Regional Fare Structure Initial Business Case

Final
April 2023

DISCLAIMER

This Initial Business Case (IBC) provides preliminary analysis, intended to inform ongoing and future conversations about the benefits and trade-offs of various regional transit fare structures. This IBC will be followed by additional and more detailed studies. At this IBC stage, cost estimates are high-level, and the ridership and revenue related to each fare structure should be considered relative to the Business as Usual (BAU) baseline and other options. Data that are provided for individual transit systems or municipalities are not intended to be used for detailed business planning.

All options presented in this business case may not align with the direction of current municipal governments or transit system authorities. However, results presented herein are intended to provide a benchmarking exercise for comparison of a wide range of possible fare structure opportunities, including benefits for customers and for fiscal sustainability of transit funding in the region. In addition to this IBC, the Ministry of Transportation (MTO) will conduct supplementary analysis and reporting on potential regional governance structures and funding models. Therefore, these topics are not included in this IBC.

This document has been reviewed and assured by the Metrolinx Research & Planning Analytics division to meet the internal Investment Panel standards. Future modelling and reporting will be updated based new information that is made available.

All predictions include risks related to future uncertainty. Ridership projections included in this report are based on 2019 ridership data. As the region recovers from the COVID-19 pandemic, transit ridership is assumed to return to baseline trends. However, if transit ridership changes from past trends, this analysis may be revised to reflect evolving travel behaviours.

METROLINX

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Executive Summary

0 Executive Summary

Executive Summary Structure

This executive summary provides a summary of the IBC narrative and analysis. It includes:

- **Overview** - background on the IBC
- **What is Fare Integration?** – a brief summary of integration
- **IBC Roles** – a summary of the parties involved in IBC development
- **Problem Statement** – a summary of the problems Fare Integration seeks to address
- **The Case for Fare Integration** – a summary of the overall case for Fare Integration
- **Detailed Variation Results** – a comparison of four potential variations for Fare Integration
- **Conclusions** – key findings from the IBC

Overview

This document is the Initial Business Case (IBC) for a Fare Integration Program. Fare Integration is a proposed package of policies and capital and operating investments with the potential to: grow transit ridership, simplify and improve the customer experience, make transit more affordable and equitable, and enable stronger performance from in-delivery transit investments.

This IBC has been developed with in line with the Metrolinx business case framework with collaboration with the Ministry of Transportation (MTO) in order to:

- Review a range of fare structure options and articulate key lessons for consideration and variation refinement in future stages of development; and
- Inform broader regional fare and service integration decision making including governance and funding.
- This IBC has been prepared in line with the requirements of the first stage in Metrolinx's business case lifecycle. This IBC will be used, along with other evidence, to inform decisions related to advancing a fare integration options.

What is Fare Integration?

Fare Integration refers to making transit easier to use, from a fares perspective, for customers who either:

- Use multiple systems as part of a single trip (example: using two or more systems to complete a trip from home to work)
- Use multiple systems regularly, but not always for the same trip (example: commuting on one transit system and using other systems for recreational trips)

Typically, a fare structure is considered 'integrated' when it includes some or all of the components In Table E-1 for travellers who make use of multiple systems.

Table 0-1: Elements of Fare Integration

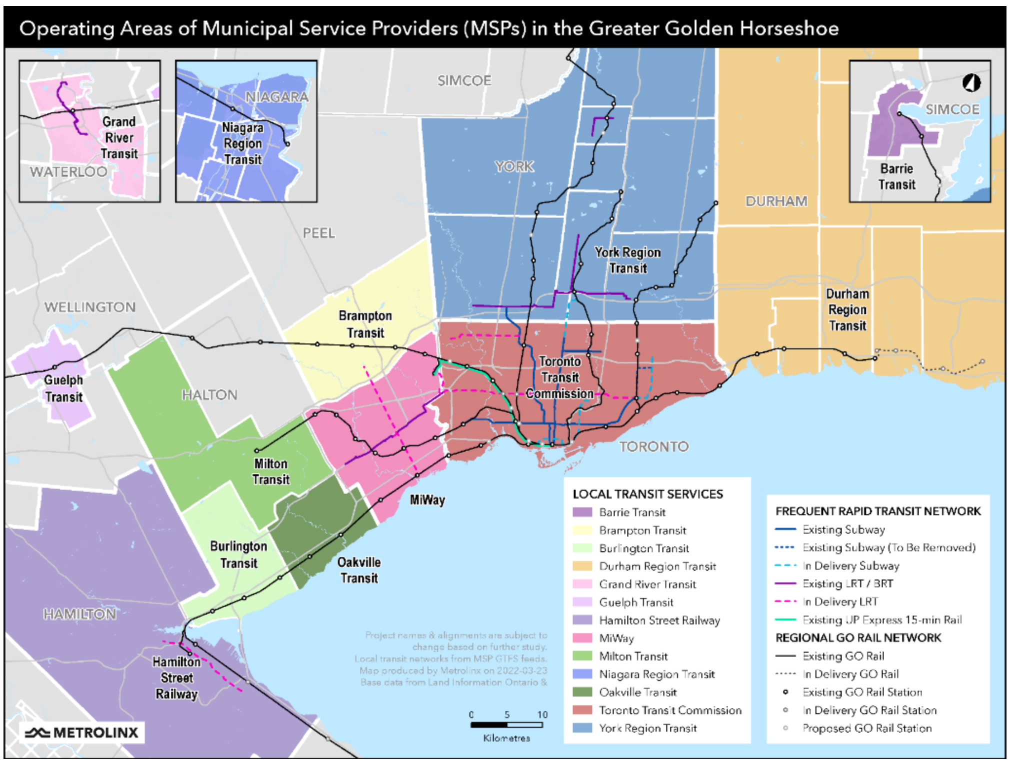
Element of Integration	Progress To Date
Common ticketing platform (currently available in much of the GTHA via PRESTO)	Implementation of PRESTO automatic fare collection across most agencies
Consistent approach to setting prices for trips that use multiple systems	System to system agreements in the '905' for free transfers (includes local transit and GO)
Shared products, passes, caps, concessions, and other incentives	Ongoing efforts to harmonize and align on concession definitions over the past decade

Note, this business case is focused primarily on modifications to the fare structure for trips that could make use of multiple systems over the duration of the trip (see first bullet above). Travellers who make use of multiple systems over the course of a time period (such as a month) typically benefit from fare integration aimed at products, caps, or concessions, which will be the focus of future analysis.

Role of Municipal Transit Systems in the IBC and Fare Integration Analysis

The Fare and Service Integration Provincial-Municipal Table was established as a problem-solving body that explored ideas and enhanced collaboration between the Ministry of Transportation (MTO), Metrolinx and 14 transit systems in and around the GTHA (see Figure E-1). These systems were engaged in the exploration of potential fare structures (called variations in this IBC), setting up strategic principles for Fare Integration, and reviewing emerging findings.

Figure E-0-1 Transit Systems Included in the IBC for Fare Integration



Problem Statement – Transit does not function as a single network, a lack of integration discourages people from choosing transit

The Greater Toronto and Hamilton Area (GTHA) and Greater Golden Horseshoe (GGH) have grown into an integrated City Region that is home to over 7 million people and is anticipated to reach 10 million people by 2041. The existing GTHA transit network and fare policies were developed over previous decades to address the needs of a smaller and less integrated region. Today's economy is more integrated than ever before – for most cities, over 30% of the work force lives in different cities. This network does meet the needs of today's more integrated region but does not provide the connectivity required to prepare for tomorrow's growth. In response to these changes, transformational investment in an integrated region-wide frequent rapid transit network is underway, with full implementation expected by 2032. Further expansion is also planned, as set out in *Connecting the GGH: a transportation plan for the Greater Golden Horseshoe* (March 2022).

While progress has been made on integration, fares will play a crucial role in achieving the potential of these investments and 'making transit work for the region' – now and in the future. The problem statement in Figure 2 was developed to guide the development and evaluation of potential integrated fare structures.

Transit does not function as a single network. A lack of integration discourages people from choosing transit.

Metrolinx and the Province are delivering over $80 billion in rapid transit investment, which will support regional goals for affordability, environmental sustainability, and economic competitiveness and prosperity for the region.

These investments expand traveler choice to improve connections:

- Within municipalities; and
- Between municipalities in support of an increasingly integrated regional economy.

Despite progress in recent years on fare integration, some existing fare policies in the region were established to focus on trips using a single system and do not fully support travel within an integrated regional economy or the best use of future investment in transit.

There are three key remaining issues at a 'fare structure' level that represent this problem.

ISSUE ONE:

Double fares between TTC and other agencies

Trips involving transit agencies outside Toronto with a transfer to TTC pay a double fare – this impedes access to jobs and employment and has resulted in a lower mode-share on transit.

Today *– this barrier impacts ~210,000 transit trips per day on municipal transit systems. In addition there are 1.7 million auto trips travelling between Toronto and neighboring cities who could use transit without a double fare.*

There are potentially 140,000 trips per day that could use TTC/GO if there was not a double fare.

ISSUE TWO:

Current GO fares are more costly than other system fares for short distance trips

GO Transit fares ($4.40 cash, $3.75 PRESTO) are much higher than transit system fares for trips under 10km (for example: TTC $3.20 PRESTO fare).

This limits use of GO services for short trips – even when GO services are faster or more convenient.

Today *(issue 1+2)* **–** *there are ~5,000 to 8,000 trips per day on GO Transit that are <10 km. Initial analysis suggest there could be 55,000 to 80,000 daily trips that could use GO if there was a lower base fare.*

ISSUE THREE:

Regional fares are inconsistently applied

Inter-city trips spanning long distances are not consistently priced:

- For example, there is a 25-30% variation for some trips of the same distance
- Long distance trips on subway from York Region to Downtown Toronto could cost as little as $3.25on subway compared to $8 on GO Rail

The Case for Fare Integration

This IBC reviewed four potential fare structures and noted the following key findings:

1. **Each of the proposed fare structure variations can address one or more of the identified fare integration issues.**
2. **Fare Integration has significant benefits at a regional scale**
3. **The benefits of fare integration are equal to or exceed many projects in-delivery today**
4. **Fare Integration can augment the benefits of key investments**

The evidence presented in this IBC is based on delivering Fare Integration with minimal fare increases such that few customers pay more; alternative pricing models may diminish or alter the benefits of Fare Integration.

