

# EGLINTON EAST LRT

## INITIAL BUSINESS CASE

MAY 2022

# Table of Contents

- 1. Executive Summary..... 3
  - 1.1. Introduction..... 3
  - 1.2. Summary of Initial Business Case Key Findings ..... 5
  - 1.3. Next Steps ..... 6
  
- 2. Introduction..... 9
  - 2.1. Purpose ..... 9
  - 2.2. Background..... 9
  - 2.3. Problem Statement .....10
  - 2.4. Project Objectives .....11
  - 2.5. Options Considered .....20
  
- 3. Strategic Case ..... 23
  - 3.1. Strategic Case Key Findings.....24
  - 3.2. Evaluation of Rapid Transit Evaluation Framework Criteria.....26
  
- 4. Economic Case ..... 38
  - 4.1. Economic Case Key Findings .....38
  - 4.2. General Assumptions.....38
  - 4.3. Costs .....39
  - 4.4. Impacts .....41
  - 4.5. Cost-Benefit Analysis Adjustments .....43
  
- 5. Financial Case..... 44
  - 5.1. Capital Cost Estimates.....44
  - 5.2. Operational and Maintenance Cost Estimates .....45
  - 5.3. Additional Cost Impacts .....45
  
- 6. Deliverability and Operations Case..... 46
  - 6.1. Deliverability and Operations Case Key Findings.....46
  - 6.2. Engineering/Technical Considerations .....46
  - 6.3. Operational and Service Planning Considerations .....49
  - 6.4. Project Governance and Capital Project Delivery Considerations .....49
  
- 7. Conclusions..... 51
  - 7.1. Summary of Initial Business Case Key Findings .....51
  - 7.2. Next Steps .....52

## List of Tables

Table 1: Summary of Key Findings .....	5
Table 2: Overview of the Rapid Transit Evaluation Framework .....	23
Table 3: Strategic Case Key Findings .....	24
Table 4: Summary of Choice Measures .....	26
Table 5: Summary of Experience Measures.....	27
Table 6: Summary of Social Equity Measures .....	29
Table 7: Summary of Shaping the City Measures .....	32
Table 8: Summary of Healthy Neighbourhoods Measures .....	33
Table 9: Summary of Public Health and Environment Measures.....	34
Table 10: Summary of Supports Growth Measures.....	36
Table 11: Economic Case Summary Present Value (\$ millions, 2022) .....	38
Table 12: Capital Costs (\$ billions, 2022) .....	39
Table 13: Lifecycle Maintenance Costs Breakdown (\$ millions, 2022) .....	40
Table 14: Annual Operating and Maintenance Costs (\$ millions, 2022) .....	40
Table 15: Present Value Costs (\$ millions, 2022 present value).....	41
Table 16: Total User Impact (\$ millions, 2022 present value) .....	42
Table 17: External Impacts Present Value (\$ millions, 2022).....	43
Table 18: Cost-Benefit Adjustment Present Value (\$ millions, 2022).....	43
Table 19: Capital Cost Estimates .....	44
Table 20: Operational and Maintenance Cost Estimates.....	45
Table 21 Summary of Key Findings .....	51

## List of Figures

Figure 1: Option 1 (Base Case).....	4
Figure 2: Option 2 (Eglinton East LRT).....	4
Figure 3: OPA 456 – Map 4 – Higher-Order Transit Corridors.....	13
Figure 4: OPA 456 – Map 5 – Enhanced Surface Transit Network.....	14
Figure 5: Designated NIAs in the City of Toronto .....	16
Figure 6: Planned and Proposed Residential Development along the Eglinton East LRT Corridor .....	18
Figure 7: Planned and Proposed Non-Residential Development along the Eglinton East LRT Corridor.....	19
Figure 8: Option 1 (Base Case).....	20
Figure 9: RapidTO Eglinton East Bus Lane.....	21
Figure 10: Option 2 (Eglinton East LRT) .....	22
Figure 11: NIAs along the Eglinton East LRT .....	31

# 1. Executive Summary

## 1.1. Introduction

The purpose of this Initial Business Case (IBC) is to assess the Eglinton East LRT project as compared to a base case (or do nothing scenario), in order to determine a preferred option for further design and analysis.

A business case for transit investment is prepared to gather and present evidence to support decision making and to answer the following fundamental questions:

- Strategic Case: Is a project supported by a robust case for change that fits with wider public policy objectives?
- Economic Case: Can it be demonstrated that the project shows good value for money?
- Financial Case: Is the project financially affordable?
- Deliverability and Operations Case: Is the project achievable?

A Preliminary Options Analysis for the Eglinton East LRT project was prepared previously in 2016. That analysis considered two LRT project options – one extending to Sheppard Avenue East and Morningside Avenue, the other terminating at UTSC. Both of these options were found to outperform the base case, which consisted of local bus service along Eglinton Avenue East from Kennedy Station to Sheppard Avenue East.

In late 2020, RapidTO bus lanes were installed along Eglinton/Kingston/Morningside to Ellesmere – a significant portion of the approved LRT alignment. This transit service improvement has resulted in a change to existing conditions from what was considered in the 2016 Preliminary Options Analysis.

The investment in the RapidTO bus lanes has improved transit service in this corridor, including improved reliability and transit travel times and it can be viewed as a pre-cursor to investment in high-order transit, such as LRT.

As a result of the introduction of the RapidTO bus lanes, this Initial Business Case (IBC) is comparing the proposed LRT investment against an improved transit environment from what was considered in 2016. It is important to take this into account when considering the findings in this IBC.

The options evaluated in this IBC are as follows:

- Option 1: This is the base case or "do nothing" scenario. This option includes transit service using the RapidTO bus lanes along Eglinton Avenue East, Kingston Road, and Morningside Avenue corridor to Ellesmere Road/UTSC.
- Option 2: This is the Eglinton East LRT project as approved by City Council in December 2020 as through-service with Line 5 Eglinton at Kennedy Station. Vehicles are planned to be stored and maintained at a maintenance and storage facility, currently contemplated to be located on Sheppard Avenue East at Conlins Road (earlier plans included a location near UTSC).

Figure 1 and Figure 2 illustrate the options evaluated in this IBC.

Figure 1: Option 1 (Base Case)

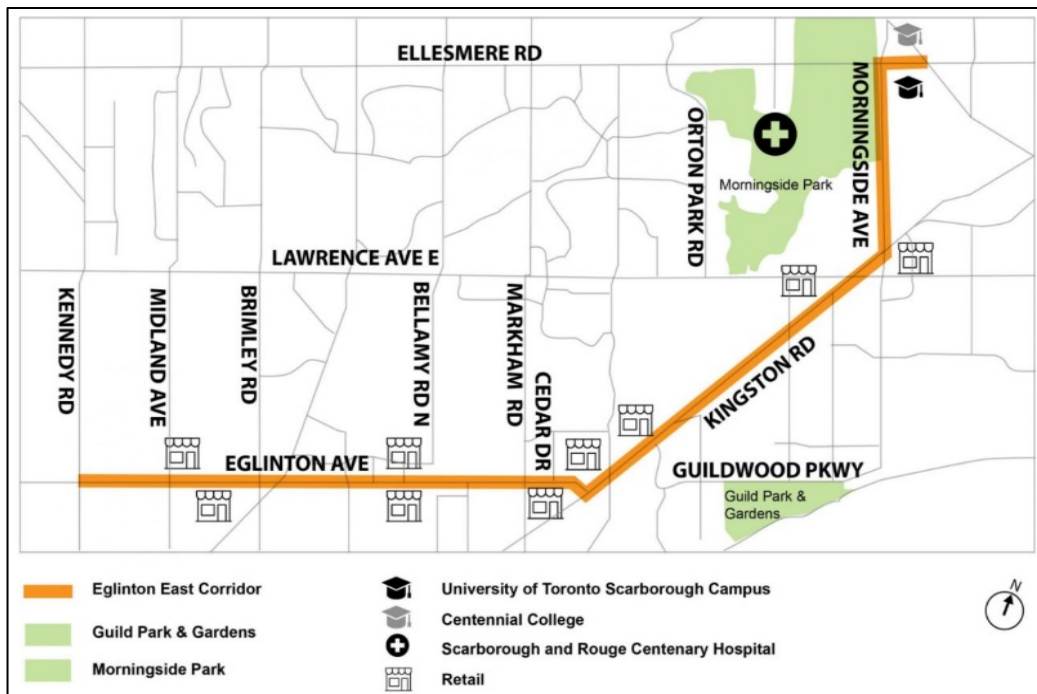


Figure 2: Option 2 (Eglinton East LRT)



## 1.2. Summary of Initial Business Case Key Findings

Summary of Initial Business Case findings:

- **Strategic Case:** The Eglinton East LRT is preferred over the base case as it would better address the RTEF criteria.
- **Economic Case:** The costs required to deliver the Eglinton East LRT exceed the expected benefits.
- **Financial Case:** The capital investment for the Eglinton East LRT, based on the project as approved in 2020, is estimated to be \$4.0-4.4 billion, with estimated annual total net value operating and maintenance cost of \$37 million.
- **Deliverability and Operations Case:** The Eglinton East LRT as an extension of Line 5 Eglinton at Kennedy Station is no longer feasible without significant and costly mitigation. There are significant conflicts between the planned tunneled section of the LRT between in the Kennedy/Midland/Falmouth area and the Scarborough Subway Extension

Table 1 presents a summary of the key findings from this initial business case. In order for the Eglinton East LRT project to have a more supportive business case, ways to improve the project benefits need to be explored.

Table 1: Summary of Key Findings

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
<b>Strategic Case</b>		
Choice		
Experience		
Social Equity		
Shaping the City		
Healthy Neighbourhoods		
Public Health and Environment		
Supports Growth		
<b>Summary</b>		
<b>Economic Case</b>		
Capital expenditure	N/A	\$3,918 million (2022\$)
Life cycle maintenance costs		\$349 million (2022\$)
Operations and maintenance costs		\$1,174 million (2022\$)
<b>Total cost</b>		<b>\$5,441 million (2022\$)</b>
User impacts		-\$891 million (2022\$)

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
Adjustments		-\$69 million (2022\$)
<b>Total conventional impacts</b>		<b>-\$960 million (2022\$)</b>
External impacts		-\$10 million (2022\$)
<b>Conventional NPV</b>		<b>-\$6,411 million (2022\$)</b>
<b>Financial Case</b>		
Capital Cost Estimate		\$4.0-4.4 billion (2020\$)
Operational and Maintenance Cost Estimate	N/A	\$37.0 million per year (2022\$)
<b>Deliverability and Operations Case</b>		
Engineering/Technical Considerations	No impact	Significant conflicts with Scarborough Subway Extension near Kennedy. Project cannot be constructed without costly mitigations.  Mitigation and coordination for other conflicts and challenges to be explored as design progresses.
Operational and Service Planning Considerations	To meet future demand, additional buses would be required. The ability to meet the demand for transit service to Kennedy Station will be constrained by the existing size of Kennedy Station and its capacity to serve buses.	Traffic impacts to be assessed through TPAP.
Project Governance and Capital Project Delivery Considerations	No impact	Coordination with Metrolinx, MTO, and TTC required to understand respective roles and funding, and align project schedules.

### 1.3. Next Steps

As a result of the deliverability and other challenges that have emerged with the project as approved, design and alignment solutions are being explored, including an alignment that would have the LRT operate as a distinct service rather than an extension of Line 5 Eglinton. This revised approach to the project would have the following key characteristics:

- A distinct Eglinton East LRT service from Kennedy Station to Malvern Town Centre with a separate Eglinton East LRT terminus at Kennedy Station, as opposed to a through-service connecting from Line 5 Eglinton.
- Potential at-grade station at and crossing of the Kingston/Lawrence/Morningside intersection.

- A light rail vehicle that is more specific to the needs of Scarborough, with shorter trains that would better match capacity with projected demand and require shorter platforms, is better able to climb the grade of Morningside Avenue and has more flexible turnback requirements.

Based on the preliminary analysis and design work to-date, a distinct service for the Eglinton East LRT could provide the following improved benefits and reduced costs from a business case perspective as outlined below.

- Strategic Case:
  - Higher service reliability due to its separation from Line 5 Eglinton and the Eglinton Crosstown West Extension service operations.
  - Improved transfer between the Eglinton East LRT and Line 2 at Kennedy Station, for passengers travelling to/from downtown Toronto.
  - Earlier construction start date and reduced combined construction period and impacts for residents and businesses in the Kennedy/Falmouth/Midland area with the Scarborough Subway Extension project.
  - A shorter and more nimble LRV that can operate on the existing Morningside Avenue bridge may:
    - Reduce environmental impacts to the Highland Creek valley compared to the Council-approved project.
    - Create reduced physical barriers for the UTSC and better align with the campus's vision.
    - Create an option to shift the alignment from travelling through UTSC to heading north along Morningside Avenue if needed.
- Economic Case:
  - Although a distinct service would introduce an additional transfer for those travelling from the Eglinton East LRT to Line 5, design should focus on minimizing transfer times, especially between Eglinton East LRT and Line 2 and GO Transit, which are projected to experience higher transfers than Line 5.
  - A smaller and more nimble LRV may improve comfort for passengers, due to smaller turning movements.
  - Opportunity to improve operational robustness and reliability (e.g. fewer cumulative delays, reliability of journey times and headways), due to a shorter LRT route.
  - Service and infrastructure disruptions could be more effectively managed.
  - Removal of the need for underground sections from the alignment near Kennedy and at Kingston/Lawrence/Morningside.
  - Shorter platforms with reduced construction costs.
  - At-grade crossing and LRT stop at Kingston/Lawrence/Morningside.
  - Smaller MSF capacity and footprint needed to accommodate smaller LRVs.
  - Opportunity to avoid or minimize additional costs needed to accommodate the through service concept due to conflicts with the Scarborough Subway Extension.
  - Reduced loading requirements for the Highway 401-Morningside overpass.
- Financial Case
  - Removal of the need for underground sections from the alignment near Kennedy and potentially at Kingston/Lawrence/Morningside.
  - Shorter platforms.



