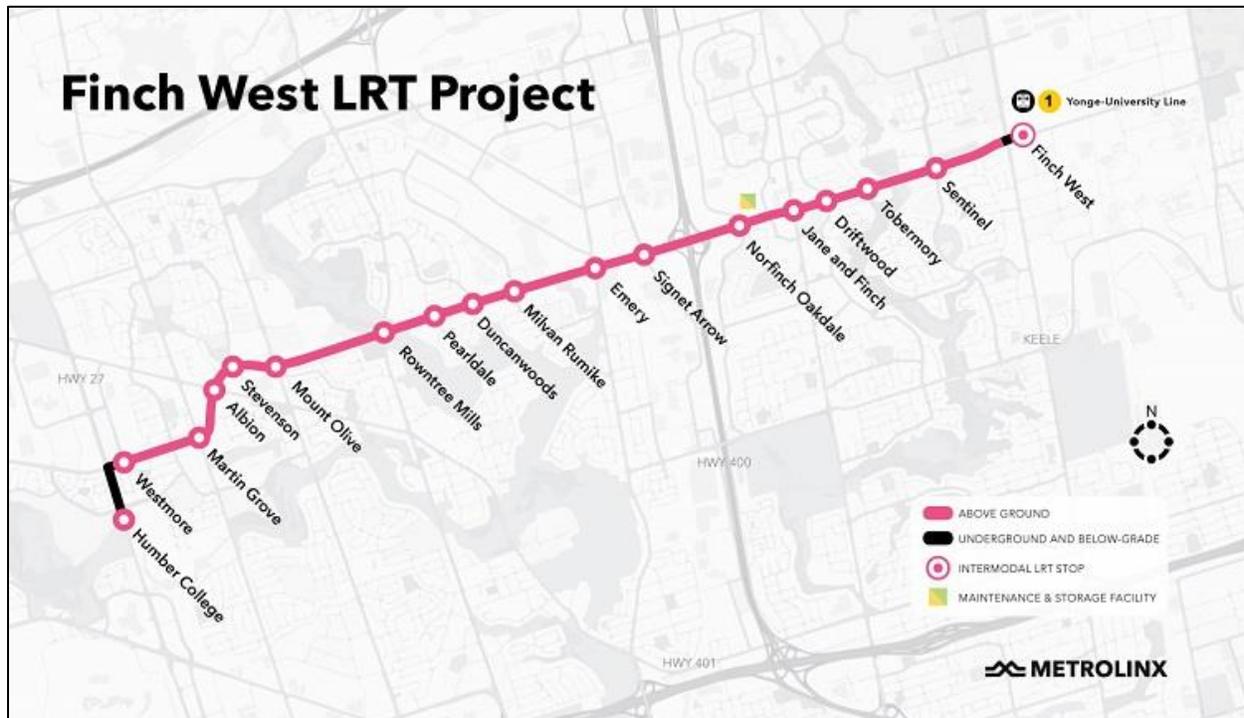


Figure 5. Finch West LRT Project Map

Current Phase: Procurement and Construction

Description

The Finch West LRT is an 11-kilometre light rail transit line along Finch Avenue West between Keele Street and Humber College. The Finch West LRT provides transit service to Northwest Toronto with connections to TTC, GO, Miway, YRT, and Züm (Brampton) transit services, as well as providing an important link to Humber College. It will be known as the Line 6 Finch West when it opens. Service levels and hours of operation are anticipated to be similar to existing TTC subway lines.

Recent History

On November 28, 2012, Metrolinx, the City of Toronto and the TTC signed a Master Agreement for the implementation of the Metrolinx Toronto Light Rail Transit Program.⁸ The agreement formalizes the construction and future operation of the Finch West LRT. Metrolinx will own and deliver the LRT lines and the TTC will operate.

In February 2016, City Council approved a list and ranking of public realm improvements along Finch Avenue West that should be obtained using the Public Realm Amount allocated to the project.⁹

⁸http://www.metrolinx.com/en/projectsandprograms/transitexpansionprojects/Master_Agreement_Nov_28_2012.pdf

⁹<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.EX13.9>

In November 2016, City Council considered the report *2016.EX19.1 Transit Network Plan Update and Financing Strategy*,¹⁰ and approved principles associated with cost-sharing and future roles and responsibilities on the Eglinton Crosstown, Finch West and Sheppard East LRTs. An Agreement in Principle¹¹ ("AIP") was entered into that specified the following:

- The TTC will operate the LRTs located in the City of Toronto on behalf of Metrolinx;
- The City and the TTC will establish service levels and set fares;
- The City and TTC will be responsible for operating and regular maintenance costs of the LRTs, as well as retain farebox revenue and non-fare box revenue; and
- Metrolinx will continue to retain asset ownership and control of LRTs in the City of Toronto, and will be responsible for lifecycle maintenance costs.

In May 2018, Metrolinx and Infrastructure Ontario selected Mosaic Transit Group (MTG), a consortium of ACS Infrastructure Canada, Aecon, and others, to complete the Finch West LRT project. MTG has been awarded a contract by Metrolinx to:

- Design, construct and finance an integrated transit system consisting of 17 stops and one station, track work, signaling, communications and other required infrastructure; and
- Maintain the LRT system for 30 years, including lifecycle repair and renewal of building and system components.

Status

Major construction will begin in spring 2019 with substantial completion expected in 2023. The City and TTC continue to work closely with Metrolinx on all aspects of the delivery of the LRT projects in Toronto, including construction mitigation and business support.

Key Facts	Current Available Information
Project Governance	Asset Owner: Metrolinx Project Manager: Metrolinx and Mosaic Transit Group (MTG) Operator: TTC Capital Funding: Province of Ontario and Government of Canada
Delivery Model	Alternative Financing and Procurement – Design, Build, Finance and Maintain (DBFM)
Environmental Assessment/TPAP	Complete – 2010 ¹²
Current Phase in Project Lifecycle	Construction – to be completed in 2023
Project Website	http://www.metrolinx.com/en/greaterregion/projects/finchwest-lrt.aspx

¹⁰ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.EX19.1>

¹¹ <http://smarttrack.to/agreement-in-principle/>

¹² http://www.metrolinx.com/en/docs/pdf/finch_west_ea/executive_summary.pdf

The Finch West LRT is a \$1.5 billion (2014\$) commitment by the Ontario government, and includes \$333 million from the Government of Canada's Building Canada Fund. This is the last available cost estimate for the project.