> **Business Case Evaluation Framework**
>
> This Business Case applies the evaluation methodology as defined by Metrolinx's Business Case framework, including:
>
> - **Strategic Case -** a review of how Fare Integration delivers on the strategic principles defined by Metrolinx, MTO, and transit systems.
> - **Economic Case –** a review of how the socio-economic value of Fare Integration benefits compared to the resources costs required to deliver Fare Integration.
> - **Financial Case –** an assessment of the financial impacts and requirements to successfully deliver Fare Integration.
> - **Deliverability and Operations Case –** an assessment of the key technical requirements to deliver and operate Fare Integration and any key risks.

The Strategic Case for Fare Integration – More Affordable Transit, Higher Ridership and More Time Saved – today and tomorrow

The strategic case identified that fare integration could:

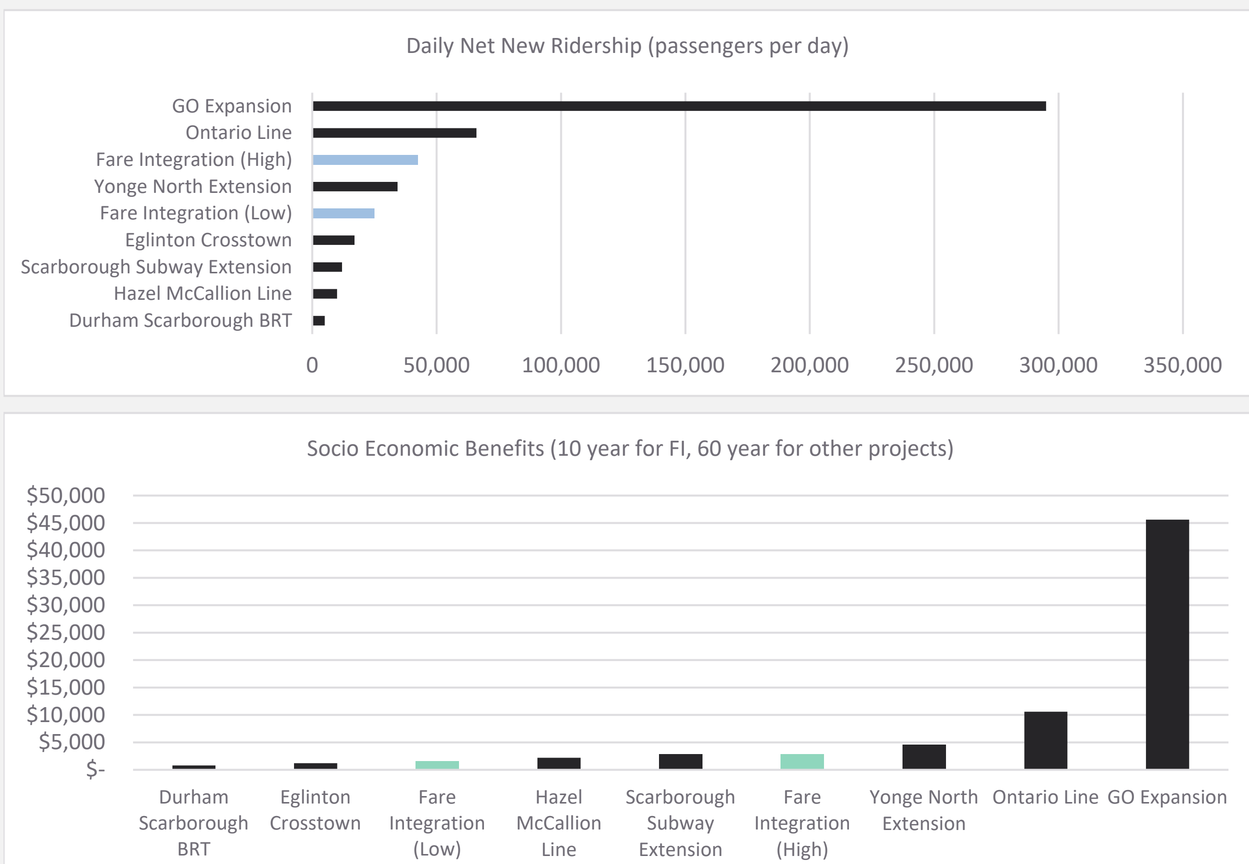
- **Reduce the price-burden of mobility -** The current fare structure in the region has significantly higher fares for trips using TTC+GO, TTC + neighbouring systems, and GO Transit for trips <10 km. Fare integration can address these fare barriers, resulting in fare reductions for 280,000 to 500,000 trips paying a lower fare each day.
- **Higher ridership across the region –** FI could generate an additional 25,000 to 40,000 trips per day on transit (without any systems losing daily boardings) – this ridership gain is comparable to many infrastructure projects (See Figure 3).
- **Save travellers time each day -** when travellers shift to faster transit– where available- time savings could amount to 2.7 million to 9 million hours each year. This means less time in congestion and less time spent travelling to work, recreation, and other activities.
- **Increase the number of jobs people can access -** FI could make over 123,000 to 194,000 jobs accessible for $3.25 when using a combination of transit systems with integrated fares.
- **Decongest highways – making roads faster, safer, and less emission intensive -** as more travellers choose transit, the region's highway and road network could see significant decongestion ranging from 140 million to 240 million fewer automobile vehicle kilometres travelled per year, resulting in fewer collisions and GHG emissions as well as up to 1.4 million hours saved by drivers per year.
- **Benefits that scale as key projects like the Ontario Line or GO Expansion enter operations -** by 2041, it is anticipated that FI could generate up to 60,000 new transit trips per day. It could also increase GO Rail boardings by 30,000 to 160,000 (supporting the success of GO Expansion), increase subway boardings by 52,000 to 142,000 (supporting the success of the subway program), and add 44,000 to 320,000 bus boardings across the municipal systems each day.

The Economic Case for Fare Integration - Benefits across the GTHA and surrounding communities at a price lower than many major infrastructure projects

The strategic benefits of Fare Integration were monetized using standard transportation economic analysis and compared against the costs required to implement the program. Economic analysis is presented in real terms in 2022 CAD and assumed FI is delivered by 2025, with evaluation ending in 2035. This analysis identified that:

- These benefits are worth $1.7 to $2.9 b over the next ten years alone – these benefits include monetized time savings for transit users, drivers and passengers, and society as a whole (due to fewer collisions and reduced emissions). These benefits, as shown in Figure 3 below, are comparable to the socio-economic benefits generated by most rapid transit projects – **however, unlike these major infrastructure projects, fare integration can deliver these benefits in 10 years instead in of in 60 years.**
- The costs required to deliver and operate fare integration (including new PRESTO hardware, software changes, and new fleet and service hours to accommodate increased demand) range from $280m to $390m over the first ten years.
- This means fare integration could have a benefit cost ratio (BCR) of 5.5 to 8.5 – meaning for every dollar invested in fare integration, the region would benefit by $5.50 to $8.50.

Figure E-2: Comparing the Strategic and Economic Case for Fare Integration to Other Projects



Note – revenues are not included in socio-economic appraisal as they are a transfer payment and not a resource cost.

The Financial Case for Fare Integration – targeted investment in PRESTO, buses, and revenue impacts may be required

A financial appraisal was conducted to understand the total cash-flow impacts of Fare Integration. This analysis is presented in nominal terms.

Fare Integration carries three major financial considerations:

- **Lost revenue ranges from $60m to $140m per year from changing fares –** including directly addressing the three key issues by removing double fares (issue 1 – removing double fares between TTC and neighbouring systems, and TTC and GO Transit), reducing the GO Transit base fare (issue 2 – reduction from $3.70 to $3.20 PRESTO), and any other changes to the GO Transit structure (issue 3). This is equal to $800m to $1.8 billion in lost revenue over ten years.
- **Lost revenue reflects a change in fares without raising anyone's fare –** fare integration may reduce fares for select travellers. While some new demand is generated, it does not offset lost revenue. These revenue losses can be mitigated through new funding (external to the transit network), or if fares are raised elsewhere in the region, or the level of discount offered by fare integration is reduced. The level of benefits identified in this business case cannot be realized if fares are raised or discounts are reduced.
- **$290 to $390 investment in new capital and operating costs –** inclusive of all PRESTO hardware where required and new bus fleet and service hours to accommodate increased demand from fare integration.

The Deliverability and Operations Case for Fare Integration – the program is deliverable using planned PRESTO upgrades but key delivery questions require further analysis

The overall deliverability and operations case for fare integration considered three dimensions:

- **Technical requirements –** fare integration can be delivered using the in-delivery PRESTO upgrades. Some variations may require additional hardware and software development, however no deliverability 'fatal flaws' were identified.
- **Operations requirements –** fare integration will increase peak period demand on local transit systems – including some substantial increases to bus demand. Additional fleet and service hours may be required to accommodate this demand.
- **Risks –** fare integration carries a range of ridership, technical, and revenue risks – a risk mitigation and study plan was identified for each major risks.

Based on this analysis, fare integration is considered deliverable, however further work is required to fully understand and define the approach to successfully deliver and operate fare integration. The following should be considered if fare integration is advanced:

- Considering co-delivery of fare integration with GO Expansion and the subway program to minimize impacts and risks, while potentially augmenting benefits. This analysis should consider status of contracting, procurement, and design for capital projects impacted by fare change.
- Developing a detailed phasing, delivery, and customer change management plan that builds upon the preliminary analysis presented in this document.
- Considering delivery alongside governance and funding models. MTO will be conducting supplementary analysis and reporting on these aspects of fare integration.

Detailed Business Case Analysis and Conclusions– understanding the case for each variations

Metrolinx developed a set of four potential fare integration structures called 'variations'. These variations were analyzed using the Metrolinx business case framework to identify the preceding findings. Business case analysis was conducted using a built for purpose forecasting model called FAST (FAre STrategy model), which was third party reviewed. The four variations were developed following engagement with municipal transit systems. Each variation is used to explore a different approach to addressing the problem statement – however, there are some common principles applied to each:

- Retain all existing transit system fares for trips wholly within one municipality on all modes (example: all TTC subway trips within Toronto do not get a price change) – no customers using a single municipal system within a single municipality will see a fare change;
- Minimize the number of customers who pay more if a new fare structure for regional trips is included in the variation (defined as cross-boundary trips over 10 kilometres on subway, and GO Transit trips over 10 kilometres); and
- Use consistent price changes between variations (example, minimize the amount of differences in average fare between variations) to illustrate how structure, not price, drives performance.

The four variations are described at a high level in Table E-2 with their detailed business case performance summarized in Table E-3.

The findings in Table E-2 and E-3 findings should be reviewed alongside two key considerations:

- The four Variations tested minimize fare increases and, as a result, significant farebox revenue losses of $60 to $140m per year are projected. However, if structures with higher fares are considered in an effort to reduce overall farebox revenue losses, the benefits of the regional fare variations, including ridership on future transit investments, will likely be lower than those identified in this IBC.
- Fare Integration's benefits are likely to meet or exceed the benefits of many infrastructure projects – however these benefits can be realized with lower costs and delivery requirements and risk. In addition, fare integration is likely to enhance the benefits of the subway program and GO Expansion.

