



**For Action  
with Confidential Attachment**

## **Line 2 Modernization – Next Steps on New Subway Train Procurement and Automatic Train Control**

**Date:** September 16, 2024  
**To:** TTC Board  
**From:** Chief Executive Officer

### **Reason for Confidential Information**

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A position, plan, procedure, criteria, or instruction to be applied to any negotiations carried on or to be carried on by or on behalf of the City or local board.

### **Summary**

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The Line 2 Bloor-Danforth Subway is critical infrastructure, connecting communities through 31 stations across 26.2 kilometres from Etobicoke to Scarborough. More than 130 TTC bus routes, and 19 regional routes through MiWay, GO Bus, GO Rail, and Union Pearson Express connect to Line 2, making it an integral part of the system that keeps Toronto and the region moving. Current forecasts indicate demand is expected to grow by 18% by 2041, with an increase in daily boardings to 661,000 by 2041.

Given the subway line's importance, advancing Line 2 modernization is a key objective (2.4) in the TTC's [Corporate Plan 2024- 2028 & Beyond, Moving Toronto, Connecting Communities](#). First opened in 1966, Line 2's current fleet of 61 trains will be 30 years old (end of design life) starting in 2026. The current fixed-block signalling system is aged technology, with some sections in service for 58 years (commissioned between 1966 and 1980). Although this system is safe, its reliability is declining despite extensive preventive and corrective maintenance efforts. Replacing the signalling system is essential to meet increased ridership demand and to provide a more reliable service.

In November 2023, the Board considered the report [New Subway Train Procurement and Implications for Line 2 Modernization and Future Growth](#). The report restated the urgent need for investment in 55 new subway trains for Line 2 and upgrading the signalling system to Automatic Train Control (ATC). These investments are complemented by the renewal of the Greenwood Signalling, Carhouse and Shop and ongoing state-of good-repair programs. The report outlined capital investment scenarios and detailed the associated risks of delayed procurement, including increasing sunk costs, reduced service reliability on Line 2, and loss of opportunity to add additional service capacity to support future growth.

The TTC has been seeking full funding to relaunch the Request for Proposals (RFP) for the new train procurement – a key milestone on the critical path to advance Line 2 modernization. Based on a current estimated cost of \$2.274 billion for 55 new trains,

one-third contributions were sought from Provincial and Federal partners to match available City funding.

The Province committed \$758 million through Premier Ford and Mayor Chow's Ontario-Toronto New Deal Agreement. The Province also committed to fully fund 15 additional trains required for the opening of the Yonge North Subway Extension and Scarborough Subway Extension (see Attachment 1).

In August 2024, the Federal government confirmed the TTC is eligible under the Baseline Funding Stream of the Canada Public Transit Fund (CPTF), and the procurement of replacement subway trains are eligible for funding. The TTC's funding allocation will be communicated after the application intake process closes this month (see Attachment 2).

The Baseline Funding stream is a \$500 million annual envelope for transit authorities across Canada, to be distributed based on a combination of ridership (70%) and population (30%). It is anticipated the TTC's allocation under this funding stream will be sufficient to secure the \$758 million in required Federal matching funding for the 55 replacement trains. **Upon confirmation of the Federal funding allocation, the TTC will issue the RFP for new trains to market**, and work with Housing, Infrastructure and Communities Canada to finalize the approvals process on an accelerated basis. The RFP for ATC will only be issued to market once the RFP for new trains is launched.

The TTC has taken the opportunity to refine the procurement process for the New Subway Trains and ATC. Details of the procurement approach for each project are provided in Confidential Attachment 1 (New Subway Trains) and Confidential Attachment 2 (ATC).

The report provides an update on the TTC's progress to maintain the existing Line 2 in a state of good repair and to modernize through asset renewal. The Ontario Ministry of Transportation, Housing, Infrastructure and Communities Canada, Metrolinx and the City of Toronto were consulted in the development of this report.

## Recommendations

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It is recommended that the TTC Board:

1. Delegate authority to the Chief Executive Officer to execute any transfer payment and/or contribution agreements required with the Province of Ontario and the Government of Canada to receive funding for new subway trains subject to terms and conditions satisfactory to the TTC's General Counsel.
2. Direct the Chief Executive Officer to issue a Request for Proposals (RFP) for a new subway train procurement upon confirmation of full funding availability, and subject to Confidential Attachment 1, for a base order of 70 trains total, which includes:
  - a. 55 replacement trains for Line 2;

- b. 15 expansion trains for the Yonge North Subway Extension and Scarborough Subway Extension to be fully funded by the Province of Ontario; and
  - c. Options within the RFP to procure up to 42 future growth trains required for Line 1 and Line 2 to be exercised at a future date subject to additional funding being secured.
3. Direct the Chief Executive Officer to issue a Request for Proposals for the delivery of Automatic Train Control (ATC) on Line 2, subject to Confidential Attachment 2, and conditional on the approval and execution of Recommendation 2 above.
4. Authorize that the information contained in Confidential Attachments 1 and 2 be released publicly upon the issuance of final contracts as set out in Recommendations 2 and 3 above.
5. Forward this report to the City of Toronto, Housing, Infrastructure and Communities Canada, Ontario Ministry of Transportation and Metrolinx for information.

## **Financial Summary**

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### **Line 2 Modernization Estimates Subject to Competitive Procurement**

The [TTC's 2024-2033 Capital Budget and Plan](#) and updated [15-Year Capital Investment Plan](#) reflect the cost and schedule for the new train procurement, ATC, Greenwood upgrades and associated infrastructure based on the scenario of launching the RFP for new trains in spring 2024. The TTC's 10-Year Capital Plan has funding in place for ATC and Greenwood Yard. The Capital Plan also includes a one-third share for the 55 replacement trains at an estimated total final cost of \$2.274 billion. Table 1 below reflects the estimated costs related to the Line 2 components.

The final cost of the new subway trains is subject to the competitive RFP process. The estimate produced was based on market conditions in 2023. Table 1 does not reflect the cost of the additional 15 trains to be included in the base order to be fully funded by the Province (see Attachment 1). Economies of scale should be achievable through an increased base order size improving per unit cost. This will be determined through the RFP process in accordance with parameters outlined in Confidential Attachment 1. The final cost of ATC for Line 2 is also subject to a competitive procurement process in accordance with parameters outlined in Confidential Attachment 2.

### **Costs Incurred to Date to Maintain a Contingency Option**

The TTC proceeded with contingency planning, as reported in November 2023, while still pursuing full funding to relaunch the new train order.