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GO Expansion Program

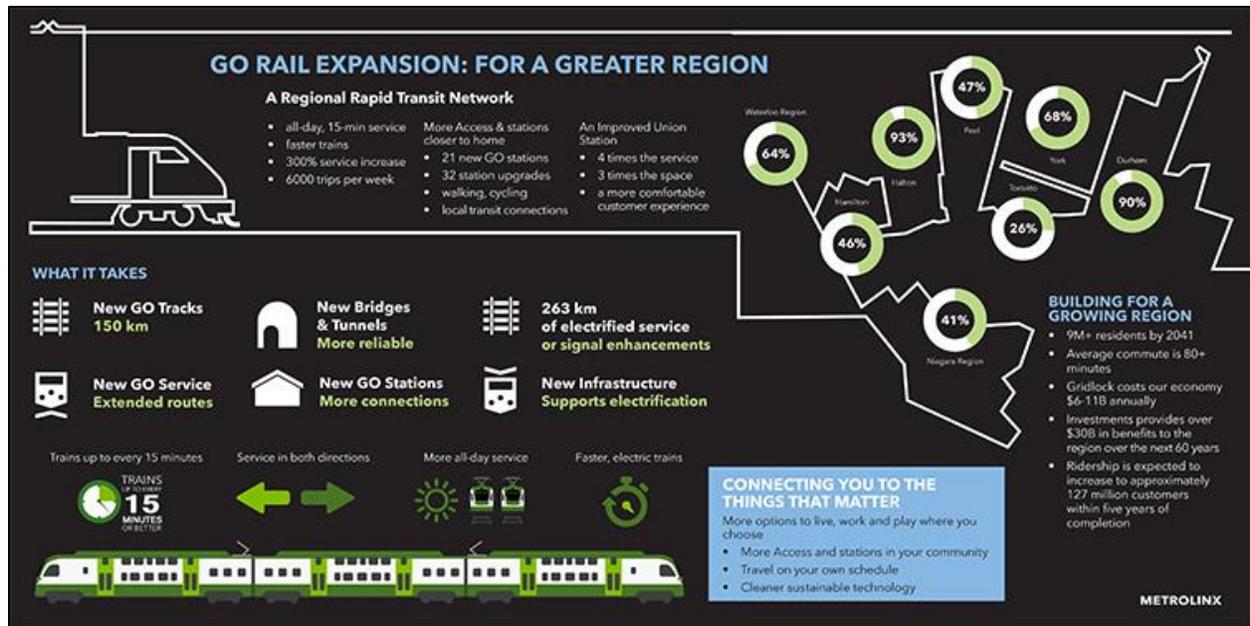


Figure 6. GO Expansion infographic

Description

GO Expansion (formerly Regional Express Rail) is a multi-year investment by the Provincial Government in GO Rail service improvements, which will feature two-way, all-day service with 15-minute frequencies on core portions of the GO Rail network by 2024/25, generating an increase in GO service from 1,500 to 6,000 trains per week. GO Expansion includes the electrification of six GO corridors (Union Station, Barrie, Stouffville, Lakeshore East, Lakeshore West and Kitchener), enhancements to Union Station, grade separations, new stations and upgrades to existing stations.

Status

Metrolinx is proceeding with work required to implement the Program, which will be delivered through a number of procurement packages involving many projects over the period of 2020 to 2025. There will be numerous impacts on existing City infrastructure (e.g., City bridges) and certain projects initiated by Metrolinx will give rise to cost-sharing in accordance with previous agreements (e.g., new grade separations). Finally, there will be construction disruption caused by the Program that the City and Metrolinx will work together to minimize and mitigate.

City staff will report to Executive Committee in 2019 on the municipal and financial implications of new grade separations on several GO corridors sponsored by Metrolinx. The Director, Major Capital Infrastructure Coordination Office will also bring forward staff reports on other matters in which the City and Metrolinx will cooperate to improve transit and transportation within the City that result from the GO Expansion Program.

Key Facts	Current Available Information
Project Governance	Asset Owner: Metrolinx Project Manager: Metrolinx Operator: Metrolinx
Delivery Model	Alternative Financing and Procurement – Design, Build, Finance, Operate and Maintain
Environmental Assessment/TPAP	Complete – 2017 ¹³
Current Phase in Project Lifecycle	Per Metrolinx Benefits Management process, project is in Design and Procurement Preparation Phase ¹⁴
Project Website	http://www.metrolinx.com/en/greaterregion/projects/go-expansion.aspx

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¹³ <http://www.metrolinx.com/en/electrification/electric.aspx>

¹⁴ http://www.metrolinx.com/en/docs/pdf/board_agenda/20181206/20181206_BoardMtg_GO_Expansion_Deck.pdf

Relief Line South

Current Phase: Preliminary Design and Engineering

Description

The Relief Line South is a new eight station subway connecting Line 2 at Pape Station to Line 1 at Queen Station and Osgoode Station. It is a priority project for the City and TTC and is required by 2031 to reduce crowding and congestion on Line 1 (south of Bloor-Yonge Station), improve the resiliency of the subway network, provide development opportunities, connect with major TTC streetcar and bus routes, and support future network

