

Attachment 5 – Assessment of Provincial Proposals Line 2 East Extension

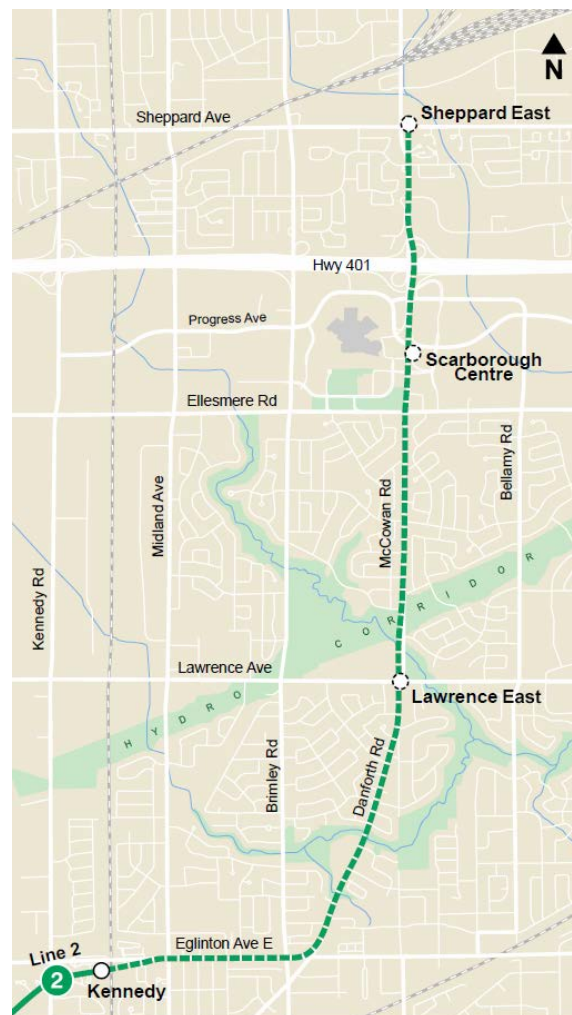
As directed by City Council in April 2019, City and TTC staff have assessed the Province's proposed 3-stop Line 2 East Extension. The details of this assessment are provided in this attachment.

1. Project Summary

1.1 Project Description

The Line 2 East Extension (L2EE), as proposed by the Province, is an approximately 8 kilometre underground extension of Line 2 Bloor-Danforth from Kennedy Station that will have three stations – at Lawrence and McCowan, Scarborough Centre and Sheppard and McCowan, as shown in Figure 1. The Province's plan for the L2EE is similar to what was being planned by the City and TTC prior to 2016.

Figure 1 - Line 2 East Extension Reference Map



Note: Map produced by City/TTC based on current understanding of project

As proposed, the extension will be fully integrated with the existing Line 2 and have through service at Kennedy Station. A turn-back may be included east of Kennedy Station to enable reduced service to Scarborough Centre, subject to demand and service standards. The extension will require approximately seven additional six-car, 138-metre-long trains to provide the service. The trains would be interoperable with the other trains on Line 2. With the station at Sheppard and McCowan supporting storage of up to six trains, there is sufficient storage and maintenance capacity existing at the TTC's Line 2 storage and maintenance facilities to accommodate this increase in fleet size. Staff's current understanding of each of the proposed stations is provided below.

- **Sheppard East Station** – It is staff's understanding that this station will be located on the northeast quadrant of the intersection of McCowan Road and Sheppard Avenue East. This station will serve as the eastern terminus of Line 2. It will also be an important point of transfer between the subway system and bus routes that current serve much of northeast Scarborough. The station will be designed to protect for connection to higher-order transit in the Sheppard East corridor in the future.
- **Scarborough Centre Station** - Prior to the Provincial change in scope for the project, Scarborough Centre Station was proposed to be located on Borough Drive north of Town Centre Court on lands currently owned primarily by Oxford Properties. The associated bus terminal was to occupy lands to the west of the station that currently are occupied by the Scarborough Centre RT station and bus terminal. An alternative location for the station is now under review, on the east side of McCowan Road with the bus terminal contained within the block bounded by McCowan Road, Progress Avenue, Grangeway Avenue and Bushby Drive.