To date, the TTC has incurred \$1.2 million to advance contingency plans in parallel to assess the required scope for a T1 Life Extension Overhaul (LEO) given the uncertainty that has existed to date about the ability to proceed with a train procurement. In addition, a procurement process is underway to advance the feasibility of further extending the life of the existing fixed block signal infrastructure of Line 2 post-2035 in

the event ATC is unable to proceed. These parallel programs will be paused once final approval for the new trains has been received.

**Table 1. Approved 2024-2033 Capital Budget and Plan – Line 2 Key Projects (\$Millions)**

| Project/Program   | Start   | End   | Estimated Final Cost (EFC) | Life to Date and Approved Funding 2024 -2033 | CIP Unfunded 2024-2038 |
|---|---------|-------|----------------------------|--|------------------------|
| <b>Line 2 Fleet</b>   |         |       |                            |  |                        |
| 55 Replacement Trains   | 2020    | 2035* | \$2,274                    | \$758  | \$1,516                |
| T1 Fleet 30-year SOGR   | 2024    | 2032  | \$163                      | \$163  | 0                      |
| T1 LEO Assessment Study   | 2023    | 2025  | \$5                        | \$5  | 0                      |
| <b>Line 2 Infrastructure</b>  |         |       |                            |  |                        |
| Line 2 ATC  | 2020    | 2035  | \$881                      | \$608  | \$273                  |
| Line 2 Fixed-Block SOGR   | Ongoing |       | \$224                      | \$212  | \$12                   |
| Greenwood Yard Modifications  | 2020    | 2033* | \$727                      | \$716  | \$11                   |
| Notes:  |         |       |                            |  |                        |
| <ul style="list-style-type: none"> <li>• ATC Line 2 is fully funded by the City 2024-2033, unfunded amount post-2033.</li> <li>• Line 2 Fixed-Block Signal SOGR, and ongoing Line 2 SOGR includes unfunded amounts post-2033.</li> <li>• *Cost estimates (\$2024) and schedules subject to refinement as project lifecycle progresses, and market pricing available through procurement.</li> </ul> |         |       |                            |  |                        |

### Input to the 2025 Budget Process

The TTC’s 2025-2034 Capital Budget and Plan submission will be updated to reflect full funding for the 55 new trains, subject to receiving the final funding approval from the Federal government under the CPTF Program. The TTC will also prioritize funding for the new 10th year of in-flight projects such as Greenwood and ATC Line 2. Ongoing SOGR programs for Line 2 infrastructure are also being reviewed as part of the 2025 Budget process in support of effective capital coordination.

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

### Equity/Accessibility Matters

The geographic coverage and seamless integration of the TTC’s multi-modal system enables the TTC to serve equity-deserving communities across Toronto. The TTC serves a diverse population, and the organization’s commitment to equity and accessibility is reflected in the planning and delivery of services. Investment in new

trains and the modernization of Line 2 is critical to ensure the TTC can provide a high-quality service to those who rely on transit every day. Procurement of new trains will ensure efficient use of resources to replace vehicles at end of life, create opportunity to add capacity to the system to meet future demand, and help maintain a modern and increasingly inclusive and accessible transit system.

The TTC supports individuals with accessibility needs by working toward barrier-free, accessible services and facilities that enable all individuals the freedom, independence, and flexibility to travel anywhere on the transit system. The TTC will continue to ensure that new vehicles meet all relevant standards under the Accessibility for Ontarians with Disabilities Act (AODA), leverage international best design practices, and work closely with the Advisory Committee on Accessible Transit (ACAT) to identify opportunities for continuous improvement.

## **Innovation and Sustainability Matters**

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In 2023, TTC's subway trains delivered over 167 million passenger trips – all completely zero-emissions. Subway trains are powered by electricity and have no direct greenhouse gas emissions (GHG). Further, the use of public transit over higher carbon transportation alternatives, such as the personal automobile, avoids the production of community wide GHG emissions by approximately 220,000 metric tonnes of carbon dioxide equivalent (CO<sub>2</sub>e) annually. The City depends on this subway train procurement to meet its commitment of net zero community-wide emissions by 2040.

The TTC is also committed to innovation and the search for emerging technologies that enhance rider experience and service reliability, including predictive maintenance systems and advanced predictive technologies. By actively engaging during the design phase of procurements, by fostering industry partnerships, and hosting innovation challenges, the TTC aims to harness new technology solutions.

## **Decision History**

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The following summarizes recent Board decision history. Please see the November 22, 2023 report for prior decision history.

**November 22, 2023: New Subway Train Procurement and Implications for Line 2 Modernization and Future Growth.** The report outlined the investments required to modernize and sustain a reliable service on Line 2, accommodate growth on Line 1, and unlock wider system benefits. The report discussed three scenarios where the timing of funding for new trains would determine options to be pursued and the resulting impacts. Report: [New Subway Train Procurement and Implications for Line 2 Modernization and Future Growth](#). Decision: [TTC Board Decision](#)

**December 20, 2023: TTC's 2024-2038 Capital Investment Plan (CIP): A Review of Unfunded Capital Needs.** The Board endorsed the 2024-2038 CIP (\$47.855 billion), and the 2024-2038 Real Estate Investment Plan. The 2024 CIP identified \$35.457 billion in unfunded requirements predominantly for state of good repair, including critical fleet and asset replacement/renewal, such as the Line 2 subway trains.

Report: [TTC's 2024-2038 Capital Investment Plan: A Review of Unfunded Capital Needs](#). Decision: [TTC Board Decision](#)

**February 22, 2024:** The TTC received **City Council Transmittal – CC13.2 Ontario-Toronto New Deal Agreement**. The Board adopted the recommendations to implement commitments in the New Deal pertinent to the TTC. The agreement included a Provincial commitment of \$758 million to 55 Line 2 replacement trains, with funding conditional on matching Federal funding. The Province also confirmed the TTC train procurement would be leveraged to purchase 15 trains for the Scarborough Subway Extension and Yonge North Subway Extension, fully funded by the Province.

Report: [City Council Transmittal – CC13.2 Ontario-New Deal Agreement](#)  
Decision: [TTC Board Decision](#)

**May 16, 2024:** **TTC Corporate Plan 2024-2028 and Beyond: Moving Toronto, Connecting Communities** sets the strategic objective 2.4 - *Prioritize Asset State-of-Good-Repair to Keep the System Moving Reliably*, supported by Action 2.4.3 - *Preserve Line 2 subway reliability by modernizing with new trains and Automatic Train Control*.

Report: [TTC Corporate Plan 2024-2028 and Beyond: Moving Toronto, Connecting Communities](#). Decision: [TTC Board Decision](#)

**June 20, 2024:** **Financial and Major Projects Update for the Period Ended April 27, 2024**. The TTC provides quarterly updates on major capital projects. A supplementary presentation and backgrounder was presented to the Board focusing on the critical risk of insufficient funding for new subway trains. The Board directed staff to launch a letter campaign on September 24, 2024, if Federal funding is not committed by that date.