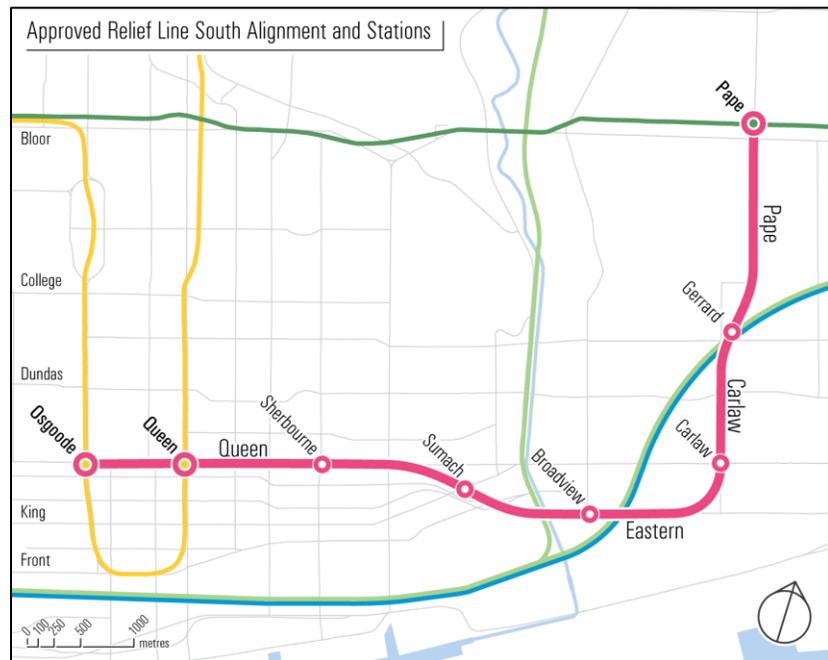


Figure 7. Relief Line South Project Map

extensions (e.g., Relief Line North and Yonge Subway Extension). “Relief Line South” is a temporary working title for the project, and the completed line will be designated by a number, name, and colour, like all other TTC rapid transit lines.

The Relief Line will operate as a separate subway line, but will be integrated into the TTC subway system. Service levels and the hours of operation will be similar to existing TTC subway lines. There will be convenient interchange connections for passengers at Pape, Queen, and Osgoode subway stations, and at the Gerrard-Carlaw and East Harbour SmartTrack stations. The trains, stations, and other infrastructure will be designed to the latest subway standards, and will permit a high-capacity service to be operated to meet the projected passenger demand over at least the next 30 years. Provision is being made for automatic train operation, platform edge doors, and longer trains, to allow the most flexibility for future increases in ridership demand. The line will be entirely tunnelled, and will be isolated from the weather-related delays that can affect service on Lines 1, 2, and 3. A separate, short tunnel will allow Relief Line trains to be driven to the TTC's existing Greenwood Yard for necessary maintenance and repairs, thus allowing efficient use of existing subway system resources. The same tunnel will also allow the TTC's existing fleet of maintenance trains to reach the Relief Line for overnight work. For maximum service resilience and redundancy, the connection to the wider subway system would allow for trains from Line 1 or Line 2 to be operated on the Relief Line, if necessary.

Recent History

In July 2016, City Council approved the Relief Line South alignment and station locations, subject to further assessment of a local segment between Gerrard Street and Queen Street.¹⁵

In May 2017, City Council considered the report *EX25.1 Advancing Planning and Design for the Relief Line and Yonge Subway Extension*.¹⁶ City Council approved the Carlaw alignment for the local segment, authorized commencement of the Transit Project Assessment Process ("TPAP") and requested the City, TTC, and Metrolinx to advance project planning and design to develop a Class 3 cost estimate and Level 3 schedule.

Per City Council direction, the City, TTC and Metrolinx entered into a Memorandum of Understanding ("MOU")¹⁷ to guide planning and design of the project. Based on the MOU, the TTC is the project manager for the current preliminary design and engineering phase of the project.

Given the importance of the Relief Line South in providing additional transit capacity and choice to downtown, City Council and the TTC Board have identified the Relief Line as a top priority project for the City of Toronto:

- 2017.EX.25.1(19): "*City Council direct staff to prioritize their work moving forward in accordance with Toronto's number one transit priority, the Relief Line.*"
- 2018.CC.1.6(3): "*get the Relief Line subway built as a priority and as quickly as possible.*"

Beyond the current preliminary design and engineering phase, there is no agreement between the City and Province in place with respect to roles, responsibilities and funding for the procurement and construction phase of the project. In 2017, City Council authorized the Mayor and City Manager to negotiate funding agreements with the Province of Ontario and Government of Canada for the capital construction of the Relief Line South and report back to City Council.

Status

The City, TTC and Metrolinx were co-proponents for the Transit Project Assessment Process for the Relief Line South, which was completed in October 2018.¹⁸

As part of the TPAP, an Environmental Project Report ("EPR") was prepared to document details about the project, including: the transit technology options that were considered; a description of the alignment, stations, and construction plan; the study process (including public engagement); existing and future environmental conditions; detailed assessment of impacts, proposed mitigation strategies and monitoring measures; and commitments to future work.

¹⁵ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.EX16.1>

¹⁶ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.EX25.1>

¹⁷ <http://reliefline.ca/south/the-project/coordinated-transit-planning/memorandum-of-understanding>

¹⁸ http://www.metrolinx.com/en/docs/pdf/relief-line-epr/Statement-of-Completion_signed.pdf

As part of the planning and design work for the Relief Line South, ridership projections are being reviewed and updated by the City/TTC in partnership with Metrolinx. During the early planning work leading to the TPAP, an assessment of transit technologies was undertaken and is documented in the EPR. This assessment recommended a subway as the preferred rapid transit technology because it has a greater range in capacity to accommodate increases in demand and can connect with existing subway lines and leverage existing equipment, infrastructure and facilities. Current projections continue to support the selection of subway technology as the most appropriate technology for the Relief Line South project.

Further planning, design and engineering is currently underway to advance design to 15-30%. This phase of work, which includes further geotechnical investigations, development of utility relocation and property acquisition plans, analysis of project risks and project delivery/ procurement options, continues to be on target for completion in Q4 2019. Metrolinx is a party to the preliminary design and engineering work, per the MOU.

As part of the current phase of the project, a detailed review of project components is underway to seek opportunities for positively impacting costs and implementation. This includes exploring options for construction methods, optimizing the number and location of stations as part of the overall transit network, and considering property requirements in light of opportunities for land value capture and transit-oriented development. A value engineering exercise is also underway to analyze the design and cost effectiveness of the project and identify potential methods of reducing costs while maintaining key project objectives. A procurement options analysis is underway to consider the best approach to delivering the design and construction of the project.

