



For Action

Line 3 Bus Replacement Study Update

Date: September 15, 2021
To: TTC Board
From: Chief Strategy and Customer Officer

Summary

The TTC's Line 3 Scarborough (also known by original names as "Scarborough RT" or "SRT") opened in 1985. It is a 6.4-kilometre intermediate-capacity rapid transit line with six stations and after 36 years of continuous operation, the trains on Line 3 have been in service over 10 years past their design life. The vehicles are now susceptible to breakdown, particularly in inclement weather, and have already been overhauled extensively to extend their life. It has become increasingly difficult to maintain reliable service for customers on Line 3 due to the age of the vehicles and obsolescence of key parts.

On February 10, 2021, the TTC Board approved ending train service on Line 3 in 2023 and directed staff to develop a plan to replace the line with interim bus service for the 7 years until the Line 2 East Extension, being delivered by the Province, is opened in 2030. This report is an update on the development of the bus replacement plan, the adaptive re-use of existing Line 3 infrastructure and the emerging directions from the initial technical review and public consultations. As presented in the February 2021 report to the Board, there are five initial on-street routing corridors that are options for the bus replacement service:

- Kennedy Road
- Midland Avenue
- Brimley Road
- McCowan Road/Danforth Road
- Bellamy Road North

For these on-street corridors, variations are also being studied that could have buses operate via Lawrence Avenue East and Kennedy Road as an alternative to by-pass planned subway construction on Eglinton Avenue East for the Line 2 East Extension. Options are also being developed to use the Line 3 right-of-way for bus service to connect customers to Kennedy Station. For all options, variations are also being evaluated to assess different operating concepts (extend existing routes or operate a shuttle route) and technology (existing mixed fleet or dedicated electric buses). The proposed alternatives are presented in more detail in Appendix 1 Table 1.

An evaluation framework is being developed to assess the different options and to identify a preferred alternative. This assessment will take place in the second phase of the study following additional customer and public consultation.

Proposed criteria in the evaluation framework include:

- customer experience
- equity considerations
- neighbourhood and community impact
- costs
- ease of implementation
- network compatibility
- impacts on urban structure and built form

The criteria and metrics will be further developed through the feedback received from public consultations. The proposed evaluation framework is presented in more detail in Appendix 1 Table 2.

The purpose of this report is to present the planning process to date, the options developed to date, and the evaluation criteria for the assessment of a preferred alternative and to receive the Board feedback and endorsement of the options and criteria for further consultations.

Recommendations

It is recommended that the TTC Board:

1. Approve the proposed alternatives in Appendix 1 Table 1 as the basis for alternatives development;
2. Approve the Evaluation Criteria in Appendix 1 Table 2 for the technical evaluation of options; and,
3. Forward this report to the City Manager, City of Toronto; the President and CEO, Metrolinx; and, the Deputy Minister, Ministry of Transportation, for their information.

Financial Summary

The adoption of these recommendations does not directly result in any financial implications. However, additional funding will be required to fully implement any of the service alternatives.

The total project cost for the SRT Life Extension is \$132 million. This comprises the costs to the end of 2020 of \$78.320 million and funding of \$53.680 million cash flowed between 2021 and 2026. This is included in the 2021-2030 Capital Plan period under Transit Expansion Programs, as approved by the TTC Board on December 21, 2021 and City Council on February 18, 2021.

Of the \$53.680 million in the SRT Life Extension Project budget, approximately \$23 million is expected to be spent between 2021 and 2023 on keeping train service operating on Line 3. In addition to the vehicle maintenance and state-of-good repair capital costs required to maintain Line 3 operational, the reconfiguration of the bus bays at Kennedy Station and Scarborough Centre Station, and construction of transit priority measures on the streets will be necessary, irrespective of which service alternative is ultimately chosen. The design and construction of the bus bays and transit priority measures is expected to occur during 2022-2023 and there is sufficient funding included in the TTC's 2021-2030 Capital Budget and Plan to complete this work, estimated at a cost of \$21.6 million. The timing of these requirements will be updated in the 2022-2031 Capital Budget and Plan submission.

The full implementation of alternatives for bus replacement service that are currently being developed and evaluated will result in future-year operating and capital costs that are currently not funded, the details of which will be presented in the final recommendations to the Board in Q1, 2022.

Funding over and above what is currently available will be required to extend Line 3 train service beyond its current life to coincide with the anticipated completion of the Line 2 East Extension. Much of this additional work would take place beginning in 2023. The additional funding, pending the decision on the selected alternative, is required to cover:

- Up to \$85 million in capital costs for the acquisition of additional buses required for the service;
- With a partial offsetting capital credit of up to \$51.8 million representing the future residual value of any new buses purchased for the project, after the Line 2 extension is open;
- An estimated \$57 million in capital costs to modify parts of the existing Line 3 for bus operations, if this option is chosen;
- An estimated cost of \$102.1 million for the decommissioning of Line 3 (as reported to Council in April, 2019.EXEC 4.1); as well as,
- Up to an additional \$80 million in operating funding beyond the \$150 million in existing funding for SRT operations required to deliver the bus service from 2023 to 2030.