- At-grade crossing and LRT stop at Kingston/Lawrence/Morningside.
- Smaller MSF capacity and footprint needed to accommodate smaller LRVs.
- Opportunity to avoid or minimize additional costs needed to accommodate the through service concept due to conflicts with the Scarborough Subway Extension.
- Reduced loading requirements for the Highway 401-Morningside overpass.
- Deliverability and Operations Case
  - Opportunity to avoid or mitigate most of the conflicts with the Scarborough Subway Extension, potentially without significant costs or project delays.
  - Opportunity to better support UTSC's vision and provides flexibility to realign the LRT along Morningside Avenue if needed.
  - Reduced design complications by eliminating underground portions of the alignment near Kennedy and at Kingston/Lawrence/Morningside.
  - Reduced construction at and impact to Highland Creek valley, if the distinct service LRV is able to climb the Morningside Avenue grade.
  - Reduced loading requirements for the Highway 401-Morningside overpass refurbishment.
  - Kennedy Station would become the terminus station for both Line 5 and the Eglinton East LRT. Design mitigations for transfers between the Eglinton East LRT, Line 2, and Line 5 would be needed to ensure transfer opportunities are convenient, comfortable, and intuitive for travellers of all ages and abilities.
  - Conflicts with the Scarborough Subway Extension in the vicinity of Kennedy Station could be mitigated, since it will not require the use of underground tunnels along Eglinton Avenue East.
  - Could be better aligned with UTSC's vision for transit that is integrated with the campus. Shorter platforms and more flexibility may result in reduced physical barriers within the campus.
  - A shorter LRV with shorter platforms may allow for an at-grade crossing of and station at Kingston/Lawrence/Morningside.
  - Smaller LRVs would reduce the needed storage capacity and overall footprint required for the Maintenance and Storage Facility.
  - If the LRV is able to operate on the existing Morningside Avenue bridge across Highland Creek, fewer impacts to the Highland Creek valley can be expected because the construction of a separate LRT bridge may not be required.
  - Shorter trains could reduce the loading requirements of the Highway 401-Morningside overpass, reducing impacts to the design and timelines for the overpass reconfiguration.

In order to fully understand the potential benefits and costs of a distinct service, further analysis and design is required.

## 2. Introduction

### 2.1. Purpose

The purpose of this Initial Business Case (IBC) is to assess the Eglinton East LRT project as compared to a base case (or do nothing scenario), in order to determine a preferred option for further design and analysis.

For transit projects in the City of Toronto, business cases are completed throughout the project lifecycle to document the rationale and requirements for project delivery.

Descriptions of the base case and the Eglinton East LRT are provided in Section 2.5.

The structure of this Initial Business Case is as follows:

- **Section 1: Executive Summary**
- **Section 2: Introduction** provides purpose and background and describes the problem statement, project objectives, and options being considered.
- **Section 3: Strategic Case** evaluates each option against project and broader city-building objectives.
- **Section 4: Economic Case** evaluates the benefits and costs of each option.
- **Section 5: Financial Case** evaluates the capital and operating costs associated with each option.
- **Section 6: Deliverability and Operations Case** evaluates the key challenges to implementing a project from the technical or engineering, operational, and governance perspectives.
- **Section 7: Conclusions** summarizes key findings and identifies next steps.

A business case for transit investment is prepared to gather and present evidence to support decision making and to answer the following fundamental questions:

- Strategic Case: Is a project supported by a robust case for change that fits with wider public policy objectives?
- Economic Case: Can it be demonstrated that the project shows good value for money?
- Financial Case: Is the project financially affordable?
- Deliverability and Operations Case: Is the project achievable?

### 2.2. Background

A Preliminary Options Analysis for the Eglinton East LRT project was prepared previously in 2016. That analysis considered two LRT project options – one extending to Sheppard Avenue East and Morningside Avenue, the other terminating at UTSC. Both of these options were found to outperform the base case, which consisted of local bus service along Eglinton Avenue East from Kennedy Station to Sheppard Avenue East.

Further analysis and design work proceeded over the following years and, in December 2020, City Council approved an Eglinton East LRT alignment as an extension of Line 5 Eglinton from Kennedy through UTSC to Malvern and directed staff to update the Initial Business Case. In February 2022, City Council directed staff to resolve alignment issues at Kennedy Station with respect to conflicts with the Scarborough Subway Extension, evaluate the potential to host the

vehicle Maintenance and Storage Facility for the Eglinton East Light Rail Transit on Provincial lands at 8304 Sheppard Avenue East (Conlins site) and ensure that the new Sheppard Station for the Scarborough Subway Extension does not prohibit the development of future higher order transit connections along Sheppard Avenue East.

In late 2020, RapidTO bus lanes were installed along Eglinton/Kingston/Morningside to Ellesmere – a significant portion of the approved LRT alignment. This transit service improvement has resulted in a change to existing conditions from what was considered in the 2016 Preliminary Options Analysis.

The RapidTO bus lanes run along Eglinton Avenue East, Kingston Road and Morningside Avenue from Brimley Road, through to the University of Toronto Scarborough Campus.

- The High Occupancy Vehicle (HOV) lanes on Eglinton Avenue East were converted to RapidTO bus lanes.
- Curbside general-purpose lanes on Kingston Road and Morningside Avenue were converted to RapidTO bus lanes.
- RapidTO bus lanes are reserved for TTC buses, Wheel-Trans buses and bicycles 24 hours a day, seven days a week, and identified using red surface treatment and signage.
- The total project cost approximately \$4 million.

The investment in the RapidTO bus lanes has improved transit service in this corridor, including improved reliability and transit travel times and it can be viewed as a pre-cursor to investment in high-order transit, such as LRT.

As a result of the introduction of the RapidTO bus lanes, this Initial Business Case (IBC) is comparing the proposed LRT investment against an improved transit environment from what was considered in 2016. It is important to take this into account when considering the findings in this IBC.

### 2.3. Problem Statement

Access to higher-order transit options in Scarborough is low, relative to the rest of Toronto, which has a disproportionate impact on communities experiencing inequity in the city. Nearly all neighbourhoods along the Eglinton Avenue East/Kingston Road corridor between Kennedy Station and Morningside Avenue have been identified by the Toronto Strong Neighbourhoods Strategy 2020 (TSNS 2020) as "Neighbourhood Improvement Areas" (NIAs).<sup>1</sup> Although there is extensive bus service in the corridor via the RapidTO bus lanes, higher-order transit service is currently limited to three GO rail stations (Kennedy, Eglinton, and Guildwood).

Toronto's Official Plan identifies Eglinton Avenue East and Kingston Road as *Avenues* and targets them for smaller-scale, mixed-use growth and economic development.<sup>2</sup> Investment in higher-order transit, including along *Avenues*, can contribute to the creation of complete

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<sup>1</sup> The Toronto Strong Neighbourhoods Strategy (TSNS) 2020 is the City of Toronto's action plan for ensuring that each neighbourhood within Toronto can succeed and thrive, including the City's NIAs.

<sup>2</sup> According to Toronto's Official Plan, *Avenues* are important corridors along major streets where reurbanization is anticipated and encouraged to create new housing and job opportunities while improving the pedestrian environment, the look of the street, shopping opportunities, and transit service for community residents.

communities that meet people's needs for daily living, provide more transportation choice, and reduce auto dependence.

### 2.4. Project Objectives

The main objectives of the Eglinton East LRT project are to:

1. Improve **access to opportunities by transit**;
2. Improve **transit equity** by supporting the Toronto Strong Neighbourhoods Strategy 2020 and improve transit access to NIAs and equity-deserving residents; and
3. Support the city's **economic vitality** and development of **complete communities**.

These objectives are discussed further below.

#### 2.4.1. Access to Opportunities by Transit

An objective of Toronto's Official Plan is to reduce auto dependence by improving access to opportunities, such as jobs, education and services, by transit. The transit mode share for internal trips in Scarborough (16%)<sup>3</sup> is lower than in the Toronto and East York area (32%).<sup>4</sup> As of late 2020, the Eglinton East LRT corridor is served by RapidTO bus lanes along Eglinton Avenue East and Kingston Road, with access to high-order transit limited to three GO stations (i.e. Kennedy, Eglinton, and Guildwood).

As outlined in Maps 4 and 5 of Toronto's Official Plan (see Figure 3 and Figure 4), the Eglinton East LRT forms part of the transit network envisioned for Scarborough, which includes a range of transit improvements and projects. The Eglinton East LRT would link transit services and destinations within Scarborough and beyond, including connections to the TTC Line 2 and Line 5, and the GO rail network at Eglinton, Guildwood, and Kennedy GO stations. Passenger transfers with local bus service is anticipated at the following locations:

- Kennedy Station
- Midland Station
- Eglinton GO Station
- Guildwood GO Station
- Kingston/Lawrence/Morningside
- Morningside/Ellesmere
- UTSC

Transit service to the UTSC currently consists of local bus service, Durham Region Transit's PULSE service connecting downtown Oshawa to downtown Pickering and UTSC, and GO bus service to Durham region, Rouge Hill GO Station, and Scarborough Town Centre. While it is estimated that 56% of students travel to campus by local transit, many experience long travel times.<sup>5</sup> UTSC has ambitious plans for expansion which are linked to improved transit service. The Official Plan supports universities and colleges by "improving transit services to existing universities... not currently served by rapid transit" (OP Policy 3.5.1(10)(h), and "Where an

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<sup>3</sup> Transit mode share for the commute to work is higher than average among residents of NIAs in Scarborough compared with NIA residents across the City. Taking account of all trips, not just the commute to work, and taking account of all residents of Scarborough, the transit mode share is lower than the City of Toronto average.

<sup>4</sup> Transportation Tomorrow Survey, 2016

<sup>5</sup> StudentMoveTO, 2019

existing university... is not directly served by rapid transit, the provision of excellent surface transit of these institutions will be pursued" (OP Policy 4.8(3)).

The Eglinton East LRT creates an opportunity to transform the way that people move around Scarborough by providing convenient and reliable higher-order transit, supporting a shift to more sustainable travel modes, and building complete streets that balance the needs and priorities of all users and uses (OP Policy 3.1.1(6)). Combined with the bus network and improved points of transfer, there would be an opportunity to enhance access to key destinations beyond and along the corridor while complimentary investments in pedestrian and cycling infrastructure can help to support first and last mile access to transit and amenities in the area.

There are also important emerging higher-order transit improvements within Scarborough with potential connections to the Eglinton East LRT: the Durham Scarborough BRT and the Scarborough Subway Extension.

The planned Durham Scarborough BRT would provide approximately 36 kilometres of dedicated transit infrastructure that would connect Durham Region and the City of Toronto, enhancing intra-regional mobility and connecting residents and employment areas. Within Scarborough, the DSBRT would primarily run along Ellesmere Road with a planned connection to the Eglinton East LRT at UTSC. The City of Toronto and TTC are working with Metrolinx, Durham Region and Durham Region Transit on the planning and design of the DSBRT. The Transit Project Assessment Process (TPAP) was completed in January 2022.

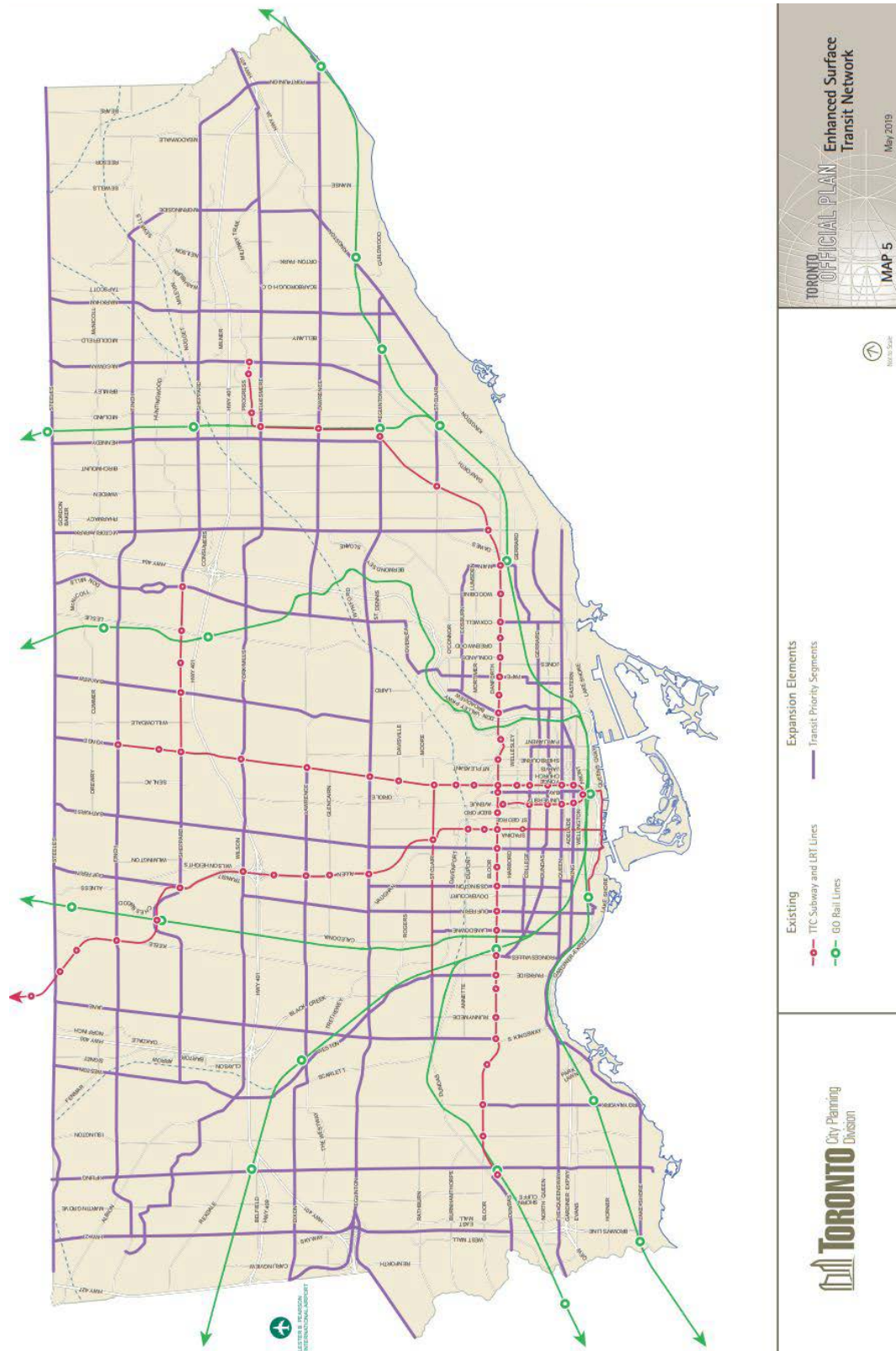
The Scarborough Subway Extension, which has begun construction, will be an extension of TTC Line 2 from Kennedy Station to Sheppard Avenue East and McCowan Road, replacing Line 3 Scarborough (Scarborough Rapid Transit - SRT). It will help reduce travel times and improve access to jobs, schools, and other key destinations throughout the Scarborough. Kennedy Station will be a key connection point for Line 2, Line 5, the SSE, GO Transit, and the Eglinton East LRT. The SSE is being delivered by Metrolinx and Infrastructure Ontario with an anticipated completion date of 2029-30. The advanced tunneling contract was awarded in May 2021 and an RFQ for the Stations, Rail and Systems (SRS) package was issued in September 2021.