Staff plan to report to TTC Board and City Council with a Class 3 cost estimate and Level 3 schedule in Q1 2020. The project will then be ready to proceed to the detailed design, procurement and construction phases, subject to required approvals. An interim staff report may be brought forward should significant changes to the project emerge as a result of the on-going cost optimization efforts.

TTC is also analyzing opportunities to accelerate this project, components of which include:

- Advancing design of enabling works;
- Property acquisition and utility relocation;
- Tunnel boring machine (TBM) launch shaft design;
- Specifications, prequalification and procurement of the TBMs and tunnel liners; and
- Prequalification and procurement of the tunnel contractor.

The outcomes of the TTC's analysis on acceleration will be part of the Q1 2020 report. The City and TTC have also invited Metrolinx and Infrastructure Ontario to provide

advice and support to identify opportunities to accelerate the project, per Council direction (2019.CC1.6).¹⁹

Key Facts	Current Available Information
Project Governance	Asset Owner: TBD Project Manager: TTC (PDE Phase) Operator: TTC
Delivery Model	TBD – Procurement Options Analysis Underway
Environmental Assessment/TPAP	Completed – October 2018
Current Phase in Project Lifecycle	Preliminary Design and Engineering (PDE) – to be completed by Q4 2019
Project Website	http://reliefline.ca/south/the-project

Current Cost and Schedule Estimates

	Capital Cost Estimate
Schedule	2020-2031 ⁽¹⁾
Cost	\$6.8 B (Class 5; not for budgeting)
Notes: (1) TTC is currently developing accelerated schedule based on additional funds provided for by City of Toronto.	

To complete the current preliminary design and engineering phase, the City of Toronto committed \$55.5 million and the Province of Ontario, through Metrolinx, committed \$45 million. The City’s capital budget includes an additional \$325 million for 2019 / 2020 to identify tactics to accelerate the schedule. The City is currently seeking partnership funding of \$162.5 million to support the \$325 million program identified by TTC for this work. The budget requirements for subsequent years are in development and will be included in the report to City Council and the TTC Board in Q1 2020.

It is important to note that the \$6.8 billion capital cost estimate presented for the Relief Line South as part of EX25.1 is a Class 5 estimate, based on a low level of design. This order of magnitude estimate, developed as part of early conceptual studies, is not suitable for budgeting purposes. It does not reflect a full risk evaluation of schedule or costs. The estimate was based on the following sets of assumptions:

- Pape-Eastern-Queen alignment (not the final approved Pape-Carlaw-Eastern-Queen alignment);
- Estimate is in 2016\$, including HST rebate, escalated to mid-point of construction in 2027;

¹⁹ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.CC1.6>

- All stations assumed "cut-and-cover" construction, mainly within public road rights-of-way;
- Based on Relief Line South ridership only, and nine 4-car revenue train sets; and
- Excludes platform edge doors, transit control upgrades, and impacted soil conditions.

A Class 5 estimate typically has an accuracy range of -50% to +100%.

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Relief Line North

Current Phase: Initiation and Development

Description

The Relief Line North is a proposed extension of the planned Relief Line South to continue rapid transit service north from Line 2 at Pape Station, with the goal of connecting to existing/future rapid transit such as Line 5 Eglinton and Line 4 Sheppard.

A continuation of the Relief Line north from Line 2 will provide more capacity and reduce overcrowding on Line 1 and at Bloor-Yonge Station; improve transit access to more communities not yet served by rapid transit; and provide an alternative rapid transit route that will help meet future travel demand.

“Relief Line North” is a temporary working title for the project, and the completed line will be designated by a number, name, and colour, like all other TTC rapid transit lines.

The Relief Line North would operate as a continuation of the Relief Line South project. The longer, continuous Relief Line South and North would be integrated into the TTC subway system. Service levels and hours of operation over the entire line would be similar to existing TTC subway lines. The trains, stations, and other infrastructure will be designed to the latest subway standards, and will permit a high-capacity service to be operated to meet the projected passenger demand over at least the next 30 years. The line would be designed to use advanced features such as automatic train operation, platform edge doors, and longer trains. Maintenance and storage facility requirements for the longer Relief Line South and North will be considered as part of a larger review of TTC subway yard requirements, thus allowing efficient use of subway resources on a system-wide level.

Recent History

In May 2017, City Council authorized staff to work in partnership with Metrolinx and TTC to develop an initial business case for the Relief Line North.²⁰ The project is governed

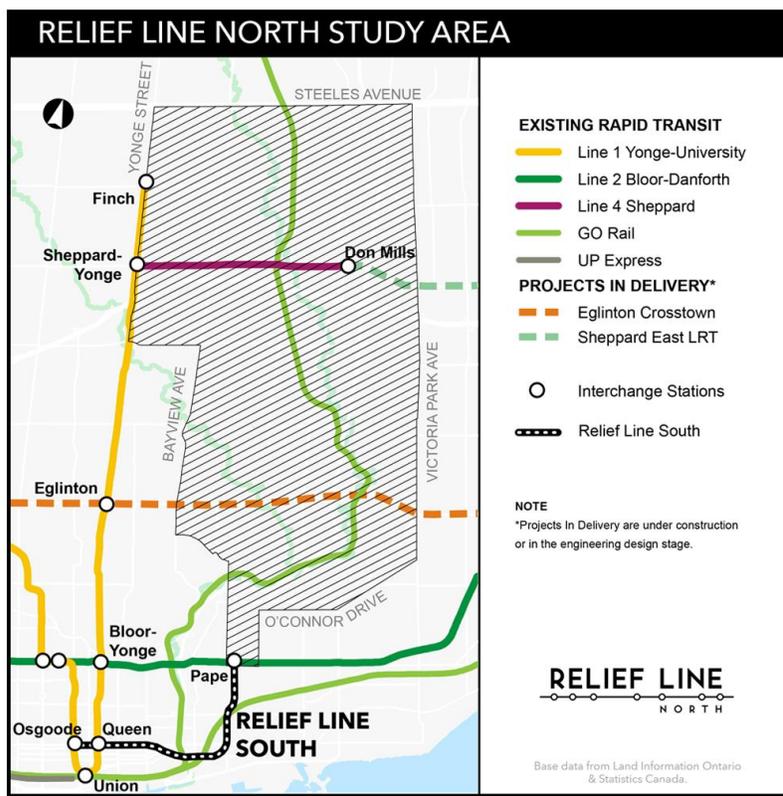


Figure 8. Relief Line North Project Map

²⁰ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.EX25.1>

by the same Memorandum of Understanding²¹ as the Relief Line South and is being led by Metrolinx. Provincial funding for the project is currently in place to advance the planning through to the TPAP.