The TTC, with the City, will continue to discuss funding requirements with the Province.

The Interim Chief Financial Officer has reviewed this report and agrees with the financial impact information.

Equity/Accessibility Matters

The TTC is committed to providing accessible and inclusive service across the network. The bus replacement service for Line 3 will operate with accessible buses and would meet all applicable Accessibility for Ontarians with Disabilities Act (AODA) requirements in terms of vehicles and accessible transit stops. The stations at Kennedy and Scarborough Centre will continue to be served by buses, and these stations are already accessible with elevators and other features.

Line 3 and connecting bus routes serve numerous Neighbourhood Improvements Areas (NIAs) and equity-deserving groups in Scarborough. The bus replacement service would maintain frequent transit service to NIAs and continue to serve equity-deserving groups. Alternatives are being developed to minimize inconvenience to customers wherever possible, such as proposing to extend existing bus routes beyond Scarborough Centre Station to Kennedy Station to provide more direct service and eliminate a transfer for most customers. Transit priority measures are also being pursued wherever possible to reduce travel time and improve reliability for customers. This could include transit signal priority, queue jump lanes, and dedicated bus lanes.

The TTC recognizes the importance of reaching out and consulting with customers who are traditionally underrepresented in the planning process and are also disproportionately affected by planning decisions. To facilitate these discussions as part of the development of the Line 3 Study, the TTC is working with partners at Social Development, Finance and Administration Division to have targeted outreach with community clusters in Scarborough and residents from Neighbourhood Planning Tables. The proposed evaluation framework for alternatives assessment also includes equity considerations as a metric. This will identify customer-trips that originate from NIAs and consider the impact of the different alternatives on their journeys and weigh that effect separately.

Decision History

In the summer of 2019, the Province, through legislation, assumed responsibility for the delivery of the Line 2 East Extension (Scarborough Subway Extension project), and revised the scope of the project back to a three-stop subway extension, with a revised completion date of 2030. To ensure ongoing transit service is provided until the completion of Line 2 East Extension in 2030, several options were reviewed to provide transit service along the corridor.

The results of the options analysis were reported to the TTC Board in February 2021 and the Board approved a plan to end train service on Line 3 in 2023 and directed staff to begin developing plans for a bus replacement service and study potential future uses for the Line 3 right-of-way and legacy structures.

Issue Background

After more than 36 years of continuous operation, the vehicles on Line 3 Scarborough are now more than 10 years past their design life. While programs have already been implemented to overhaul structural, mechanical, and cosmetic requirements, the vehicles are still susceptible to breakdown, particularly in inclement weather. During hot weather, the propulsion equipment tends to overheat, and as a result, slower speeds are operated to help the system remain within tolerable limits, but this degrades the customer experience. In cold weather, snow and ice also affects the operation of the line and service suspension is not uncommon during extreme weather events. Additionally, obsolescence of key parts is further contributing to maintenance difficulties. Other sub-systems, such as signalling and electrical, are also at the end of their design life. Overall, as vehicle reliability continues to degrade with equipment failures, it will result in more frequent and unscheduled service disruptions and the required capacity to meet customer demand will not be met. As a result, customers will increasingly experience unreliable and crowded train service on Line 3.

At the February 2021 meeting, the Board approved ending train service and decommissioning Line 3 in 2023, and directed staff to replace the line with interim bus service until the Line 2 East Extension is open. The Board also directed a comprehensive consultation process to be delivered throughout the study to engage with customers on the alternatives being developed and on potential future uses for Line 3 station lands. The Board also directed staff to include a busway on the Line 3 right-of-way as part of the alternatives development, and to consult on transit priority measures for buses as part of the public consultations.

In response, staff developed a work plan that phases the study into two parts. The first part will be the initial review and alternatives development – options for the bus replacement service and adaptive re-use will be developed and shared for public consultation along with the proposed evaluation framework. The second part will take the feedback from public consultations and technical review and recommend options for the bus replacement service and next-steps for the adaptive re-use of existing Line 3 infrastructure. The second part will include further customer and public consultations to refine the proposal before presenting any recommendations for the Board to approve.

The purpose of this report is to provide an update on the status of the first part of the study, on the planning for the interim bus replacement service and the options for adaptive re-use of the Line 3 right-of-way, including legacy structures.