Figure 3: OPA 456 – Map 4 – Higher-Order Transit Corridors





Figure 4: OPA 456 – Map 5 – Enhanced Surface Transit Network



## 2.4.2. Transit Equity

Scarborough is home to 632,000 Torontonians, making up 23% of Toronto's population.<sup>6</sup> Scarborough is also home to a seven of the City's 31 NIAs defined by Toronto's Strong Neighbourhoods Strategy (Figure 5).<sup>7</sup>

Access to transit service in Scarborough, particularly higher-order transit, is lower than in other parts of the city. The average Scarborough resident can access only half the number of jobs that the average Toronto resident can access using transit. Transit use is higher than average for residents living within NIAs in Scarborough; in some NIAs, up to 50% of residents use transit to commute to work, compared to a city-wide average of 37%.<sup>8</sup> Transit access in Scarborough to key destinations, such as community services, jobs, and educational opportunities, falls below Toronto's benchmark, as defined by Toronto's Strong Neighbourhoods Strategy 2020. The introduction of higher-order transit improvements would better serve equity-deserving residents of these NIAs, allowing for improved transit reliability within Scarborough and to other parts of the City.

Equity-deserving groups are communities that face significant collective challenges in participating in society. This marginalization could be created by attitudinal, historic, social and environmental barriers based on age, ethnicity, disability, economic status, gender, nationality, race, sexual orientation and transgender status, etc. Equity-deserving groups are those that identify barriers to equal access, opportunities and resources due to disadvantage and discrimination and actively seek social justice and reparation.<sup>9</sup> This includes equal access to transit.

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<sup>6</sup> Statistics Canada, 2016 Census

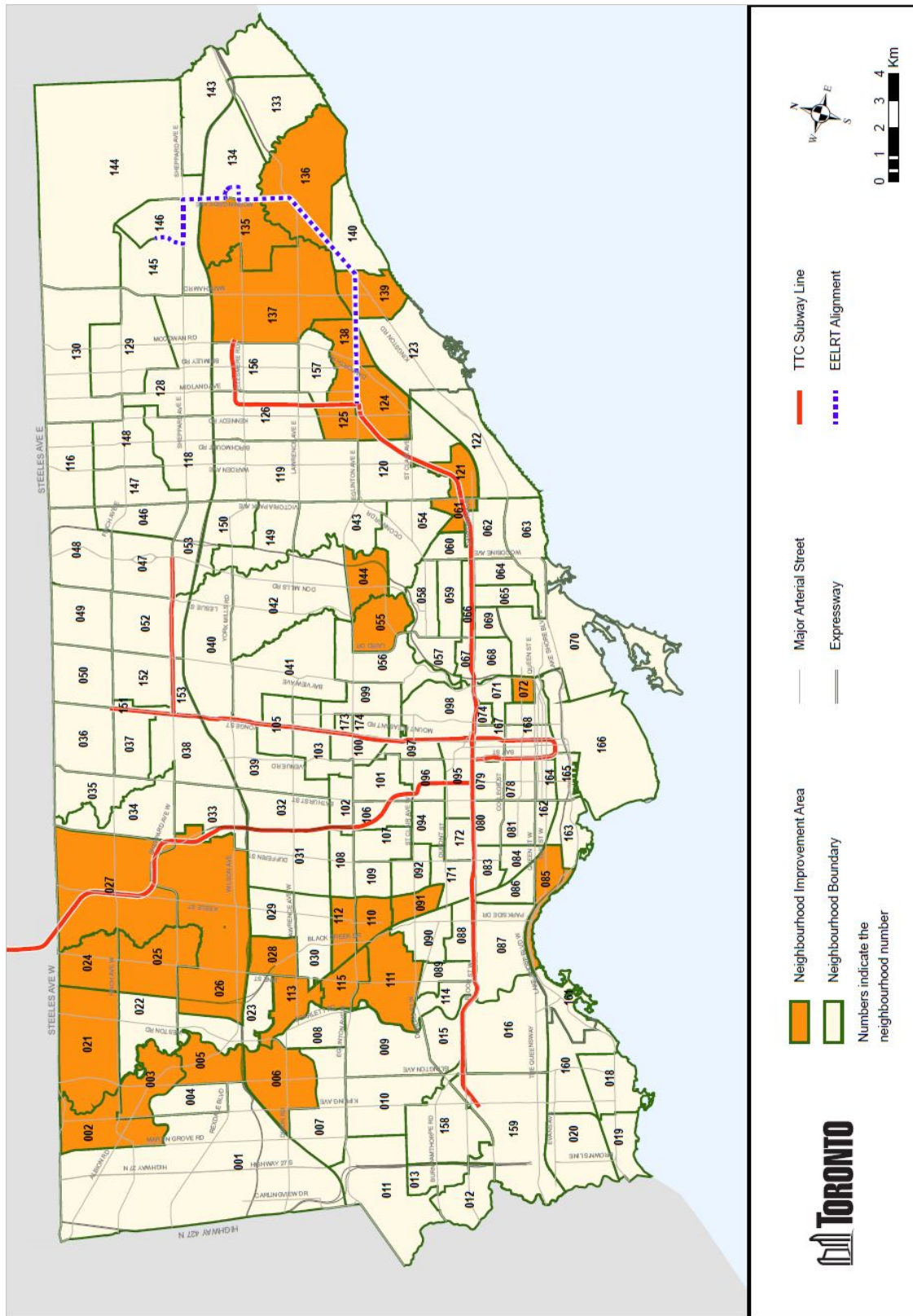
<sup>7</sup> City Council adopted this strategy in 2014, which identified thirty-one NIAs as areas that experience inequitable outcomes. Note that the City is currently updating the boundaries of neighbourhoods including the splitting of two NIAs, resulting in a total of thirty-three NIAs.

<sup>8</sup> Statistics Canada, 2016 Census

<sup>9</sup> Canada Council for the Arts



Figure 5: Designated NIAs in the City of Toronto<sup>10</sup>



### 2.4.3. Economic Vitality and Complete Communities

The Official Plan focuses on successful city-building to support a strong economy and complete communities. City-building involves balancing social, economic, and environmental needs and priorities for all. In order to remain economically competitive in the global economy, it is important to understand the connections that make up people's daily lives, and provide a fast, convenient, and high-quality transit system linking areas of housing and employment, while also providing access to goods and services, healthcare, education, and recreation.

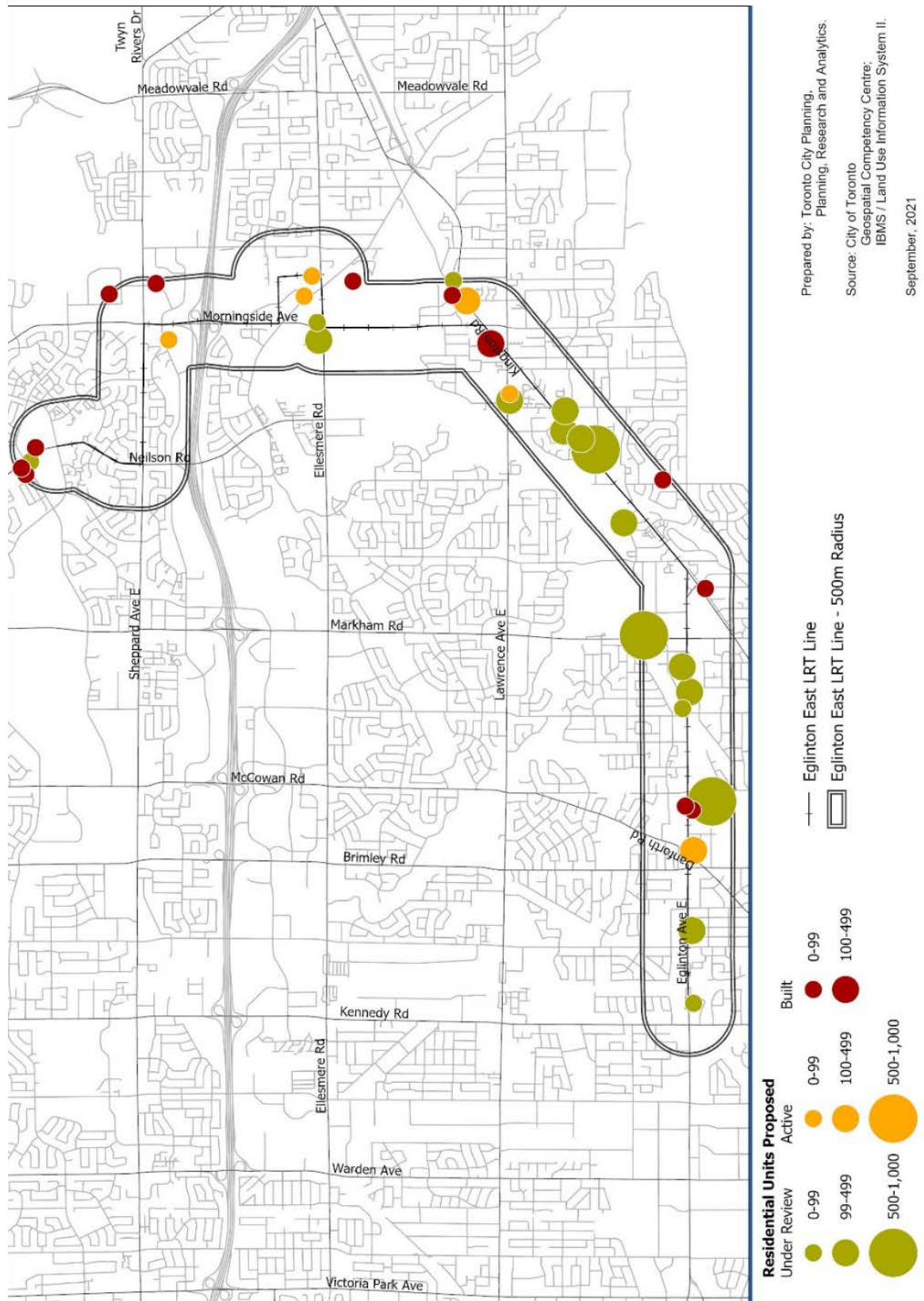
Within the Eglinton East LRT corridor, areas planned for growth are focused along Eglinton Avenue and Kingston Road, which are defined as *Avenues* in the Official Plan. Potential development nodes are located at Eglinton Avenue East and Kingston Road, Kingston Road/Lawrence Avenue/Morningside Avenue, the Morningside Campuses (Centennial College and UTSC), and Malvern Town Centre.

Development activity within the Eglinton East LRT corridor is illustrated in Figure 6 and Figure 7. A total of approximately 5,800 residential units and 131,000 square metres of non-residential GFA is anticipated. Over the past five years, the Eglinton East LRT corridor has seen an increase of 160% in proposed residential developments (approximately 3,500 units) and 311% in non-residential GFA (approximately 99,000 square metres).

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<sup>10</sup> Map does not include recent changes to neighbourhood boundaries, specifically the splitting of Woburn into Woburn North 142 and Golfdale-Woburn.

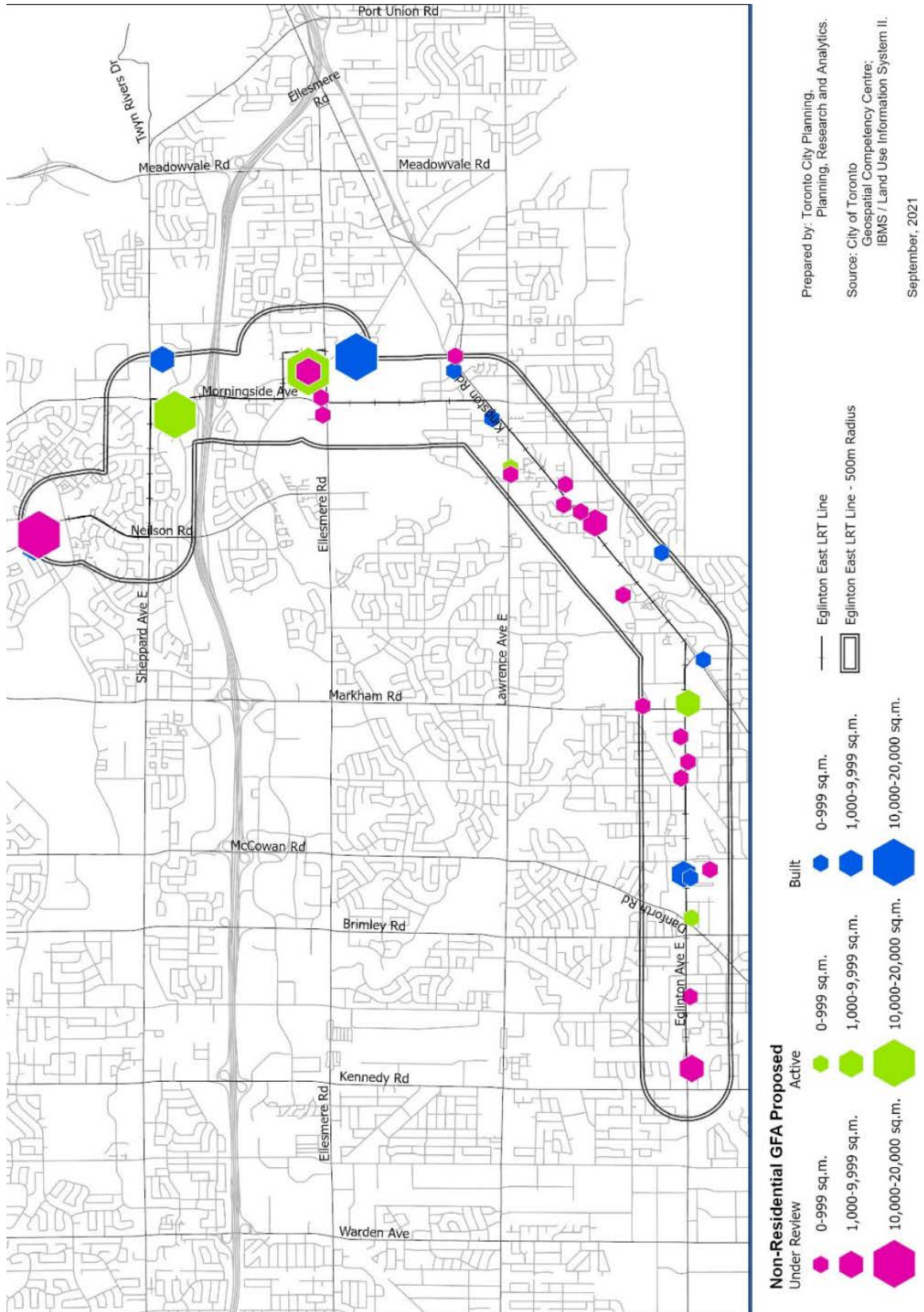
Figure 6: Planned and Proposed Residential Development along the Eglinton East LRT Corridor



