



## Advancing Planning and Design for the Relief Line and Yonge Subway Extension

**Date:** May 8, 2017

**To:** Executive Committee

**From:** City Manager

**Wards:** All

### SUMMARY

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This report was prepared in collaboration with the Chief Executive Officer of the Toronto Transit Commission (TTC).

The purpose of this report is to recommend a final alignment for the Relief Line South, and advance planning and design for the Relief Line and Yonge Subway Extension (YSE) within the context of current demand forecasts for Line 1 (Yonge Subway).

#### Relief Line

The Relief Line South from Pape-Danforth to Downtown will be required by 2031 to reduce crowding on Line 1. This has been confirmed by several past studies including the TTC's 2012 Downtown Rapid Transit Expansion Study (DRTES). Advancing work on the Relief Line South is a key priority for the City and TTC.

The Relief Line Project Assessment was initiated in 2014 to identify an alignment and station locations for the Relief Line South. In July 2016, City Council approved a Pape-Eastern-Queen alignment subject to further assessment of a segment of the alignment between Queen Street and the area north of the GO tracks on Pape Avenue. Since July, the City and TTC have undertaken further due diligence and extensive consultation with the local community to assess the alignment for the Relief Line South. As a result, this report recommends City Council approve a Carlaw alignment for the local segment of the Relief Line South in order for staff to complete the Environmental Assessment (EA)/Transit Project Assessment Process (TPAP). Finalizing the project concept and moving to complete the EA/TPAP process is a significant milestone in advancing this important project.

The next phase of work for the Relief Line South is to accelerate the planning and design, including developing a project budget and schedule (Class 3 cost estimate), which is approximately 15 to 30% design. This report recommends the City and TTC in partnership with Metrolinx advance work on the Relief Line South and report back to City Council at the next decision gate for the project which includes a Class 3 cost estimate and schedule in 2019.

The Relief Line North (Pape-Danforth to Sheppard) will provide another travel alternative, divert demand from Line 1, and provide greater transit capacity to downtown. Given the long lead time required to plan complex infrastructure projects, this report recommends initiating the planning studies including the development of the initial business case for the Relief Line North in partnership with Metrolinx.

There is currently no commitment by any order of government to fund the capital costs of building the Relief Line. This report recommends City Council authorize the Mayor and City Manager to enter into discussions with the Provincial and Federal governments to identify sources of capital funding for the Relief Line South.

### **Yonge Subway Extension**

The YSE is currently more advanced in the project development process than the Relief Line. An EA for the YSE project was approved by City Council, York Region Council and TTC Board in 2009.

This report recommends City Council authorize City and TTC staff to undertake the planning and design required to advance to the next decision gate of the project, which includes developing a Class 3 cost estimate and schedule. The TTC will project manage and lead the planning and design of the YSE, with York Region and Metrolinx represented in the project team. The costs will be fully funded by the Province/Metrolinx and York Region. There is currently no commitment by any order of government to fund the capital costs of building the YSE.

### **Line 1 Demand Forecasts**

Demand forecasting to-date indicates that Line 1 will be at capacity in 2031 and the Relief Line South will be required. These projections also indicate that a future extension of the Relief Line North to Sheppard Avenue would provide benefits over the longer-term. Current forecasts are based on a network of currently funded/committed projects including the Toronto-York-Spadina Subway Extension, Eglinton Crosstown LRT, Scarborough Subway Extension, Sheppard East LRT, Finch West LRT, Regional Express Rail, and SmartTrack.

This report recommends advancing planning and design for the Relief Line South and YSE in anticipation of both projects being in-service by 2031. Given the implications of the proposed YSE on Line 1 demand, future project approvals for the YSE beyond the current phase of work will continue to be considered within the context of Line 1 capacity analysis. City and TTC will undertake further work to update modelling results in collaboration with Metrolinx and York Region.

The analysis will also assess the impacts of fare integration and local and regional service integration. This report also recommends the City and TTC continue to work in partnership with Metrolinx and York Region to assess potential measures to address demand on Line 1. This analysis will be included in the report back to City Council and the TTC Board at the next decision gate for the YSE, anticipated in 2019.

## RECOMMENDATIONS

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The City Manager recommends:

### *Relief Line*

1. City Council approve the Carlaw alignment, as illustrated in Figure 6 in this report, for the segment of the Relief Line South from immediately north of the GO tracks at Gerrard Avenue East south to Queen Street East and commence the Transit Project Assessment Process.
2. City Council request the Chief Planner and Executive Director, City Planning in partnership with the Chief Executive Officer, Toronto Transit Commission and Metrolinx, to advance the planning and design of the Relief Line South based on the recommended alignment and report to City Council, when a Class 3 cost estimate and schedule has been developed for the project, which is anticipated to be in the fourth quarter of 2019.
3. City Council authorize the City Manager to negotiate and enter into a Memorandum of Understanding with Metrolinx and Toronto Transit Commission to define roles and responsibilities and the cost-sharing agreement between Metrolinx, the City of Toronto, and Toronto Transit Commission, as described in this report, to complete the planning and design work required to develop a Class 3 cost estimate and schedule for the Relief Line South.
4. City Council authorize 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.
5. City Council request the City Manager to work in partnership with the Chief Executive Officer, Toronto Transit Commission, and Metrolinx to develop an initial business case for the Relief Line North, as an extension of the Relief Line South alignment described in Recommendation 1, and report to City Council in the first quarter of 2018 with a preferred alignment and station locations.

### *Yonge Subway Extension*

6. City Council request the City Manager and the Chief Executive Officer, Toronto Transit Commission, in partnership with Metrolinx and York Region to advance the planning and design of the Yonge Subway Extension, and report to City Council at the next decision gate with a Class 3 cost estimate and schedule, anticipated to be in the fourth quarter of 2019, subject to the following:
  - a) City/TTC will own, operate, and maintain the future Yonge Subway Extension, recognizing it is an extension of Line 1 service;
  - b) TTC will be responsible for project management of project planning and design;
  - c) York Region and/or Metrolinx will be responsible for the costs associated with

- the planning and design of the project and provide funding to the TTC;
- d) All parties will agree to a procurement options analysis to assess the best project delivery model for the Yonge Subway Extension project; and
- e) TTC will be responsible for future delivery of the Yonge Subway Extension project.

7. City Council authorize the City Manager to enter into a Memorandum of Understanding with TTC, Metrolinx and York Region, to define roles and responsibilities as described in Recommendation 6, and ensure the TTC recovers the full costs from Metrolinx and York Region of undertaking work required to develop a Class 3 cost estimate and schedule for the Yonge Subway Extension.