Table E-2: Four Fare Structure Variations

	A: Free Transfers	**B: Regional Trips Use GO Fares**	**C: Regional Trips Use Fare by Distance**	**D: Regional Trips Use Zones**
Description	Remove all double fares between GO-TTC and TTC-905 agencies (free transfers for all trips)	Remove double fares, lowers base GO Fare to $3.25, and brings subway trips that cross a municipal boundary into existing GO zones-based pricing	Remove double fares, lowers base GO Fare to $3.25, and uses a new standardized distance-based fare structure on all GO Transit trips and subway trips that cross a municipal boundary	Remove double fares, lowers base GO Fare to $3.25, and uses a zone structure for all GO Transit trips and subway trips that cross a municipal boundary
Common Features	• Few customer pay more • Structurally designed: each system retains autonomy for all fares for trips that begin and end on one system within one municipality (subway in Toronto is always flat)			
Unique Features	Fewest changes to fares but higher revenue loss than B as many trips shift from GO (higher fare) to subway + bus to take advantage of the free transfer	Adds regional subway trips to the GO Fare structure – this results in lowest revenue loss as fewer trips shift from GO to subway	Completely reworks the GO Fare structure to standardize it with one key constraint: optimize so 'no one pays more'. Variation C has no customers paying more, while a small number of customers pay more (short trips across a zone) on Variation D due to the zone structure. Because fares are inconsistent today (trips of the same distance on different lines have different fares), this means many customers will have a lower fare on average - GO Rail trips pay 10-15% less	
Benefits comparison	Lowest benefits	Intermediate benefits	Highest benefits	Highest benefits
Requirements comparison	Simplest technical requirements Intermediate revenue loss	Intermediate technical requirements Lowest revenue loss	Highest technical requirements Highest revenue loss (tie)	Highest technical requirements Highest revenue loss (tie)
Benefit driver	Reduced double fare	Same as A plus a lower base fare for GO Transit	Same as B plus a new GO transit structure that results in generally lower fares	

Table E-3: Detailed Fare Integration Variation IBC Analysis

Impact	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Strategic Case				
Ridership Growth	+26,500 per day (8.1 million a year, 1.4% increase)	+25,000 per day (8 million a year, 1.3% increase)	+41,000 per day (12.9 million a year, 2.2% increase)	+39,000per day (12.3 million a year, 2.1% increase)
Simplicity - including degree of potential change to customer experience (for understanding fares and paying for transit) and transit travel time saved	Minor changes to customer experience	Moderate changes to customer experience	Major changes to customer experience – however structure for GO Transit may be perceived as more consistent	Major changes to customer experience – however structure for GO Transit may be perceived as more consistent
	2.7 million hours per year saved	6.3 million hours per year saved	7 million hours per year saved	9 million hours per year saved
Affordability and Equity	0% pay more / 14% pay less	1.2% pay more / 15 % pay less	0.4% pay more / 24.2 % pay less	1.3% pay more / 24.2 % pay less
Fiscal Sustainability (annual financial impact, cost per new rider)	$90 million/year	$60 million/year	$140 million/year	$140 million/year
	$10.95	$7.70	$10.90	$11.15
Future Ready (new daily trips in 2041)	+40,000	+26,000	+50,000	+60,000
Economic Case (million 2022 $)				
10-Year Benefits	$1,630	$2,130	$2,800	$2,860
10-Year Costs	$290	$280	$390	$340
10-year Benefit Cost Ratio	5.5	7.5	7.2	8.5
10-year net present value	$1,340	$1,850	$2,410	$2,520
Financial Case				
10-year Net Financial Impact	-$1,490	-$1,080	-$2,190	-$2,140
Deliverability and Operations Case				
Risk and Requirements	Low risk, low requirements	Medium risk, medium requirements	High risk, high requirements	High risk, high requirements

Next Steps

IBCs are the first stage of Metrolinx's business case lifecycle. Subsequent analysis should consider the following key questions:

- How far should fare integration go? Should it include free transfers, applying the existing GO Fare structure for longer distance 'regional subway trips' between cities, and greater than 10 km, or completely transform the fare structure for regional trips?
- How could fare integration be phased and delivered?
- What governance, funding, and revenue allocation models could be used to deliver fare integration?
- What barriers and enablers of success for fare integration need to be monitored?
- What are the specific agency and customer impacts of the Variations?
- How can fare integration be delivered alongside service integration and how do these programs influence each other?

1

Introduction

1 Introduction

Overview

This introduction chapter includes the following subsections to aid readers in making most effective use of the document:

- **Background** – a brief introduction to this document
- **Project Lifecycle Update –** a summary of the fare integration program and previous analysis and policy development efforts that feed into this business case
- **Decisions Informed by the Business Case –** a summary of the range of decisions this business case seeks to inform and the future decisions that can be considered
- **Document Structure –** a guide to the remaining seven chapters of the business case

Background

This document is an 'Initial Business Case' (IBC) for Fare Integration. It has been developed collaboratively by Metrolinx and the Provincial Government. Feedback from municipal transit systems was sought during the development of this IBC, including input on the problem statement, variation scoping, and evaluation. This IBC was developed to support decision makers in contemplating key challenges created by the current state of fare integration and to explore variations (different regional fare structures) based on their benefits, costs, trade-offs, and wider consequences. Specifically, the fare structure variations in this IBC assess four approaches to changing:

- The price of transfers between transit systems
- The approach used to set fares for GO Transit
- The approach used to set prices for 'regional trips' – those that cross boundaries and travel longer distances (>10 km)

All variations were developed to show different approaches to realize a vision for integrated fares in the region. This vision is based on five strategic principles:

- **Simplicity** - A customer-focused transit system that is easy to understand and seamless to use
- **Future Ready** - A fare structure that is responsive to changing user needs, technology and service offerings and optimizes planned transit developments
- **Ridership Growth** – a fare structure that help grow regional transit ridership, encourage residents to drive less, and support smart growth in the region
- **Affordable and equitable** – a fare structure that improves service and respects different levels of service needs, and makes transit a more attractive option for customers
- **Financially Sustainable** – a fare structure that is developed considering fare revenues, operating costs/fare collection costs, benefits to regional economic competitiveness and additional investments

The findings outlined in this IBC will be used to:

- Review a range of variations and articulate key lessons for consideration and variation refinement in future stages of development; and
- Inform broader regional fare and service integration decision making including governance and funding.

This business case is not being used to:

- Select a single variation for implementation; or
- Define fare prices or level of investment to allocate to fare integration.

What is Fare Integration?

Fare Integration refers to making transit easier to use, from a fares perspective, for customers who:

- Use multiple systems as part of a single trip (example: using two or more systems to complete a trip from home to work)
- Use multiple systems regularly, but not always for the same trip (example: commuting on one transit system and using other systems for recreational trips)

Typically, a fare structure is considered 'integrated' when it has multiple of the following components in Table 1.1 that allow travellers to make use of multiple systems in.

Table 1-1: Elements of Fare Integration

Element of Integration	Progress To Date
Common ticketing platform (currently available in much of the GTHA via PRESTO)	Implementation of PRESTO automatic fare collection across most agencies
Consistent approach to setting prices for trips that use multiple systems	System to system agreements in the '905' for free transfers (includes local transit and GO)
Shared products, passes, caps, concessions, and other incentives	Ongoing efforts to harmonize and align on concession definitions over the past decade

Note, this business case is focused primarily on modifications to the fare structure for trips that could make use of multiple systems over the duration of the trip (see first bullet above). Travellers who make use of multiple systems over the course of a time period (such as a month) typically benefit from fare integration aimed at products, caps, or concessions, which will be the focus of future analysis.

Project Lifecycle Update

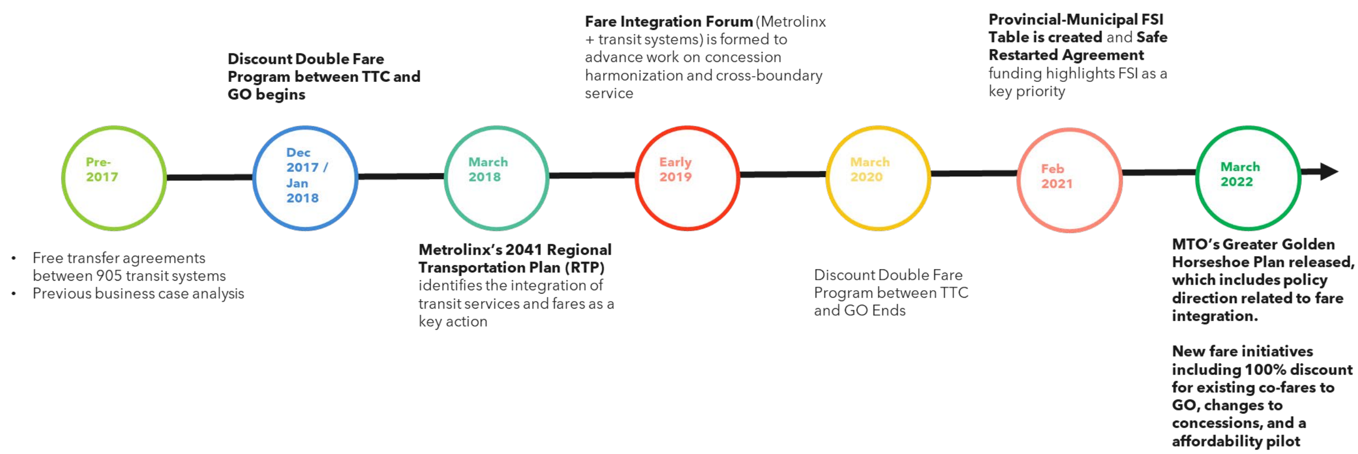
Progress since 2017 - Towards Fare Integration

This IBC is the next step in a multi-year work program to explore the potential for fare integration within the Greater Toronto and Hamilton Area (GTHA) and with surrounding communities. Figure1-1 illustrates key milestones in the development of an integrated fare policy since 2017 – including incremental changes (2017 discount double fare between TTC and GO Transit pilot and 2021 discount double fare changes between MSPs and GO Transit), plans (such as the 2041 Regional Transportation Plan and Greater Golden Horseshoe transportation plan), the development of a Fare Integration Forum in 2019, and the creation of a Fare and Service Integration Provincial – Municipal Table in 2021 by the Associate Minister of Transportation. This table was responsible for developing recommendations, guiding principles, and considerations for fare & service integration in order to make significant progress.