Prepared by: Toronto City Planning, Planning, Research and Analytics.  
 Source: City of Toronto Geospatial Competency Centre; IBMS / Land Use Information System II.  
 September, 2021



Figure 7: Planned and Proposed Non-Residential Development along the Eglinton East LRT Corridor



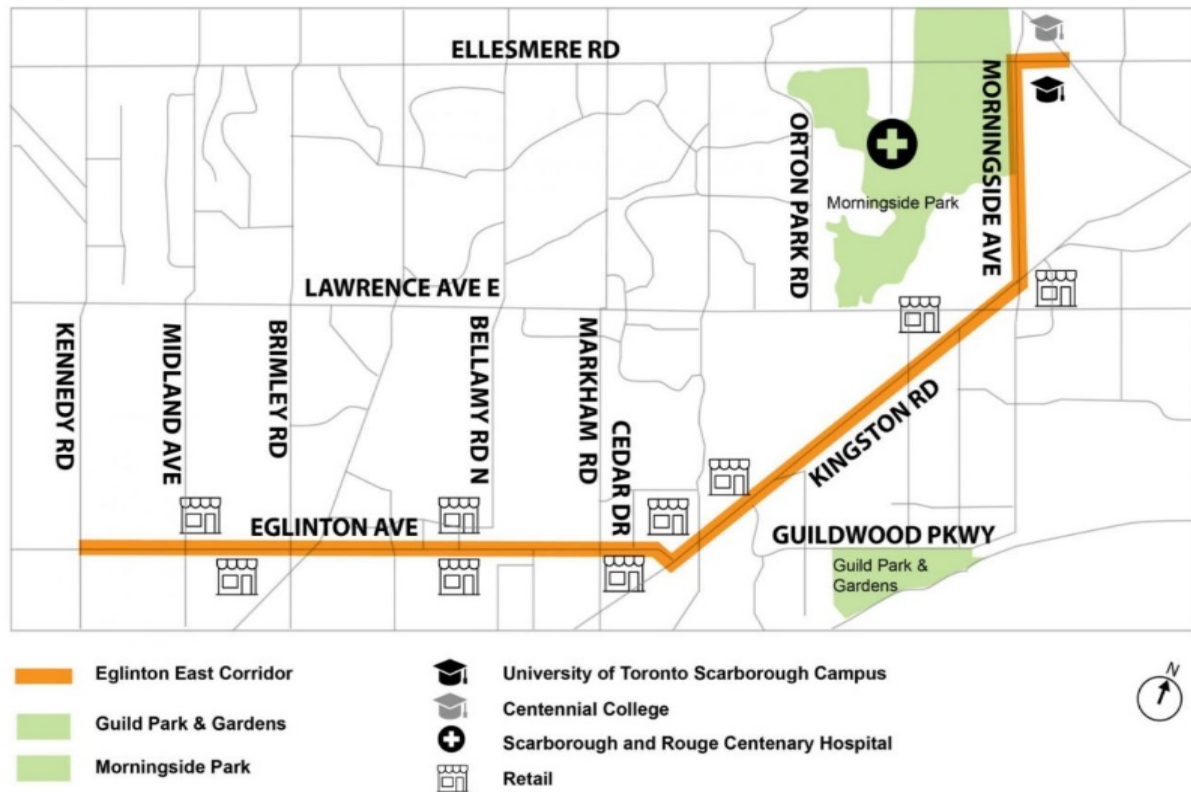
## 2.5. Options Considered

### 2.5.1. Option 1: Base Case (RapidTO Bus Lanes)

Option 1 is the base case or "do nothing" scenario. This option includes existing bus service within the Eglinton Avenue East, Kingston Road, and Morningside Avenue corridor, including the RapidTO bus lanes (see Figure 8 and Figure 9). Bus routes using these dedicated bus lanes primarily include the following:

- 86 Scarborough
- 986 Scarborough Express
- 116 Morningside
- 905 Eglinton East Express

Figure 8: Option 1 (Base Case)



*Figure 9: RapidTO Eglinton East Bus Lane*



### 2.5.2. Option 2: Eglinton East LRT

Option 2 is the Eglinton East LRT project as approved by City Council in December 2020 (see Figure 10). It is planned to be a 21-stop service running between Kennedy Station and Malvern, via Eglinton Avenue East, Kingston Road, Morningside Avenue, Sheppard Avenue East, and Neilson Road. The approved Eglinton East LRT includes through-service with Line 5 Eglinton at Kennedy Station. Vehicles are planned to be stored and maintained at a maintenance and storage facility, currently contemplated to be located on Sheppard Avenue East at Conlins Road (earlier plans included a location near UTSC).

Figure 10: Option 2 (Eglinton East LRT)



### 3. Strategic Case

The purpose of the Strategic Case is to evaluate how the options address the project objectives and broader City of Toronto goals. The options have been evaluated using the City's Rapid Transit Evaluation Framework (RTEF) (see Table 2).

Table 2: Overview of the Rapid Transit Evaluation Framework

<b>Principles</b>	<b>Criteria</b>	<b>Objectives</b>
Serving People	Choice	Develop an integrated network that connects different modes to provide for more travel options
	Experience	Capacity to ease crowding / congestion; reduce travel times; make travel more reliable, safe, and enjoyable
	Social Equity	Allow everyone good access to work, school, and other activities
Strengthening Places	Shaping the City	Use the transportation network as a tool to shape the residential development of the City
	Healthy Neighbourhoods	Changes in the transportation network should strengthen and enhance existing neighbourhoods; promote safe walking and cycling within and between neighbourhoods
	Public Health and Environment	Support and enhance natural areas; encourage people to reduce how far they drive; mitigate negative impacts
Supporting Prosperity	Affordability	Improvements to the transportation system should be affordable to build, maintain, and operate
	Supports Growth	Investment in public transportation should support economic development: allow workers to get to jobs more easily; allow goods to get to markets efficiently

The findings from the RTEF assessment are provided below, with the exception of the assessment of affordability, which is included as part of the Economic Case in Section 4.



















### 3.1. Strategic Case Key Findings

#### 3.1.1. Summary

Based on evaluation of seven of the RTEF criteria, as well as the overall project objectives, the Eglinton East LRT is preferred over the base case from a Strategic Case perspective (see Table 3).

Table 3: Strategic Case Key Findings

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
<b>Rapid Transit Evaluation Framework Criteria</b>		
<b>Choice:</b> Develop an integrated network that connects different modes to provide for more travel options		
<b>Experience:</b> Capacity to ease crowding / congestion; reduce travel times; make travel more reliable, safe, and enjoyable		
<b>Social Equity:</b> Allow everyone good access to work, school, and other activities		
<b>Shaping the City:</b> Use the transportation network as a tool to shape the residential development of the City		
<b>Healthy Neighbourhoods:</b> Changes in the transportation network should strengthen and enhance existing neighbourhoods; promote safe walking and cycling within and between neighbourhoods		
<b>Public Health and Environment:</b> Support and enhance natural areas; encourage people to reduce how far they drive; mitigate negative impacts		
<b>Supports Growth:</b> Investment in public transportation should support economic development: allow workers to get to jobs more easily; allow goods to get to markets efficiently		
<b>Summary</b>		

The Eglinton East LRT provides a new higher-order transit option for residents in Scarborough relative to the base case (RapidTO bus lanes). This includes connections to three GO stations, Line 2 Bloor-Danforth, Scarborough Subway Extension, Line 5 Eglinton, and the proposed Durham Scarborough BRT.

The Eglinton East LRT is proposed to serve UTSC which would provide a new higher-order transit service for students and staff and support planned campus expansion. This provides a strategic link between UTSC and the rest of the City, and supports UTSC's ambition to become

an anchor institution. Currently, existing and planned facilities at UTSC are not optimally located relative to the Eglinton East LRT; there is an opportunity for the UTSC to plan its campus expansion to be more easily served by future higher-order transit.

The average number of transfers required per trip and average travel times across the network in the Eglinton East LRT option are similar to the base case. Current ridership modelling suggests that the base case attracts a higher forecasted network-wide ridership than the Eglinton East LRT by approximately 4,700 passengers per day in 2041. Further work defining the local bus network to complement the Eglinton East LRT may result in higher ridership for the LRT scenario.<sup>11</sup> The Eglinton East LRT offers improved experiences due to higher transit reliability, smoother rides, and new amenity for transit riders.

The Eglinton East LRT potentially better aligns with the Toronto Strong Neighbourhoods Strategy through the benefits of constructing new higher-order transit, such as supporting residential and employment growth, improving the public realm, and stimulating the local economy for seven NIAs. Some neighbourhoods may experience a slight reduction in access to jobs along the Eglinton East LRT corridor, compared to the base case.

The Eglinton East LRT creates an opportunity for wider community-building benefits as a result of the investment in the project, including new community-gathering spaces and civic spaces at key locations and improving the streetscape and public realm along the alignment. New community gathering spaces would support wider social equity and community development goals. The Eglinton East LRT connects to mixed-use Avenues, retail clusters in Employment Areas and Malvern, community services and facilities, two post-secondary institutions, and the Toronto Pan Am Sports Centre, stimulating growth and vibrancy in these areas and encouraging economic opportunities along the alignment. However, access to community amenities remains similar between both options. The Eglinton East LRT would also support the development of complete communities and transit-oriented development along Eglinton Avenue East and Kingston Road and at Malvern Town Centre.

The Eglinton East LRT offers moderate improvements to the Public Health and Environment through the reduction of greenhouse gas emissions, although the crossing of the Highland Creek and ravine would pose as a major environmental challenge requiring mitigation through the design process. New environmental challenges are not expected for the base case.

It should be noted that approximately 70% of the area that would be served by the Eglinton East LRT is currently being served by frequent surface transit on the RapidTO bus lanes in the base case. The current RapidTO bus lanes end at UTSC and do not serve Malvern residents. The Eglinton East LRT offers the additional strategic benefit of providing a higher-order transit connection to Malvern.

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<sup>11</sup> The Eglinton East LRT is estimated to have a peak period, peak direction (PPPD) ridership demand of 12,000 (LRT and parallel bus services combined), suggesting that a higher-order transit service is needed in the Eglinton East corridor. While it is technically possible to provide enough buses to serve this ridership in the future, this would require large expansions to the Kennedy Station bus terminal and storage facilities. Operations of this terminal and the buses along Eglinton Avenue East would be a challenge, and reliability and comfort would be low.

### 3.2. Evaluation of Rapid Transit Evaluation Framework Criteria

The evaluation of the RTEF criteria is presented in this section. It should be noted that approximately 70% of the area that would be served by the Eglinton East LRT is currently being served by frequent surface transit on the RapidTO bus lanes in the base case.

#### 3.2.1. Choice

From the Choice perspective, the Eglinton East LRT is similar to the base case (see Table 4).

*Table 4: Summary of Choice Measures*

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
Population within walking distance (500m) of frequent surface transit or higher-order transit stops	Existing: 49,000 people Projected growth: 11,000 people Projected future: 60,000 people	Existing: 63,000 people Projected growth: 12,000 people Projected future: 75,000 people
Change in number of transfer stations* / Change in number of connections available	No change	No change, with potential for increased transfer opportunities with future higher-order transit along Sheppard Avenue East
Change in connections to existing cycling infrastructure	No change	Similar connections to the base case, with potential for new or improved amenities and easier access to / use of cycling infrastructure
Change in transit access to major destinations	No change	Varied impacts, including improved access in some areas and reduced access in others

\* Higher-order transit stations only. Further work is needed to identify the bus network that complements and supports the Eglinton East LRT.

Key findings show that the Eglinton East LRT provides minimal impacts to choice compared to the base case:

- New higher-order transit service in the proximity of 63,000 residents.
- No change in higher-order transit connections, including three GO stations, Line 2 Bloor-Danforth, Scarborough Subway Extension, Line 5 Eglinton, and proposed Durham Scarborough BRT.
- Better transportation options for Malvern residents who are currently only served by local bus service, including a new higher-order transit connection to UTSC.
- Similar connections to existing bicycle infrastructure, with potential for new or improved amenities and improved first- and last-mile connection options for travelers.

Regarding access to key destinations in the Greater Toronto Area, the Eglinton East LRT offers the following impacts compared to the base case:

- UTSC: decreased travel times for Malvern residents with increased travel times south of Eglinton Avenue East and Kingston Road, as well as in areas surrounding Kennedy Station (e.g. Ionview and Kennedy Park neighbourhoods).

- Malvern Town Centre: decreased travel times throughout areas along Kingston Road and Morningside Avenue.
- Scarborough Town Centre: minor decreases in travel times for Malvern residents and minor increases in travel times south of Kingston Road.
- Pearson Airport and Downtown Toronto: travel times remains similar between the Eglinton East LRT and the base case.

An integrated transit network that connects different routes and modes to provide for more travel options leads to increased choice for Toronto residents. Choice can be measured by access to higher-order transit and connections via transfer opportunities, access to active transportation connections, and access to major destinations.

GO Expansion will make GO Stations increasingly important connection points for riders destined for downtown Toronto and elsewhere in the city. Both the base case and the Eglinton East LRT would connect to the GO rail network at three stations – Guildwood, Eglinton, and Kennedy.

Direct connections to higher-order transit would be provided at Kennedy Station, including Line 2 Bloor-Danforth, the Scarborough Subway Extension, and Line 5 Eglinton, offering access to destinations across midtown Toronto and connections to Line 1 Yonge-University and other GO stations beyond Scarborough.

The proposed Durham Scarborough BRT is being planned to further improve transit connections from UTSC to Scarborough Centre and Durham Region. The stop at the Toronto Pan Am Sports Centre also provides opportunities for connections to the proposed Meadoway multi-use trail along the Gatineau Hydro Corridor.