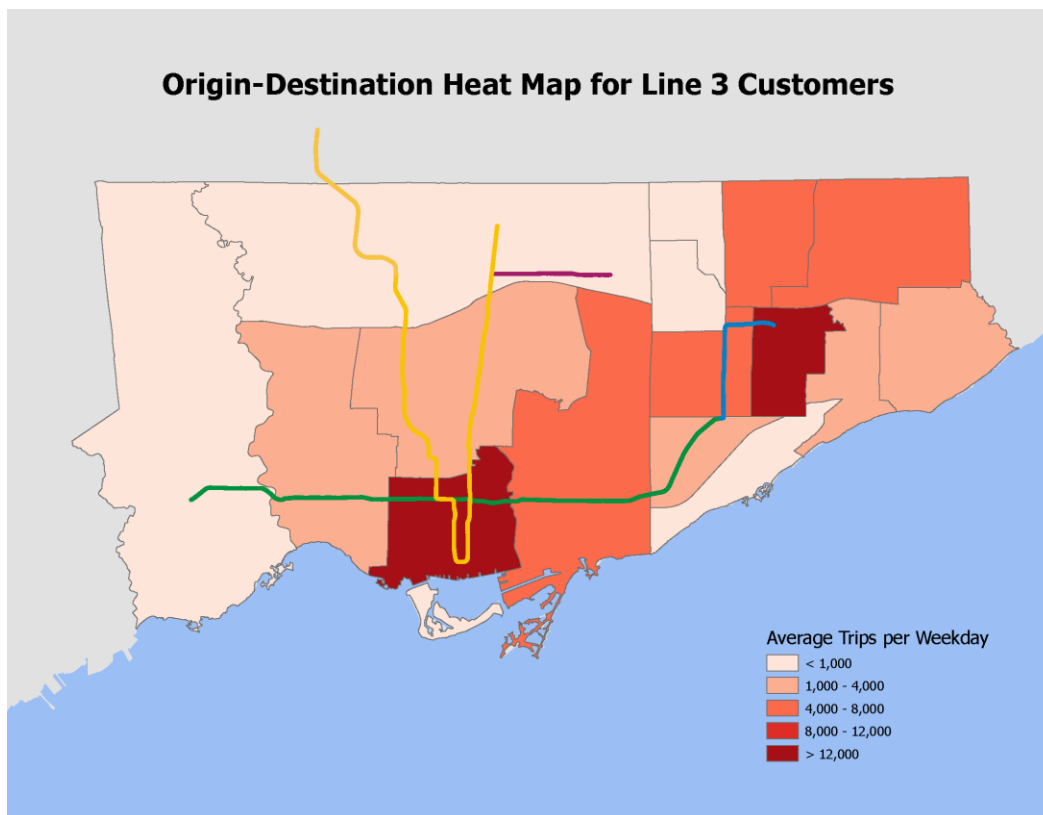
The report presents the alternative service replacement options and evaluation criteria arising from the initial technical review and public consultation.

Comments

Existing Customer Journeys

Approximately 35,300 daily customer-trips are made on Line 3 Scarborough. The majority of customers on Line 3, about 86%, have a connection with Line 2 and beyond, making the connection to Kennedy Station a critical link for Scarborough customers. Nearly 60% of these trips connect with the downtown area. Scarborough Centre is the busiest station on Line 3, and the majority of the ridership on the entire line comes from customers who transfer at that station to or from buses – approximately 19,300 daily customers. Nearly 40% of customers on Line 3 connect with central Scarborough, with Scarborough Town Centre and Centennial College as the major destinations. Figure 1 shows a heat map of the origins and destinations of Line 3 customers. These ridership statistics demonstrate the importance of maintaining an excellent connection between Scarborough Centre and Kennedy stations as they are major nodes in the transit network for Scarborough customers.

Figure 1. Origin-Destination of Line 3 Customers



On this map, the planning areas are shaded to show the percentage of Line 3 customers beginning or ending their TTC trips. A darker shade indicates a higher percentage of trips that begin or end in that district.

Planning Principles for Bus Replacement Service

The bus replacement service for Line 3 Scarborough will replace the capacity that is provided by trains in order to minimize inconvenience for customers. This means that very frequent bus service will operate in order to provide the equivalent capacity and to maintain crowding on-board buses within the Service Standards. The replacement service will also operate identical hours to the existing train hours so that coverage for customers will not be reduced.

Connections to Ellesmere Road and Lawrence Avenue East will be maintained, and new connections at these stops will now become accessible with buses (the existing stations at McCowan, Midland, Ellesmere, and Lawrence East are not accessible connections). For all alternatives under consideration, transit priority measures will be pursued wherever possible to help move customers more quickly and reliably. This will include investigating the feasibility of transit signal priority, queue jump lanes, and dedicated bus lanes similar to RapidTO. These measures will be developed in consultation with City staff.