Prior to 2017, key progress towards fare integration included:

- Free-transfer agreements between transit GTHA agencies outside of Toronto (905 transit systems) – these agreements allow customers to use multiple 905 agencies without paying a second fare. These free transfer agreements now cover all 905 agencies, with some agreements existing for over 20 years.
- Developing a 'Draft Preliminary Business Case' for Fare Integration (2016-2017, published 2018) – this business case explored four high-level options for integration and included the development of new modelling tools to support fare analysis. Since this business case, Metrolinx published a new Business Case Manual (Volumes 1 and 2) and the policy context (including land use, infrastructure priorities, population growth, employment growth, and other plans and policy priorities) has evolved, which is one of the motivators for a new fare integration IBC.

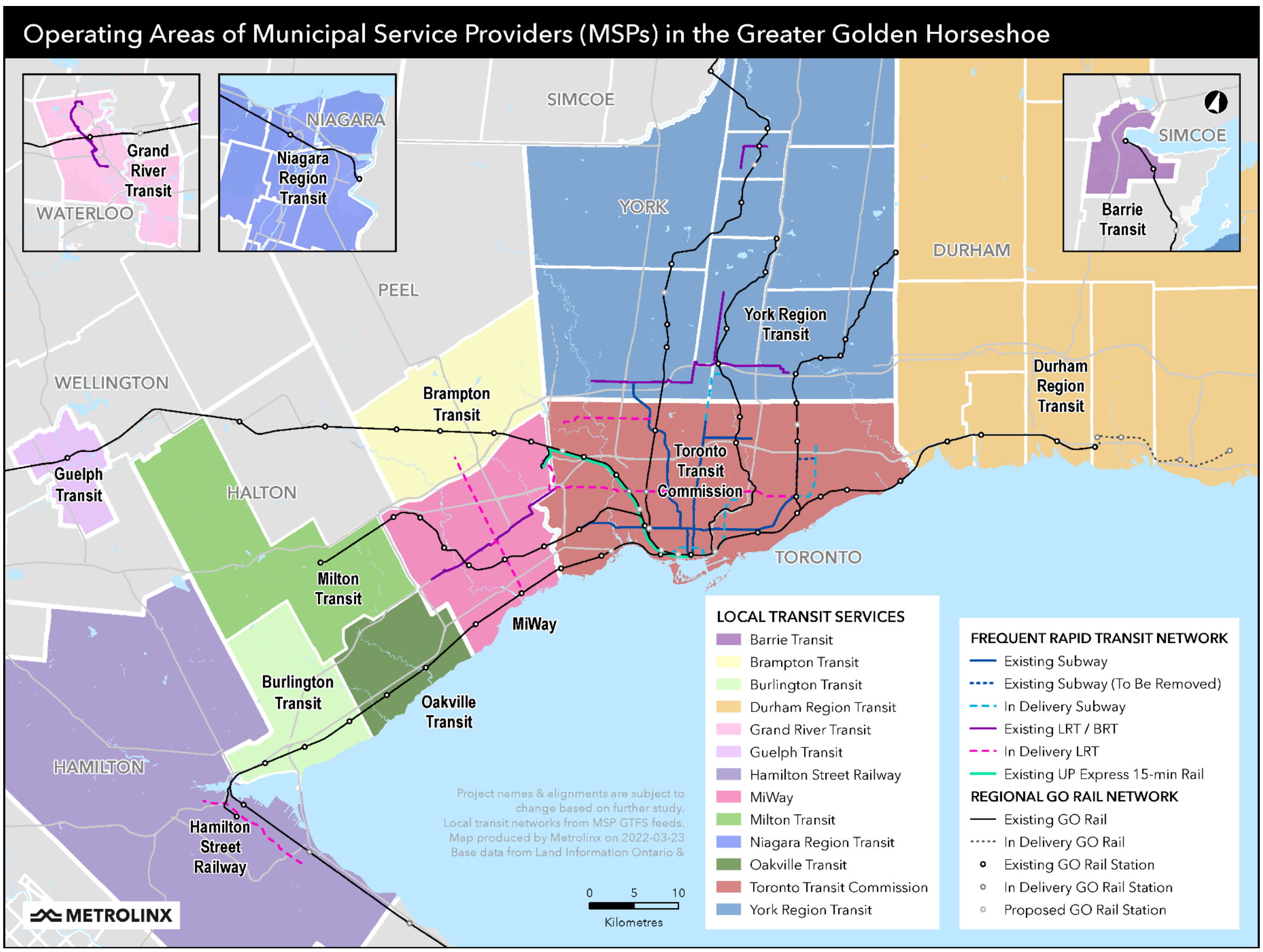
Figure1-1: Timeline of Fare Integration Progress



Role of the Fare and Service Integration Provincial-Municipal Table

The Fare and Service Integration Provincial-Municipal Table was established as a problem-solving body that explored ideas and enhanced collaboration between the Ministry of Transportation (MTO), Metrolinx and 14 transit systems in and around the GTHA. Figure1-2 illustrates 13 of these agencies – note that Peel Region provides specialized transit service, including an overlap with Brampton Transit and MiWay service areas. With the exception of Peel Region all agencies have been included in the quantitative analysis for this IBC ([see Chapter 3 section on FAST model]). Collectively these agencies are referred to as the 'Fare Integration Study Area Systems' and the geography they serve is referred to as the 'study area' in this IBC. Note – third party travel options and other government agencies– such as ride sharing, ONTC, or VIA Rail were not included in this analysis. They may be included in future studies.

Figure1-2: Transit systems in and around the GTHA participating in the FSI Provincial-Municipal Table



The Table's work and discussions has progressed in three phases:

- Phase 1 focused on identifying foundational building blocks and new short-term actions for advancing integration.

- Phase 2 focused on confirming principles and an evaluation framework to narrow down a long list of Regional Fare Structure Options to a short list that could be further explored.
- Phase 3 conducts a deeper analysis on these regional fare structure options in order to understand the range of benefits and consequences associated with changing to any one of these options. The analysis is compiled into this report and will be submitted to MTO for review and consideration.

As a result of Phase 1 collaboration, new fare programs were implemented in March 2022, including:

- Setting a consistent 100% discount for any agency that has an existing co-fare agreement (primarily the 905 service area). Free transfers on local transit to and from GO are intended to increase affordability for existing customers and help build back regional ridership as part of programs to recover from the impacts of the COVID-19 pandemic.
- Replacement of the GO and UP's current "Student" PRESTO concession with "Youth" for customers who are between 13 and 19 years old and removing the requirement to be enrolled in school. This aligned GO and UP with the other transit systems in the GTHA who were already using this definition, making it easier now for customers to move seamlessly across systems using a single PRESTO card. In addition, the PRESTO-only discount for the Youth and Post-Secondary concessions were increased from 22.5% off the adult full fare to 40% to better reflect the needs and financial considerations of young people.
- A new rebate pilot program for low-income customers (GO Affordability Program), that was first launched on Brampton Transit and MiWay, and will be rolled out across the region over the next two years. Customers who are already part of their municipal low-income transit programs will now receive a 50% fare rebate on their GO trips, improving affordability and helping to increase options of travel for these customers.

Other transit systems continue to explore and implement FSI initiatives in parallel, including service integration studies, to find efficiencies and opportunities to improve service between adjacent municipalities.

Role of the Initial Business Case

The Initial Business Case will be used to inform subsequent analysis of the potential of different fare and service policies for the study area (Fare Integration Study Area Systems). This Business Case differs from the previous fare integration business cases in the following ways:

- The Ministry of Transportation has partnered with Metrolinx to validate the regional transit issues and opportunities and has helped to facilitate discussions with transit systems.
- All 14 transit systems were involved in the development of the problem statement and principles, which guided the selection of the options in this Business Case. Feedback was also collected throughout the development of this Business Case, including how to approach analysing customer and agency-level benefits and impacts.
- Metrolinx has included more elements of the customer experience and analysis of how these options could perform 'today' and in a future transit network.

Decisions Informed by Business Case

This IBC was developed to inform future analysis and decisions. In line with Metrolinx's business case guidance and policies, this IBC will not be used to select or advance a specific fare structure variation for implementation. **Table 1-1** provides a summary of key fare integration decision points that have been explored in Phases 1-3 of this fare integration program and their relation to the IBC. Greater detail on existing conditions is shown in Chapter 2 and specific variations that address these decisions are defined in Chapter 3.

Table 1-2: Decision Points Explored in the IBC

Decision Point	Description	What are existing conditions?	How is it explored in the IBC?	How will IBC findings be used in future analysis?
How could transfers be priced?	Fare structures can charge customers the cost of each transit service used or provide a 'free transfer' or 'transfer discount' when using multiple agencies	A customer pays two fares when using: • 905 agencies +TTC (example $7.35 for TTC + York Region Transit, compared to $3.25 for TTC alone) • TTC+GO A customer does not pay a transfer when: using 905+GO, using multiple 905 agencies	Free transfers are proposed across all options (A, B, C and D)	Exploring the financial impacts and benefits (ridership growth, wider benefits) of making all transfers free.
Should flat fares be regional or municipal service provider (MSP) specific?	Flat fares can be specific to a given MSP or consistent between all MSPs (example: all bus fares in the region are $3.25)	Each MSP has a unique flat fare determined by municipal policies	The decision to retain municipal fares was made in previous stages of the analysis (see the Short List section of the IBC for details)	Not applicable
Which services could use distance pricing?	Some services may be priced based on how far a trip is; typically, these fares are applied for longer distance or cross-regional trips	• GO Transit (rail and bus) use a distance-based fare structure; • The TTC uses flat fares for all services	Regional application of distance fares for GO Transit and subway trips between Toronto and York Region that are >10 km	Exploring long term potential of refined distance pricing for select modes
Which approaches to distance-based fares are optimal for the GGH?	If fares increase based on distance travelled, they typically will use either zones or measured distance (price per km)	Today GO Transit uses a large number of zones to emulate a measured distance approach	GO Zones (Variations A/B) Fare by Distance (Variation C) Large circular zones (Variation D)	
How could fare policy changes be phased?	Each of the above decisions can be made simultaneously or in a staged order	N/A	The IBC looks at multiple transformation pathways that combine fare options in the short and long term (2041+)	Exploring opportunities to optimize fares today, during the delivery of the Frequent Rapid Transit Network, and beyond 2041.

This IBC has been developed to inform future work across these decision points but will not be used to make a specific decision on major structural or pricing changes. This decision hierarchy for fare integration is outlined in **Table 1-2**. The role of IBCs in Metrolinx's general decision-making approach (or stage gate approach) is shown in **Figure 1-3**. Note – this figure reflects the Metrolinx Business Case Manual's framing for IBCs. This IBC varies in that it will not be used to select a single preferred alternative for further development. Additional analysis on funding, implementation, and governance will be conducted in parallel. Combined, this analysis will aid decision makers in determining next steps for fare integration.