In the previous express subway concept, Scarborough Centre Station was intended to serve as the eastern terminal station of Line 2. A large number of bus routes were planned to provide service to the station from north and central Scarborough. In the 3-stop L2EE project, it can be expected that some of these interconnecting bus services will be rerouted to Sheppard East Station. Scarborough Centre station will still serve as the GO bus station location.

- **Lawrence East Station** – It is staff's understanding that the station will be located with entrances on the northwest and southwest quadrants of McCowan Road and Lawrence Avenue East. This will be an in-line station along Line 2 with local bus routes providing east-west and north-south service.

Additional project assumptions for the proposed Line 2 East Extension, as developed by Metrolinx and Infrastructure Ontario ("IO"), include:

1. Minimum three stop subway extending from Kennedy Station to Sheppard Avenue East
2. Operation of existing Line 3 Scarborough RT to be maintained until revenue service
3. Systems to be integrated with existing Kennedy Station infrastructure
4. Systems design per TTC Design Manual, practices and approved variances

5. Facilities designs to comply with City of Toronto Official Plan policies and TTC Design Manual, practices and approved variances
6. Bus facilities to be provided at each station and designed in accordance with TTC, GO Transit and Durham Region Transit operations requirements
7. Subway technology using existing T1 vehicles (with life extension) for initial revenue service
8. Protection to be provided for proposed centre-running Eglinton East LRT connection to Kennedy Station
9. Protection for a future interchange station at Sheppard Avenue and McCowan Road for a potential future Line 4 Sheppard extension.

Metrolinx have advised that they will be developing a Preliminary Design Business Case (“PDBC”) for the project, and this PDBC will be considered by the Metrolinx Board in late 2019. According to Metrolinx’s Business Case Manual¹, the PDBC is developed during the preliminary design phase of the project. It selects a specific project concept and reviews different approaches to refine or optimize it. The creation of a PDBC reflects the fact that the design of the L2EE is advanced further than other projects, such as Ontario Line and Eglinton West LRT, which are currently the subject of Initial Business Cases (IBCs).

Staff have not been provided with any information regarding the scope or findings of the PDBC, but it is our expectation that the PDBC will address issues such as the inclusion of a turn-back east of Kennedy Station, and reflect advice from a panel of external advisors convened by Metrolinx. Metrolinx has assembled a panel of external advisors with a mandate of reviewing previously developed plans and assessing their technical and commercial deliverability. Since mid-summer, the panel has been working with Metrolinx and IO for the purposes of providing advice on topics such as financial and economic modeling, tunnel and station design, costing, construction and delivery. TTC and City staff met with the panel to provide information on the project over the summer.

1.2 Project Costs and Schedule

It is the City and TTC's understanding that the \$5.5 billion project budget announced in 2019 Ontario Budget was based on the City’s estimate of approximately \$4 billion (adjusted for inflation) for the express extension to Scarborough Centre, and an additional \$1.5 billion for scope associated with the additional two stations.

The City’s anticipated completion date for the express L2EE was Q2 2026 / Q2 2027 (with and without applicable schedule risk allowance respectively).² The 2019 Ontario Budget has estimated a completion date for the 3-stop L2EE at 2029-30.

The City and Province, pursuant to further negotiations, will continue to discuss responsibility for funding costs for maintaining the Line 3 (Scarborough RT) and/or

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<http://www.metrolinx.com/en/regionalplanning/projectevaluation/benefitscases/Metrolinx%20Business%20Case%20Overview%20Volume%201.pdf>

² Further details on the schedule and risk analysis for the express extension can be found in Attachment 2 of EX4.1 Toronto’s Transit Expansion Program – Update and Next Steps (<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.EX4.1>)

replacement transit service in Scarborough due to the delay in the scheduled completion of the L2EE as a result of the change in scope and delivery of the project.

The TTC are currently undertaking a review of the impacts on the SRT of extending the in-service date of L2EE to 2029/30.