Report: [Financial and Major Projects Update for the Period Ended April 27, 2024](#)  
Presentation: [Spotlight on New Subway Train Procurement](#).  
Decision: [TTC Board Decision](#)

**July 17, 2024:** **Prioritizing TTC Asset State of Good Repair to Keep the System Moving Reliably – 2025 Capital Budget** focuses on the state of good repair and compliance with health, safety, and legislated requirements as the first priority within the TTC's 2024-2038 CIP. The report reaffirmed SOGR is the priority, and the Line 2 replacement trains and associated subway infrastructure SOGR requirements are included as priority areas for investment.

Report: [Prioritizing TTC Asset State of Good Repair to Keep the System Moving Reliably – 2025 Capital Budget](#). Decision: [TTC Board Decision](#)

## **Issue Background**

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### **Line 2 is Critical Infrastructure Requiring Investment**

The Line 2 Bloor-Danforth Subway spans 26.2 kilometres making connections through 31 stations to more than 130 TTC bus routes, Line 1 Subway, and 19 regional routes through MiWay, GO Transit, and Union Pearson Express. With the expansion of Line 2 by an additional three stations via the Scarborough Subway Extension, and the Line 2 interchange with the Ontario Line project expected in the 2030s, the subway line continues to be an essential part of the network that keeps Toronto moving.

Current forecasts indicate Line 2 demand is expected to grow by 18% by 2041, with an increase in daily boardings to 661,000 by 2041. Consider, that currently:

- To replace Line 2 capacity, the TTC would need to provide approximately 600 bus trips per hour across an already congested road corridor.
- In the busiest hour during the morning rush, demand on Line 2 is more than 30,000 people in one direction, equivalent of replacing 27,000 cars.
- Line 2 moves more than three times the number of people per day than the Gardiner Expressway, which has a daily volume of 140,000 cars (or 155,000 people at 1.1 people per car).

Advancing Line 2 modernization is a key objective (2.4) in the TTC’s Corporate Plan. Line 2’s current fleet of 61 T1 trains will be 30 years old (end of design life) starting in 2026 and will be approaching 35 years by the time the first new trains are delivered in 2030 if procurement starts now (see Table 2). The current fixed-block signalling system is aged technology and will be approaching 70 years in various segments at the time of expected replacement (see Table 3). Investment in Line 2 is necessary to sustain existing subway services and enable capacity enhancements to meet growth.

**Table 2. Line 2 T1 Fleet at 30-Year Design Life**

| Year  | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | Total |
|---|------|------|------|------|------|------|-------|
| Number of T1 Trains Reaching End of Design Life by Year | 4    | 10   | 15   | 14   | 13   | 5    | 61    |

**Table 3. Line 2 Fix Block Signaling System Age**

| Line 2 Section                             | In Service Date | End of Design Life | Current Age (2024) | Replacement Age in 2035* | Replacement Age in 2040** |
|--|-----------------|--------------------|--------------------|--------------------------|---------------------------|
| Keele to Woodbine                          | 1966            | 1996               | 58                 | 69                       | 74                        |
| Keele to Islington and Woodbine to Warden  | 1968            | 1998               | 56                 | 67                       | 72                        |
| Islington to Kipling and Warden to Kennedy | 1980            | 2010               | 44                 | 55                       | 60                        |

\*Assumes ATC cutover in 2035 under recommended option to proceed with RFP in 2024.  
 \*\*Assumes ATC cutover can be achieved by 2040 in the contingency option under assessment.

## Line 2 Investment Decision – Modernize or Extend Asset Life

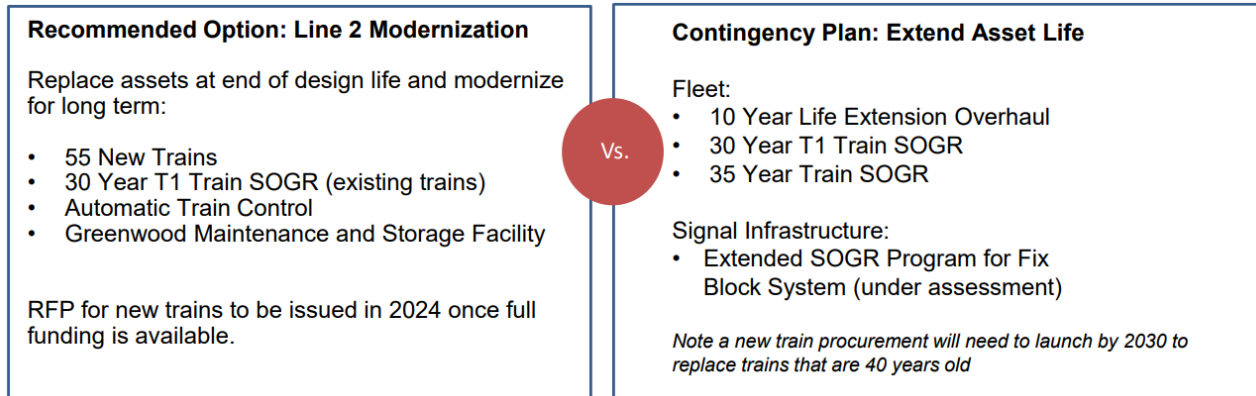
In 2020, the TTC allocated funding to key projects and programs to begin the modernization of Line 2. This included allocating available funding for implementation of ATC, upgrades to Greenwood Yard, and one-third funding toward new subway trains to replace the T1 Fleet. These interdependent projects are anchored on the timely procurement of new subway trains.