8. City Council authorize the Mayor and City Manager to negotiate funding agreements with York Region, the Province of Ontario and Government of Canada for the capital construction of the Yonge Subway Extension and report back to City Council.

#### *Line 1 Capacity*

9. City Council direct the Chief Planner and Executive Director, City Planning in partnership with the Chief Executive Officer, Toronto Transit Commission, to undertake further analysis of forecasted Line 1 demand in 2031 and 2041, including the following:

- a) in consultation with Metrolinx, consider the potential impacts on Line 1 demand of different fare structure scenarios including but not limited to the concepts currently included in Metrolinx's ongoing GTHA Fare Integration Study;
- b) in consultation with York Region and Metrolinx, identify and evaluate other possible measures to address Line 1 demand; and
- c) report back to the TTC Board and City Council at the next decision gate of the Yonge Subway Extension once a Class 3 cost estimate has been developed for the project, which is anticipated to be in the fourth quarter of 2019.

10. City Council request the City Manager to forward this report to the Province of Ontario, Metrolinx and York Region for information.

## **FINANCIAL IMPACT**

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### **Financial Impact of Advancing Planning & Design**

#### *Relief Line*

Approximately \$4.1 million has been spent by the City since 2014 on the Relief Line Project Assessment. The budget required for the next phase of planning and design to develop a Class 3 cost estimate and schedule (approximately 15-30% design) is estimated to be \$100 million. The costs associated with the next phase of work are to be funded by the City and the Province/Metrolinx.

The City has allocated \$55.52 million over 2017-18 in the City's 10-year Capital Budget and Plan for Relief Line. In June 2016, the Province committed \$150 million to Metrolinx to work with the City and TTC to advance planning and design of the Relief Line. This report recommends City Council authorize the City Manager to enter into a Memorandum of Understanding (MOU) with Metrolinx and the TTC to define roles and responsibilities and to share the total costs of work required to develop a Class 3 cost estimate for the project. Under this agreement, the City will provide \$55.52M and Metrolinx will provide the remaining amount (estimated to be \$45M) required to undertake the next phase of work.

Metrolinx has estimated the budget required to develop an initial business case, including alternatives analysis, project definition and TPAP for the Relief Line North to be approximately \$5 million. Metrolinx will fund this work through the Province's \$150 million commitment to Relief Line planning and design.

**Table 1: Summary of Estimated Cost and Funding Sources for Planning and Design (2017-2018)**

Project	Cost Estimate	Funding Sources		
		City	Provincial	York Region
Relief Line South	\$100M <sup>1</sup>	\$55.52 <sup>2</sup>	\$45M <sup>3</sup>	
Relief Line North	\$5M <sup>4</sup>		\$5M <sup>4</sup>	
YSE	\$90M <sup>1</sup>		\$55M <sup>5</sup>	\$36.3M <sup>6</sup>

**Notes:**

- (1) TTC estimated budget for planning and design to Class 3 cost estimate.
- (2) The City's contribution includes a 50% contribution from the Federal Government through its PTIF Phase 1 program.
- (3) The funds are to be allocated through the June 2016 Province/Metrolinx \$150 million funding allocation to advance Relief Line planning and design.
- (4) Based on historical project costs; to be funded through Province/Metrolinx funds announced in June 2016.
- (5) Province committed \$55M to Metrolinx for YSE planning and design in June 2016.
- (6) York Region PTIF allocation to this project subject to York Region Council and Federal Government approvals, including Federal Government PTIF program requirements.

*Yonge Subway Extension*

Approximately \$4.8 million has been spent to date on YSE project planning and design since 2007, including the Environmental Assessment and 2012 Conceptual Design Study. These costs were jointly funded by the City/TTC and York Region.

Staff estimate that the budget required to advance the YSE project to a Class 3 cost estimate level of design is \$90 million. Metrolinx and York Region are responsible for all costs associated with the next phase of work. The Province committed \$55 million to Metrolinx to advance the detailed planning, engineering and design work for the YSE

project. Subject to York Region Council and Federal Government approvals, York Region will commit its \$36.3 million allocation under the Federal Phase 1 Public Transit Infrastructure Fund (PTIF) to the project.

This report recommends that City Council authorize the City Manager in partnership with the CEO, TTC, to enter into a MOU with Metrolinx and York Region to define respective roles and responsibilities, and for the TTC to recover the full costs of completing the planning and design phase of work for YSE.

### **Capital Construction Cost Estimates**

Preliminary Class 5 capital construction cost estimates are presented in Table 2 below. These order of magnitude estimates are intended for planning purposes only and will be refined as detailed design and project planning advances. Further design work is required to provide an increased level of confidence and greater precision with regard to project elements, feasibility and risks suitable for budget authorization. Per best practice established by the Association for the Advancement of Cost Engineering International (AACE), the project budget and schedule should be established once a Class 3 cost estimate has been achieved.

This report recommends that the Relief Line South and YSE be developed to a level of design sufficient for a Class 3 cost estimate (approximately 15-30% design). The numbers presented in Table 2 will be updated once further due diligence has been completed.

#### *Relief Line*

Currently there is no funding committed to the capital construction of the Relief Line. In December 2016, City Council confirmed the Relief Line South as a key priority for Phase 2 Federal infrastructure funding. The 2017 Federal Budget committed \$20.1 billion to Phase 2 investments in public transit. Funding will flow through bilateral agreements with provinces/territories, with allocations to be based on a combination of ridership (70%) and population (30%). Individual municipal allocations are not known at this time. The federal funding will be provided to a maximum of 40% of the total project costs for transit expansion. Other program details, including cost-sharing between governments, are not yet known.

This report recommends City Council authorize the Mayor and City Manager to negotiate funding agreements with the Province of Ontario and Federal government for the purposes of securing capital funding for the Relief Line South, and report back to City Council. An update on the status of funding negotiations and any resulting financial implications will be reported once available.

#### *Yonge Subway Extension*

There is currently no funding committed to the capital construction costs for the YSE. In 2009, City Council adopted several key conditions for YSE including a condition that the City would not be responsible for any costs associated with the project. An update

on funding implications of this project will be reported when cost-sharing arrangements are known.