Table 1-3 - Fare Integration Decision Hierarchy

Decisions Made Before the IBC	Decisions Informed by the IBC	Future Decisions
• Free transfer agreements between 905 transit systems • To launch the Fare and Service Integration Provincial-Municipal Table • To implement free transfers between most agencies in the GGH and GO Transit	• No specific policy changes will be informed by the IBC; it will be used as a starting point for further analysis. For example, Metrolinx's major transit capital projects progress through a Preliminary Design Business Case (stage gate 2) and Full Business Case (stage gate 3) where more progressively more detailed project information on project scope, benefits, and costs are incorporated	Whether or not to continue developing or implement regional fare integration, including: • Future transfer policies • Future pricing policies • Specific price points for transit services • Funding and governance policies • Implementation approaches

Figure 1-3: Metrolinx Business Case Lifecycle

Business Case Overview

The remainder of this document follows Metrolinx's Business Case Manual Volume 2: Guidance[1], which includes the following chapters:

- **Chapter 2 – the Case for Change –** a summary of the problems and opportunities that could be addressed by expanding the state of Fare Integration in the GGH
- **Chapter 3 – Policy Variations –** a summary of four fare structure variations included in this IBC to respond to the Case for Change (these are evaluated in Chapters 4-7)
- **Chapter 4 – Strategic Case –** a review of how each fare structure variation can support or impede key strategic priorities for the region
- **Chapter 5 – Economic Case –** a review of the socio-economic benefits (including to travellers and the region as a whole) of each fare structure variation compared to the costs to deliver them
- **Chapter 6 – Financial Case –** a review of the financial impacts of each variation – including changes to fare revenue and costs
- **Chapter 7 – Deliverability and Operations Case –** a review of specific requirements for successful implementation of each variation
- **Chapter 8 – Conclusions –** a summary of key lessons learned from analyzing the four fare structure variations in Chapters 4-7

[1] https://www.metrolinx.com/en/regionalplanning/projectevaluation/benefitscases/Metrolinx-Business-Case-Guidance-Volume-2.pdf

2

The Case for Change

2 The Case for Change

Introduction

The Case for Change defines the overarching problem that fare integration has been proposed to solve and explores the general ways that fare integration can address it. It includes the following sections:

- **Problem Statement –** a summary of the key issues related to fares that impede ridership growth and other strategic priorities in the region
- **Key Issues – Critical Review** – a review of the key fare issues related to the problem statement and their impacts on travel – today and in the future
- **Opportunity Statement** – a summary of the key benefits the region can realize by addressing the problem
- **Business Case Framework** – a summary of how fare integration variations are evaluated across the document

Establishing the Case for Change

In the past, fare integration has been reviewed as a potential policy intervention in the Greater Toronto and Hamilton Area. This includes a recent business case in 2018 as well as a range of technical studies and forecasting exercise.

This IBC is considered a new business case that was launched collaboratively with the Province. Input from municipal transit systems was sought and reflected throughout, including in the definition of a problem statement and solution statement.

This chapter builds on these statements to align them with Metrolinx's Business Case framework and integrate additional analysis to aid decision makers in understanding the central issues fare integration is proposed to address.

Problem Statement

<u>**Transit does not function as a single network. A lack of integration discourages people from choosing transit.**</u>

Metrolinx and the Province are delivering over $80 billion in rapid transit investment, which will support regional goals for affordability, environmental sustainability, and economic competitiveness and prosperity for the region.

These investments expand traveler choice to improve connections:

- Within municipalities; and
- Between municipalities in support of an increasingly integrated regional economy.

Despite progress in recent years on fare integration, some existing fare policies in the region were established to focus on trips using a single system and do not fully support travel within an integrated regional economy or the best use of future investment in transit.

There are three key remaining issues at a 'fare structure' level that represent this problem.

ISSUE ONE:	ISSUE TWO:	ISSUE THREE:
Double fares between TTC and other agencies Trips involving transit agencies outside Toronto with a transfer to TTC pay a double fare – this impedes access to jobs and employment and has resulted in a lower mode-share on transit.	**Current GO fares are more costly than other system fares for short distance trips** GO Transit fares ($4.40 cash, $3.75 PRESTO) are much higher than transit system fares for trips under 10km (for example: TTC $3.20 PRESTO fare). This limits use of GO services for short trips – even when GO services are faster or more convenient.	**Regional fares are inconsistently applied** Inter-city trips spanning long distances are not consistently priced: • For example, there is a 25-30% variation for some trips of the same distance • Long distance trips on subway from York Region to Downtown Toronto could cost as little as $3.25on subway compared to $8 on GO Rail
Today *– this barrier impacts ~210,000 transit trips per day on municipal transit systems. In addition there are 1.7 million auto trips travelling between Toronto and neighboring cities who could use transit without a double fare.* *There are potentially 140,000 trips per day that could use TTC/GO if there was not a double fare.*	**Today** *(issue 1+2)* **–** *there are ~5,000 to 8,000 trips per day on GO Transit that are <10 km. Initial analysis suggest there could be 55,000 to 80,000 daily trips that could use GO if there was a lower base fare.*	

The three issues have a significant impact on customers travelling on transit within the study area. They also impact transit's overall attractiveness compared to other modes - such as the private automobile.

Figure 2-1 illustrates the existing fare barriers in the region, which include:

- **Issue 1**
  - Customers are required to pay two full fares when transferring between a 905 transit system and the TTC.
  - Customers are required to pay two full fares when transferring between GO and TTC.
- **Issues 2 and 3**
  - Fares for travel on GO Transit within Toronto or between Toronto and neighbouring municipalities are higher than fares for travel on TTC due to the use of distance-based pricing.

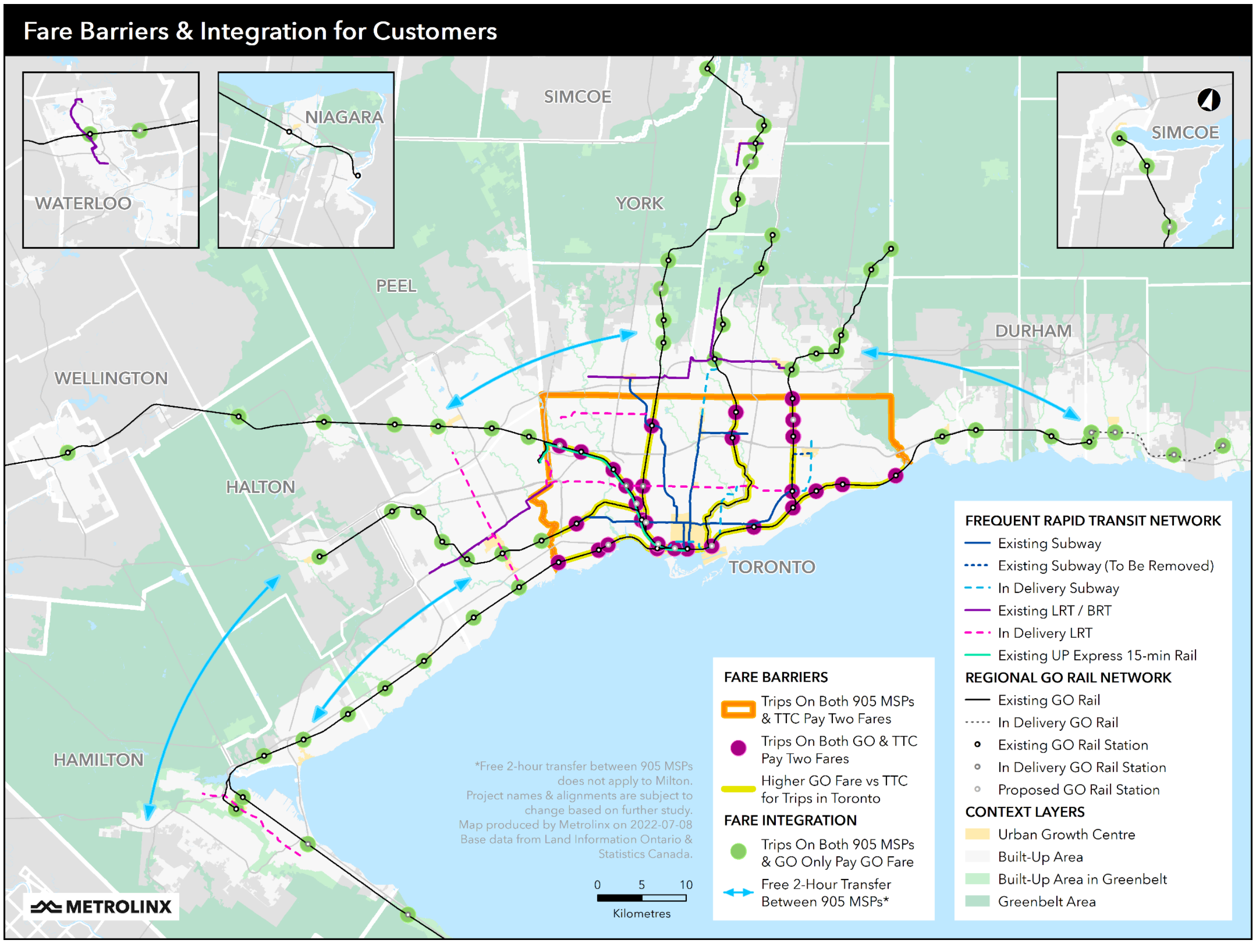
Combined these issues mean that customers making three types of trips may pay a disproportionately higher fare than other trips of a similar distance:

- trips that begin and end in different cities (with one city being Toronto)
- trips that could use GO Transit for short distance travel
- trips that could use GO Transit and TTC together

The impacts of these higher fares include:

- Ridership on transit services may be supressed for three trip types.
- Customers may choose slower services, or non-transit modes, to avoid paying a higher fare for transit. This means travellers may choose services that are crowded and spend more time travelling, or choose a personal vehicle, contributing to congestion and emissions. Customers are choosing less efficient transportation options over services that are available, faster, and have capacity.
- In the future, as the frequent rapid transit network expands with new subway extensions and frequent GO rail service is introduced across the region, these issues could increase. The current fare structure does not provide adequate flexibility to allow customers to make best use of these new services.

Figure 2-1: Fare Barriers & Integration for Customers



Root Cause Analysis: Why this problem, and why now?