In June 2023, the TTC cancelled a procurement with four qualified bidders for a base order of 80 trains (55 for Line 2 replacement and 25 for Line 1 growth) due to insufficient funds to proceed at the time. This resulted in updated scenario planning. The [November](#)



[2023 Board report](#) outlined iscenarios, which ultimately presented two options for Line 2 based on adjusted timelines for procuring new trains, summarized in Figure 1 below:

Figure 1. Line 2 Investment Options

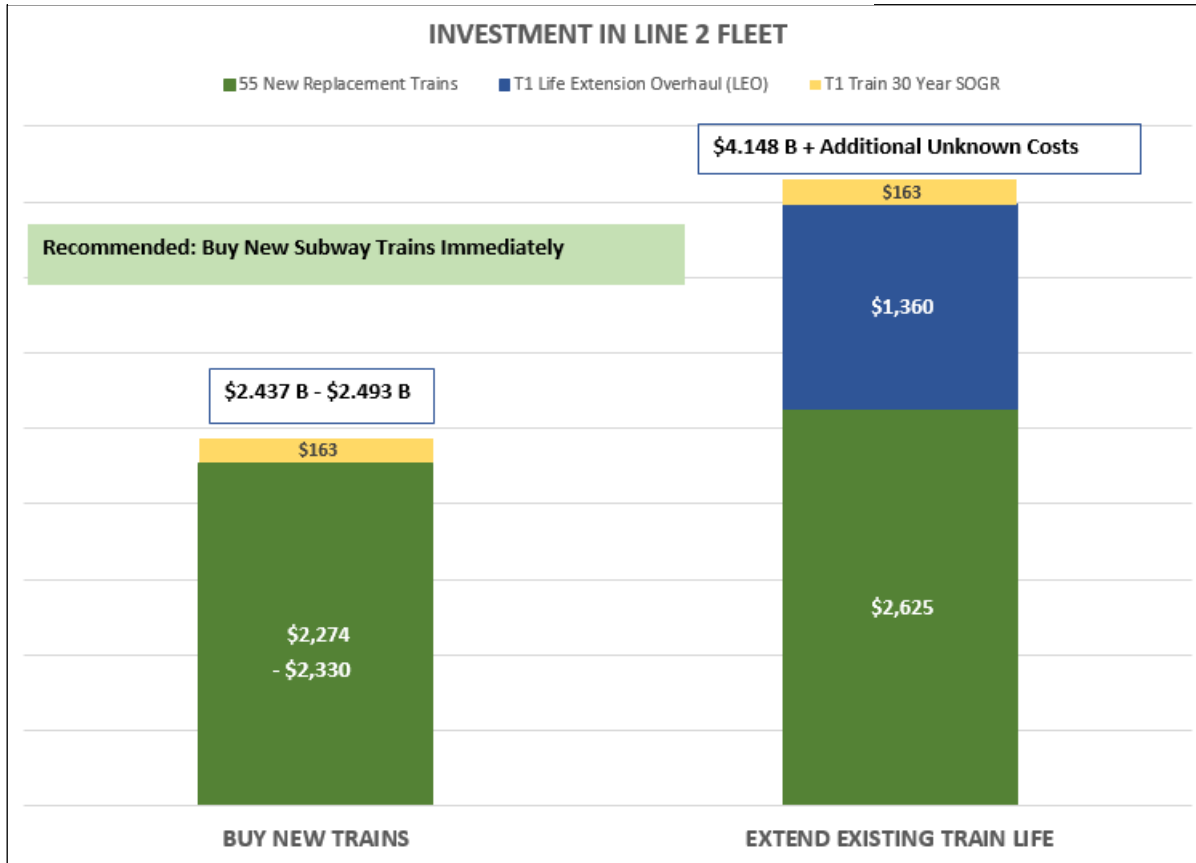


The report identified the need for full funding to be secured for new trains by Q1 2025 at the latest. If not achieved, the recommended option for Line 2 would be abandoned and all City funding secured in plan would be redirected to implement a Life Extension Overhaul of the existing Line 2 trains. This would result in temporary measures being implemented in the immediate term with available funding, despite the overall option being more costly long term. Figure 2 summarizes the following fleet costs per option:

- **Recommended Option:** Procure 55 replacement trains at an estimated cost of \$2.27 billion. A 30-Year SOGR program is also needed for the existing T1 trains as they will approach design life before full fleet replacement based on new train delivery timelines. This has an estimated cost of \$163 million.
- **Contingency Plan Option:** This includes an initial estimate of \$1.36 billion to undertake a Life Extension Overhaul (LEO) to extend the life of the T1 trains to a 40-year asset life. A new train procurement would need to commence within five-to-six years due to lead time for procurement and delivery, at an early estimated cost of \$2.63 billion. Additional costs are also associated with extending the asset life of the signal infrastructure and a 35-Year SOGR program for the T1 fleet – these costs are subject to further assessment and not included in Figure 2.



Figure 2. Cost Comparison of Options for Line 2 Fleet



In summary, the cost of delaying a train procurement another five-to-six years will result in nearly doubling the level of investment needed on the Line 2 fleet, in addition to other unknown costs for Line 2. Buying new trains in the immediate term unlocks the opportunity to modernize Line 2 and enable growth, support sustainable transportation choices, and development of transit-oriented communities. If required to maintain existing trains and assets past design life, this will introduce risks to operations, reduce service reliability, and prevent the opportunity to add additional service capacity to support growth despite transit expansion already underway.

### Train Requirements to Support Growth and Network Expansion

Securing full funding to invest in new Line 2 trains unlocks the opportunity to address broader subway network needs associated with forecasted growth and Provincially planned network expansion. The full train requirements for Line 2 and Line 1 were summarized in the November 2023 report based on current available demand projections and target service headways. Requirements also are based on an indicative service concept for opening day. The Scarborough Subway Extension is assumed to open in 2030 and the Yonge North Subway Extension in 2032, which will be updated as Metrolinx progresses with the planning and delivery of the subway extensions.

By 2041, Line 2 requires a total fleet of 66 new subway trains, and Line 1 a total fleet of 122 trains, inclusive of the existing 76 Toronto Rocket (TR) Subway Trains. The new

train RFP is being established to enable options for the TTC to secure required growth trains for Line 1 needed in the immediate term, and additional trains in the future to fully meet 2041 service requirements, as outlined below:

Line 2:

- **By 2032:** 62 higher-capacity trains are required<sup>1</sup>. Of this total, 55 new trains are to replace the existing 61 T1 trains to deliver 25.5 trains per hour (141-second headway) at the AM peak point. Seven trains are required for the opening day service on the Scarborough Subway Extension.
- **Beyond 2032:** Four additional trains are required on Line 2 to deliver 30 trains per hour (120-second headway) at the AM peak point. ATC on Line 2 is also required to enable an improved headway to be achieved.

Line 1:

- **By 2032:** 25 additional trains are required to increase Line 1 capacity to deliver 34.3 trains per hour (105-second headway) at the AM peak point. Eight trains are also required for Yonge North Subway Extension opening day service.
- **Beyond 2032:** 13 additional trains would be required to increase Line 1 capacity system-wide and deliver 36 trains per hour (100-second headway) at AM peak point.

Table 4 provides a high-level summary of the fleet needs and forecasted service requirements. The actual availability of fleet to meet service requirements depends on the procurement and delivery of trains and additional maintenance and storage capacity. This information informed the development of options in the new train RFP.