**Table 2: Current Capital Cost Estimates (Year of Expenditure\$)**

Project	Class Estimate <sup>(3)(5)</sup>	(YOE\$) <sup>(4)</sup>
Relief Line South	Class 5 (0-2% design)	\$6.8 Billion <sup>1</sup>
YSE	Class 4/5 (1-15% Design)	\$5.6 Billion <sup>2</sup>

**Notes:**

<sup>(1)</sup>Class 5 Relief Line South estimate based on Relief Line Initial Business Case - June 2016 (Paper Alignment). It does not include the cost of potential bus terminals, or maintenance and storage facilities. No cost estimate is available for Relief Line North as the project concept has not yet been confirmed.

<sup>(2)</sup>Class 4/5 Yonge Subway Extension estimate based on Conceptual Design Report – March 2012 and does not include cost of projects arising from accommodating YSE (i.e. North York Service Road Improvements, Bloor-Yonge Station improvements). Potential maintenance and storage facility costs have not been included.

<sup>(3)</sup>Class 5 cost estimates have a potential variance of -50% to +100%; Class 4 cost estimates have a potential variance of -30% to +50% and are not suitable for establishing a project budget and schedule baseline (Class 3 cost estimate is required)<sup>1</sup>;

<sup>(4)</sup> Costs are escalated over construction period (escalation rate is 4%), assuming lines are in service by 2031 with construction taking approximately 8-10 years;

<sup>(5)</sup>Project procurement method has not been determined; potential DBF costs associated with financing, AFP/procurement, etc. have not been included; Management Reserve costs for potential scope changes have not been included; Risk allowance costs have not been included.

The Deputy City Manager & Chief Financial Officer has reviewed this report and agrees with the financial impact information.

## DECISION HISTORY

In 2009, City Council approved the submission of the Environmental Project Report for a 7.4 kilometre extension of the Yonge Subway Line (YSE) from the current terminus at Finch Station to the Richmond Hill Centre at Highway 7 in York Region. Council also approved several key principles, including:

- The City expects the Province of Ontario will be responsible for all capital costs, including property acquisition costs, necessary to implement the Yonge Subway Extension;
- The City is not responsible for net operating costs resulting from operations of the YSE;
- TTC is responsible for project management and delivery of the YSE;
- TTC will operate and maintain the subway infrastructure (including commuter parking lots) but excluding passenger pick up and drop off and bus terminals located in York Region;

<sup>1</sup> See: [Appendix 1: Cost and Schedule Estimate Classification of EX16.1 Staff Report: Developing Toronto's Transit Network Plan](#)

- TTC will own the property, assets and subway facilities within York Region except for bus terminals and passenger pick-up and drop-off facilities/bus terminals located in York Region;
- The cost of measures to address potential capacity constraints at the Yonge-Bloor station and North York Service Road arising from the project be included as project costs; and
- Metrolinx be requested to prioritize the Relief Line noting that it is the first priority for the Toronto Transit Commission and City of Toronto and in advance of the YSE in order to accommodate capacity issues resulting from YSE

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2009.EX28.1>)

In 2013, City Council reiterated that it would not proceed with the proposed YSE until improvements are made to reduce demand on Line 1.

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.EX31.3>)

On June 10, 2014, City Council approved a Terms of Reference and public consultation plan for the Relief Line South Project Assessment and directed City and TTC to jointly proceed with work required to complete the Transit Project Assessment Process (TPAP) for the Relief Line section between Downtown and the Bloor-Danforth Subway east of the Don River.

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.PG33.12>)

In July 2016, City Council approved a Pape-Eastern-Queen alignment for the Relief Line South (segment from Danforth to Downtown), subject to an assessment of a specific alignment west of Pape Avenue, starting immediately north of the GO tracks on Pape Avenue to south of Queen Street, with a station box at Queen Street and Carlaw Avenue (<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.EX16.1>).

In January 2017, City Council adopted the TTC Capital Program Delivery Review, which included forty-one recommendations from KPMG to improve the TTC's capital project delivery. A key recommendation was to implement a staged approval process for projects to provide clear decision points and reporting requirements for capital projects

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.EX21.14>).

## COMMENTS

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### 1. Background

Line 1 is the backbone of the City's transit system, carrying over 500,000 passengers into and out of downtown Toronto daily. The capacity of Line 1 (Yonge Subway) to serve current and future demand is a widely recognized and long-standing challenge for Toronto's transit system. The TTC's 2012 Downtown Rapid Transit Expansion Study (DRTES)<sup>2</sup> and Metrolinx's 2015 Yonge Relief Network Study (YRNS) were completed to identify and examine solutions to Line 1 capacity.

<sup>2</sup> [http://www.ttc.ca/PDF/About\\_the\\_TTC/DRTES\\_Final\\_Report\\_-\\_September\\_2012.pdf](http://www.ttc.ca/PDF/About_the_TTC/DRTES_Final_Report_-_September_2012.pdf) 2012.pdf



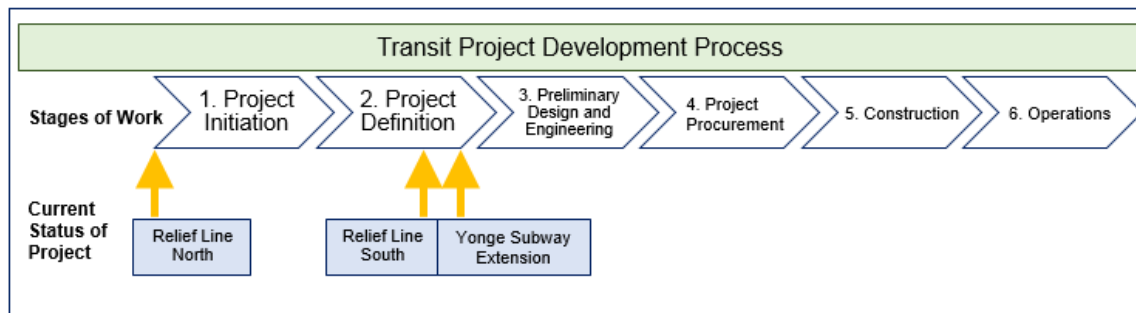
DRTES found that a Relief Line would be required by 2031 beyond currently planned improvements to address crowding and congestion on Line 1 and at the critical Bloor-Yonge interchange station.

YRNS<sup>3</sup> confirmed the importance of the Relief Line project to reducing demand on Line 1 and provide needed additional transit capacity and choice to downtown. It also found that a Relief Line project north to as far as Sheppard Avenue East would provide benefits in the long-term. The extension of the Yonge Subway north to Richmond Hill will add additional demand to Line 1.