Status

The Relief Line North is now in the initiation and development phase, including development of an Initial Business Case and recommended route and station locations, targeted for completion in Q4 2019 and will be reported to City Council and the TTC Board in Q1 2020. Six corridor options were presented for public comment in April 2018; the options generally follow Bayview, Leslie, Don Mills (three variations) and Victoria Park. Analysis of options and development of an initial business case is currently underway. Further public consultation is being planned for later this year prior to reporting to City Council.

Key Facts	Current Available Information
Project Governance	Asset Owner: TBD Project Manager: Metrolinx (Initiation and Development Phase) Operator: TTC (to be confirmed)
Delivery Model	TBD – Procurement Options Analysis Required
Environmental Assessment/TPAP	Incomplete – TBD – Initial Business Case Required
Current Phase in Project Lifecycle	Initiation and Development – to be completed by Q4 2019
Project Website	http://www.reliefnorthand.ca/background/background-materials/

A cost estimate has not yet been developed as the planning work is still at an early stage.

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²¹ <http://reliefline.ca/south/the-project/coordinated-transit-planning/memorandum-of-understanding>

SmartTrack Stations Program

Current Phase: Procurement and Construction²²

Description

The SmartTrack Stations Program is a package of six new stations on the Stouffville, Lakeshore East and Kitchener GO corridors. The Program also entails a service concept of 6-10 minutes during peak periods and 15 minutes during off-peak periods, along with a fare policy that address the following City Council requests:

- Reduce GO Transit's base fare component and increase the distance component; and
- Provide riders using transit in Toronto, with the same GO Transit co-fare option on the TTC as riders starting trips in other Greater Toronto and Hamilton Area (GTHA) municipalities have.



Figure 9. SmartTrack Stations Program Project Map

The SmartTrack Stations Program leverages existing heavy rail infrastructure and the GO Expansion Program in Toronto to increase local service and expand transit options for residents traveling within and beyond the City of Toronto.

Recent History

In 2016, City Council approved a Summary Term Sheet and authorized the City of Toronto to enter into an Agreement in Principle ("AIP") with the Province of Ontario with respect to the SmartTrack Stations Program. A "Stage Gate Process" was developed by the City and the Province that allows for key decisions at defined stages of the project, and principles with respect to the funding and delivery of SmartTrack. The AIP also established a series of conditions for the City and Province to assess whether or not both parties are satisfied in order to proceed through the next decision gate of the SmartTrack Stage Gate Process.

In April 2018, City Council approved a funding contribution of up to \$1.463 B and requested Metrolinx to proceed with the procurement of the SmartTrack Stations Program, subject to amending the AIP in order to satisfy the terms and conditions required to move to the next phase of the project.²³ An MOU was signed by the City and

²² Subject to Province finalizing agreement with City per May 2018 Memorandum of Understanding.

²³ <https://www.toronto.ca/legdocs/mmis/2018/ex/bqrd/backgroundfile-113940.pdf>

Province in May 2018, expressing the intention of the Province and City to formally amend the AIP. See EX33.1 Attachment 1 for further details.

Status

At its meeting on December 6, 2018, the Metrolinx Board of Directors adopted a Market Driven Strategy to Delivering Transit Infrastructure, which has the stated intention to (i) leverage third-party investment to reduce the funding required from the Province for transit expansion, (ii) leverage existing real estate assets to increase ridership and revenue, and (iii) enhance the GO customer experience through dense, mixed-use, integrated development at GO stations.²⁴ Metrolinx is currently developing an implementation plan for this strategy and is engaging the City in this process. Metrolinx will act directly with any third-party developers. Once the Market Driven Strategy has been developed and the AIP is amended, procurement and delivery of the SmartTrack Stations will proceed.

Key Facts	Current Available Information
Project Governance	Asset Owner: Metrolinx Project Manager: Metrolinx Operator: Metrolinx
Delivery Model	Design-Build-Finance AFP contract by Metrolinx/IO; may be impacted by Metrolinx's Market Driven Strategy
Environmental Assessment/TPAP	TPAP Statement of Completion in September 2018 ²⁵
Current Phase in Project Lifecycle	Procurement and Construction ²⁶ – in-service date planned for 2025
Project Website	http://smartrack.to/

Current Cost and Schedule Estimates

	Capital Cost Estimate
Schedule	2018-2025
Cost	\$1.470 B ¹
Notes: (1) Includes \$6.9 M for staff resources 2019-2021.	

²⁴ http://www.metrolinx.com/en/docs/pdf/board_agenda/20181206/20181206_BoardMtg_TOD_Strategy.pdf

²⁵ http://www.metrolinx.com/en/greaterregion/regions/docs/newstations/epr/Final_SmartTrack-Statement-of-Completion_signed.pdf

²⁶ Subject to Province finalizing agreement with City per May 2018 Memorandum of Understanding.