### 3.2.2. Experience

From an Experience perspective, the Eglinton East LRT is preferred over the base case (see Table 5).

*Table 5: Summary of Experience Measures*

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
Average travel times*	Average travel times are comparable for both options: AM: 62 minutes Mid-day: 46 minutes PM: 60 minutes Evening: 57 minutes	
Average daily transfers per person across TTC system (2041)	1.8 transfers	
Reliability	Buses operate in dedicated ROW** (generally in the curb lanes)	LRT is expected to be more reliable than buses due to the buses operating in mixed traffic at intersections, conflicts with right-turning vehicles, cyclists using curb lanes, full access driveways, and passing vehicles. Includes two fully

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
		dedicated underground sections of ROW at Kennedy and Kingston/Lawrence/Morningside.
Customer satisfaction, cleanliness, and comfort (perceived, due to crowding)	No change	LRVs operate with smoother movements than traditional buses, potentially allowing for a more comfortable ride.
Transit ridership change (daily riders attracted to transit system in 2041)	No change	-4,700 (compared to the base case)

\* Average travel times are network-wide. Local impact would depend on passenger origin and destination, as well as the complementary bus network (yet to be developed).

\*\* It should be noted that the current measure for transit reliability for the RapidTO bus lanes is within the pandemic condition of traffic and transit volumes. Reliability has not yet been measured in "normal" traffic conditions.

Key findings include the following:

- Both options may expect similar average network-wide travel times on an average weekday.
- The average daily number of transfers across the TTC system (i.e. the convenience of trips) is the same for both options (however it should be noted that transfers are generally reduced for residents living along the Eglinton East LRT corridor, and increased for residents living further from the corridor, who would have to transfer from a local bus service onto the LRT).
- Reliability of service is expected to be higher for the Eglinton East LRT.
- The Eglinton East LRT may allow for a more comfortable ride for passengers.

A transit project's ability to improve travellers' experience impacts projected transit ridership, given that people are more likely to choose to take transit if it offers a better experience than a different mode of travel. Experience can be understood in terms of ability to mitigate crowding on transit, change in travel time between origins and destinations, reliability, and the perceived safety, cleanliness, and comfort of the transit trip.

Initial transit ridership forecasts were developed with the assumption that some of the bus services along the Eglinton-Kingston corridor would be rerouted once the Eglinton East LRT is operational. This scenario results in an overall degradation of transit service and reduction in system-wide transit riders. It is anticipated that at minimum, 35,000 people would use the LRT in 2041 over the course of a typical weekday. Further work is needed to identify an appropriate bus network to complement and support any LRT. Projected ridership is expected to improve as further work on the bus network is undertaken.

### 3.2.3. Social Equity

From a Social Equity perspective, the base case provides better access to jobs and destinations, while the Eglinton East LRT enables more opportunities to stimulate vibrant communities and economic growth (see Table 6).

Table 6: Summary of Social Equity Measures

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
Alignment with Toronto Strong Neighbourhoods Strategy 2020	No or limited change is currently expected	Creates more opportunities to improve physical surroundings, economic opportunities, and healthy lives for the equity-deserving residents in Scarborough
Change in NIAs served by higher-order transit stops	No change	7 NIAs
Estimated number of equity-deserving residents served by frequent surface transit or higher-order transit*	30,000 residents	38,000 residents
Access to destinations for NIA residents** (number of people accessible within a 45-minute travel time for an average resident of a NIA in Scarborough)	882,500 people	861,000 people (-21,500 or -2.4% compared to the base case)
Average number of jobs within a 45-minute travel time for an average resident of a NIA in Scarborough	507,200 jobs	488,800 jobs (-18,400 or -3.6% compared to the base case)

\*Population weighted by Neighbourhood Equity Index is used as a proxy for estimated number of equity-deserving residents.

\*\*Number of people accessible by transit is used as a proxy for access to all destinations.

Key findings show that the Eglinton East LRT has the following advantages over the base case:

- Creates opportunities to better align with Toronto's Strong Neighbourhoods Strategy 2020 objectives of improving physical surroundings, economic opportunities, and healthy lives for the equity-deserving residents in Scarborough.
- Within a 500 metre walking distance from higher-order transit stations, it would directly serve an estimated 38,000 equity-deserving residents, including approximately 3,000 equity-deserving Malvern residents.
- North of UTSC (beyond the corridor served by the RapidTO bus lanes), the Eglinton East LRT may provide opportunities to stimulate economic growth at Malvern Town Centre, improve access to jobs, support existing community groups and programs, and enhance transit service to the local amenities and services.

In the August 2021 GTAModel, travel times are shown to be worse for the Eglinton East LRT when compared to the base case. This is due to various factors, including how the model treats

the existing RapidTO bus lane performance as compared to the LRT, resulting in bus travel speeds being higher than the LRT.

Based on the model's findings, some neighbourhoods may experience a slight reduction in access to jobs along the Eglinton East LRT corridor, compared to the base case:

- Provides access to 2.4% fewer destinations for NIA residents in Scarborough (measured by number of people accessible within a 45-minute travel time for an average resident of a NIA).
- Provides access to 3.6% fewer jobs for NIA residents in Scarborough.

Social equity is an important city building objective when considering major transit investments, due to the potential to help uplift vulnerable communities and empower equity-deserving individuals. Social equity objectives include providing convenient, affordable, and reliable transit options to those who need it, increasing access to jobs, and increasing the size and diversity of the labour-force available to existing or potential employers. Toronto's Strong Neighbourhoods Strategy 2020 aims to ensure each of Toronto's neighbourhoods can succeed and thrive, including targeting inequalities neighbourhoods are facing and removing differences between neighbourhoods that are unjust, unnecessary, and unfair.

Toronto's Strong Neighbourhoods Strategy 2020 also aims for the long-term transformation of NIAs; along the Eglinton East LRT alignment, equity-deserving residents within seven NIAs would benefit from access to higher-order transit (Figure 11). While Malvern is not categorized as a NIA, there are an estimated 3,000 equity-deserving individuals that would have direct access to higher-order transit through the Eglinton East LRT.

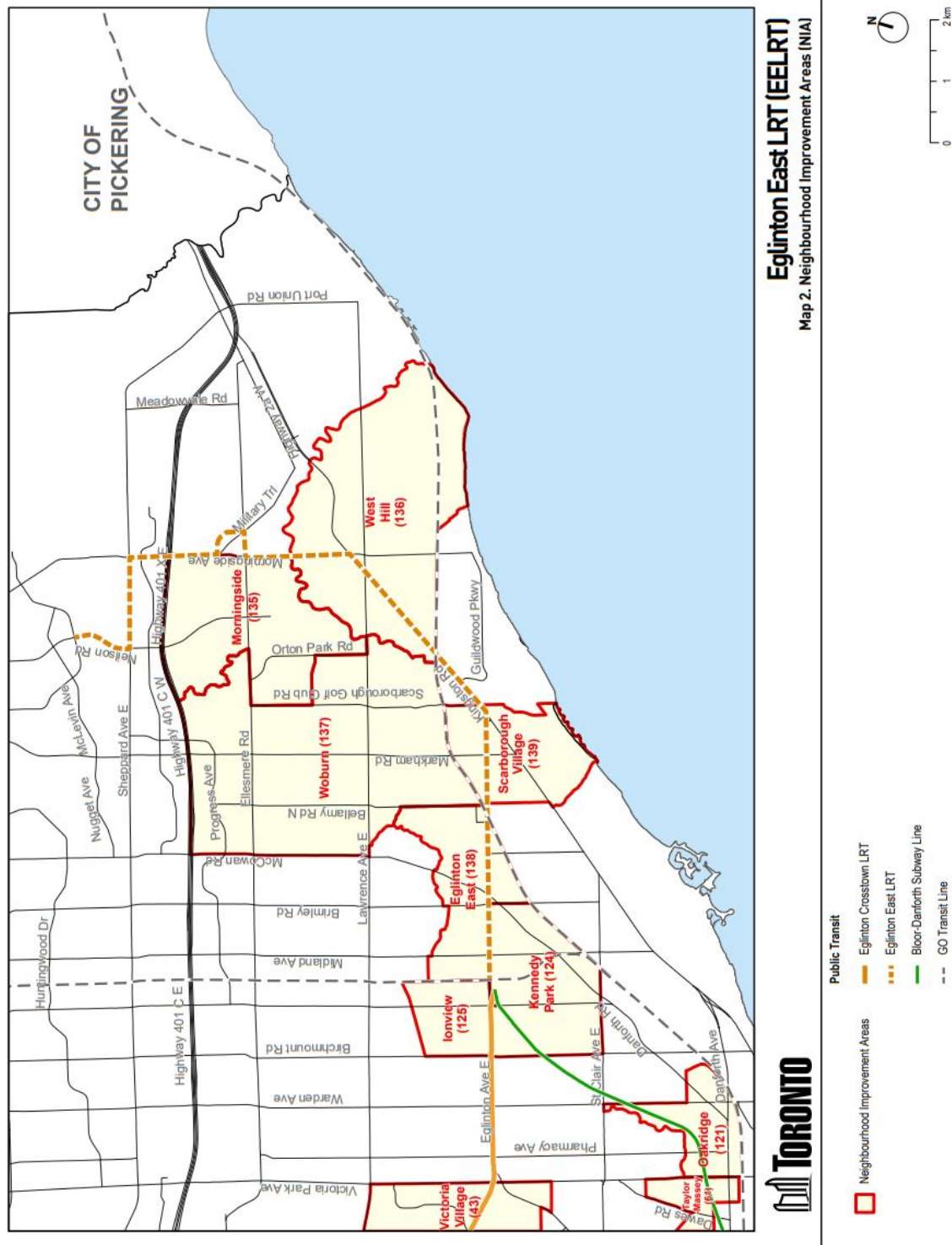
The Eglinton East LRT aligns well with Toronto's Strong Neighbourhoods Strategy 2020 through the following benefits to equity-deserving residents in Scarborough:

- Stimulates a vibrant local community by promoting transit development where it helps to shape new economic opportunities, jobs, and affordable housing.
- Creates a cleaner and healthier environment by improving air quality through the reduction of auto VKT (see "Public Health and Environment" sub-section) and creation of more walkable communities.
- Promotes active living through investing in active transportation infrastructure and facilities and improving the public realm.
- Connects residents to the amenities and services they need, such as health care, healthy food, school and community services.
- Improves transit access in neighbourhoods, including ensuring routes help the local community, enabling the creation of vibrant communities near transit hubs, integrating the TTC and GO for a GTA-wide system, and creating local jobs as part of transit expansion.

Improving access to jobs for NIAs is important for improving economic opportunities in Scarborough. The Eglinton East LRT's impact on access to jobs within a 45-minute travel time for residents living in NIAs varies locally, compared to the existing buses on the RapidTO bus lanes. Although access to jobs is improved for residents north of UTSC due to the provision of new higher-order transit, some neighbourhoods may experience a slight reduction in access to jobs along the Eglinton East LRT corridor, compared to the base case.



Figure 11: NIAs along the Eglinton East LRT<sup>12</sup>



<sup>12</sup> This figure does not include the recent splitting of Woburn into two NIAs. Updates for neighbourhood boundaries and mapping by the City is in progress.



### 3.2.4. Shaping the City

From a Shaping the City perspective, the Eglinton East LRT is preferred (Table 7).

*Table 7: Summary of Shaping the City Measures*

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
Higher-order transit service to residential growth areas	None; local bus stops only serving portion of corridor from Kennedy Station to UTSC	12 stops planned within mixed-use Avenues along Eglinton Avenue East and Kingston Road and opportunities to serve future residential development to the north towards Malvern
Area and proportion of land within walking distance (500m) of frequent surface transit or higher-order transit stops designated for population growth	Mixed use: 1.1 km <sup>2</sup> 13%	Mixed use: 1.4 km <sup>2</sup> 11%
Population within walking distance (500m) of frequent surface transit or higher-order transit stops	Existing: 49,000 people Projected growth: 11,000 people Projected future: 60,000 people	Existing: 63,000 people Projected growth: 12,000 people Projected future: 75,000 people
Population density within walking distance (500m) of frequent surface transit or higher-order transit stops	Existing: 5,800 people/km <sup>2</sup> Projected growth: 1,300 people/km <sup>2</sup> Projected future: 7,200 people/km <sup>2</sup>	Existing: 5,200 people/km <sup>2</sup> Projected growth: 1,000 people/km <sup>2</sup> Projected future: 6,200 people/km <sup>2</sup>

Key findings show that the Eglinton East LRT is preferred over the base case in terms of the following:

- Potential to stimulate more growth and development along Eglinton Avenue East and Kingston Road, and in Malvern.
- Provides higher-order transit stops within walking distance of approximately 63,000 residents, including identified growth areas and potential transit-oriented development.

Transit investment can play a significant role in the residential development of the city. Higher-order transit may be constructed to better serve existing areas of high residential density or areas planned for higher employment density in order to increase access to transit, and incentivize residential development near stops and stations.<sup>13</sup>

<sup>13</sup> Existing population density can be used as a proxy for what future population density would be, and models can be used to project future population density. Projections are based on observed trends and do not capture any incentive that higher-order transit infrastructure would provide to developers in the future.

The evaluation of a project's impact on supporting residential growth relates to how a project would serve residential growth areas. Studies have consistently demonstrated that LRT can provide an uplift in property values and increase residential development.<sup>14</sup> There are opportunities for growth and development within the mixed-use Avenues along Eglinton Avenue East and Kingston Road.

### 3.2.5. Healthy Neighbourhoods

The Eglinton East LRT is preferred from the perspective of Healthy Neighbourhoods due to moderate improvements to Neighbourhoods (see Table 8).

*Table 8: Summary of Healthy Neighbourhoods Measures*

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
Area and proportion of land within walking distance of higher-order transit stops designated as Neighbourhoods	4.0 km <sup>2</sup> 47%	5.5 km <sup>2</sup> 46%
Amenity and public realm improvements (improvements to streetscapes, facilities, stations, stops, or vehicles related to a transport trip)	No additional improvements expected as part of the RapidTO program	Improvements to the streetscape and public realm as a part of the Eglinton East LRT project
Road safety benefits (reduction in auto VKT as proxy for reduced accidents resulting in death or injury)	No change	Potential reduction in accidents due to fewer conflict points with vehicles and cyclists, but minor increase in accidents due to higher auto VKT compared to the base case (refer to Table 9 and "Public Health & Environment" sub-section)
Access to community amenities	Similar access to diversity of community amenities for both options	

Key findings show that the Eglinton East LRT has the following advantages over the base case:

- Provides higher-order transit within walking distance of 5.5 km<sup>2</sup> of lands designated as Neighbourhoods.
- Provides potential improvements to the streetscape and public realm through project implementation.
- Potential reduction in accidents due to separation from cyclists using curb lanes and consolidation of driveways, which may reduce points of conflict.