### Current Status of Transit Expansion Projects

A transit network perspective is required to advance planning for YSE, Relief Line South, and Relief Line North given their impacts on Line 1 demand. Planning for the Relief Line from Danforth to downtown (Relief Line South) was initiated in 2014 and is a City/TTC priority transit expansion project. In 2012, Metrolinx identified the Relief Line South in its list of future priority transit projects. A joint work plan with Metrolinx to initiate project planning for the Relief Line North to Sheppard Avenue East is underway to plan for a longer-term solution. The YSE has been in project planning since 2007 and is currently furthest advanced in the transit project development process.

**Figure 1: Current Status of Projects**



The key stages of work required to advance a transit expansion project from project initiation to operations occurs over many years. During this time it is not uncommon for there to be changes in the policy and planning context, which may result in changes in forecasted behaviours in the transit network. A staged approval process for the Relief Line and YSE will ensure that decision-making of City Council, TTC Board, and partner organizations is based on the best available data and technical analysis.

<sup>3</sup> [http://www.metrolinx.com/en/docs/pdf/board\\_agenda/20150625/2015-06-25\\_Yonge\\_Relief\\_Network\\_Study.pdf](http://www.metrolinx.com/en/docs/pdf/board_agenda/20150625/2015-06-25_Yonge_Relief_Network_Study.pdf)

Figure 2: Map of Projects

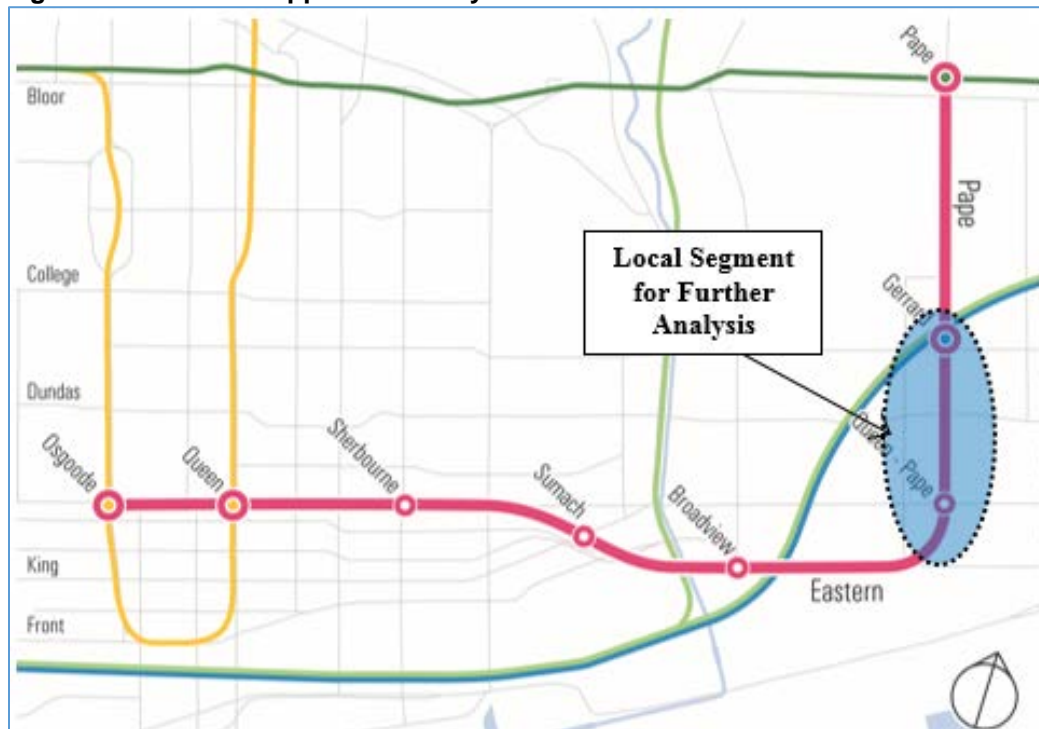


## 2. Relief Line Project Update

### *Relief Line South*

The Relief Line South is currently in the phase of finalizing the recommended project concept in order to proceed to the TPAP<sup>4</sup> to obtain the necessary environmental approvals. In July 2016, City Council approved the preferred alignment for the Relief Line South from Pape to Downtown via Queen/Eastern, subject to a further assessment of an additional alignment west of Pape within a local segment from immediately north of the GO tracks on Pape Avenue to south of Queen Street (illustrated in Figure 3).

**Figure 3: Relief Line Approved in July 2016**



City Council also directed the Chief Planner and Executive Director, City Planning and CEO, TTC to work in partnership with Metrolinx to confirm station locations for optimal connections between the Relief Line and SmartTrack/Regional Express Rail, including future extensions of the Relief Line.

This report recommends the Carlaw alignment for the local segment of the Relief Line South. City and TTC will work to finalize the draft Environmental Project Report in order to commence the TPAP for the Pape-Carlaw-Eastern-Queen alignment by Q3 2017.

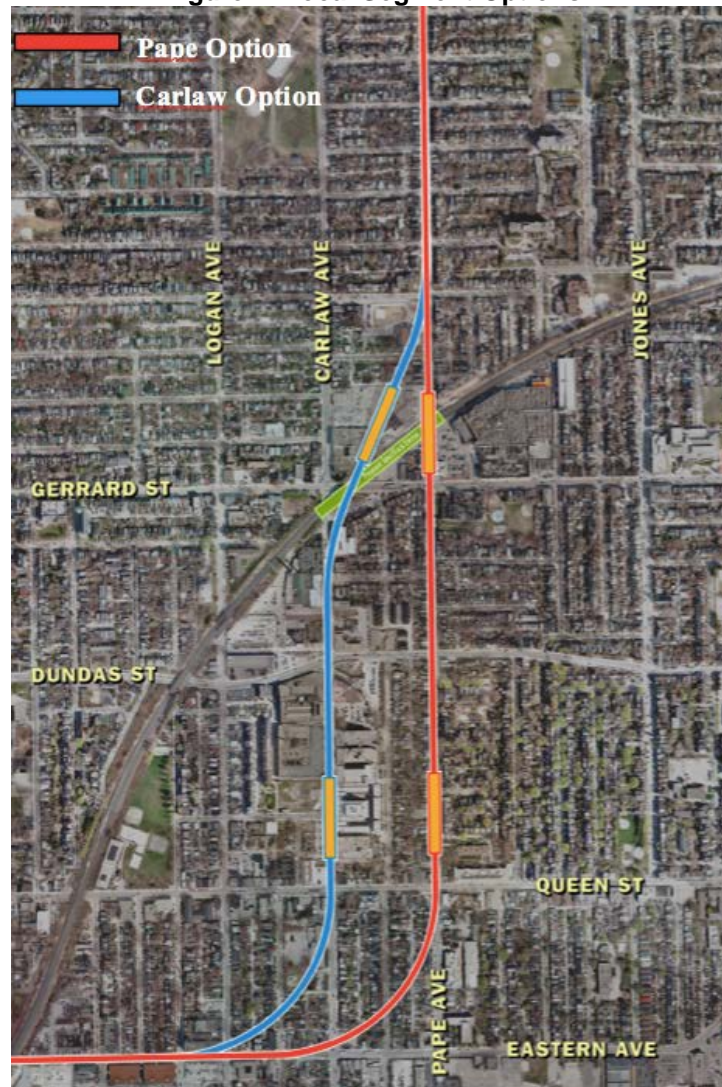
<sup>4</sup> See Figure 5 in [EX13.3 Developing Toronto's Transit Network Phase 1](#) for a summary of the TPAP process.