**Table 4. Summary of Current Forecasted Line 2 and Line 1 Service Requirements (AM Peak)**

| Horizon Year                              | Line 2          |        | Line 1 |        |
|---|-----------------|--------|--------|--------|
|   | 2032            | 2041   | 2032   | 2041   |
| In-Service Trains                         | 52              | 58     | 94     | 106    |
| Total Trains                              | 66 <sup>1</sup> | 66     | 109    | 122    |
| Trains per Hour                           | 25.5            | 30.0   | 34.3   | 36.0   |
| Peak Point Capacity (pphpd <sup>2</sup> ) | 27,900          | 33,000 | 37,700 | 39,600 |
| Peak Point Crowding                       | 99%             | 95%    | 97%    | 97%    |

Establishing a base train contract for 55 Line 2 trains and the purchase of 15 trains for opening service of Yonge North Subway Extension and Scarborough Subway Extension enables options for the procurement of trains to support growth and meet future fleet requirements. The advancement of Line 2 modernization is identified as a key objective (2.4) in the TTC’s Corporate Plan, in support of the strategic direction to attract new

<sup>1</sup> The new trains will have capacity for 1,100 passengers per train. The existing T1 fleet has capacity for 1,000 passengers per train. As a result, 55 trains are required to replace the existing 61 T1 trains. Note in 2032, Line 2 would need to operate a mix of T1 fleet and new trains.

<sup>2</sup> Passengers per hour peak direction (pphpd)

riders and retain customer loyalty. Modernizing Line 2 is also a prerequisite to build subway network capacity to support long-term growth to 2041, another key objective (3.1). The report provides an update on the status of Line 2 modernization activities.

## Comments

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### 1. Update on Funding for the New Train Procurement

*Provincial Commitment: 1/3 Funding for 55 Trains, and 100% Funding for 15 Trains*

Provincial funding for the 55 replacement trains was confirmed in November 2023, as part of the Ontario-Toronto New Deal Agreement. Funding was conditional on Federal and municipal matching funding. Attachment 1 of this report contains correspondence from the Ministry of Transportation reconfirming the Provincial commitment of \$758 million. In addition, the Province has committed to fully fund 15 additional trains for the Yonge North Subway Extension and Scarborough Subway Extension. The Province will leverage the TTC-managed train procurement in order to secure required trains for expansion. This would increase the base order size of the procurement to 70 trains.

As agreed to in the [Ontario-Toronto Agreement in Principle](#), endorsed by the Board and City Council in July 2024, the TTC will be the asset owner of the 15 trains being procured for Yonge North Subway Extension and Scarborough Subway Extension.

*Federal Funding Commitment: 1/3 Funding for 55 Trains*

The Federal government launched the Canada Public Transit Fund (CPTF) on July 17, 2024. The CPTF intends to provide up to \$3 billion annually as a permanent source of transit funding across the country, delivered through three funding streams (see Table 5). The TTC is seeking to utilize the Baseline Funding stream to secure more timely approval and access to Federal funding to advance the new train procurement process. The TTC will seek to maximize available funding under the CPTF for other critical TTC priorities and will provide information as CPTF details become available for the next stage of the Metro-Region Agreements and Targeted Funding streams.

The TTC submitted an Expression of Interest for the Baseline Funding stream on July 17, 2024. The TTC has confirmed with Federal government officials (Attachment 2) that:

- Replacement trains for Line 2 are an eligible project under the CPTF.
- Funding allocation will be formula-based using ridership (70%) and population (30%) of the pool of eligible recipients. Based on this approach, the TTC has estimated sufficient funding should be available within the envelope to accommodate the \$758 million Federal share of funding between fiscal years 2026/27 and 2036/37.

The Federal government has indicated communication of the allocation under the Baseline Funding stream will occur after September 16, 2024 (Attachment 2). Note, on September 13<sup>th</sup> the deadline for transit agencies to submit an initial application for the Baseline Funding stream was extended to September 30, 2024. The TTC will be invited to submit a Capital Plan application that includes the subway train replacement project.

The TTC has shared detailed project information and the TTC's Capital Investment Plan with the Federal government in advance to support the next steps of the process.

Given the risks to interdependent capital projects and programs, and potential cost implications to further delay in the procurement, it is recommended the RFP be issued to market upon Federal confirmation of the funding allocation under the Baseline Funding stream. Finalizing the remaining steps in the process and approvals will need to occur over Q4 2024.

Recommendation 1 of the report requests the Board to delegate authority to the CEO to enter into any funding agreements with the Provincial and Federal governments to receive matching funding for the new subway trains.

**Table 5. Canada Public Transit Fund (CPTF): Funding Streams Overview**

| Baseline Funding  | Metro-Region Agreements  | Targeted Funding  |
|---|--|---|
| <p><b>\$500 Million Annually</b> – Allocated Nationally (\$5 Billion over 10 Years)</p>   | <p><b>\$2 Billion Annually</b> – Allocated Nationally (\$20 Billion over 10 Years)</p>   | <p><b>\$500 Million Annually</b> Allocated Nationally (\$5 Billion over 10 Years)</p>   |
| <p><b>Program Design:</b></p> <ul style="list-style-type: none"> <li>Stable, predictable funding toward routine growth and rehabilitation, such as system expansion, extension of assets lifecycle, state-of-good-repair, and/or transit performance improvements.</li> <li>Up to 10 Year Agreements with communities with eligible transit systems</li> <li>Maximum Federal contribution of 40% of eligible costs for capital projects.</li> </ul> | <ul style="list-style-type: none"> <li>Stable, predictable funding geared to regions with highest funding demand and complex transit systems.</li> <li>Funding to support diverse projects, including planning and feasibility studies, major transit expansion based on priorities outlined in an Integrated Regional Plan. Projects may also include transformational investments that build new subways, dedicated bus lines, and to maintain and sustain health of an existing system.</li> <li>Up to 10-Year Agreements with local government/transit agency partnerships within or adjacent to a Census Metropolitan Area, and with support of the Provincial government.</li> </ul> | <ul style="list-style-type: none"> <li>Targeted intake process for applications based on Federal priorities.</li> <li>Could include rural and remote transit, active transportation, transit solutions in indigenous communities, zero emissions solutions.</li> <li>Single project agreements targeted at communities of all sizes.</li> </ul> |
| <p><b>Process:</b></p> <ul style="list-style-type: none"> <li>Stage 1: Submit an Expression of Interest (EOI) by September 30, 2024<sup>3</sup></li> <li>Stage 2: Federal department to notify of notional allocation and invite submission of Capital Plan Application.</li> <li>Funds to flow in 2026/27.</li> </ul>  | <ul style="list-style-type: none"> <li>Stage 1: Metro-Regions submit an EOI (partner agencies and Province express interest).</li> <li>Stage 2: Integrated Regional Plan submission.</li> <li>Stage 3: Metro Region Agreement entered into.</li> <li>Stage 4: Project Funding Applications.</li> <li>Stage 5: Contribution Agreements.</li> <li>Funding to flow in 2026/27.</li> </ul>   | <ul style="list-style-type: none"> <li>Details pending.</li> </ul>  |
| <p><b>Status:</b></p> <ul style="list-style-type: none"> <li>Opened July 17, 2024.</li> <li>EOI Application submitted July 17, 2024.</li> <li>Notice of eligibility received August 13, 2024.</li> <li>Awaiting allocation confirmation</li> </ul>  | <ul style="list-style-type: none"> <li>Opened July 17, 2024, for EOI from partner agencies, and Province in a CMA</li> <li>EOI process is being coordinated by Ontario Ministry of Transportation. Further details pending.</li> </ul>   | <ul style="list-style-type: none"> <li>Details pending</li> </ul>   |