1.3 Project Delivery

Metrolinx and IO plan to conduct a procurement options analysis, which will include consideration of a design-build procurement model and alternate contracting approaches.

In 2017, following the completion of a procurement options analysis, City Council approved the procurement model for the project as Design-Build Finance, subject to successful negotiations leading to an agreement with IO. In the event an agreement was not reached with IO, Council further directed staff to proceed with a Design-Bid-Build (DBB) procurement based on a single construction contract. Further information on the findings of the procurement options analysis can be found in EX23.1 Next Steps on the Scarborough Subway Extension.³

2. City/TTC Assessment

Information to support the assessment of the Line 2 East Extension was obtained through a series of technical working groups meetings with Provincial staff, and was directly informed by previous planning for a three-stop subway extension completed by the TTC.

The City and TTC assessment of L2EE was guided by the City's Rapid Transit Evaluation Framework ("RTEF"). Background information on the RTEF is provided in Attachment 2.

Highlights

- Rapid transit in this corridor will expand Toronto's higher-order transit network, better connect Scarborough Centre to the rest of the region, catalyse transit-oriented growth to encourage the development of the Centre into a vibrant urban node, and provide a replacement for the aging Line 3 (Scarborough RT).
- L2EE will replace the rapid transit service to Scarborough Centre that is currently provided by Line 3 (Scarborough RT). The vehicles and some of the other infrastructure on Line 3 have reached the end of their useful life.
 - Existing Ellesmere and Midland Line 3 stations will not be replaced by stations on L2EE.
 - The Lawrence East Line 3 station will be replaced indirectly by a station on Line 2, approximately two kilometres east of the existing station.
 - The Scarborough Centre and McCowan Line 3 stations will be replaced by a single new Line 2 Scarborough Centre Station.

³ <https://www.toronto.ca/legdocs/mmis/2017/ex/bgrd/backgroundfile-101444.pdf>

- L2EE will better connect Scarborough Centre to the rest of the rapid transit network by providing through service to Scarborough Centre and eliminating the transfer between Line 3 and Line 2 at Kennedy Station. The project will expand the rapid transit network in Toronto by extending it north to Sheppard Avenue to connect with the future Sheppard East LRT and provide high quality connections to rapid transit for riders on buses in north Scarborough.
- Preliminary travel demand modelling suggests that the L2EE will attract approximately 11,000 net new transit riders per day by 2041. Preliminary modelling also suggests that the extension will also increase the peak westbound demand on Line 2 (east of Pape Station) by approximately 1,000 riders in the AM peak hour. The total estimated number of riders of westbound riders on Line 2 is expected to be less than the already expected eastbound demand. Expected demand will require future modernization to Line 2.
- Emerging modelling results also show that L2EE will reduce the estimated usage of the future Lawrence East SmartTrack Station, and that it will increase transit ridership on the Sheppard Corridor east of McCowan, but reduce it west of McCowan.

Further work is required to fully assess these impacts. Further analysis is also needed to assess the implications of a potential extension of Line 4 (Sheppard), as suggested by the 2019 Ontario Budget.

- The project will provide subway service to at least one Neighbourhood Improvement Area: stations at Scarborough Centre and Lawrence Avenue East would each serve the Woburn neighbourhood.
- Scarborough Centre is identified as a Centre in the Official Plan, with significant residential and employment growth planned over a large area. A new subway station in Scarborough Centre, with improved connections to the rest of the transit network is expected to help advance the urbanization of what is today an area of suburban development in a predominantly car-oriented public environment.
- It is our understanding that opportunities for a fully integrated transit facility with private development are being explored by the Province, to ensure a seamless development pattern in Scarborough Centre. Transit Oriented Development that is integrated with the transit facilities at Sheppard East station are also possible. Growth opportunities at Lawrence Avenue East and McCowan Road are constrained by existing conditions and existing planning policies.
- The Provincial L2EE will have greater property requirements than the previous express concept. Property impacts will result from the station facilities (including but not limited to bus terminals, traction power substations and a Passenger Pick-Up and Drop off) at both Lawrence/McCowan and Sheppard/McCowan.