## Local Segment Analysis and Evaluation

Since July 2016, City and TTC staff developed and evaluated two alignment options for the local segment area as described below and illustrated in Figure 4:

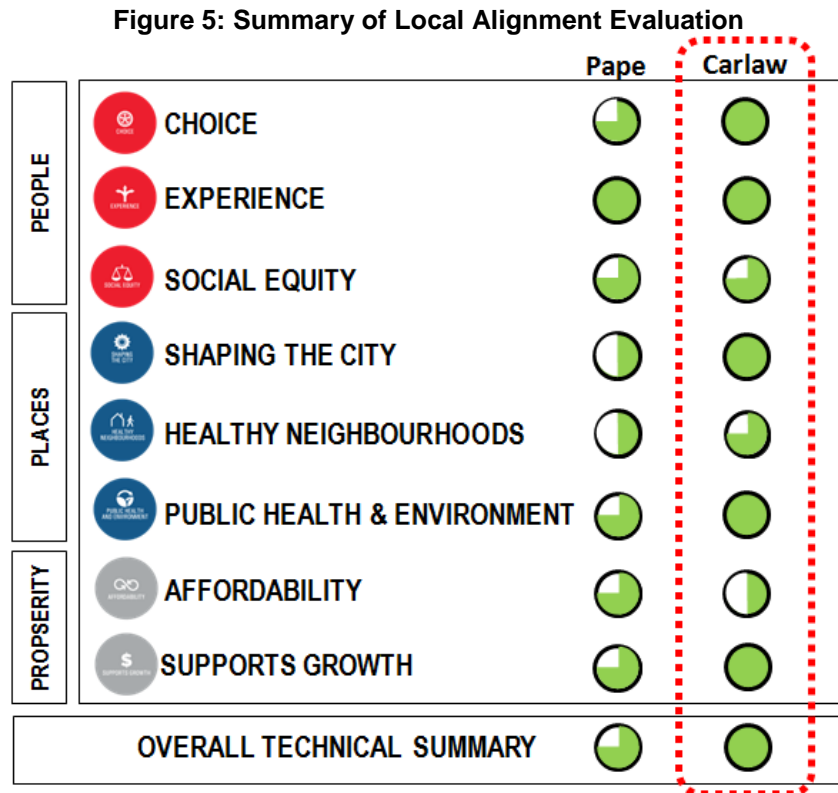
- Subway running under Pape from Queen to Danforth, with stations near Queen and Gerrard; and
- Subway running under Carlaw from Queen to the GO Rail corridor, then running diagonally under commercial and residential properties to connect to Pape near Riverdale Avenue, with stations near Queen and Gerrard.

**Figure 4: Local Segment Options**



Strong interchange connections between the Relief Line South and SmartTrack is integral to optimizing usage and city-building opportunities. Discussions with Metrolinx are ongoing to ensure optimal interchange connections with the new Gerrard and Unilever/East Harbour SmartTrack stations and proposed Relief Line South stations near Queen and Gerrard.

City and TTC staff undertook an evaluation process for the local segment alignments that included extensive community consultation and detailed technical analysis to identify local conditions. Technical analysis included investigations of underground building constraints, utility constraints, geotechnical/seismic analysis, a real estate impacts study, and subway noise and vibration tests. The technical analysis fed into City Planning's Rapid Transit Evaluation Framework (RTEF). Figure 5 provides a summary of the local alignment evaluation based on the RTEF criteria.



The preliminary project cost estimates provided to City Council in the Initial Business Case in July 2016 will be updated with Class 3 cost estimates at the next stage gate in late 2019. The Carlaw option for the Local Segment has greater cost risks, and is estimated to cost approximately \$150 million (\$2017) more than the Pape alignment. Opportunities to mitigate these and other issues and minimize impacts will be explored as the Relief Line project as a whole proceeds through the design process.

Based on the comprehensive analysis, the Carlaw alignment is recommended because it better achieves the following objectives:

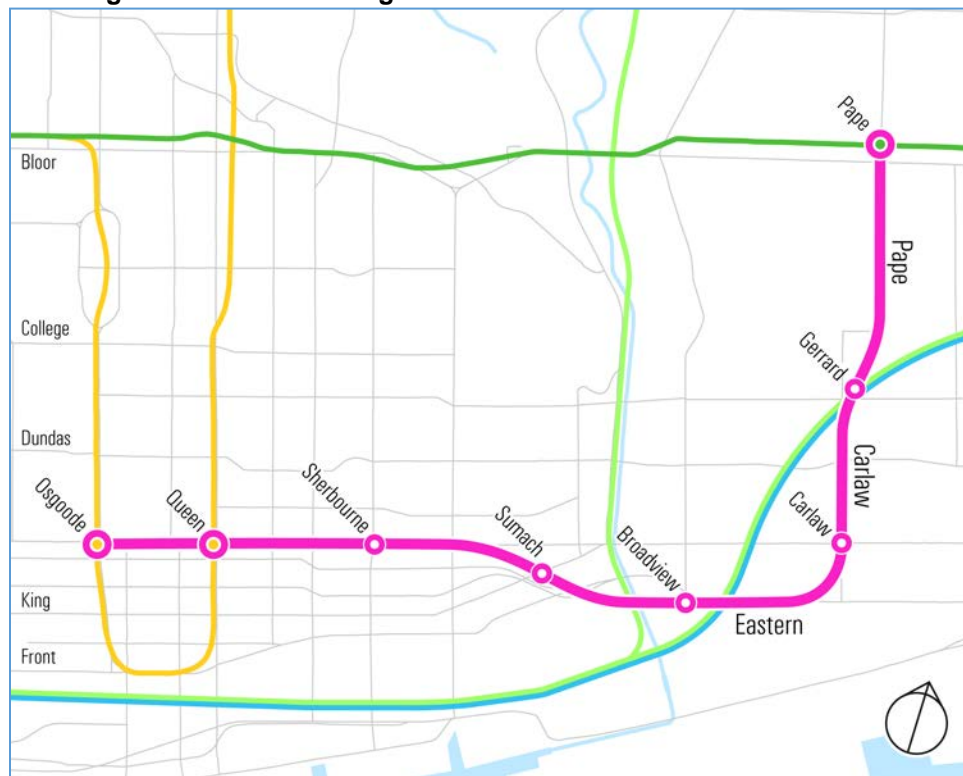
- Maximizing city-building opportunities around stations;
- Ability to integrate stations into the existing urban fabric;
- Serve the areas with the most people and jobs, today and in the future;
- Compatibility with existing neighbourhoods and support for local businesses
- Potential opportunities for public/private partnership;
- Providing people with the best ways to make transfers between the Relief Line and local buses/streetcars; and