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Waterfront Transit Network



Figure 10. Waterfront Transit Network Map

Description

The Waterfront Transit Network area extends between Long Branch and Lake Shore Blvd W in the west to Queen Street and Woodbine Avenue in the east. The 2041 plan identifies a dedicated LRT (streetcar in an exclusive right-of-way) from Park Lawn Rd and Lake Shore Blvd to Leslie St and Commissioners St. The network comprise a number of streetcar infrastructure projects and traffic improvements, all at varying stages of design. In January 2018, City Council approved the Waterfront Transit Network Plan, including identification of priority segments. The segments, as shown in Figure 10, are:

1. Humber Bay (Humber Loop to Park Lawn/Legion Rd)
2. Exhibition Place (Exhibition Loop to Dufferin Gate Loop)
3. Union Station to Queens Quay Link (and extension to Parliament St)
4. Port Lands (Parliament St to Leslie St)

The two most significant projects in the network are the westerly extension of the existing streetcar from the Exhibition Loop to the Dufferin Gate Loop (Segment 2), and improving the underground transit link from Union Station to Queens Quay (Segment 3). The Union Station Link also includes the approved East Bayfront LRT on Queens Quay to the Parliament St area. Without these two components of the network, the benefits of further transit improvements to the west and the east cannot be fully realized.

The completion of the Waterfront Transit Network is critical to serving current and future population and employment growth in the area, as well as major cultural, sports, entertainment, special events, and recreational uses that are concentrated in this area of the city.

Recent History

In January 2018, City Council endorsed the overall Waterfront Transit Network Plan, including identification of priority segments.²⁷

²⁷ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2018.EX30.1>

Status

Segment 1

The City and TTC are working on opportunities to improve priority for streetcar customers from the Humber Loop to Park Lawn Rd, in conjunction with the on-going Transportation Master Plan study for the area.

Segment 2

The Exhibition Loop – Dufferin Gate Loop section area is on track to complete preliminary design and engineering in Q3 2019. Staff will report to City Council and TTC Board with an updated Class 3 cost estimate and a Level 3 schedule in Q4 2019. The initiation of the planning for the western portion of the Humber Bay Link from Dufferin St to the Queensway and Colborne Lodge Dr is currently in the initiation and development phase, and will proceed based on advancing the extension to Dufferin St.

Segment 3

The Union Station-Queens Quay Link project has completed initiation and development, including updated Class 4 cost estimates, and is seeking approval of the preferred technology option to proceed to preliminary design and engineering. The section of Queens Quay from Bay Street to Parliament Street has been included in the design and costing work for the Union Station-Queens Quay Link.

Segment 4

The Port Lands area is in various stages of planning and design, ranging from detailed design (Villiers Island area around Cherry St), to final stages of the Environmental Assessment process (Broadview Ave extension and LRT from Queen to Commissioners St, and Commissioners St LRT from Broadview Ave to Leslie St).

Key Facts	Current Available Information
Project Governance	Asset Owner: TTC Project Manager: TTC, City of Toronto, Waterfront Toronto Operator: TTC
Delivery Model	To be determined
Environmental Assessment/TPAP	Various – see EX30.1 Waterfront Transit Network Plan
Current Phase in Project Lifecycle	Various – see EX30.1 Waterfront Transit Network Plan
Project Website	www.toronto.ca/waterfronttransit

Current Cost and Schedule Estimates

Class 5 cost estimates for completion of the entire Waterfront Transit Network are in the range of \$1.98 billion to \$2.31 billion in 2017 dollars. These costs are primarily based on

1% or less level of design, and do not include rolling stock. This estimate is subject to further design work and third party cost estimate validation. This estimate does not include escalation, financing costs or the pricing of risk.

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Waterfront Transit Network

Exhibition Loop – Dufferin Gate Loop Streetcar Connection

Current Phase: Preliminary Design and Engineering

Description

This project would construct a new streetcar connection, approximately 800 metres in length, along the north side of Exhibition Place, connecting the existing Exhibition Loop with the existing Dufferin Gate Loop. The project is part of the Waterfront Transit network program.

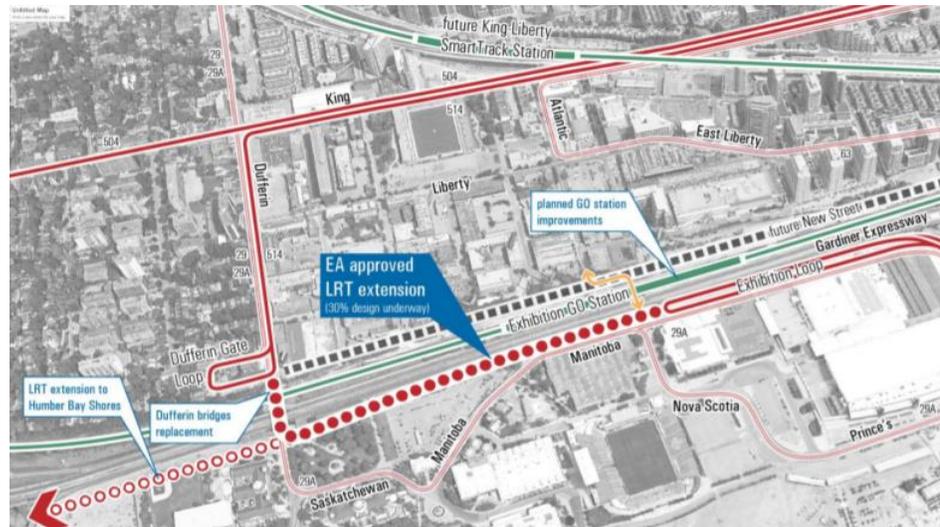


Figure 11. Exhibition Loop – Dufferin Loop Project Map

The new streetcar connection would allow the extension of existing TTC streetcar service west from Exhibition Place to Dufferin Street, and north and west from there on Dufferin Street, King Street, the Queensway, and Lake Shore Boulevard. This service would increase transit capacity and provide new direct TTC journey opportunities in Parkdale, The Queensway, and Humber Bay Shores. The connection would operate in a year-round dedicated right of way, and not be affected by events at Exhibition Place. The streetcar connection would replace the existing 29 Dufferin bus service that operates into Exhibition Place, and often must be suspended because of closure of the grounds for events. The new streetcar connection would also provide significantly improved connections and resiliency in the TTC's streetcar network, and would be designed to serve every-day transit trips as well as periods of high ridership and service demands during events at Exhibition Place.