The Greater Toronto and Hamilton Area (GTHA) and Greater Golden Horseshoe (GGH) have grown into an integrated City Region that is home to over 7 million people and is anticipated to reach 10 million people by 2041. The existing GTHA transit network and fare policies were developed over previous decades to address the needs of a smaller and less integrated region. Today's economy is more integrated than ever before – for most cities, over 30% of the work force lives in different cities. This network does meet the needs of today's more integrated region but does not provide the connectivity required to prepare for tomorrow's growth. In response to these changes, transformational investment in an integrated region-wide frequent rapid transit network is underway, with full implementation expected by 2032. Further expansion is also planned, as set out in *Connecting the GGH: a transportation plan for the Greater Golden Horseshoe* (March 2022). Fares will play a crucial role in achieving the potential of these investments and 'making transit work for the region' – now and in the future.

Metrolinx has developed this IBC to explore how to address the region's fare issues based on the magnitude of their impact today and potential impacts on the future network.

Current Context – a region of multiple service providers & fare structures

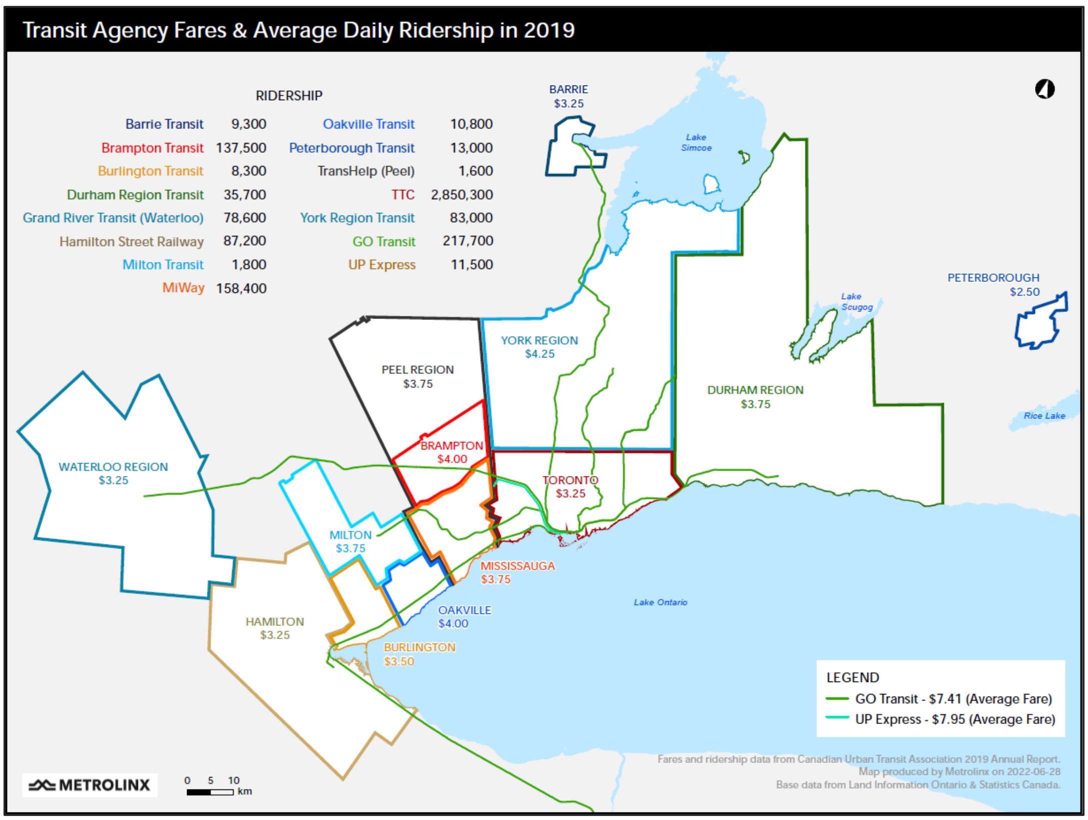
This sub-section provides a brief overview of the existing transit network in the region to support a deep-dive into the three key issues.

The study area includes:

- 14 transit systems who operate local transit services; and
- Metrolinx, who operates both GO Transit regional rail and bus services and the UP Express[2], which offers rail service between Pearson Airport and Union Station.

The pre-COVID-19 transit network, fares, and ridership for each agency is illustrated in **Figure 2-2** and **Figure** 2-3. These existing transit networks each have distinct fare policies and service and operational planning principles. As noted in this figure, there is an existing network of cross-boundary connections between agencies (for example, see **Figure 2-4** for a focus on cross-boundary connections between Toronto and neighbouring areas).

Figure 2-2: GTHA Fares & Average Daily Ridership (Pre-COVID fares, 2019)



[2] All analysis in this business case includes the UP Express service – however the models and analytic tools deployed do not capture UP Express airport demand. All ridership impacts on UP Express are included in the GO Rail category throughout the document and represent use of UP Express service for commuting and recreational, but not for air travel, purposes.

Figure 2-3: Municipal Service Providers (MSPs) in the Greater Golden Horseshoe

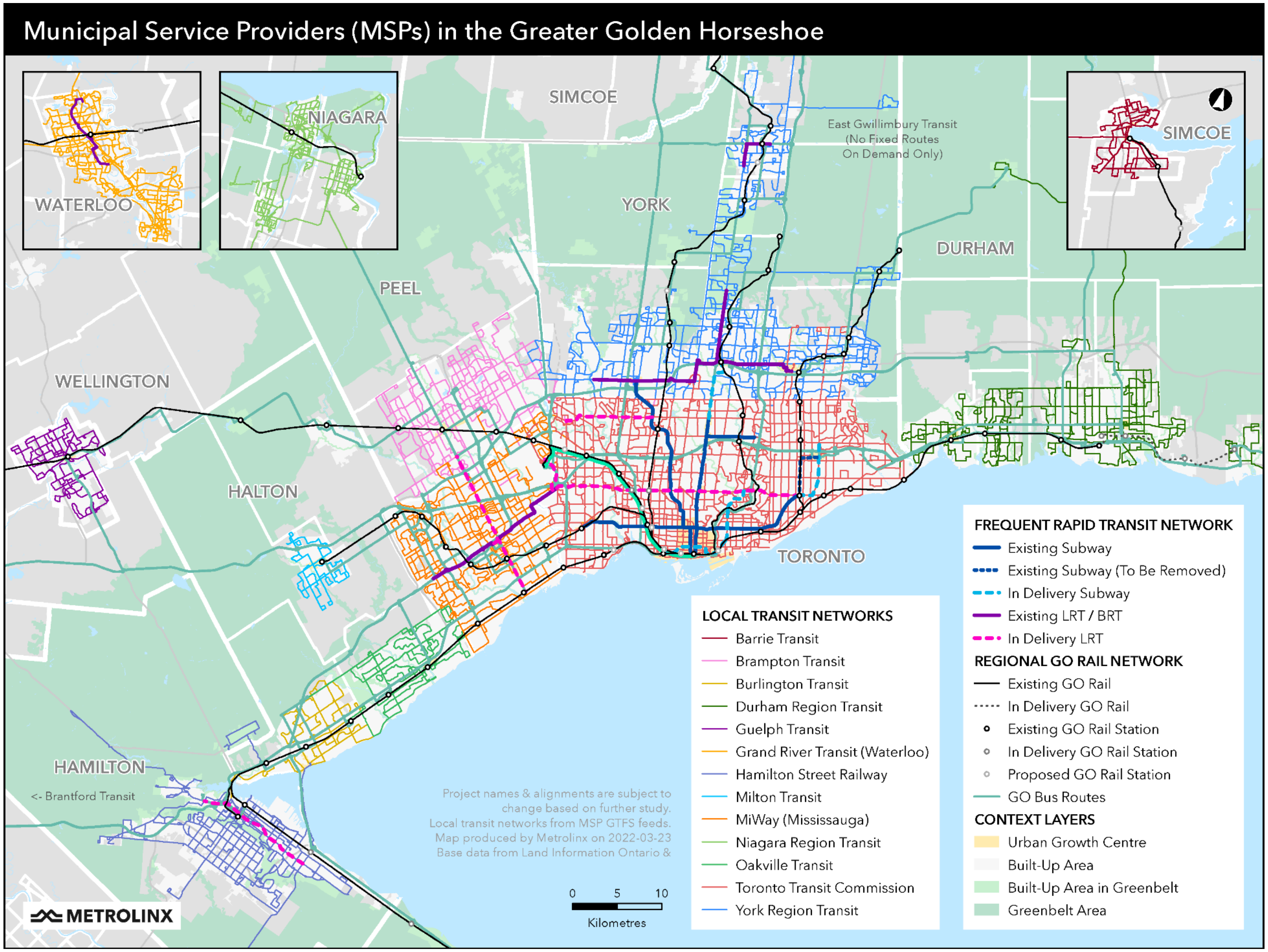
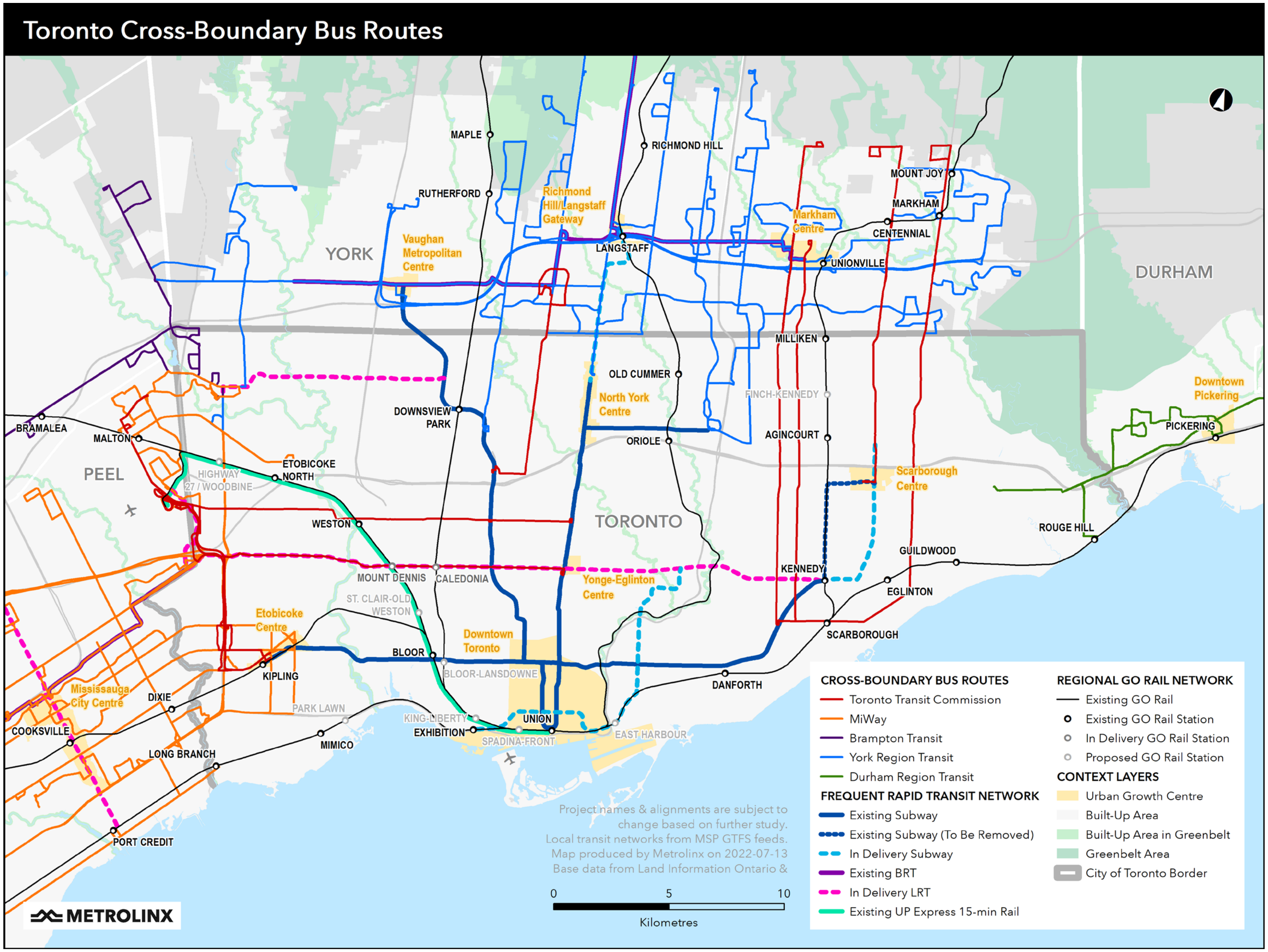