- Minimizing potential negative impacts on the local area, both during and after construction.

Attachment 1 provides further information on the technical analysis and evaluation of options within the local segment. Additional detail is available on the project website (<http://reliefline.ca/the-project/project-materials>).

The full project concept to be advanced to TPAP is illustrated in Figure 6. City and TTC staff will prepare the draft Environmental Project Report and initiate the TPAP in Q3 2017.

**Figure 6: Relief Line Alignment/Stations to be advanced to TPAP**



### Next Steps

Following environmental approvals for the Relief Line South, the next stage of work in the transit project development process is preliminary design and engineering. This report recommends that City Council direct staff to work with Metrolinx to complete preliminary engineering and design required to develop a Class 3 cost estimate (15-30%). It is best practice to establish a project budget and baseline schedule for capital construction when a Class 3 cost estimate is available.

The work plan includes the following scope of work:

- Geotechnical and hydrological investigations;
- Infrastructure design including alignment, track, tunnel, and station design, etc.
- Utility design and relocations;

- System design requirements including electrical/traction power analysis, substation, signal, communications, etc;
- Operational work plans (i.e. proof of concept for operations and maintenance, service plan, vehicle procurement, ongoing updates to demand forecasts);
- Construction work plans including constructability assessment, staging, traffic management plans, and schedule);
- Stakeholder and public consultation as required.

City and TTC staff will report back when a Class 3 cost estimate and schedule is available, including an update on discussions regarding funding for this project. The timeline to complete the next phase of work is approximately 24 months. Efforts will be made to accelerate the work program in order to report back as early as possible. The timing of the report back is based on City Council approval of the alignment recommended in this report, environmental approvals, and initiating the next phase of work in mid-2017.

Construction of the Relief Line South is currently estimated to take approximately 8 to 10 years, once capital funding is secured. An updated budget and schedule for the project is required once further design and due diligence has been completed.

#### *Relief Line North*

Planning for the Relief Line to-date has focused on the study area for the Relief Line South. The Relief Line North is the segment of the Relief Line from Pape Station to Eglinton or Sheppard Avenue. The project was identified through several studies (DRTES and YRNS) as an addition to the transit network to increase capacity and address demand on Line 1 over the longer term.

Given current demand forecasts, this report recommends that City and TTC work in partnership with Metrolinx to initiate the work required to develop an initial business case, project definition and TPAP for the project.

The work plan includes the following:

- Developing a terms of reference for the Relief Line North;
- Identifying an alignment and station locations;
- Initial business case development;
- Developing preliminary Class 5 Cost Estimates based on the functional project plan;
- Consideration of integration and phasing with the Relief Line South to provide necessary capacity and reduce cost and disruption at Pape Station; and
- Undertaking public and stakeholder consultation.

Project planning will need to ensure alignment with the City Council-approved alignment for the Relief Line South. City and TTC will work in partnership with Metrolinx to develop an initial business case for this project and report back in Q1 2018.

## *Relief Line Project Governance*

A MOU is being developed that reflects the City, TTC, and Metrolinx's partnership and respective accountabilities for the Relief Line. There is currently no capital funding committed to this project aside from City and Metrolinx funding for the current phase of planning and design work.

The role of asset owner and operator is still to be confirmed. For the purposes of planning, it is assumed that provincial funding for the capital construction of the Relief Line is predicated on Metrolinx ownership of the asset. It is also assumed the TTC will be the operator of the Relief Line.

As the local planning authority, work to plan and implement major infrastructure projects in the City requires City Council approval to ensure project planning is integrated with existing land uses, aligned with the City's Official Plan policies and meets city-building objectives. As the potential operator of the Relief Line, TTC service, design, and operating standards are a key consideration in the next phase of work to ensure the seamless integration of the infrastructure with TTC's existing system. TTC Board approval will be required on decisions relating to operations and service planning. The project delivery model will be subject to Provincial and Metrolinx requirements, assuming provincial funding for the construction of the project.

### **3. Yonge Subway Extension**

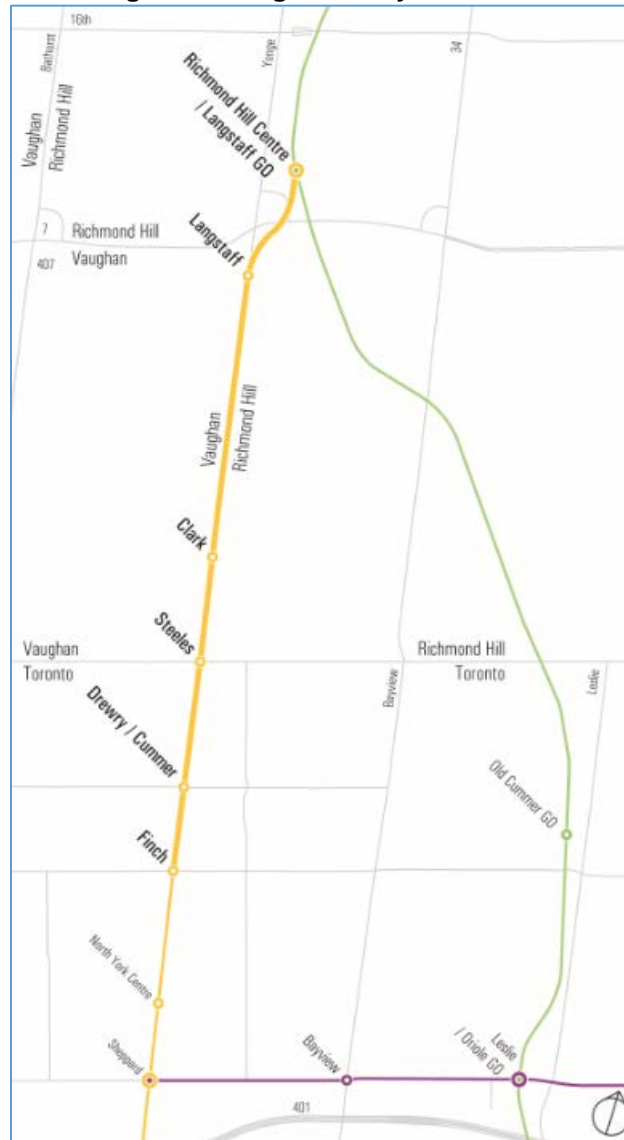
In 2009, City Council approved an EA for a 7.42 kilometre extension of the Yonge subway north to York Region (Figure 7), including several key principles for advancing this project (see decision history). Approximately 2 kilometres of this extension is in the City of Toronto with stations at Cummer/Drewry and Steeles Avenue. The majority of the extension is in York Region, including 3 stations at Clark, Langstaff, and Richmond Hill Centre. A maintenance and storage facility requirement was identified in the TTC's Subway Rail Yard Needs Study, endorsed by the York Region Rapid Transit Corporation Board, and included in the conceptual design study that was completed for this project in 2012.