<sup>3</sup> Note: The deadline for transit agencies to submit an Expression of Interest was extended from September 16<sup>th</sup> to September 30<sup>th</sup>. Extension to the deadline occurred on September 13, 2024.

## 2. New Subway Trains Procurement

Subject to final confirmation of Federal funding of \$758 million being available for the new trains, the TTC will restart the competitive Negotiated Request for Proposals (NRFP) to procure 70 new subway trains. This includes:

- 55 trains to replace the T1 trains operating on Line 2, with one-third funding from each order of government; and
- Seven trains for the Scarborough Subway Extension and eight trains for the Yonge North Subway Extension funded 100% by the Province.

The contract will also include options to enable the procurement of 42 additional trains at a future date subject to additional funding being secured. This includes:

- 25 trains for growth on Line 1 to accommodate demand to 2032; and
- 17 trains for service maturity on Line 1 (13 trains) and Line 2 (four trains) to accommodate demand to 2041.

**Table 6. Summary of RFP Structure and Subway Fleet Plan Requirements to 2041**

|   | Line 1 | Line 2 | RFP        |
|---|--------|--------|------------|
| <b>Existing Fleet</b>                         | 76     | 64     | n/a        |
| <b>New Train Procurement</b>                  |        |        |            |
| Replacement                                   |        | 55     | Base Order |
| Metrolinx Expansion – Opening Day (SSE, YNSE) | 8      | 7      | Base Order |
| Growth Trains – 2032 Service                  | 25     |        | Option     |
| Growth Trains – 2041 Service                  | 13     | 4      | Option     |
| <b>Total Fleet (Existing + New Trains)</b>    | 122    | 66     |            |

The need to secure funding for 25 additional growth trains for Line 1 continues to be necessary to provide capacity to meet Line 1 service demand as previously reported. A maintenance and storage facility is also needed for Line 1. The TTC will provide an update on Line 1 once updated demand projections are available, including the latest information on Metrolinx’s forecasted opening date for the Yonge North Subway Extension.

The design of the new subway trains to be procured will be similar in form to the Toronto Rockets operating on Line 1, but with additional features to improve accessibility and the customer and employee experience. The design will comprise of:

- A six-car train composed of three coupled married pairs and allows for six-car and four-car operations.
- Each pair can operate on its own in yards, such as Greenwood.

- Open gangways between the cars and married pairs.
- Cars will be integrated with Automatic Transit Control (ATC).
- Trains will also consist of a full-width cab, including an emergency evacuation detrainment device and cab entry doors on both sides.
- Enhanced seating layout, which will improve capacity and passenger flow, increasing passenger capacity compared to Line 2 legacy fleet by at least 10%.
- Have accessibility features, including, but not limited to, blue seats, a Mobility Device Area, a Multi-Purpose Area, Wi-Fi, and Digital wayfinding screens for better passenger information.

Figure 3. Rendering of New Subway Train for Illustration Only



Confidential Attachment 1 provides further information on the procurement process for the new subway trains. Recommendation 2 of the report requests the Board to authorize the issuance of the RFP for the new train procurement subject to Confidential Attachment 1, and upon the Federal contribution allocation amount being confirmed.

The TTC will be seeking to improve upon the estimated per unit cost per train with an increased base order size of 70 trains and the inclusion of options for future trains subject to additional funding being secured through an open, competitive procurement.

Assuming the TTC can launch the RFP this fall, the following key milestones are anticipated:

- **Q4 2024:** Procurement for new subway trains and ATC commences.
- **Q1 2026:** Contract Award for the new subway trains.
- **2030 to 2035:** Delivery of the 55 trains and 15 trains for expansion.
- **2034/35:** Last T1 Train retired from Line 2, enabling phased cutover to ATC



As previously reported, the delay in funding commitments for the new trains resulted in the cancellation of the original RFP in spring 2023. The RFP has been on hold until full funding is made available. Consequently, the existing T1 fleet on Line 2 will require a 30-Year SOGR program. Since the T1 fleet will begin reaching their 30-Year design life in 2026, this program will ensure state of good repair for the additional three-to-four years required until the first new train is delivered (assuming above milestone dates). The TTC is advancing work to scope this SOGR program, and it is currently estimated to cost \$163 million. This is funded in the TTC's 10-Year Capital Plan.

The procurement of new trains for Line 2 is also being closely coordinated with the procurement of Line 2 ATC given the interdependency between the two projects.

### **3. Automatic Train Control (ATC) Procurement**

ATC is a key component of modernizing Line 2 and implementation of this new signalling system is dependent on new trains to optimize the benefits. Once the RFP is issued for the subway train procurement, it is recommended that the TTC also issue the RFP for the delivery of ATC on Line 2.

The procurement of the ATC system for Line 2 will be a competitive and open process, which will allow industry-wide Communications-Based Train Control (CBTC) suppliers to participate and yield the most competitive pricing for the Line 2 ATC contract. The requirements set out in the RFP have been developed to ensure the most appropriate ATC solution is provided to meet the future Line 2 capacity needs, while optimizing the efficient, effective, and safe operation of Line 2.

The competitive procurement will incorporate lessons learned from the implementation of ATC on Line 1 and allow for the evaluation based on technical, safety, and new subway train requirements. Future service planning and operational assessments have also been reviewed to support the competitive procurement strategy.

As outlined in Confidential Attachment 2, the scope of the procurement includes the design and implementation of ATC from Kipling to Kennedy on Line 2, the onboard equipment for the new Line 2 subway trains and maintenance work cars (non-revenue fleet), and all other supporting infrastructure required for the delivery of the Line 2 ATC system. Confidential Attachment 2 also outlines several additional options as part of the procurement process, including the option for onboard equipment for future growth trains, and the option for the implementation of ATC on the Scarborough Subway Extension (subject to further discussion with the Province and Metrolinx). These options will be exercised later subject to additional funding to be secured for each option.