- L2EE is not expected to impose significant impacts to the City's cultural heritage, the natural environment, parks, or the public realm.

2.1 Rapid Transit Evaluation Framework Principle #1 – Serving People

Transit Users Choice

Compared to today's higher-order transit network, transit riders will benefit from an extension of rapid transit north from Scarborough Centre to Sheppard Avenue and the elimination of a transfer between Line 2 and Line 3 at Kennedy Station. The service will be fully integrated with the existing Line 2, and trains on the extension will run through from Kipling Station to the new station at Sheppard and McCowan. Many customers who now travel on buses from northeast Scarborough will benefit from a shorter travel time, as they would connect to the subway at Sheppard East Station, instead of the existing Line 3 Scarborough Centre Station.

Opportunities to transfer at Kennedy Station will remain as they currently exist and are planned, including transfers to numerous TTC bus routes, Line 5 Eglinton, and GO trains.

At the new station at Lawrence and McCowan, transfers to three local and one express TTC bus routes will be available. A bus terminal will be constructed for use by these buses operating east-west on Lawrence Avenue East and north-south on McCowan Road.

At the new Scarborough Centre Station, transfers to several local bus routes as well as GO Transit regional buses may be available. A new bus terminal would be constructed to accommodate these transfers however, station design is yet to be resolved.

If the Provincial L2EE concept includes infrastructure to accommodate a scheduled turn-back of service east of Kennedy Station it could conflict with current designs for an eastern extension of Line 5 Eglinton Crosstown LRT (i.e. the Eglinton East LRT). Further analysis and design work is required to fully understand the implications of this potential conflict, should it arise.

Experience

Network Demand

A key component of the City and TTCs assessment of the Provincial L2EE concept is determining how it could affect the overall performance of the transit network. Key considerations include how it may

1. Increase future demand on Line 2; and
2. Increase or decrease future demand on other funded or proposed projects.

Travel demand modelling is a tool that is used to help understand these issues. Travel demand models use inputs such as projected population and employment distributions,

demographics and existing travel behaviour to estimate demand on Toronto's transportation network at a point in the future, known as the planning horizon.

Travel demand modelling has been undertaken by both the City and Metrolinx – key results are summarized in Table 1.

Table 1: L2EE Travel Demand Projections⁴

<p>Projected Line 2 Demand (2041):</p> <ul style="list-style-type: none"> • Hourly Demand (Morning peak hour, peak point, peak direction) <ul style="list-style-type: none"> ○ Westbound, east of Kennedy ○ Westbound, east of Pape ○ Eastbound, west of Bathurst • Total Daily Boardings 	<p>9,500 riders per hour</p> <p>23,000 – 28,000 riders per hour</p> <p>23,000 – 31,000 rider per hour</p> <p>600,000 - 675,000 riders per day</p>
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The findings are preliminary and will be the subject of further refinement. The work is based on the best information available about the Provincial projects.

The key conclusion from this analysis is that while the L2EE will increase westbound demand towards downtown during the morning peak, this increased demand will not exceed previously expected eastbound demand towards downtown.

Preliminary travel demand modelling suggests the following impacts to other funded or proposed projects:

- Provincial transit projects would together reduce the estimated usage of the future Lawrence Kennedy SmartTrack Station.
- The inclusion of a station at Sheppard and McCowan will increase transit ridership on the Sheppard Corridor east of McCowan, but reduce it west of McCowan.

The Province has announced their intent to extend Line 4 - Sheppard (subway) to meet Line 2 at McCowan Road through the 2019 Ontario budget. However, no funding has been committed and no details or timelines are available regarding this potential project. Line 7 – Sheppard (Light Rail Transit, LRT), a provincially funded project, has been approved since 2010 to run from Don Mills subway station east on Sheppard Avenue to terminate at Conlins Road east of Morningside Avenue. This project is part of the existing LRT program as detailed in the LRT Master Agreement.

⁴ All demand estimates reported are for the 2041 planning horizon. All four provincial priority projects are assumed to have been built and are included in the model. In all cases, the range of values represents the different estimates resulting from the travel demand models run by the City and Metrolinx; in all cases the lower estimates are output by the Metrolinx model, while the higher estimates are the output by the City model.