The purpose of this report is authorize only the planning and design of the YSE to approximately 15-30% in order to develop a Class 3 cost estimate and schedule. A report back to City Council and TTC Board will be required once this phase of work is completed.

Further discussion is required between the parties with respect to responsibilities for funding the capital, operating, maintenance, lifecycle maintenance, and other costs associated with constructing the project (i.e. procurement costs, financing costs, property acquisition, etc).



**Figure 7: Yonge Subway Extension**



### *Project Governance*

The YSE is an extension of existing infrastructure owned by the City and TTC, and will be operated by the TTC. As a result, the City and TTC have accountabilities that cannot be assigned to any other party.

The City and TTC will ensure planning and design for YSE is consistent with existing TTC service and operational standards. The technical expertise required to design and engineer an extension of the TTC's existing infrastructure resides within the TTC.

Toronto City Council is also accountable for ensuring project approvals are aligned with the transit planning policy and operational context. Toronto City Council and York Region Council are the local planning authorities within their respective jurisdictions. The authority of each of these bodies relates to approving the planning framework under which the project will be implemented and ensuring that project planning is integrated

with existing land uses, aligned with the City's Official Plan policies and meets city-building objectives.

Metrolinx is providing funding for the current phase of work and will be engaged as the regional transportation authority responsible for ensuring coordinated engagement between the local planning authorities and respective local transit authorities.

The project governance will reflect partner accountabilities described above for both the planning and design as well as procurement and delivery of the project.

A joint administrative executive oversight body with City/TTC, York and Metrolinx representation is being established. For the purposes of completing design and engineering and to ensure a single point of accountability, a TTC chief project manager will report to the administrative executive oversight body. A joint project team including City of Toronto, TTC, York Region and Metrolinx will ensure that project partners are engaged in the planning and design of the project.

A review of project governance options will be completed in partnership with Metrolinx and York Region to identify a governance model for project procurement and delivery, in accordance with key accountabilities described above. The results of this review will be reported to City Council and TTC Board for its consideration, prior to project procurement and delivery phases of the YSE.

#### *Conditions for Next Phase of Work*

This report recommends that City Council request City and TTC to work in partnership with Metrolinx and York Region to advance planning and design required to develop a Class 3 cost estimate and schedule and to report to City Council at the next decision gate for the project anticipated to be in the fourth quarter of 2019, subject to the following:

- City/TTC will own, operate, and maintain the future YSE recognizing it is an extension of Line 1 service;
- TTC will be responsible for project management of project planning and design;
- York Region and/or Metrolinx will be responsible for the costs associated with planning and design of the project and provide funding to the TTC;
- A procurement options analysis will be undertaken to assess the best delivery model for the project; and
- TTC will be responsible for future delivery of the YSE project.

A MOU will be established for this project to complete the planning and design to develop a Class 3 cost estimate based on roles and responsibilities of the project partners described above.

## *Next Steps*

The work plan for advancing planning and design on the YSE will take approximately 24 months to complete following City Council approval. The scope of work to be undertaken includes:

- Geotechnical and hydrological investigations;
- Infrastructure design including alignment, track, tunnel, and station design, etc.
- Utility design and relocations;
- System design requirements including electrical/traction power analysis, substation, signal, communications, etc;
- Operational work plans (i.e. proof of concept for operations and maintenance, service plan, vehicle procurement, ongoing updates to demand forecasts);
- Construction work plans including constructability assessment, staging, traffic management plans, and schedule);
- Updated modelling and demand forecasting
- Updated economic and benefits case analyses;
- Property protection strategy
- Assessment of alternative funding sources (i.e. land value capture)
- Stakeholder and public consultation as required.

City and TTC staff will report back to request authority to proceed with any additional work for this project. The report back will also provide an update on Line 1 capacity analysis as described below.

## **4. Line 1 Capacity Update**

Line 1 currently has an optimal peak point capacity of 28,000 passengers per hour per direction (pphpd), while the TTC delivers approximately 28,300 on a typical day. The subway is effectively at capacity under present operating conditions. Delivering optimal peak point capacity is contingent on specific operating standards, such as station crowding, availability of sufficient trains and operators, prevention and prompt resolution of any delays, and track and infrastructure requirements to run the scheduled service. Overcrowding and congestion on Line 1 erodes passenger experience, system efficiency and reliability, and impacts the TTC's ability to deliver optimal capacity. Several investments are currently planned to address this critical issue for the City's transit system. This includes investments to expand the capacity of Line 1 to improve the system's ability to serve current and projected demand and to efficiently distribute riders across the system by making alternatives more attractive.

### *Investments to Increase Capacity*

Table 3 summarizes the investments that are being made to increase capacity of Line 1. Investments to increase capacity include improved signalling and train control systems (ATC or Automatic Train Control), Line 1 fleet replacement to new higher-capacity "walk-through" trains (TR trains), revised schedules for greater service reliability, and additional station staff to improve passenger flow in the station.

When ATC is fully implemented in 2021, Line 1 optimal capacity will be increased to 36,000 passengers per hour per direction.