Public Consultations

The Line 3 Study is following a two-round consultation process, with Round One focused on introducing the Study and sharing and seeking feedback on: bus route and corridor options, the proposed evaluation framework, and adaptive re-use of the Line 3 corridor and stations.

Round One ran from June 29 to July 29, 2021, and involved broad and targeted engagement activities, including:

- A **stakeholder meeting** on June 29, with organizations representing Scarborough transit advocacy groups, Scarborough community groups, and city-wide transit advocacy groups invited
- A **public survey** available June 30 to July 23, both online and as a postage-paid hard copy. Over 430 responses were received.
- A **dedicated voicemail** and **e-mail** for customers to contact the project team to learn about the Study and share feedback.

The TTC promoted the Study and public consultation through its website, social media channels, email lists, with the help of local Councillors and members of the stakeholder group, and through announcements at Line 3 stations.

The Round One consultation process also included a focus on reaching often under-represented voices through several equity-focused engagement tactics, including:

- **Meetings with Community Co-ordination Plan tables** (convened by the City of Toronto and the United Way of Greater Toronto as part of their

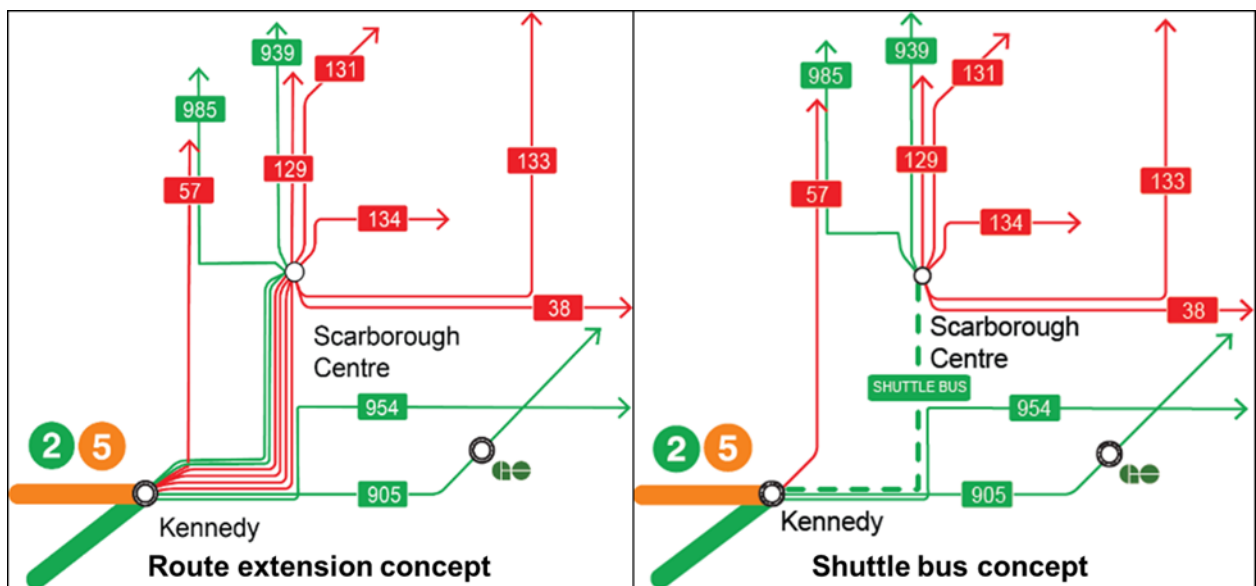
emergency response to COVID-19), including a meeting with the North Scarborough Cluster (July 14) and the South Scarborough Cluster (July 21).

- A **focus group** (July 29) with recruitment focused on resident members of the two Neighbourhood Planning Tables affected by the Line 3 Study (Kennedy Eglinton Progressive Engagement Collaborative and Southeast Scarborough Planning Table).
- **Other tactics**, including: enabling a built-in translation function on the online survey so residents speaking different languages could learn about and share feedback, and distributing hard copies of the survey through members of the Community Coordination Plan tables (over 100 hard copies shared) and to other individuals who requested to receive a copy.

Alternatives Development

There are two main service concepts for how the bus replacement service for Line 3 could operate – either as an extension of existing routes, or as a dedicated shuttle bus. The concepts are illustrated in Figure 2.