This project is closely co-ordinated with other nearby projects. This project:

- Will minimise changes to the existing tracks at Exhibition Loop, which were renewed in 2016/2017;
- Is co-ordinated with Metrolinx's planned improvements to Exhibition GO Station;
- Is co-ordinated with the City's Dufferin Bridge replacement work;
- Will include a renewal and upgrade of the existing TTC Dufferin Gate streetcar and bus loop; and
- Will permit a future connection south of Dufferin Street to the Humber Bay Link, an additional westward streetcar connection that has been contemplated as part of the Waterfront Transit network.

Recent History

In July 2016, City Council considered the report *EX16.17 Waterfront Transit Network Vision*²⁸ and directed City staff to initiate the preliminary design and engineering of the extension of streetcar service from Exhibition Loop to the Dufferin Gate Loop.

In January 2018, City Council considered the report *EX30.1 Waterfront Transit Network Plan*,²⁹ and endorsed the overall Waterfront Transit Network Plan, including identification of priority segments. City staff also directed staff to report back on the next steps for design and construction on the extension between the Exhibition Loop and the Dufferin Gate Loop.

Status

An Environmental Assessment for this project was originally completed in 1995, and was updated in 2008 and 2011. A preliminary design report for the connection between Exhibition Loop and Dufferin Gate Loop was completed in 2010.

In response to the 2018 Waterfront Transit Network Plan (EX30.1), TTC staff initiated a new Preliminary Design Report study in 2018. This study will update the 2010 study considering changes to the area, including Metrolinx's new work on the Exhibition GO Station and increased pedestrian activity in Exhibition Place and in Liberty Village, and develop a 30% design for the connection. The results of the pedestrian modelling study, expected in Q3 2019, will be used to inform any further changes to the preliminary design. Public consultations will be held in Q2 or Q3 of 2019, and a report to Council and to the TTC Board in Q4 will include a 30% design for the connection, detailed cost estimates, and recommendations on how to proceed with construction.

Key Facts	Current Available Information
Project Governance	Asset Owner: TTC Project Manager: TTC Operator: TTC
Delivery Model	To be determined
Environmental Assessment/TPAP	EA modification completed 2008 for streetcar connection. EA updated in 2011.
Current Phase in Project Lifecycle	Preliminary Design and Engineering (PDE) – to be completed by Q3 2019

²⁸ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.EX16.17>

²⁹ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2018.EX30.1>

Current Cost and Schedule Estimates

	Capital Cost Estimate
Schedule	2020-2025
Cost	\$109.5 M ¹ (Class 5; not for budgeting)
Note: (1) To be updated in Q4 2019.	

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Yonge Subway Extension

Current Phase: Preliminary Design and Engineering

Description

The Yonge Subway Extension ("YSE") is a 7.4-kilometre extension of the TTC's Line 1 from Finch Station in Toronto to the Richmond Hill/Langstaff Gateway Urban Growth Centre at Highway 7 in Richmond Hill with connections to York Region Transit and GO buses at Steeles and Richmond Hill Station. The project is required to relieve crowding and delays on bus services on Yonge Street; to improve connections with the busy TTC bus services on Cummer Avenue, Drewry Avenue, and Steeles Avenue; and to support growth in North York and York Region, while providing further integrated rapid transit in the Greater Toronto and Hamilton Area.

Recent History

In May 2017 City Council authorized the City and TTC, in partnership with York Region and Metrolinx, to advance the preliminary design and engineering work to develop a Class 3 cost estimate and Level 3 schedule at no financial cost to the City, subject to the following conditions:

- City/TTC will own, operate and maintain the future Line 1 extension subject to satisfactory cost-sharing agreements with York Region and/or the Province;
- TTC is the project manager for the PDE phase;
- York Region and Metrolinx are responsible for costs associated with PDE; and
- TTC will deliver the YSE project.³⁰

Per City Council direction in 2017, the City, TTC and Metrolinx entered into a Memorandum of Understanding to guide the PDE phase of the work on the YSE. The PDE phase is generally intended to include all necessary work to finalize preliminary



Figure 12. Yonge Subway Extension Project Map

³⁰ <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.EX25.1>

design and engineering to between approximately 15% and 30% in preparation for a decision on full funding and project readiness for procurement and delivery.

Analysis shows that the Relief Line South, improvements to Bloor-Yonge station and other Line 1 capacity enhancements are required to support the YSE. The Relief Line South must also be in operation prior to the opening of the YSE if both projects proceed concurrently.³¹

Status

The PDE phase of the YSE is currently underway and expected to be completed by Q4 2019. Staff will report to City Council and TTC Board with a Class 3 cost estimate, Level 3 schedule and risk analyses in Q1/Q2 2020. The report will also include further analysis on Line 1 capacity and demand to inform the appropriate sequencing of projects.

Key Facts	Current Available Information
Project Governance	Asset Owner: TTC Project Manager: TTC (PDE Phase) Operator: TTC
Delivery Model	TBD – Procurement Options Analysis Required
Environmental Assessment/TPAP	MOE approved the YSE EPR in April 2009 and an addendum to add the train storage facility in November 2014. ³²
Current Phase in Project Lifecycle	Preliminary Design and Engineering (PDE)
Project Website	http://www.yongesubwayext.com/

Current Cost and Schedule Estimates

	Capital Cost Estimate
Schedule	TBD
Cost	\$5.6 B (Class 5; not for budgeting)

To complete the PDE phase for the YSE, the Government of Canada, through York Region, committed \$36 million and the Province of Ontario, through Metrolinx, committed \$55 million. A long-term funding commitment for capital construction for the YSE project is still required.

³¹ Recommendation 14: <http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.EX25.1>

³² <http://www.vivanext.com/epraddendum>
http://www.vivanext.com/PDFs/YSE/2009_ReportEnvironmentalProject.pdf

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Appendix A – Cost Estimate Classifications

Cost estimate classification systems are used throughout the estimating industry to categorize cost estimates based on the maturity level of project definition. As project development proceeds, estimate accuracy ranges narrow because more is known about the project and there is a corresponding reduction in risk and uncertainty in the cost estimate.