The RFP for Line 2 ATC does not include a Crossline Train Operation (CTO) feature for trains to move between Line 1 and Line 2. The requirement for CTO has been reviewed based on existing and future service plans, and operational needs assessment. It has been determined that CTO is not a requirement for day-to-day service for Line 1 and Line 2. There are also technical challenges that arise with CTO on the revenue fleet with one of the main constraints being that the trains on Line 1 are a permanent six car consist with a fixed ATC Train-Borne equipment configuration, whereas the expected new trains for Line 2 will consist of three married pair cars that will be dynamically

configured. The dynamic configuration for the Line 2 ATC Train-Borne equipment is not supported by the ATC Line 1 system architecture. It should be noted that to support the CTO feature, additional funding would be required to redesign and upgrade the existing Line 1 ATC system to accommodate CTO.

Confidential Attachment 2 provides further details on the RFP strategy for ATC. Recommendation 2 of the report requests the Board to authorize the issuance of the RFP for ATC on Line 2 subject to Confidential Attachment 2.

Assuming the launch of the RFP in fall 2024, the following key milestones are anticipated:

- **Q4 2024:** procurement for new subway trains and ATC commences.
- **Q4 2025:** Contract Award for ATC Line 2.
- **2027 to 2035:** Design, installation and test and commissioning.
- **2034/5:** Last T1 train retired from Line 2, enabling phased cutover to ATC.

As previously reported, the TTC will continue to support a SOGR program for the Line 2 fixed-block signal infrastructure system to sustain the aging infrastructure until ATC is operationalized. Key considerations include co-ordination with other critical SOGR works along the line, and priority initiatives, such as the implementation of cellular services (Rogers). As part of the contingency planning efforts, the TTC initiated a feasibility assessment to determine if extending asset life of the fixed-block signal system post-2035 was possible. Outputs from this work will inform ongoing SOGR planning for Line 2 until ATC is implemented.

#### **4. Update on Interdependent Line 2 Capital Programs**

##### *Greenwood Carhouse, Shop and Yard Signalling*

A key component of Line 2 modernization efforts includes modifications to Greenwood to accommodate the replacement trains, support maintenance requirements and other infrastructure enhancements. Funding has been provided in the 10-Year Capital Plan for Greenwood Signalling, Carhouse and Shop as it is acknowledged that replacement trains will eventually need to be procured in any possible scenarios. This project work is underway. As of August 2024, the following progress has been made:

- Facility Carhouse Modifications: The project design scope baseline (30%, Stage Gate 3) was approved in April 2024. The detailed design (to 100%) is in progress and expected to be completed by Q2 2025. The construction of the carhouse modifications is forecasted to be complete by 2030, in line with expected schedule for the first new train delivery.
- Overhaul Shop Modifications: Modifications to the shop to accommodate fleet maintenance needs of the new fleet are being designed, in addition to replacement of HVAC systems. The design concept is in development (Stage Gate 2). The construction of the shop modifications is forecasted to be complete by 2033.

- Yard Signalling: A signalling technology solution (Computer-Based Interlocking (CBI) with Train Stops) was selected to replace and upgrade the existing signal system in the yard. The system will protect 100% of yard vehicle movements against red signal violations and is like the solution that was implemented at Wilson Yard. Implementation of the yard signalling system is forecasted to be complete by 2033.

The above scope of the Greenwood investments is currently estimated to cost \$727 million and is fully funded in the 10-year plan. The investment will upgrade the signalling system and modify the Carhouse and Shop to support Line 2 service requirements. The TTC is incorporating the Toronto Green Standard and will include the Net Zero requirements into its design as directed by City Council.

#### *Other Subway State of Good Repair*

Efforts to modernize Line 2 also require close coordination with ongoing state-of-good repair of the Line 2 infrastructure beyond just the signal system and the T1 fleet. In addition to the major project investments in new trains, ATC, and Greenwood, the TTC's Capital Investment Plan includes other key programs to maintain critical system assets. The 2024-2033 Capital Budget and Plan maintains steady-state funding for essential safety and SOGR capital work to ensure safety and reliability of TTC systems. Examples of key Line 2 SOGR works include:

- **Non-Revenue Fleet**: Mid-life overhaul, complete rebuilds and significant upgrades to the TTC's fleet of workcars to ensure reliability and availability for the subway systems operating maintenance and capital rehabilitation/construction work.
- **Linear Infrastructure**: Replacement of critical track assets (mainline and yards) as well as the rail re-profiling program to maximize the life and value of rail assets.
- **Communications**: SOGR replacement for communications systems that play a vital role in the day-to-day operations of the TTC by providing a direct link between Operators, Transit Control, platforms, and emergency services.
- **Traction Power/Power Distribution**: SOGR replacement for the electrical assets that feed power to the subway system.

As highlighted in the July 17, 2024, report on prioritizing SOGR, there is an immediate investment need in the next five years of \$313.4 million for the Line 1 subway TR mid-life overhauls, and subway infrastructure programs for facilities (i.e. escalators, stations renewals) and systems (i.e. communications, traction power). This is being identified as a priority area for investment in the 2025 Budget process underway.

## **5. Enabling Future Capacity to Meet 2041 Demand and Beyond**

The investment in Line 2 modernization is a pre-requisite to building network capacity to support long-term growth to 2041. As reported, an active train procurement enables options to be made available, subject to additional funding, to procure growth trains for both Line 1 and Line 2. Enhancing the capacity of Line 1 and Line 2 is required to enable the benefits of in-flight transit network expansion projects to be achieved:

- *Line 1 Capacity Enhancement Program:* The TTC has been advancing initial planning, design, and implementation of key elements of the L1CEP Program to improve capacity along Canada’s busiest subway line. By 2041, daily boardings on Line 1 are currently projected to increase to more than 1.3 million, a 55% increase from 858,000 in 2019. Demand will also be impacted by the future YNSE extension. In addition to the growth and expansion trains required for Line 1 (see Table 4 above), a new Line 1 Train Maintenance and Storage Facility will be required, including enhanced station capacities and system upgrades to support increased trains and customers on the line. Through the program, the TTC aims to achieve more frequent service levels by 2041, enabling Line 1 to move 39,600 passengers per hour at peak times.
- *Line 2 Capacity Enhancement:* As outlined in Table 4, the TTC will need a total fleet of 66 Line 2 trains by 2041 to meet service requirements. The current priority focus for Line 2 is addressing SOGR through modernization. Longer-term station capacity enhancements and systems upgrades will be required to meet demand to 2041 and beyond. Following the renewal of Greenwood, a future maintenance and storage yard will be required (Western Yard) to facilitate long-term demand. The TTC will undertake a full assessment of this long-term need including updated estimates, facility needs and schedule, which may require medium-term interventions.