<sup>14</sup> 'The North American Light Rail Experience: Insights for Hamilton' (2012), Higgins, C., Ferguson, M. McMaster Institute for Transportation and Logistics, McMaster University, Hamilton, ON. April 2012. This paper provides a review of the academic literature examining the impacts of LRT on property values. Up to 23% uplift in value for commercial properties, and up to 10% uplift in property values for homes, depending on place.

Both options offer similar access to community amenities, such as libraries, parks, and schools.

Transit investments can strengthen and enhance existing Neighbourhoods through enhancing amenities and the public realm, improving road safety for all users, and improving access to community benefits.<sup>15</sup>

The majority of the potential Eglinton East LRT corridor is recognized as *Avenues*, designated for mixed use growth in the City's Official Plan. Some of the land use within station areas (although set back from the roadway) is identified as *Neighbourhoods*. This land amounts to 46% of the area within walking distance of station areas, and may see some development pressure in the long term. Along Morningside Avenue, much of the corridor is designated as Open Space. The Eglinton East LRT would pass over the ravine on an elevated structure and no stations would be built in the Open Space area.

The provision of higher-order transit stops near Neighbourhoods may offer improved walking and cycling infrastructure for accessing transit stops and other physical surroundings such as parks, green spaces, and public meeting spaces.

### 3.2.6. Public Health and Environment

The Eglinton East LRT performs slightly worse than the base case from a Public Health and Environment perspective (see Table 9).

*Table 9: Summary of Public Health and Environment Measures*

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
Total daily system-wide transit passengers (2041)	3,259,700 passengers	3,255,000 passengers (-0.2% compared to the base case)
Active lives (health improvements due to shift to active modes)	No change	May provide improved walking and cycling infrastructure, encourage increased active modes for accessing transit and local short trips
Change in auto mode share*	N/A	No change
Change in vehicle-kilometres-travelled (VKT)*	N/A	41,000 VKT
Greenhouse gas emissions	0.0167 kg to 0.0325 kg CO <sub>2e</sub> /passenger/km for non-articulated diesel and hybrid buses	0.0010 kg CO <sub>2e</sub> /passenger/km for Low-Floor LRVs
Major environmental challenges	None	Significant crossing of Highland Creek and ravine

<sup>15</sup> According to the Official Plan, Neighbourhoods are considered physically stable areas made up of residential uses in lower scale buildings such as detached houses, semi-detached houses, duplexes, triplexes and townhouses, as well as interspersed walk-up apartments that are no higher than four storeys. Parks, low scale local institutions, home occupations, cultural and recreational facilities and small-scale retail, service and office uses are also provided for in Neighbourhoods.

\*The change in auto mode share and change in vehicle-kilometres-travelled (VKT) assumes that a portion of buses would be rerouted from the Eglinton-Kingston corridor once the Eglinton East LRT is operational. Further work is required to identify the local bus transit routes and service that would complement and support the Eglinton East LRT.

Key findings include the following:

- The base case results in more new transit passengers by 2041, potentially encouraging slightly more local residents to adopt more sustainable lifestyles.
- The Eglinton East LRT provides improved walking and cycling infrastructure, which may increase the use of active modes for accessing transit or short trips in the area.
- The Eglinton East LRT experiences minimal auto mode share change, although the Eglinton East LRT slightly increases auto VKT compared to the base case.
- Light rail vehicles produce fewer greenhouse gas emissions and adverse local air quality impacts than diesel and hybrid buses.<sup>16</sup>
- The base case does not have any major environmental challenges, whereas the Eglinton East LRT would require a crossing of the Highland Creek and ravine.

Transit has the opportunity to reduce adverse impacts to health and encourage healthy habits. Providing attractive and efficient transit options close to people and jobs encourages an increase in both transit usage and the use of active modes to access transit (e.g. walking and cycling). Active transportation modes are largely dependent on convenience, density, built form, and supportive infrastructure.

Transit can reduce impacts of transportation on the environment. There is a benefit in shifting auto trips to transit in order to relieve traffic congestion, use energy more efficiently, and reduce greenhouse gas emissions. Major infrastructure projects such as higher-order transit may also have adverse impacts to natural features, which must be avoided or mitigated.

Higher ridership would also suggest lower VKT and greenhouse gas emissions.<sup>17</sup> Although the Eglinton East LRT would result in 41,000 VKT more than the base case, light rail vehicles utilize electric rail technologies, which reduces the amount of energy spent per trip and passenger compared to the private automobile and existing bus modes.

The Eglinton East LRT would cross the Highland Creek system, a significant natural feature in Scarborough, along Morningside Avenue between Kingston Road and Ellesmere Road. To accommodate this crossing, the Eglinton East LRT guideway would be on its own structure on the east side of Morningside Avenue. The alignment is also on ravine areas and wetlands south of Ellesmere Road to access UTSC. Both of these features have potential to disturb and impact environmentally sensitive areas. Approval under Ontario's Environmental Assessment Act was previously granted to the Scarborough Malvern LRT, which would have similar environmental impacts as the Eglinton East LRT. Detailed mitigation strategies would be updated for the Eglinton East LRT through the Transit Project Assessment Process.

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<sup>16</sup> The TTC is transitioning to a 100% e-bus fleet by 2040.

<sup>17</sup> Vehicle Kilometres Travelled (VKT) measures the total distance travelled by cars (volume and length of trips). A decrease in VKT in Toronto indicates a reduction in overall congestion and greenhouse gas emissions.

### 3.2.7. Supports Growth

From a Supports Growth perspective, the Eglinton East LRT is preferred over the base case (see Table 10).

*Table 10: Summary of Supports Growth Measures*

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
Higher-order transit service to employment growth areas	None; frequent surface transit serving portion of corridor from Kennedy Station to UTSC	12 stops planned within mixed-use Avenues along Eglinton Avenue East and Kingston Road, 2 stops within or near Core/General Employment Areas, and 1 stop at Malvern
Area and proportion of land within walking distance (500m) of frequent surface transit or higher-order transit stations designated for employment growth	Mixed use: 1.1 km <sup>2</sup> Employment lands: 0.1 km <sup>2</sup> Total: 15%	Mixed use: 1.4 km <sup>2</sup> Employment lands: 0.6 km <sup>2</sup> Total: 16%
Jobs within walking distance (500m) of frequent surface transit or higher-order transit stations	Existing: 7,700 jobs Projected growth: 2,700 jobs Projected future: 10,400 jobs	Existing: 13,800 jobs Projected growth: 4,800 jobs Projected future: 18,500 jobs
Employment density within walking distance (500m) of frequent surface transit or higher-order stations	Existing: 900 jobs/km <sup>2</sup> Projected growth: 300 jobs/km <sup>2</sup> Projected future: 1,200 jobs/km <sup>2</sup>	Existing: 1,100 jobs/km <sup>2</sup> Projected growth: 400 jobs/km <sup>2</sup> Projected future: 1,500 jobs/km <sup>2</sup>
Access to jobs (number of jobs accessible to the average person in Scarborough within 45-minute transit travel)	437,000 jobs	431,500 jobs (-1.3% compared to Option 1)

Key findings include the following:

- The Eglinton East LRT better supports the employment growth and development of Mixed Use Areas, General Employment Areas, and Core Employment Areas along the alignment compared to Option 1, due to the provision of higher-order transit and the value LRTs generate.
- The Eglinton East LRT would provide higher-order transit stops within walking distance of 18,500 jobs.

Transit investments can play a significant role in the employment development in the City. Higher-order transit may be constructed to better serve existing areas of high employment density, or areas planned for higher employment density in order to increase transportation accessibility, and therefore incentivise businesses to be located near stops and stations.<sup>18</sup>

The evaluation of a project's impact on supporting employment growth relates to how the project would serve employment growth areas. Studies have consistently demonstrated the value that LRT brings to city-building and growth. There is evidence that implementation of LRT can provide an uplift in property values, investment, and associated economic activity, particularly if it is coordinated with other planning initiatives.<sup>19</sup>

The Eglinton East LRT would provide enhanced transit connections to existing employment and generate opportunities for employment growth in Mixed Use Areas, General Employment Areas, and Core Employment Areas along the alignment. Such connections would include existing employment along the Eglinton Avenue East and Kingston Road corridor, as well as various retail clusters (Eglinton-Markham, and Kingston/Lawrence/Morningside, and Morningside-Sheppard), terminating at Malvern Town Centre.

The Eglinton East LRT provides higher-order transit service to UTSC students and staff and supports campus expansion. This strategic link between UTSC and the rest of the City supports UTSC's ambition of becoming an anchor institution.

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<sup>18</sup> Existing employment density can be used as a proxy for projected future employment density in an area. Projections are based on observed trends and may not be able to predict some employment growth as they do not capture the positive incentives that higher-order transit infrastructure would provide to businesses in the future.

<sup>19</sup> 'The North American Light Rail Experience: Insights for Hamilton' (2012), Higgins, C., Ferguson, M. McMaster Institute for Transportation and Logistics, McMaster University, Hamilton, ON. April 2012. This paper provides a review of the academic literature examining the impacts of LRT on property values. Up to 23% uplift in value for commercial properties, and up to 10% uplift in property values for homes, depending on place.

## 4. Economic Case

The Economic Case assesses whether the expected benefits of the investment exceed the costs required to deliver it, and articulates the overall economic benefit of pursuing the investment for society (including travellers, people, firms, and government).

The Economic Case follows the methodology set out by Metrolinx in the [Business Case Manual Volume 2: Guidance](#) that was published in August 2021 and is available for download on the Metrolinx website.

### 4.1. Economic Case Key Findings

Based on the economic case assessment as described below, the costs required to deliver the Eglinton East LRT exceed the expected benefits (see Table 11).

Table 11: Economic Case Summary Present Value (\$ millions, 2022)

Type of Cost / Impact	Present Value of Cost / Impact
<b>Costs</b>	
Capital expenditure*	\$3,918
Life cycle maintenance costs	\$349
Operations and maintenance costs	\$ 1,174
<b>Total cost</b>	<b>\$5,441</b>
<b>Impacts</b>	
User impacts	-\$891
Adjustments	-\$69
<b>Total conventional impacts</b>	<b>-\$960</b>
External impacts	-\$10
<b>Summary</b>	
<b>Conventional Net Present Value</b>	<b>-\$6,411</b>

\*The base year for capital expenditure is 2020 which is inflated to 2022 prices with a 1% cost escalation rate (in real terms), based on the Metrolinx Business Case Guidance. Capital expenditure will be reviewed and updated as the project is further refined.

### 4.2. General Assumptions

The Economic Case is based on the following assumptions:

- Evaluation period: 60 years
- Project opening year: 2030<sup>20</sup>
- Base year of dollar value: 2022
- Base year of capital costs: 2020

<sup>20</sup> At the time that this economic analysis was completed, a project opening year of 2030 was assumed. Based on conflicts identified in the Deliverability and Operations Case, the project may be completed at a later date. Impacts due to a later opening date will be assessed as the Eglinton East LRT project is further refined.

- Discount year: 2022
- Discount rate: 3.5%/year based on the Metrolinx Business Case Guidance
- Cost escalation rate: 1%/year (in real terms) based on the Metrolinx Business Case Guidance

### 4.3. Costs

The costs or ‘required investment’ to deliver the Eglinton East LRT are divided into three categories: capital costs, life cycle maintenance costs, and operation and maintenance costs.

#### 4.3.1. Capital Costs

Capital Costs are fixed one-time costs incurred during the implementation of the investment and include labour and materials required for construction, fleet acquisition, property acquisition, and contingency.

The 2020 capital cost estimate has been used as the basis for the economic case. Based on Class 4 estimates developed at that time, the capital cost for the Eglinton East LRT is estimated to be [\\$4.0-4.4 billion](#).<sup>21</sup>

For the purposes of this analysis, construction duration is assumed to be six years, from 2024 to 2030, with the investment costs being distributed evenly throughout this period. It is also assumed that these costs will be escalated in real terms by 1% per year in line with Metrolinx Business Case Guidance. The values in the present value costs section represent the total discounted costs. For the purposes of this analysis, the midpoint of the 2020 cost estimate range is used (\$4.2 billion), which, when escalated to 2022 dollars, is \$4.4 billion (see Table 12).

*Table 12: Capital Costs (\$ billions, 2022)*

Type of Cost	Total Capital Cost
Capital costs	\$4.4

#### 4.3.2. Lifecycle Maintenance Costs

Lifecycle maintenance costs are ongoing costs that would be required to keep the Eglinton East LRT up to an operational level, including infrastructure, rolling stock, system, and equipment.

The total lifecycle maintenance cost over the lifecycle (60 years) of this project is estimated to be \$349 million (present value, 2022) (see Table 13).

<sup>21</sup> Capital cost estimates will be refined to a greater level of accuracy as the planning and design for the project advances.



Table 13: Lifecycle Maintenance Costs Breakdown (\$ millions, 2022)

Frequency of Lifecycle Maintenance (years)	% of Capital Costs	Lifecycle Maintenance Costs
10	2%	\$87.4
15	3%	\$131.1
20	4%	\$174.8

\*The lifecycle maintenance cost breakdown is based on a previous bottom-up lifecycle cost assessment for this project. Based on this study, this economic analysis assumes 2% rehabilitation cost every 10 years, 3% lifecycle maintenance cost every 15 years, and 4% rehabilitation cost every 20 years.

\*\*At this time, the lifecycle maintenance costs have not been adjusted for inflation beyond 2022.

#### 4.3.3. Operating and Maintenance Costs

Operating and maintenance (O&M) costs are ongoing costs required to operate the service and provide day-to-day maintenance of the project. Based on information provided by TTC, O&M costs are estimated to be \$37.0 million annually (net of bus service savings).

To determine the total O&M, the yearly operating expense has been escalated in real terms at 1% per year, consistent with Metrolinx Business Case Guidance, then discounted to present value. The total O&M cost is estimated to be \$1,174 million (present value, 2022) (see Table 14).