[The Association for Advancement of Cost Engineering \("AACE"\)](#) provides the most generally accepted industry guidelines for cost estimate classification systems. The Ministry of Transportation and Infrastructure (MOTI), Government of British Columbia,³³ also has detailed cost estimating guidelines³⁴ that build on the AACE framework for transportation projects.

Table A1 depicts AACE's Cost Estimate Classification system which provides general principles for using cost estimates to evaluate, approve and/or fund projects.³⁵ Table A1 illustrates typical ranges of accuracy based on level of project definition. The +/- represents typical variation of actual costs from the cost estimate after application of contingency for given scope. In addition to the degree of project definition, estimate accuracy is also driven by other systemic risks such as familiarity with the technology in the project; complexity; quality of reference cost estimating data; unique nature of the project; other political and environmental risks, etc. The greater the complexity of the project, the greater the uncertainty of early project estimates.

Table A1. AACE International Recommended Practice- Cost Estimate Classification Matrix

Estimate Class	Maturity of Project Definition <i>Expressed as % of complete definition</i>	End Usage <i>Typical purpose of estimate</i>	Methodology <i>Typical estimating method</i>	AACE Classification Expected Accuracy Range <i>Typical variation in low and high ranges</i>
Class 5	0% to 2%	Concept Screening.	Parametric models; judgement, analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility.	Parametric; Elemental factored	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization	Semi-detailed unit costs	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender.	Detailed costing	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender.	Detailed costing	L: -3% to -10% H: +3% to +15%

³³ <https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/transportation-planning/cost-estimating>

³⁴ https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/planning/guidelines/cost_estimating_guidance.pdf

³⁵ The Association for the Advancement of Cost Engineering (AACE), (2018) <http://web.aacei.org/docs/default-source/rps/10s-90.pdf?sfvrsn=28>

The classification of cost estimate needs to be taken into consideration when used for decision-making purposes. Specifically, the class levels reflect the level of scope definition at which the cost uncertainty (typically expressed as an accuracy range) is reduced to a point that decision-makers can make a project investment decision. The estimate level will be important in terms of when it is appropriate to establish the project budget. The MOTI, Government of British Columbia has an established guideline that indicates at minimum 10 to 40% design should be complete (Class 3, AACE Estimate) in order for the estimate to become the basis for developing the project budget. This is also consistent with AACE Cost Classification Standards.

The following provides a more detailed summary of the difference in project definition and the methodology employed to develop a cost estimate at various levels on the scale:

- A **Class 5** cost estimate is based on the lowest degree of project definition, and is used in early conceptual studies. Class 5 estimates are used for project option screening, assessment of viability, and long range capital planning. In the context of the project lifecycle, a Class 5 estimate is typical as part of early planning work on a project. A Class 5 estimate is an order of magnitude³⁶ estimate, prepared when there is little or no design information available for the project. The types of techniques or methodologies employed for developing an estimate this early in the project lifecycle include factor estimating (i.e., taking the known cost of a similar facility and factoring the cost for size); historical values; rules of thumb; and simple mathematical calculations. Cost estimates developed using the above methodologies should not be used as the basis for approving a project budget.³⁷
- A **Class 4** cost estimate is generally prepared based on limited information and subsequently has a fairly wide accuracy range. Class 4 estimates are typically used for project screening, determination of feasibility, concept evaluation, and preliminary (but generally not final) budget approval. They are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and approval to proceed to the next stage.
- A **Class 3** estimate is a budget estimate³⁸ based on the completion of the preliminary design and engineering phase of the project. These types of estimates are used for budget authorization, and full funding. "A Class 3 estimate is recommended to support full project funding requests, and become the first of the project phase 'control estimates' against which all actual costs and resources will be monitored for variations to the budget."³⁹ A Class 3 estimate is used as the project budget until replaced by more detailed estimates. The methodology to develop a Class 3 estimate usually involves more deterministic estimating

³⁶ ANSI Standard Reference Z94.2-1989 Name: Order of Magnitude Estimate

³⁷ https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/planning/guidelines/cost_estimating_guidance.pdf

³⁸ ANSI Standard Reference Z94.2-1989 Name: Budget Estimate

³⁹ AACE International Recommended Practice NO. 18R-97, 1998.

methods that involve semi-detailed unit-costing and occasionally less detailed estimation (i.e., factoring estimates) on less significant areas of the project. This type of costing is possible at this stage in the lifecycle of project due to the availability of detailed design drawing, greater maturity in the project plan, and level of detail on the project work-breakdown structure.

It is important to note that if a project is using an Alternative Financing and Procurement (AFP) model as opposed to a traditional design-bid-build (DBB) model, the level of design for a project being delivered as an AFP in the preliminary design phase may be lower (closer to 15% of project definition) than typically seen in a DBB delivery model (closer to 30% of project definition).

- **Class 2** cost estimates are generally prepared to form a detailed control baseline against which all project work is monitored in terms of cost and progress control. For contractors, this class of estimate is often used as the “bid” estimate to establish contract value.
- A **Class 1** cost estimate is based on the highest maturity of project definition (full project definition), and is a definitive estimate.⁴⁰ These types of estimates are typically prepared for discrete components of the project, as opposed to generating an estimate for the entire project at this level of detail. Class 1 estimates may be used to evaluate bid checking, support vendor/contractor negotiations, or for claims evaluations and dispute resolution.⁴¹ Class 1 estimates involve the highest degree of deterministic estimating methods, and require a great amount of effort. For instance, detailed cost estimating involves each cost item to be broken down to the unit level, quantified and priced. This method can only be used when design definition has advanced to the point where quantification of units of work is possible (or can reasonably be assumed).⁴² Detailed cost estimating is possible where there is a high degree of maturity in project definition.

⁴⁰ ANSI Standard Reference Z94.2-1989 Name: Definitive Estimate

⁴¹ <http://web.aacei.org/docs/default-source/rps/10s-90.pdf?sfvrsn=28>

⁴² https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/planning/guidelines/cost_estimating_guidance.pdf