Figure 2-4: Bus Routes that Cross the City of Toronto Border



Emerging Issues

The fare integration analysis presented in this document draws upon a multi-year work program to identify key problems, scope options, and evaluate them. While efforts are made to update models and tools used to analyze fare issues, some emerging issues require further consideration. There are a range of additional factors that decision-makers should consider when reviewing the evidence included in this IBC and the overall case for fare integration. These factors have not been fully incorporated into this analysis, but will be assessed in future stages:

- Potential changes in commuter work patterns, including hybrid models and work from home models for some segments of the economy
- Changes to the perception of public transit due to the COVID-19 pandemic and current recovery rates
- Inflation rates and fuel prices (which have seen rapid increases as of June 2022)

Key Issues – Critical Review

This section presents a deep-dive review of the three key issues, including: a review of the issue, its causes, its impact today, and its impact in the future.

Problem Definition Framing: Data Sources

This section draws upon four primary data sources to frame the problem:

- The Fare Strategy (FAST) model – which includes data on all trips made across the study area, average fare paid (inclusive of all products, concessions, and discounts used by customers) for different transit mode combinations, traveller characteristics (trip purpose, income, auto ownership, and other factors), and modal characteristics (such as speed, frequency, access time, and other factors).
- The Greater Golden Horseshoe Model V4 – which is a comprehensive activity based model for the GGH.
- Transportation Tomorrow Survey – a survey of travel behaviour conducted across the GTHA every five years
- CUTA Factbook Data – an annual summary of key transit system statistics

Where data is presented, the source(s) are noted.

In addition, three ways to present fares are used in this chapter:

- **Cash fares –** used to show the maximum fare an individual pays for a trip today
- **PRESTO fares –** used to show the fare paid by customers who use PRESTO
- **Average fares –** derived from the CUTA Factbook and FAST model – these fares reflect the ‘average fare’ a customer would pay for a trip based on the full range of passes, concessions, and products available. They are approximately equal to total revenue collected by a transit system divided by the total trips on an agency in a 2019

Note – all analysis presented later in this business case is based on average fares derived from the CUTA factbook and used in the FAST Model. The FAST model has been calibrated to match the total annual revenue of each transit system and the region as a whole.

Understanding Issue 1: Double fares between TTC and other agencies

Customers who use both the TTC and a neighbouring transit system for a single trip. Those who use the TTC and GO Transit for a single trip must also pay two fares.

What is the issue?

Fares play a crucial role in the attractiveness, affordability, and suitability of transit for a range of traveller needs. When high or multiple fares are required for a single journey, there is the potential that ridership will be constrained or reduced and that transit will be unaffordable and out of reach for some would-be customers. Today, the following types of trips require multiple fares:

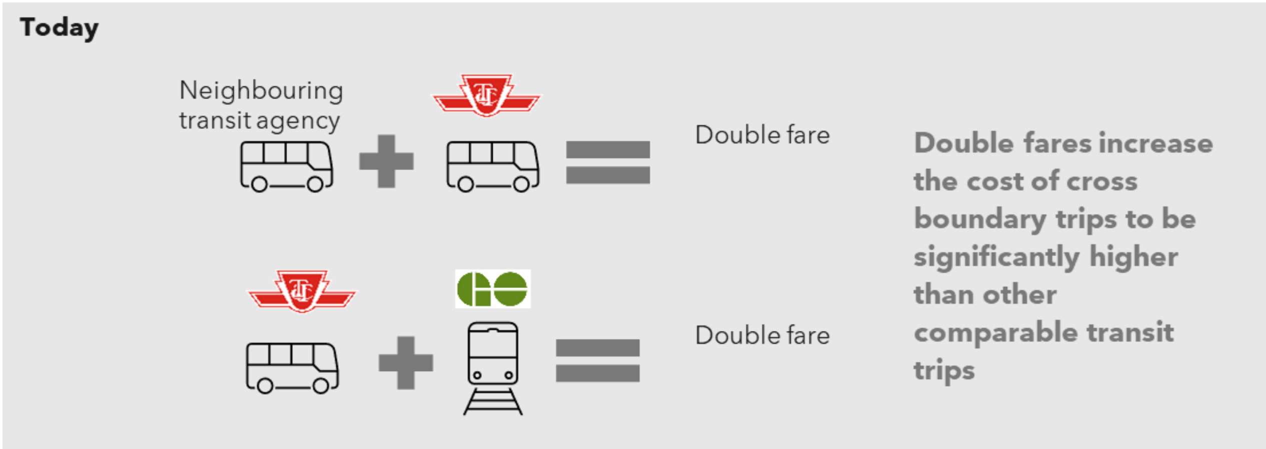
- Trips involving TTC and neighboring 905 systems: Regardless of trip distance (a short 2-5 km trip across a boundary or a 20 km trip), riders must pay two fares. This means a 5 km trip that crosses a boundary could cost more than $7.50 (TTC and YRT fares with cash, or $7.08 PRESTO), while a 5 km trip within an agency service area could only cost $3.25 (TTC cash fare only, or $3.20 on PRESTO) – a price of $0.65 per kilometer when using one agency compared to $1.50 per kilometer when using multiple agencies.
- Trips involving TTC and GO Transit: Using TTC and GO in concert is limited due to the requirement to pay one fare to use TTC bus/streetcar/subway and an additional fare for GO Transit.

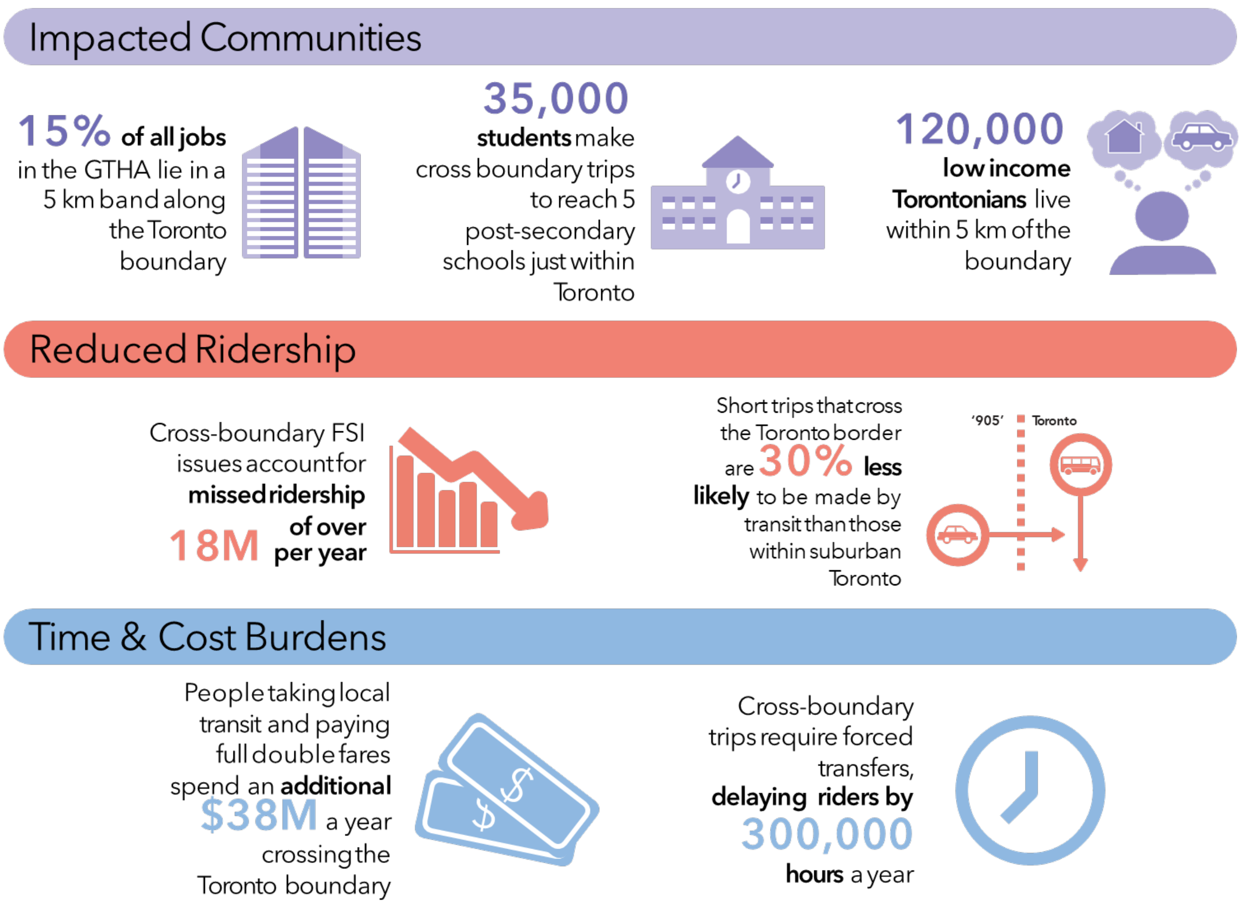
Progress to date – previously removed double fares:
Fare integration has been in place between 905 transit systems for several years. This allows customers travelling between 905 municipalities to transfer between systems within a 2-hour window. In addition, in Spring 2022, travel on all 905 systems became free when customers transfer to or from GO Transit outside of Toronto.