Figure 2. Service Concepts for Bus Replacement



Bus replacement service operating as route extensions would extend the major bus routes that currently terminate at Scarborough Centre Station to Kennedy Station. This will provide the majority of customers that currently use Line 3 with a transfer-free ride and provide a more convenient and faster trip. The major bus routes that are proposed to be extended to Kennedy Station include:

- | | |
|--|--|
| <ul style="list-style-type: none"> • 38 Highland Creek • 129 McCowan North • 131 Nugget | <ul style="list-style-type: none"> • 134 Progress • 939 Finch Express • 954 Lawrence East Express |
|--|--|

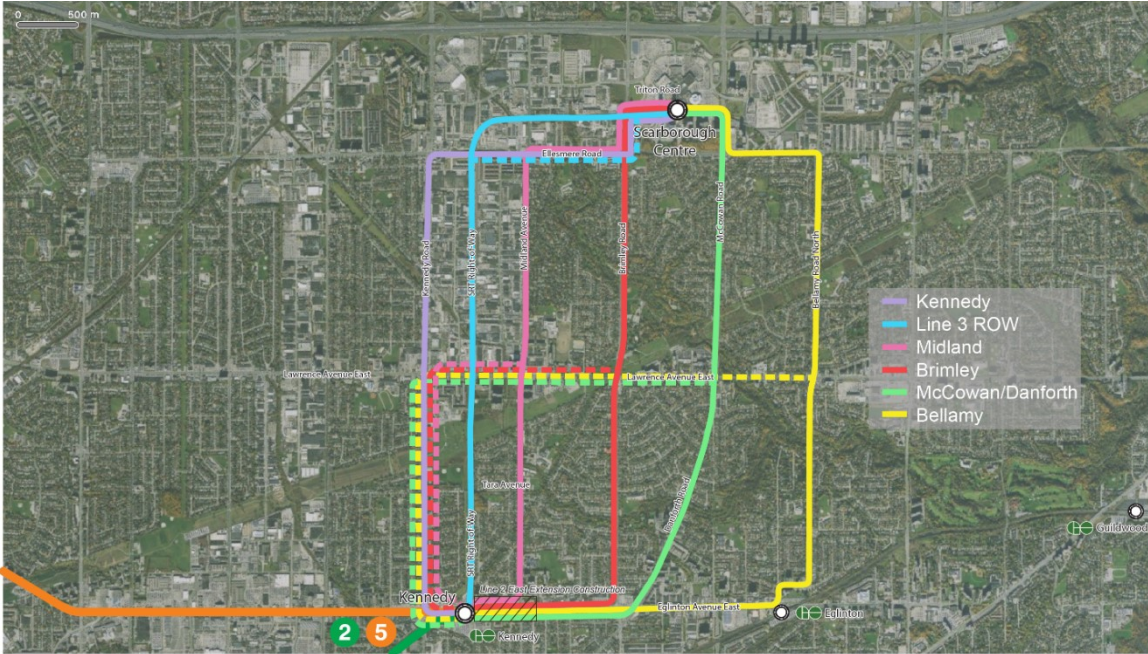
- 133 Neilson
- 985 Sheppard East Express

An online public survey collected feedback about the proposed routes, among other things, and respondents were generally supportive of the proposed route changes to extend service to Kennedy Station. Approximately 87% said they supported or were neutral about the changes. Along with the major routes being extended, the survey also received requests for a dedicated express bus to also operate between Scarborough Centre and Kennedy stations. Integration with GO Transit was also requested by customers, and is an alternative that will be studied in more detail in the second phase of this Study.

Under the shuttle bus concept, all bus routes that terminate at Scarborough Centre Station would continue to do so, and customers will need to transfer to a shuttle bus to get to Kennedy Station. This concept was initially screened out at the start of the project, but is now being considered after feedback received from stakeholder engagement and the online public survey.

As is the case in both concepts, the bus would operate express and is proposed to only serve major stops at Ellesmere Road and Lawrence Avenue East. Also common to both service concepts are the routing alternatives for how buses will connect between Scarborough Centre and Kennedy stations. The corridor options under review are shown in Figure 3. These corridor options were one of the focus of Round One stakeholder and public engagement.

Figure 3. Corridor Options



The “off-street” corridor option, shown in light blue in the map, includes retrofitting the existing Line 3 right-of-way for bus operation. Two variations are possible for

this option – for buses to operate the entire length of the existing right-of-way between Kennedy and McCowan stations; or, for buses to operate only on the at-grade, north-south portion between Kennedy and Ellesmere stations, and then for buses to operate via Ellesmere Road and Brimley Road to Scarborough Centre Station, with transit priority, in order to provide a more direct and fast journey for customers.

The “on-street” corridor options include: Kennedy Road, Midland Avenue, Brimley Road, McCowan Road/Danforth Road, and Bellamy Road North. Buses could operate on one of these streets, or a combination of these streets, to connect between Scarborough Centre and Kennedy stations. Where feasible, variations for each corridor are also being evaluated, with buses operating via Lawrence Avenue East and Kennedy Road. This is being considered to help mitigate anticipated construction delays along Eglinton Avenue, east of Kennedy Station, for Line 2 East Extension construction work.

The resulting combination of service concepts and corridor options that are being evaluated are summarized in **Appendix 1 Table 1**.