The Line 1 and Line 2 Capacity Enhancement Programs are not fully funded and are reflected in the TTC’s Capital Investment Plan as growth programs for future investment subject to funding availability. As outlined in the November report and previous long-range planning studies, increasing capacity of these lines will be essential to support future growth and facilitate transit expansion already underway.

The TTC in partnership with the City has started the process of updating the demand model to undertake updated long-range demand forecasts to 2051. This work will support any necessary refinements to the timing of target headways required, plus other network needs to support future demand. Population forecasts indicate that by 2051 there will be more than 3.65 million people living in Toronto. With more transit-supportive land uses, constrained road space, and an expanded network through new Provincial expansion projects, the demand for transit is expected to continue to grow. Building capacity of the base network will be key to realize the benefits of further expansion. A separate report to the Board will be prepared to provide updates on the Line 1 needs.

## **6. Next Steps**

The report provides recommendations on the procurement for the new subway trains and ATC. The TTC is working closely with officials at Housing, Infrastructure and Communities Canada to finalize the remaining steps in the application process for the Federal share of train funding under the Canada Public Transit Fund. Upon confirmation of available funding, the TTC will issue the RFP. Failure to move forward in the coming months with the issuance of an RFP for new trains and ATC will result in increased risk to Line 2 service reliability, with consequences for customer and employee experience.

## Contact

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## Signature

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Greg Percy  
Interim Chief Executive Officer

## Attachments

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Attachment 1 - Correspondence from Ontario Ministry of Transportation  
Attachment 2 - Correspondence from Housing, Infrastructure and Communities Canada  
Confidential Attachment 1 - Procurement of New Subway Trains  
Confidential Attachment 2 - Procurement of Automatic Train Control System

Ministry of Transportation

Ministère des Transports

Office of the Deputy Minister

Bureau du sous-ministre

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August 9, 2024

277-2024-8121

Richard J. Leary  
Chief Executive Officer  
Toronto Transit Commission  
1900 Yonge Street  
Toronto, Ontario M4S 1Z2

Dear Mr. Leary:

I am writing to reconfirm the Province of Ontario's support for 55 new subway trains for the Toronto Transit Commission's (TTC) Line 2. As announced by Premier Ford and Mayor Chow on November 27, 2023, through the Ontario-Toronto New Deal (New Deal), the province will commit \$758 million, subject to matching municipal and federal funding, for the procurement of 55 new subway trains for the TTC's Line 2 to ensure the safety and reliability of the subway network.

As per the terms of the New Deal, this funding will support the purchase of 55 new subway trains on Line 2 to replace assets that are reaching their end of life. Metrolinx will also leverage the TTC-managed procurement to purchase 15 additional trains, fully funded by the province, for the Scarborough Subway Extension (SSE) and Yonge North Subway Extension (YNSE).

Recognizing the importance of this project as an opportunity to enhance current capacity, support future ridership demand through new transit infrastructure, and connection to the provincial priority projects, the province encourages the TTC to:

- enter into an agreement with Metrolinx that will enable Metrolinx to leverage the procurement for the purchase of the 15 YNSE and SSE trains.
- prioritize the delivery of Automatic Train Control (ATC) signaling system for Line 2.
- ensure transit vehicles are procured in accordance with the Provincial Canadian Content for Transit Vehicle Procurement Policy.

We will continue to engage the city and the TTC in the coming months on this procurement and the necessary downstream agreements. At the same time, we will continue to collaborate with the federal government to provide funding and ensure their active participation.

Sincerely,

A handwritten signature in cursive script that reads "Doug Jones".

Doug Jones  
Deputy Minister of Transportation

Cc: The Honourable Prabmeet Sarkaria, Minister of Transportation  
Councillor Jamaal Myers, Board Chair, Toronto Transit Commission  
Paul Johnson, City Manager, City of Toronto  
Karen Thorburn, Executive Director, Corporate Initiatives, Toronto Transit Commission  
James Pearce, Assistant Deputy Minister (A), Transit Division, Ministry of Transportation



Ottawa, Canada  
K1P 0B6

August 30, 2024

Bruce Macgregor  
Interim Chief Executive Officer  
Toronto Transit Commission  
1900 Yonge Street  
Toronto, Ontario M4S 1Z2

Dear Bruce Macgregor:

Congratulations on your appointment as Interim CEO for the Toronto Transit Commission.

I'm writing to follow up on a discussion with the outgoing CEO, Rick Leary, on July 16, 2024, about the Toronto Transit Commission's (TTC) intention to move forward with the procurement of replacement subway cars for Line 2, for which \$758 million in federal funding is being sought. Mr. Leary had inquired about the possibility for the TTC to seek support under the new Canada Public Transit Fund (CPTF). Now that the CPTF has been announced and the TTC has submitted its Expression of Interest under the Baseline Funding stream, I believe this is an opportune time to outline the process moving forward.

I can confirm, as per the letter from Minister Fraser to Councilor Jamaal Myers on August 13, 2024, that the TTC is eligible under the Baseline Funding stream. The Baseline Funding stream is part of the CPTF and will disburse an annual envelope of approximately \$500 million to transit authorities across Canada to help with their regular capital needs.

Under the Baseline Funding stream, eligible transit agencies may receive funding for up to 40 percent of their capital projects. The procurement of rolling stock, such as the replacement of subway cars, is an eligible category for funding as the intent of Baseline Funding is to support investments in public transit system expansions, improvements, and state of good repair.

The TTC's funding allocation from the \$500 million envelope will be calculated based on a combination of ridership (70 percent) and population (30 percent). Housing, Infrastructure and Communities Canada will communicate your notional allocation after September 16, 2024, when the Expression of Interest intake period is currently slated to close.

...2



Once the Expression of Interest is complete and eligible applicants have been informed of their allocations, the TTC will be invited to submit a Capital Plan application that details the projects for which the TTC would like to use its Baseline allocation. The TTC would be able to submit the Line 2 subway car replacement as a project within the capital plan.

Please note that projects contained within the Capital Plan application may be subject to environmental assessment and Indigenous consultation requirements, climate resilience and greenhouse gas assessments, and housing conditions.

Thank you once again for your ongoing partnership and we look forward to continuing our work together to enhance public transit in Toronto.

Please accept my best regards.

Sincerely,

A handwritten signature in black ink, appearing to read "Kelly Gillis". The signature is fluid and cursive, written in a professional style.

Kelly Gillis  
Deputy Minister of Housing, Infrastructure and Communities

c.c. Kyla Marrin  
Manager, Government Relations and Policy