**Table 3: TTC Line 1 System Upgrades**

Initiative	Impact on Line 1 Capacity	Implementation	Investment
Automatic Train Control (ATC)	28% increase; headways reduced from 2 min 21 secs to 1 min 50 secs; improved service reliability.	2017-2020	\$570 Million
Walk-through TR trains	10% per train; 2500 passengers per hour	2010-2017	\$1.2-billion. Does not include yard and shop upgrades.
New schedules for increased service reliability	Improves service reliability	2014-2016	\$2.4-million operating per year
Additional station staff at Bloor-Yonge	Reduced platform crowding; better use of existing capacity	2013	\$600,000 operating per year

### *Investments to Improve Mobility*

Investment have been made by the Province and the City to upgrade the rapid transit network to improve mobility within the transit network. This includes the Province's investment in the GO Regional Express Rail program, which will provide enhanced service on 5 of 7 GO corridors. The City is also currently working with Metrolinx to advance SmartTrack, which will add six new stations to the Stouffville and Kitchener GO Corridors in Toronto, including an extension of the Eglinton West LRT from Mount Dennis to Renforth Gateway and Pearson Airport. These projects have the potential to reduce demand on Line 1 by enhancing service on existing GO transit infrastructure, making it an attractive transit option in the City and across the Region.

### *Demand Forecasts*

Analysis to date indicates that the increase in capacity associated with the TTC's Line 1 system upgrades described above, or potential reduction in Line 1 ridership attributed to investments in Regional Express Rail and SmartTrack, will be taken-up by new trips generated by forecast population and employment growth as well as pent-up latent demand. Latent demand refers to riders that would prefer to use Line 1 but choose an alternative travel option due to crowding and service reliability concerns.

In 2031 the optimal capacity of Line 1 will be 36,000 passengers per hour per direction. Current City and TTC demand forecasts indicate that Line 1 will be at capacity by 2031. In 2031, morning peak hour, peak direction, ridership at the critical peak point south of Bloor is forecast to be 36,000 to 39,500, depending on SmartTrack fare. This forecast

assumes a base transit network with all funded/committed projects including the Toronto-York-Spadina Subway Extension, Scarborough Subway Extension, Sheppard East LRT, Finch West LRT, Crosstown LRT, Regional Express Rail, and SmartTrack.

The Relief Line South will reduce demand on Line 1 to a point below capacity, south of Bloor-Yonge station, during the critical morning peak hour in 2031. The Relief Line South diverts a significant number of westbound to southbound transfers between Line 2 and Line 1, which reduces the number of riders at the critical peak point south of Bloor-Yonge station. However, the Relief Line South will not mitigate any forecast increase in demand on Line 1 in the peak southbound direction of travel north of Bloor-Yonge station. Consequently, the section of Line 1 immediately north of Bloor-Yonge station becomes the most congested section of Line 1 after the Relief Line South is added to the subway network, with ridership approaching capacity in 2031 (between 34,500 and 36,000).

With the addition of YSE, current demand forecasts indicate that Line 1 may exceed capacity in 2031. Additional study is required before such a conclusion can be confirmed, including determining a service plan for the YSE, an assessment of more current travel behaviour data from the 2016 Transportation Tomorrow Survey, and other initiatives affecting Line 1 demand described below. The Relief Line North will provide benefits and eventually be required over the longer term, however, the timing for the Relief Line North is subject to further analysis.

#### *Other Initiatives Affecting Line 1 Demand*

Current demand forecasts have not considered the potential impact of other initiatives affecting Line 1 demand, including:

- The impact of different fare integration scenarios including the fare structure concepts currently under consideration in Metrolinx's GTHA Fare Integration Study and the potential measures identified in the City's report "EX16.1 Developing Toronto's Transit Network to 2031"; and
- Local transit service improvements to better integrate with RER and SmartTrack.

Current demand forecasts indicate the importance of fare structure in influencing travel behaviours. Work is currently underway by Metrolinx, on the GTHA Fare Integration Study to consider integrated fare structure concepts for the region. This study is expected to be completed in late 2017.

In July 2016, City Council considered the report EX16.1 Developing Toronto's Transit Network to 2031, which identified key measures to forward to Metrolinx for consideration in the fare integration study. These measures included assessing the feasibility of a co-fare system with the TTC, and a reduction in the base fare component of the GO fare, in order to encourage short and medium trips on the GO network.

The City and TTC continue to work with Metrolinx to assess the fare structure for SmartTrack in the context of the GTHA Fare Integration Study and the fare related requests put forward by City Council in Item EX16.1 in July 2016. For additional information on the City's current state assessment of fare policy see Attachment 7: Fare Advancing Relief Line and Yonge Subway Extension

Policy Current State Assessment:

<http://www.toronto.ca/legdocs/mmis/2016/ex/bgrd/backgroundfile-94625.pdf>

This report recommends that City and TTC undertake further analysis in consultation with Metrolinx to understand the potential impacts of the fare structure concepts considered as part of the GTHA Fare Integration Study on Line 1 demand. City and TTC staff will also identify other measures to address Line 1 demand. This report recommends that City and TTC staff, in consultation with Metrolinx and York Region, undertake further analysis to identify and evaluate other possible measures, including work to identify the timing for the Relief Line North. Staff will report back at the next decision gate with a Class 3 cost estimate for the YSE (approximately 15-30% design).

## **5. Summary**

This report recommends advancing project planning for major infrastructure investments in transit for the City and Region. Planning for the Relief Line and YSE need to be considered in the context of existing transit network and system challenges. This report demonstrates that, based on current demand forecasts, the Relief Line South is required by 2031 to address demand on Line 1 and that Relief Line North planning and approvals should be advanced. City and TTC staff will undertake further work to assess the potential impacts of changes within the transit planning context including fare policy changes, GTHA fare integration, service enhancements on the GO network, and the timing of the Relief Line North.

Although this report recommends City Council approve the next phase of work to develop the YSE to a level of design required for a Class 3 cost estimate, City and TTC staff will report back to request City Council authorization for future phases of work. The report back will include an assessment of Line 1 conditions to implement YSE, which will be completed in consultation with Metrolinx and York Region. The City and TTC will work with York Region and Metrolinx to ensure coordinated reports to their respective Boards and Regional Council.

Given the importance of advancing these major infrastructure projects through the project development process, this report also recommends City Council authorize the Mayor and City Manager to initiate discussions with other orders of government to identify funding for capital construction of these projects.

## **CONTACT**

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## **SIGNATURE**

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Peter Wallace  
City Manager

## **ATTACHMENTS**

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Attachment 1 - Relief Line South – Local Alignment Assessment