Through the online survey, the strong majority of customers indicated preference for the bus replacement service to operate on the Line 3 right-of-way. More than 70% of survey respondents ranked that option as their most preferred. Brimley and Midland were the next most preferred routes after the off-street option.

Proposed Evaluation Framework

In addition to the routing alternatives, the TTC also shared during Round One the proposed evaluation framework that will be used to help assess the alternatives. This was intended to capture feedback from the public to help confirm that the TTC would evaluate the bus replacement service with criteria that customers also found important. The proposed evaluation criteria to assess the routing alternatives include:

- Customer experience
- Neighbourhood and community impact
- Ease of implementation
- Costs
- Impacts on urban structure and built form
- Equity considerations
- Network compatibility

A detailed description of each criteria is summarized in **Appendix 1 Table 2**.

Through the online survey, the majority of respondents indicated positive support of the proposed evaluation criteria. Although the proposed criteria are not weighed relative to each other, customer experience and equity were viewed by most respondents as the most important criteria. In the next phase of technical work, a sensitivity analysis will be done on the evaluation criteria to confirm their order of magnitude.

Line 3 Right-of-Way Conversion

In order to pursue the off-street option of retrofitting the existing Line 3 right-of-way to accommodate bus operation, an engineering feasibility study is being undertaken. The study will consider relevant standards and regulations for bus operation and the constructability of any changes that may be required, including looking at the decommissioning of any elements no longer required for train operations. Early findings from the engineering feasibility study confirms that the existing Line 3 right-of-way can be converted to accommodate buses, and the existing station structures will not impact bus operation. Further details about the right-of-way conversion will be available in the next phase of this Study when routing recommendations are presented. Subject to the finalization of this Study, the proposed alternative in the shuttle bus concept that would consider guided-bus technology on the Line 3 right-of-way could be screened out as the technology would not be required and the existing fleet would not need to be retrofitted to operate on the right-of-way.

E-Bus Technology and Compatibility

As the TTC transitions its fleet to battery-electric buses, the buses operating on the replacement service will increasingly be made up of e-buses. By 2030, more than 50% of the TTC bus fleet will be electric. As a result, the operating strategy for the bus replacement service will be compatible with this new technology and will support the future composition of the TTC's fleet. The replacement bus service will be scheduled around the range limitations of e-buses. A larger Fleet Electrification Study is currently underway and will ultimately identify which routes may necessitate on-route charging at bus terminals.

Inter-Dependencies and Other Co-ordinated Projects

RapidTO: Bus and Streetcar Priority

As supported by the TTC's 5-Year Service Plan and 10-Year Outlook, the City of Toronto and the TTC are developing a comprehensive network of surface transit priority corridors along arterial roads through the use of tools, such as bus lanes, intersection and signal improvements, and customer amenity improvements at transit stops. Any transit priority measures that are required from this project to help facilitate the effective transport of customers between Scarborough Centre and Kennedy stations will be co-ordinated with the RapidTO program so that a cohesive strategy is implemented for this part of the city.

GO Bus Relocation from Scarborough Centre

GO and intercity buses will need to relocate from the existing Scarborough Centre bus terminal so that those bays currently occupied by regional and intercity carriers can be reassigned back to the TTC. More bus bays will be needed by the TTC in order to accommodate the increase in service from the bus replacement service. The TTC is working with GO and Metrolinx and the City of Toronto on relocating their services within the Scarborough Centre area to

ensure that customers will still be able to have a high-quality transfer between regional and intercity services with the TTC.

Line 2 East Extension

TTC staff understand that Metrolinx and their contractors will begin construction for Line 2 East Extension starting in 2021. This subway extension will eventually replace the Line 3 bus replacement service in 2030 when it is scheduled to open for service. Until then, the construction for the subway extension will impact surface road operations and delays will need to be managed to minimize impact on bus customers. The bus terminal at Kennedy Station will also be a hub for construction activity for the subway extension. The bus replacement service planning will be cognizant of these construction impacts, and alternatives are being developed to avoid construction where possible. TTC, City, and Metrolinx staff continue to meet on this issue. This will also be assessed in the proposed evaluation framework under customer experience and neighbourhood and community impact.

Discussions about the funding for the Line 3 Bus Replacement and Line 3 decommissioning works continue between the TTC, the City, and the Province.

2022 Annual Service Plan

The TTC's 2022 Annual Service Plan (ASP) will implement changes across the network to connect customers to Line 5 Eglinton. Some of these changes could affect the bus replacement service, particularly if the route extension concept is advanced. Proposed changes, such as the 954 Lawrence East Express route being extended farther west from its present terminus at Lawrence East Station, will alter the base assumptions for the route extension concept and further adjustments to the 954 express route will be required. The 2022 ASP also proposes to reduce the bus service on 34 Eglinton East, which will largely be replaced by the LRT. This will help reduce the amount of bus traffic destined to Kennedy Station and will make the operation of the bus replacement service more manageable. These proposals, among others, for the 2022 ASP will be presented to the Board for consideration in Q4 2021.