The assumptions for the O&M cost estimates include the following:

- The O&M costs are in 2022 present value.
- All amounts are based on cost estimates for Line 5 Eglinton and Line 6 Finch West unit costs and are therefore preliminary and subject to refinement, based on upcoming review and discussions.
- Operating costs are mainly based on Line 5 Eglinton estimates (proportionally adjusted for service level). Specific characteristics related to Eglinton East LRT may not have been taken into account and are therefore subject to refinement.
- Maintenance costs reflect regular operating maintenance only. Lifecycle maintenance costs are not included in the O&M cost estimate calculated above.
- At-grade stops on dedicated right of way (not full stations) are assumed.
- Minimal TTC fare collection costs are assumed. Fare collection costs may require adjustment based on fare collection requirements.
- Reflects steady state costs and does not factor in costs in start-up phase (e.g. training).

Table 14: Annual Operating and Maintenance Costs (\$ millions, 2022)

Type of Cost	Operation and Maintenance Cost
Maintenance costs	\$30.7
Other operating costs	\$29.3
Gross operating costs	\$60.0
Bus service savings	(\$23.0)
<b>Operating expenses (annually)</b>	<b>\$37.0</b>
<b>Total net value operating and maintenance cost</b>	<b>\$1,174</b>

#### 4.3.4. Present Value Costs

All above noted costs have been discounted to the base year of evaluation (2022) using a discount rate of 3.5% per year, consistent with Metrolinx Business Case Guidance. Table 15 provides the present value costs, which may be different to the above costs as they reflect the timing of costs and include discounting. Over a 60-year evaluation period, the total present value costs for the project are estimated to be approximately \$5,441 million (present value, 2022).

*Table 15: Present Value Costs (\$ millions, 2022 present value)*

Type of Cost	Present Value Cost
Capital expenditure	\$3,918
Lifecycle maintenance costs	\$349
Operations and maintenance costs	\$1,174
<b>Total present value cost</b>	<b>\$5,441<sup>22</sup></b>

#### 4.4. Impacts

##### 4.4.1. User Impacts

User impacts are a key area of analysis for transport investments. They capture how the investment would affect the welfare of transport network users (travellers). These impacts are categorized as follows:

- **Transit User Travel Time:** improvements to travel times compared to existing transit options;
- **Transit User Crowding:** improvement in the perceived quality of service related to the utilization and capacity of the line; and
- **Auto Cost Savings:** these benefits are realized by users should they switch from automobiles to transit and represent the costs related to auto ownership and maintenance.

<sup>22</sup> Note on escalation and assumptions: an inflation rate of 1% is used, based on the Metrolinx Business Case Guidance. However, a price escalation due to market uncertainty resulting from several factors has been observed, which may further impact capital costs for the project:

- Supply chain delays for multiple key materials of the construction sector have caused a reduction in raw material supply during the pandemic, and thus, price escalation. The supply chain delays are in part caused by closures and delays from manufacturers during the lockdown.
- Material prices have escalated at a faster rate than the contractor bid prices on average, meaning contractors have had to significantly reduce their profit margins, with some firms incurring losses.
- Average construction wages have also experienced notable year over year increases in 2021. The total number of construction employees in North America has not fully recovered from pre-pandemic times. This decrease in labor supply has caused an increase in labor costs.
- Crude oil in the U.S jumped 55% in 2021 and another 40% this year in light of the new geopolitical situation. The escalation of crude oil causes a trickle-down effect on other construction materials and labor (higher energy costs translating into higher operating costs).

Key assumptions for the analysis of user impacts include:

- Travel time savings / ridership annualization factor: 306 days – based on TTC 2019 annual passengers divided by average daily passenger revenue.
- Transit crowding annualization factor: 250 days – based on the typical number of work days in a year.
- Annual time savings benefits / ridership growth rate: 0.85%/year – based on population projections by the Ontario Ministry of Finance. This parameter has been used to escalate the benefits across the investment lifecycle (60 years).

The most significant contributor to user impacts is the transit user travel time ‘disbenefit’ as articulated in the economic modelling results. In the August 2021 GTAModel, travel times are shown to be worse for the Eglinton East LRT when compared to the base case. This is due to various factors, including how the model treats the existing RapidTO bus lane performance as compared to the LRT, resulting in bus travel speeds being higher than the LRT. The total user impact of the Eglinton East LRT is calculated to be -\$891 million, which indicates that the project as currently defined has a negative user impact (see Table 16).

*Table 16: Total User Impact (\$ millions, 2022 present value)*

Type of Impact	Value of Impact
Transit user travel time benefits	-\$908
Transit user crowding benefits	\$45
Auto cost savings	-\$104
Transit reliability	\$76
<b>Total present value user impact cost</b>	<b>-\$891</b>

#### 4.4.2. External Impacts

Auto trips can have negative impacts to society through emissions that pollute the air, or from injuries that can occur from collisions. These impacts are called external impacts, or the social cost of transport. Transportation investments are an opportunity to reduce these costs by improving the economic efficiency of the transportation system.

External impacts are estimated through the changes to travel mode that can be generated by the proposed transit investment. If travellers move from a less efficient mode to transit, then there is an impact equivalent to the externalities per trip on transit, minus the externalities on their previously used mode. These benefits are calculated based on the change in automobile vehicle kilometres travelled (VKT).

As discussed above, the transit travel times, as shown in the August 2021 GTAModel results, are worse for the Eglinton East LRT option as compared to the base case where transit riders switch to automobile, and thus kilometers travelled by car increase. Therefore, the external impacts of the project are negative. The total external impact of Eglinton East LRT is calculated to be -\$10 million (see Table 17).

Table 17: External Impacts Present Value (\$ millions, 2022)

Type of Impact	Present Value of Impact
Road safety benefits	-\$7
Greenhouse gas emissions	-\$3
Air quality benefits	-\$1
<b>Total present value impact</b>	<b>-\$10</b>

#### 4.4.3. Wider Economic Impacts

Wider economic impacts are benefits to society beyond those offered to travellers (user impacts) and those realized by reducing the social cost of travel (external impacts). Investment into transit can improve accessibility to work, leisure, customers, and suppliers which can trigger greater and new economic activity. By improving the connectivity between businesses and people, a transit investment can support improved productivity related to greater exchange of information between workers and firms. The wider economic impacts are categorized as follows:

- **Productivity:** impacts to firms and workers which benefit from proximity. Transit investments can reduce the cost/time to travel between locations improving the perceived density of the region.
- **Imperfect Competition:** higher prices for specific goods can be higher due to low network connectivity. Transit investments can improve competition by connecting new markets or reducing the cost of travel within existing markets.

The Eglinton East LRT does not improve wider economic impacts and so these impacts are not being considered as part of this economic case.

#### 4.5. Cost-Benefit Analysis Adjustments

After project impacts are estimated, a resource correction adjustment is to be applied to reflect changes in costs across society (see Table 18).

- **Fare Revenue Adjustment:** an incremental post user impact estimation adjustment that converts user costs into societal costs relevant in a cost-benefit analysis context, i.e., net of transfer payments and taxes. A transit fare is perceived as a financial cost during a user's mode choice decision-making and therefore makes up a user's utility for transit and determines transit ridership.

Table 18: Cost-Benefit Adjustment Present Value (\$ millions, 2022)

Type of Adjustment	Present Value of Adjustment
Fare revenue adjustment	-\$69

## 5. Financial Case

The Financial Case evaluation assesses the capital, operational, and maintenance costs associated with the Eglinton East LRT. Notes and assumptions for the cost estimates are provided below.

### 5.1. Capital Cost Estimates

The following preliminary capital cost estimates were presented to City Council in December 2020 (see Table 19). It should be noted that the 2020 capital cost estimates for the purposes of the Financial Case are presented in 2020 dollars and have yet to be adjusted to inflation.

*Table 19: Capital Cost Estimates*

2020 Cost Estimate	Baseline Cost Estimate	Variance
\$4.0-4.4 billion	\$2.3 billion	\$1.7-2.1 billion

**Notes:**

1. Cost estimates are Class 4, except for elements related to the Morningside Bridge work. Those costs will be confirmed through design work to be undertaken by the Ministry of Transportation as part of the Morningside Bridge rehabilitation project.
2. Class 4 estimates are considered accurate within a range of -30% to +50%.
3. Costs include the previously assumed MSF, north of UTSC. Estimates for the Conlins MSF are not expected to be significantly different and have yet to be factored into the capital cost estimate.
4. Estimates exclude costs associated with procurement, escalation, lifecycle maintenance, and operations and maintenance.

Capital cost estimates will be further refined through the next phase of design work, including cost-saving opportunities.

## 5.2. Operational and Maintenance Cost Estimates

Preliminary operational and maintenance cost estimates are provided below (see Table 20).

*Table 20: Operational and Maintenance Cost Estimates*

<b>Cost Type</b>	<b>Cost Estimate (\$ Millions – 2022\$)</b>
Maintenance	30.7
Other Operating Costs	29.3
Gross Operating Costs	60.0
Bus Service Savings	(23.0)
<b>Annual Operating Expense, net of bus service savings</b>	<b>37.0</b>

### Notes:

1. All amounts based on cost estimates for Line 5 Eglinton and Line 6 Finch West and are therefore preliminary and subject to refinement, based on further review and discussions.
2. Maintenance costs reflect regular operating maintenance only. Life cycle costs (e.g. overhaul and track/vehicles replacement) are considered capital costs and therefore not included in this estimate.
3. Other operating costs are mainly based on Line 5 Eglinton estimates (proportionally adjusted for service level). Specific characteristics related to the Eglinton East LRT may not have been taken into account and are therefore subject to refinement.
4. This estimate assumes the alignment includes no stations, only above ground stops on dedicated right of way.
5. This estimate assumes limited TTC fare collection costs, due to the non-use of faregates (no stations). Costs may require adjustment based on fare collection requirements.
6. This estimate reflects steady state costs and does not factor in costs in start-up phase (e.g. training).

## 5.3. Additional Cost Impacts

Additional cost impacts are expected due to the constructability issues of the Eglinton East LRT, as identified in the Deliverability and Operations Case. These potential costs are not included in this Initial Business Case and would require further analysis, should the project continue as currently planned. Additional costs may include but are not limited to:

- Fees for any scope changes or delays to the Scarborough Subway Extension project to accommodate the Eglinton East LRT;
- Delayed construction start may lead to higher costs and prolonged negative impact to businesses and residents in the area, due to extended construction duration from both the Eglinton East LRT and the Scarborough Subway Extension projects;
- Additional property impacts to accommodate both the Eglinton East LRT and the Scarborough Subway Extension near Kennedy, including Provincially-owned properties designated for Transit Oriented Communities; and
- Further utility relocations, after the Scarborough Subway Extension is completed, if initial relocations were not coordinated effectively with Metrolinx, leading to inefficient use of funds and prolonged adverse impacts to the area.



## 6. Deliverability and Operations Case

The Deliverability and Operations Case considers key challenges to implementing a project. Implementation challenges are highlighted from a technical or engineering, operational, and governance perspectives. Previously, the Eglinton East LRT has had strong support from the public regardless of the options considered, with particularly strong public support for the extension to Malvern.

### 6.1. Deliverability and Operations Case Key Findings

The key finding from a deliverability perspective is that the Eglinton East LRT as an extension of Line 5 Eglinton at Kennedy Station is no longer feasible without significant and costly mitigation. There are significant conflicts between the planned tunneled section of the LRT in the Kennedy/Midland/Falmouth area and the Scarborough Subway Extension.

### 6.2. Engineering/Technical Considerations

#### 6.2.1. Kennedy Station

The Eglinton East LRT project as approved by City Council in December 2020 would provide through-service with Line 5 Eglinton at Kennedy Station. Connections to other higher order transit at this location include Line 2 Bloor-Danforth and future Scarborough Subway Extension, and the Stouffville GO Transit line.

Coordination is needed to mitigate schedule and cost risks, through the clarification and formalization of respective City and Metrolinx roles and responsibilities in the design, construction, and maintenance of the project as it relates to the Kennedy Station.

#### 6.2.2. Scarborough Subway Extension

In the early stages of the 10% Functional Design work, conflicts between the Council-approved Eglinton East LRT and the Scarborough Subway Extension were identified in the Kennedy/Midland/Falmouth area. Conflicts include:

- Between Kennedy and Midland, clearance between the two tunnels would be approximately 1.65 meters at the most constrained point under Eglinton Avenue East which falls below typical TTC standards without additional structural protections;
- The north wall of the Eglinton East LRT tunnel box would likely be in conflict with the existing Eglinton Avenue bridge abutment footings although further investigation on depth, composition, and existing condition is needed;
- East of Midland, there is a potential conflict between the Eglinton East LRT tunnel and the preferred location of Emergency Exit Building EEB-01 for the Scarborough Subway Extension;
- The Eglinton East LRT box and portal are located directly above the Scarborough Subway Extension, which poses significant constructability and safety issues for both projects, and may preclude the Council-approved Eglinton East LRT; and
- Potential utility and traffic coordination conflicts.

Based on the information available at this time, the Council-approved Eglinton East LRT is not constructible without significant changes to the Scarborough Subway Extension design and

procurement schedule (which includes the Advanced Tunneling contract already awarded and the Stations, Rail, and Systems contract to be awarded in 2022).

Although investigations into mitigations to allow for the Council-approved Eglinton East LRT are currently underway, significant impacts to cost, scope, and project timelines are expected. Continued coordination with Metrolinx's Scarborough Subway Extension project team in the design and development phase is required to mitigate potential challenges and additional costs.

It is also assumed that the Eglinton East LRT would be constructed while the Scarborough Subway Extension is in operation, requiring structural mitigations and approval of Metrolinx as the asset owner and TTC as the operator.

### 6.2.3. Ellesmere Watermain and Durham Scarborough BRT

Within the UTSC portion of the Eglinton East LRT alignment, a 2100mm transmission watermain exists on the south side of Ellesmere Road, within close proximity to the existing right-of-way. During the early stages of the 10% Functional Design work, it was discovered in the Durham Scarborough BRT plans that Ellesmere Road is intended to be widened and a portion of the transit infrastructure may be located on top of the watermain. Opportunities to shift either project's infrastructure is constrained by the valley south of Ellesmere Road. Relocating the watermain is not a preferred solution due to the significant costs associated with interrupting service for a transmission watermain.

Coordination with Toronto Water and Metrolinx's Durham Scarborough BRT design team is necessary to understand the amount of separation or mitigation measures required to minimize impacts to the watermain, Military Trail, and proposed passenger and pedestrian connections at UTSC, during and after construction of both the Eglinton East LRT and the Durham Scarborough BRT.