Travel demand modelling undertaken to date suggests that the type of higher order transit that may be built on the Sheppard East corridor in the future does not have a significant impact on the demand on Line 2.

Further detailed work is still required to fully assess network impacts.

Operations

Service on the extension will be operated as an extension of the existing Line 2 and will be of comparable quality to service provided across the existing TTC network. It will also match service that will be provided across the subway network in the future. Tunnels, stations, and other infrastructure would be designed to protect for the future installation of an Automatic Train Control system.

Bus terminals at each station will improve customer experience while transferring between the subway and local or regional buses. Improvements to the public realm and transit oriented development, which are part of the project objectives but not included in the current conceptual level of design, will further improve passenger experience and incent people to travel by transit rather than other modes like private automobile.

Effective integration into the TTC's existing network is critical. Further engagement by City and TTC staff is needed to ensure project planning for the Province's L2EE project reflects requirements from a service and operations perspective.

Social Equity

The project will provide subway service to at least one Neighbourhood Improvement Area: stations at Scarborough Centre and Lawrence Avenue East will each serve the Woburn neighbourhood. The Sheppard East terminal station is not located near any Neighbourhood Improvement Areas.

2.2 Rapid Transit Evaluation Framework Principle #2 – Strengthening Places

Shaping the City

Scarborough Centre is identified as a Centre in the Official Plan, with significant residential and employment growth planned over a large area. It is the only one of the City's four Centres that does not already have direct subway service. A new subway station in Scarborough Centre is expected to help advance the urbanization of what is today an area of suburban development in a predominantly car-oriented public environment. The City understands that opportunities for a fully integrated transit facility with private development are being explored by the Province to ensure a seamless development pattern in Scarborough Centre.

The Sheppard Avenue East station is within an Employment Area as defined by the Official Plan. While new employment uses, including office growth, are encouraged in these areas, the City anticipates that most office growth will occur in Scarborough Centre. Residential is not a permitted use north of Sheppard Avenue at McCowan Road and there are limited opportunities for residential development on the south side. While

much of Sheppard Avenue East is identified as Avenue, it does not extend to McCowan Road. Nevertheless, there may be opportunities for transit-oriented development that is integrated with the transit facilities at Sheppard East station.

Growth opportunities at Lawrence Avenue East and McCowan Road are severely constrained by Highland Creek to the northeast, institutional uses (Scarborough Hospital and senior care homes) to the west, and relatively small parcels of Mixed Use Areas on the south side of Lawrence Avenue that lie adjacent to stable residential neighbourhoods. A subway station at this location is expected to act primarily as a transfer point for riders travelling to destinations further east or west, however, subway access to the hospital may be an opportunity for new investment at that facility, with corresponding employment growth.

Healthy Neighbourhoods

Property will need to be acquired to accommodate stations, bus terminals, traction power substations, a passenger pick-up and drop off facility at Sheppard East station, and emergency exit buildings. Detailed property impacts have not been shared with the City and TTC.

Public Health and Environment

The L2EE project is not expected to impose significant impacts to cultural heritage, natural environment, parks, or the public realm. East Highland Creek is adjacent to the Sheppard East station and the West Highland Creek crosses the alignment in two locations: once north of Eglinton Avenue East and again north of Lawrence Avenue East. At each of these locations the tunnel will be located below the creeks. TRCA will need to be engaged to review and provide input to the station plans, as well as monitor construction activity.

The subway will run beneath the Gatineau Hydro Corridor immediately west of McCowan Road, and may run beneath the Frank Faubert Woodlot north of Ellesmere Road. No surface construction activity is expected at these locations with the exception of a bus loop built in the hydro corridor west of McCowan Road and north of Highland Creek.

2.3 Rapid Transit Evaluation Framework - Principle #3 - Supporting Prosperity

Supports Growth

The L2EE project could support existing employment uses and projected employment opportunities, particularly in Scarborough Centre, as discussed above under Shaping the City.