Adaptive Re-use

The TTC is also working with the City to evaluate alternate uses for Line 3 infrastructure that may no longer be required for transit operations. As part of the online public survey, respondents provided feedback on potential future uses for the corridor and station lands. Figure 4 highlights an example of what is covered by "corridor" and "station lands". Active transportation and the development of a linear park/urban green space were the most popular alternatives for the corridor. For the re-use of existing station buildings, different stations gathered different preferences. Lawrence East, Ellesmere, and Midland stations emerged with more respondents preferring the development of community and cycling hubs, while enhanced active transportation connectivity was the most preferred for Scarborough Centre Station, and enhanced public plaza for McCowan Station.

This feedback will be used by the City and the TTC to develop recommendations for the adaptive re-use study, which will also be informed by the technical recommendation for the bus replacement service and determination of what infrastructure will ultimately become available for adaptive re-use.

Figure 4. Image of Line 3 Infrastructure – Station Structure and Corridor Highlighted



Project Timeline

A detailed project timeline has not yet been developed. This will be undertaken as part of the detailed analysis that would follow Board approval of the routing alternatives and the evaluation criteria. A high-level timeline is attached as Appendix 2. Key highlights on this timeline are:

- Detailed design of the required bus terminal expansions would take place in the first half of 2022.
- GO Transit and intercity carriers would have to vacate their space at Scarborough Centre Station in the fall of 2022. The exact date will be determined as soon as possible, to assist GO in their planning for an alternative bus stop location.
- Expansion of the bus terminals would take place from fall 2022 to fall 2023.
- Train service would end in fall 2023, once bus terminal expansion is complete.
- Construction of transit priority measures on the on-street routings would take place in the spring and summer of 2023
- Bus service would start using on-street routings the day after train service ends.
- If chosen as the preferred option, conversion of the Line 3 right of way for bus operation would begin after train service ends in fall 2023, and could be complete by the fall of 2025, at which point the bus service

would move from on-street routings to the new busway on the former Line 3 right-of-way.

All of these times and project stages are subject to further review and refinement.

Next Steps

Subject to Board approval, the TTC will process the proposed alternatives through the evaluation framework and identify leading options to take for further analysis. This will be delivered in the second phase of this Study. Further public engagement will then be delivered on the leading options and a recommendation will be formed after consulting with stakeholders and customers. A final report on the bus replacement plan is targeted for January 2022.

Contact

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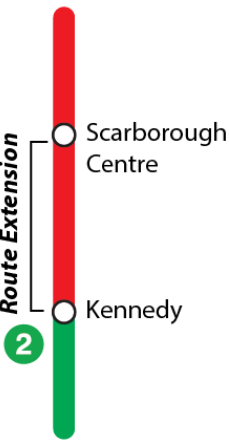






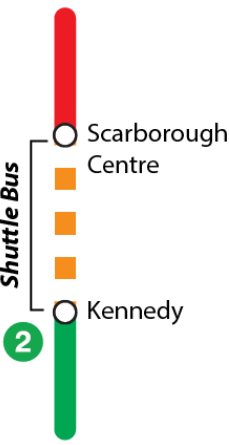









Kathleen Llewellyn-Thomas, P.Eng.
Chief Strategy and Customer Officer

Attachments

Appendix 1 – Proposed Options and Evaluation Criteria
Appendix 2 – Line 3 Bus Replacement Timeline

Appendix 1 Table 1 – Proposed Options for Evaluation

		Corridor Options		
		Replacement Service on Entire Line 3 ROW	Replacement Service on Partial Line 3 ROW	Replacement Service on On-Street*
Legend  Mixed-fleet  Electrific bus  Guided-bus				
		Fleet Options		
Operating Concept Options	Route Extension 	 	 	 
	Shuttle Bus 	  	 	 