### 6.2.4. Military Trail Re-alignment and UTSC Master Planning Study

The re-alignment of Military Trail as set out in the UTSC Master Plan (2011) was envisioned to ensure the LRT can support the development of UTSC. During conversations with UTSC, it was expressed that the Council-approved Eglinton East LRT project was not in alignment with the campus's vision due to the ROW required to accommodate the Bombardier Flexity Freedom LRVs. Concerns expressed by UTSC include:

- Wide ROW presents a physical barrier for students and faculty on campus due to a hostile street environment and limited pedestrian crossing locations across Military Trail; and
- Campus developments are being planned and/or under construction and may conflict with the LRT ROW.

Additional coordination with UTSC is required to ensure the design and construction of the Eglinton East LRT aligns with the university's objectives and expansion plans, including development applications currently underway.

### 6.2.5. Kingston/Lawrence/Morningside

The underground alignment at the Kingston/Lawrence/Morningside section of the Eglinton East LRT results in a portal and increased property impact on Morningside Road for properties adjacent to the portal. Construction staging of the underground (cut and cover section) section would be disruptive to the area.

### 6.2.6. Interface with Guildwood GO Station

A stop at the intersection of Kingston Road and Celeste Drive is planned. This stop would be located more than 200m from Guildwood GO Station. As a redevelopment of the Guildwood GO Station is being planned as part of GO Expansion, further discussion is required to explore opportunities for enhancing the connection between the Eglinton East LRT and the Guildwood GO station. The connection will be addressed through development of the 10% design process.

### 6.2.7. Maintenance and Storage Facility Requirements

The latest direction from City Council includes a MSF at the Conlins site, located on Provincial lands at 8304 Sheppard Avenue East. The Conlins MSF is already approved under Ontario's Environmental Assessment Act, and the site has already been prepared. Challenges for the Conlins MSF include:

- Required environmental protection and mitigation measures as per the Environmental Project Report. The MSF is situated on top of a channelized stream, near the Rouge River Valley, and near the Toronto Zoo, which is particularly sensitive to noise and light pollution.
- Its proximity to a future planned, funded and approved North East Scarborough Community Centre and Joyce Trimmer Park on the east side of the MSF site. Building an MSF in this location could erode the potential to cultivate a community hub in the area.

Further assessment of requirements for the MSF will be confirmed through the 10% detailed design of the project.

### 6.2.8. Highland Creek Crossing

The Highland Creek area is an environmentally sensitive area. The bridge structure and berm extension to support the LRT guideway and platform at Morningside/Ellesmere would require approval from Toronto Region Conservation Authority. The impacts of this crossing and strategies to mitigate those impacts would be identified through an updated Transit Project Assessment Process for the project.

### 6.2.9. Highway 401-Morningside Overpass

The Ministry of Transportation (MTO) will be refurbishing the Morningside overpass over Highway 401 in the second phase of Highway 401 upgrades, with an anticipated construction start date of 2025. City staff have made arrangements with MTO to include the reinforcement of the bridge to accommodate the Eglinton East LRT. Capital funding to pay for the incremental cost of reinforcing the bridge for the purpose of supporting LRVs would need to be secured early enough to ensure the bridge reinforcement can occur as part of its planned refurbishment.

There is desire to provide cycle tracks across the 401, per the City's cycling plan. The addition of cycle tracks to the LRT scope of work would further complicate construction over the 401 by potentially triggering a widening of the overpass and potential redesign of the interchange. Further coordination with MTO is required to ensure the Eglinton East LRT is accommodated through the overpass refurbishment works.

## 6.3. Operational and Service Planning Considerations

The Eglinton East LRT as approved by City Council would require platforms long enough to accommodate three-car trains to allow for through-service with Line 5 Eglinton at Kennedy Station.

The base case faces deliverability challenges in terms of bus service continuing to serve existing routes using the RapidTO bus lanes. In order for the base case to reasonably meet transit demand, additional buses would be required. The ability to meet the demand for transit service to Kennedy Station will be constrained by the existing size of Kennedy Station and its capacity to serve buses. The feasibility and cost associated with expanding the bus fleet, the bus terminal at Kennedy Station, or other required facilities has not been explored for the base case.

### 6.3.1. Traffic Conditions

Traffic impacts are anticipated at particular intersections along the Eglinton East LRT alignment. Through the Transit Project Assessment Process, traffic impacts would be reassessed with the possibility of developing new recommendations to mitigate adverse impacts. The Kingston/Lawrence/Morningside intersection would be of particular importance due to the significant traffic impacts identified previously in the Scarborough Malvern LRT environmental assessment.

### 6.3.2. Impacts on Surface Network Service

The Eglinton East LRT project requires further work to identify the appropriate surface transit network to complement and support transit riders along the LRT alignment.

## 6.4. Project Governance and Capital Project Delivery Considerations

### 6.4.1. Institutional Roles and Responsibilities

There are a significant number of institutional partners involved in the Eglinton East LRT whose respective roles in the design, construction, operation, and maintenance of the project would need to be clarified and formalized in order to successfully and seamlessly deliver any of the options. The coordination required introduces schedule and cost risk.

Prior to late 2021, the City of Toronto and TTC were leading the planning stage for the Eglinton East LRT without significant involvement from the Province or Metrolinx. Metrolinx is responsible for the delivery of the segment of Line 5 Eglinton between Mount Dennis and Kennedy subway station through a design-build-finance-maintain (DBFM) alternative financing & procurement (AFP) model. A private consortium, Crosslinx Transit Solutions, is building and would maintain that segment, with the TTC to operate service. If a through-service extension to the east is continued to be pursued, it would need to integrate seamlessly with the rest of Line 5 Eglinton, including the potential use of the Eglinton Maintenance & Storage Facility (MSF) near Mount Dennis. There may be challenges associated with modifying or expanding the scope of an existing AFP project agreement, which introduces the risk of increased costs and/or delays in delivery of the Eglinton East LRT.

#### 6.4.2. Financial/Procurement

Preliminary analysis has been undertaken on implementation scenarios for the governance framework for advancing the Eglinton East LRT through Preliminary Design and Engineering (PDE) to a stage of procurement-readiness. Each scenario comes with opportunities, but also risks. Further detailed analysis, and discussion with project partners, is required prior to advancing the project to the PDE phase of work.

#### 6.4.3. Construction Labour Market

As with all major infrastructure projects, there are construction labour market considerations. There is a potential for capital cost increases if other major infrastructure projects are being constructed at the same time across the Greater Toronto-Hamilton Area, placing a large demand for labour from a limited labour pool.

Further details on price escalations are provided in Section 5.2.1 of this Initial Business Case.

#### 6.4.4. Utility Relocations

As detailed design, enabling works, and construction advances, utility relocations can add to the cost of construction. Coordination with Metrolinx's Scarborough Subway Extension project team would be required to minimize additional relocations in the Kennedy/Midland/Falmouth area.

## 7. Conclusions

















### 7.1. Summary of Initial Business Case Key Findings

Summary of Initial Business Case findings:

- **Strategic Case:** The Eglinton East LRT is preferred over the base case as it would better address the RTEF criteria.
- **Economic Case:** The costs required to deliver the Eglinton East LRT exceed the expected benefits.
- **Financial Case:** The capital investment for the Eglinton East LRT, based on the project as approved in 2020, is estimated to be \$4.0-4.4 billion, with estimated annual total net value operating and maintenance cost of \$37 million.
- **Deliverability and Operations Case:** The Eglinton East LRT as an extension of Line 5 Eglinton is no longer feasible without significant and costly mitigation. There are significant conflicts between the planned tunneled section of the LRT between in the Kennedy/Midland/Falmouth area and the Scarborough Subway Extension

Table 21 presents a summary of the key findings from this initial business case. In order for the Eglinton East LRT project to have a more supportive business case, ways to improve the project benefits need to be explored.

Table 21 Summary of Key Findings

Measure	Option 1: Base Case	Option 2: Eglinton East LRT
<b>Strategic Case</b>		
Choice		
Experience		
Social Equity		
Shaping the City		
Healthy Neighbourhoods		
Public Health and Environment		
Supports Growth		
<b>Summary</b>		
<b>Economic Case</b>		
Capital expenditure	N/A	\$3,918 million (2022\$)
Life cycle maintenance costs		\$349 million (2022\$)
Operations and maintenance costs		\$1,174 million (2022\$)
<b>Total cost</b>		<b>\$5,441 million (2022\$)</b>



Measure	Option 1: Base Case	Option 2: Eglinton East LRT
User impacts		-\$891 million (2022\$)
Adjustments		-\$69 million (2022\$)
<b>Total conventional impacts</b>		<b>-\$960 million (2022\$)</b>
External impacts		-\$10 million (2022\$)
<b>Conventional NPV</b>		<b>-\$6,411 million (2022\$)</b>
<b>Financial Case</b>		
Capital Cost Estimate	N/A	\$4.0-4.4 billion (2020\$)
Operational and Maintenance Cost Estimate		\$37.0 million per year (2022\$)
<b>Deliverability and Operations Case</b>		
Engineering/Technical Considerations	No impact	Significant conflicts with Scarborough Subway Extension near Kennedy. Project cannot be constructed without costly mitigations.  Mitigation and coordination for other conflicts and challenges to be explored as design progresses.
Operational and Service Planning Considerations	To meet future demand, additional buses would be required. The ability to meet the demand for transit service to Kennedy Station will be constrained by the existing size of Kennedy Station and its capacity to serve buses.	Traffic impacts to be assessed through TPAP.
Project Governance and Capital Project Delivery Considerations	No impact	Coordination with Metrolinx, MTO, and TTC required to understand respective roles and funding, and align project schedules.

## 7.2. Next Steps

As a result of the deliverability and other challenges that have emerged with the project as approved, design and alignment solutions are being explored, including an alignment that would have the LRT operate as a distinct service rather than an extension of Line 5 Eglinton at Kennedy Station. This revised approach to the project would have the following key characteristics:

- A distinct Eglinton East LRT service from Kennedy Station to Malvern Town Centre with a separate Eglinton East LRT terminus at Kennedy Station, as opposed to a through-service connecting from Line 5 Eglinton.

- Potential at-grade station at and crossing of the Kingston/Lawrence/Morningside intersection.
- A light rail vehicle that is more specific to the needs of Scarborough, with shorter trains that would better match capacity with projected demand and require shorter platforms, is better able to climb the grade of Morningside Avenue and has more flexible turnback requirements.

Based on the preliminary analysis and design work to-date, a distinct service for the Eglinton East LRT could provide the following improved benefits and reduced costs from a business case perspective as outlined below.

- Strategic Case:
  - Higher service reliability due to its separation from Line 5 Eglinton and the Eglinton Crosstown West Extension service operations.
  - Improved transfer between the Eglinton East LRT and Line 2 at Kennedy Station, for passengers travelling to/from downtown Toronto.
  - Earlier construction start date and reduced combined construction period and impacts for residents and businesses in the Kennedy/Falmouth/Midland area with the Scarborough Subway Extension project.
  - A shorter and more nimble LRV that can operate on the existing Morningside Avenue bridge may:
    - Reduce environmental impacts to the Highland Creek valley compared to the Council-approved project.
    - Create reduced physical barriers for the UTSC and better align with the campus's vision.
    - Create an option to shift the alignment from travelling through UTSC to heading north along Morningside Avenue if needed.
- Economic Case:
  - Although a distinct service would introduce an additional transfer for those travelling from the Eglinton East LRT to Line 5, design should focus on minimizing transfer times, especially between Eglinton East LRT and Line 2 and GO Transit, which are projected to experience higher transfers than Line 5.
  - A smaller and more nimble LRV may improve comfort for passengers, due to smaller turning movements.
  - Opportunity to improve operational robustness and reliability (e.g. fewer cumulative delays, reliability of journey times and headways), due to a shorter LRT route.
  - Service and infrastructure disruptions could be more effectively managed.
  - Removal of the need for underground sections from the alignment near Kennedy and at Kingston/Lawrence/Morningside.
  - Shorter platforms which would reduce construction costs.
  - At-grade crossing and LRT station at Kingston/Lawrence/Morningside.
  - Smaller MSF capacity and footprint needed to accommodate smaller LRVs.
  - Opportunity to avoid or minimize additional costs needed to accommodate the through service concept due to conflicts with the Scarborough Subway Extension.
  - Reduced loading requirements for the Highway 401-Morningside overpass.
- Financial Case

- Removal of the need for underground sections from the alignment near Kennedy and potentially at Kingston/Lawrence/Morningside.
- Shorter platforms.
- At-grade crossing and LRT stop at Kingston/Lawrence/Morningside.
- Smaller MSF capacity and footprint needed to accommodate smaller LRVs.
- Opportunity to avoid or minimize additional costs needed to accommodate the through service concept due to conflicts with the Scarborough Subway Extension.
- Reduced loading requirements for the Highway 401-Morningside overpass.
- Deliverability and Operations Case
  - Opportunity to avoid or mitigate most of the conflicts with the Scarborough Subway Extension, potentially without significant costs or project delays.
  - Opportunity to better support UTSC's vision and provides flexibility to realign the LRT along Morningside Avenue if needed.
  - Reduced design complications by eliminating underground portions of the alignment near Kennedy and at Kingston/Lawrence/Morningside.
  - Reduced construction at and impact to Highland Creek valley, if the distinct service LRV is able to climb the Morningside Avenue grade.
  - Reduced loading requirements for the Highway 401-Morningside overpass refurbishment.
  - Kennedy Station would become the terminus station for both Line 5 and the Eglinton East LRT. Design mitigations for transfers between the Eglinton East LRT, Line 2, and Line 5 would be needed to ensure transfer opportunities are convenient, comfortable, and intuitive for travellers of all ages and abilities.
  - Conflicts with the Scarborough Subway Extension in the vicinity of Kennedy Station could be mitigated, since it will not require the use of underground tunnels along Eglinton Avenue East.
  - Could be better aligned with UTSC's vision for transit that is integrated with the campus. Shorter platforms and more flexibility may result in reduced physical barriers within the campus.
  - A shorter LRV with shorter platforms may allow for an at-grade crossing of and station at Kingston/Lawrence/Morningside.
  - Smaller LRVs would reduce the needed storage capacity and overall footprint required for the Maintenance and Storage Facility.
  - If the LRV is able to operate on the existing Morningside Avenue bridge across Highland Creek, fewer impacts to the Highland Creek valley can be expected because the construction of a separate LRT bridge may not be required.
  - Shorter trains could reduce the loading requirements of the Highway 401-Morningside overpass, reducing impacts to the design and timelines for the overpass reconfiguration.

In order to fully understand the potential benefits and costs of a distinct service, further analysis and design is required.