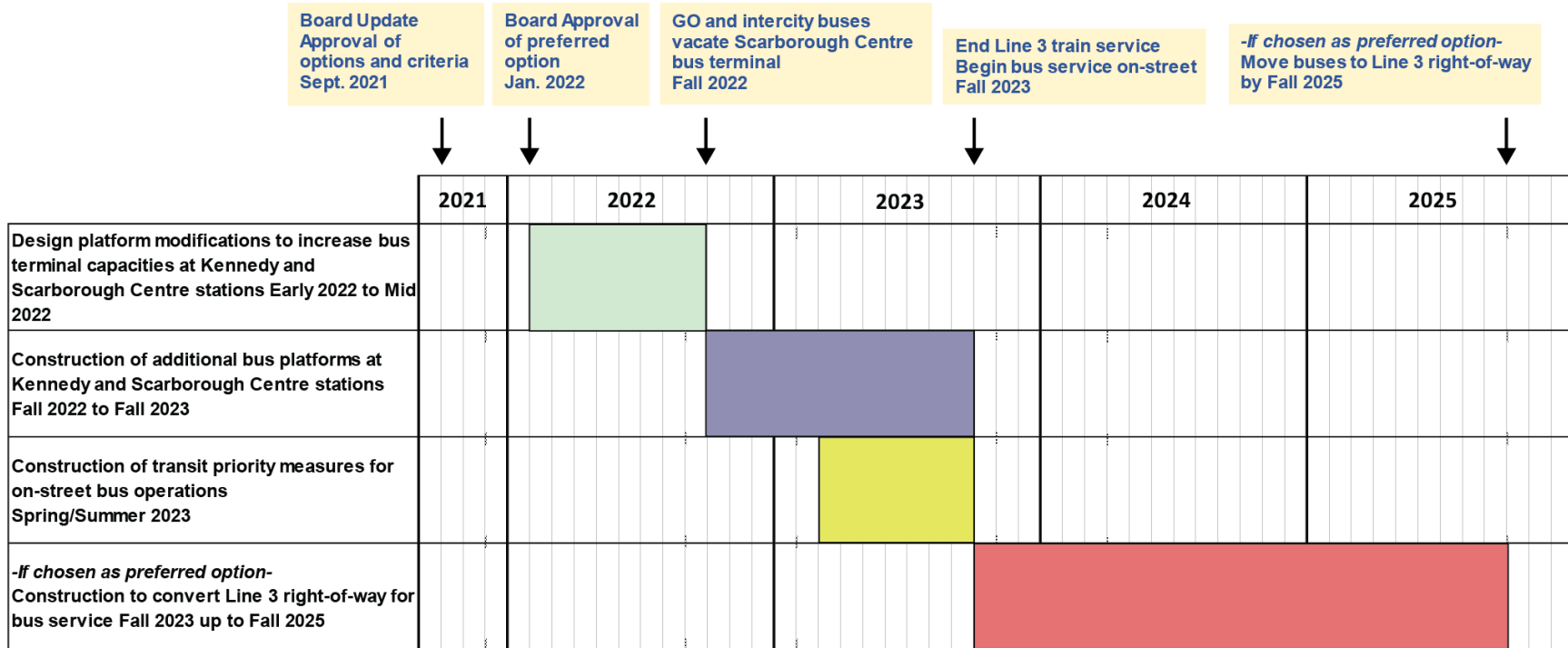
* On-street options include: Kennedy, Midland, Brimley, McCowan/ Danforth, and Bellamy

Appendix 1 Table 2 – Proposed Evaluation Criteria

	Customer Experience	Neighbourhood and Community Impact	Ease of Implementation	Impacts on Urban Structure and Built Form	Equity Considerations	Costs	Network Compatibility
Definition	Quantitative assessment of in-vehicle travel times, transfers, and service reliability between the different service options	Qualitative and quantitative assessment of the impact of frequent bus service operating along the corridors to residents, local communities, and other traffic	Qualitative assessment on the constructability of necessary infrastructure changes to implement the bus service extension	Qualitative assessment of any built form changes from the different routing options, including any impact to the adaptive re-use on Line 3 corridor and station lands	Quantitative assessment on the journey time changes for customers from equity seeking areas, and qualitative consideration of impacts on Neighbourhood Improvement Areas (NIAs)	Quantitative assessment on the total operating, maintenance, and capital costs to implement the bus replacement service (not including any costs related to adaptive re-use of Line 3 corridor or station lands)	Qualitative assessment of implication to network operations by the alternative and impacts to existing infrastructure
Metrics	<ul style="list-style-type: none"> - Travel time - Transfers - Reliability 	<ul style="list-style-type: none"> - Traffic and safety - Noise - Environment and climate change 	<ul style="list-style-type: none"> - Duration of construction - Length of time to implement - Proven in-service operability - Engineering feasibility 	<ul style="list-style-type: none"> - Support for Line 3 ROW adaptive re-use 	<ul style="list-style-type: none"> - Change in journey times for NIAs 	<ul style="list-style-type: none"> - Operating costs - Capital costs 	<ul style="list-style-type: none"> - Vehicle reliability - Legacy use for transit operations - Technological and infrastructure risk

Appendix 2

Line 3 Bus Replacement Service Timeline - Draft, and subject to change



Risks :

Delays to the completion of Line 5 Eglinton project - could delay TTC ability to reconfigure bus platforms at Kennedy
 Line 2 East Extension - planned early works and planned tunnelling works could delay TTC ability to reconfigure bus platforms at Kennedy