Despite these successes, customer research suggests further improved fare and service integration regionally is needed to encourage mode shift to transit as only 4 in 10 transit customers are satisfied with cross-boundary travel options.

Figure 2-5 illustrates Issue 1 with some of the key impacts it creates for travellers today.

Figure 2-5: Illustration of Double Fares



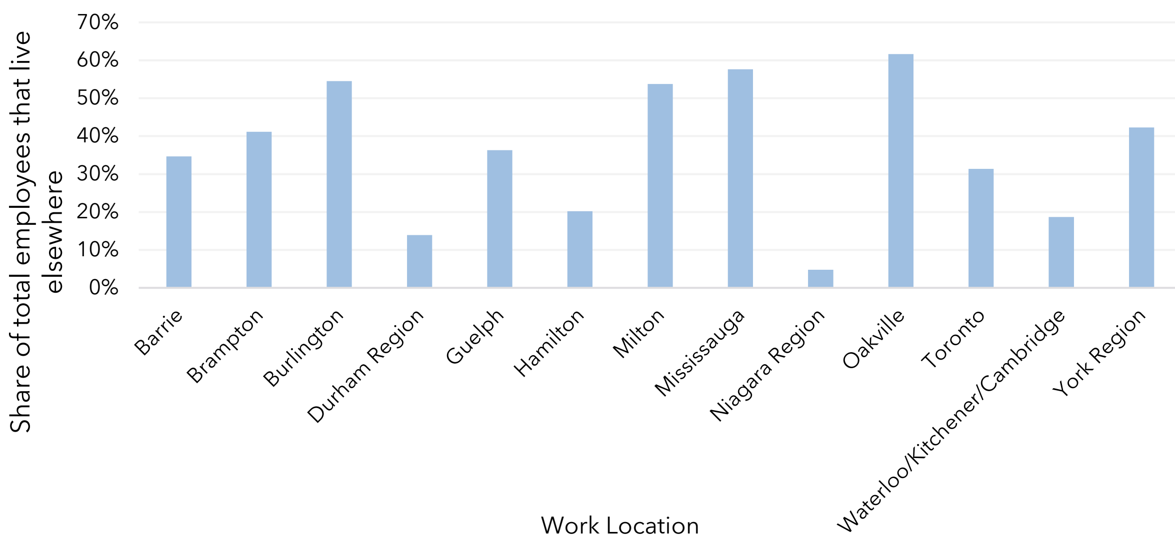


Why is this an issue today?

As the region has grown, it now acts as an integrated economy

Over the past few decades, the regional economy has grown, and people increasingly live and work in different municipalities and have much more diverse mobility needs than the past. This is illustrated by data from the Transportation Tomorrow Survey (2016) shown in **Figure 2-6**, which shows the proportion of employees who commute into work from a home in a different municipality. For example, 31% of Toronto employees live outside of Toronto. This represents approximately 433,000 employees entering Toronto on a daily basis.

Figure 2-6: Share of Employees that Commute in From Another Municipality (Source: TTS 2016)



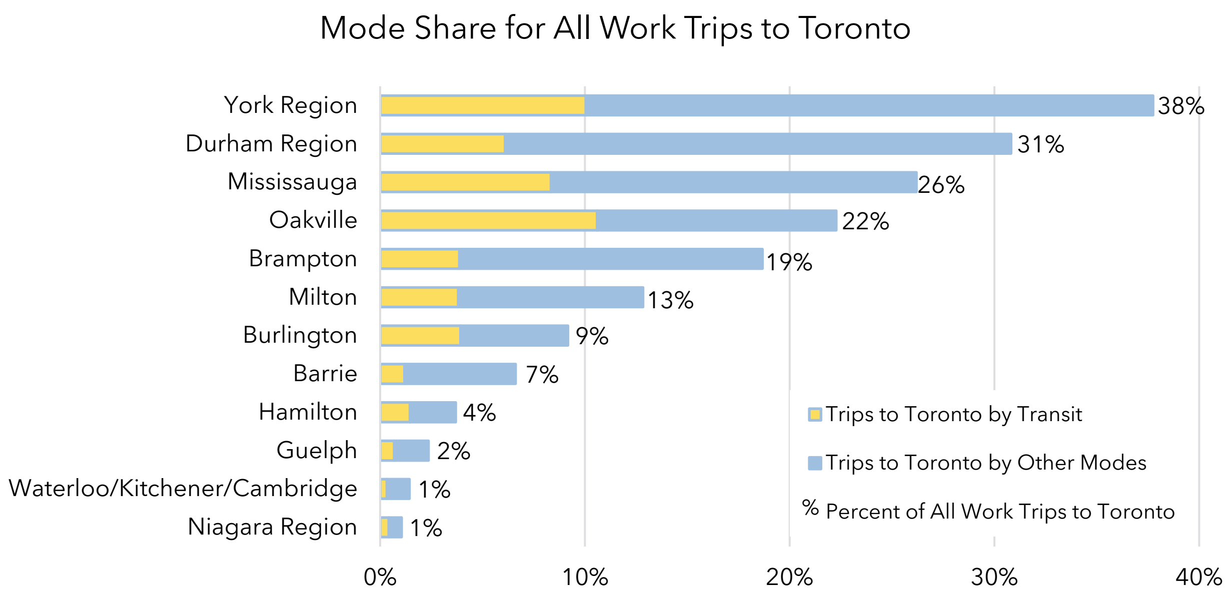
Despite high-levels of economic integration, some labour markets have poorer transit mode-share

The areas bordering the City of Toronto—Durham Region, York Region and Mississauga—have the greatest proportion of working people commuting to Toronto (**Figure 2-7**). These larger employment markets illustrate the relationship between economic integration and fare and service policy. For these trips, double fares may supress use of transit for commuters, which means:

- Commuters may opt for private automobile instead of transit, which contributes to congestion and related negative externalities – such as slower travel times on highways, reduced productivity, and increased pollution
- Workers may have reduced job choice and employers may have a reduced labour pool to draw from

These commuter travel markets could be an opportunity to increase transit ridership through greater fare and service integration. While not represented in Figure 2-7, the use of transit for non work trips may be similarly supressed.

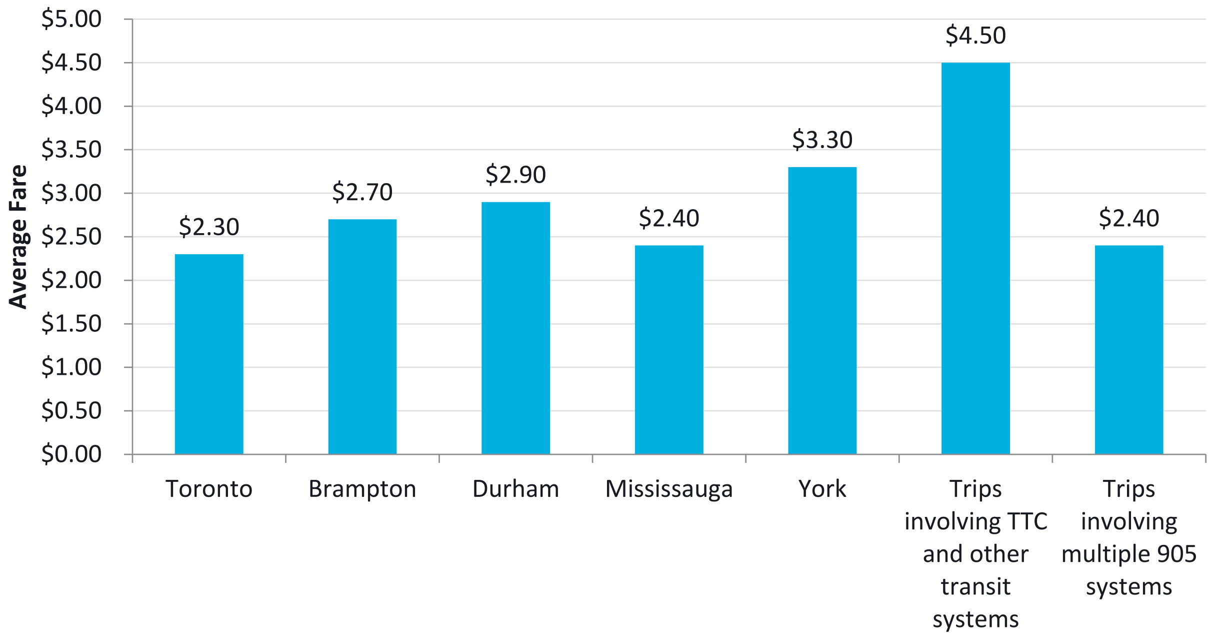
Figure 2-7: Work Trips to Toronto as a % of All Work Trips (Data Source: TTS 2016)



The role of fares in lower mode-share

Figure 2-8 provides a summary of average transit fares for trips on one system in one municipality (Toronto, Brampton, Mississauga, York Region, and Durham Region) and trips between municipalities – including those using TTC and other systems, and those using multiple 905 systems. These average fares are derived from the CUTA fact book and the FAST model used to explore fare issues and assess fare options. This figure indicates that the average fare for trips using TTC and other systems is significantly higher (nearly double), which may impact attractiveness and affordability and contribute to ridership suppression for cross-boundary trips.

Figure 2-8 – Average Fares for Trips Using TTC and Other Systems compared to Single System Fares (source: FAST Model, CUTA Factbook)



Note – Trips Involving multiple 905 systems already include a free transfer

Impact of Issue 1 Today – TTC + Neighbouring Agency Double Fare

There are nearly 1.9 million trips made between Toronto and its neighbours each day across all modes – including private and shared auto, active modes, municipal transit systems, and GO transit. **Table 2-1 (TTS Data) illustrates the total trips made between Toronto and neighbouring areas, the number of trips made on transit, and the total transit trips made on each municipal system**. This table indicates that:

- The cross-boundary travel between Toronto and neighbouring areas totals over 1.9 million trios, of which 211,000 (or roughly 11%) use municipal transit systems
- Cross-boundary municipal transit ridership is larger than any other agency in the region, with the exception of the TTC, and cross-boundary ridership accounts for a significant proportion of each system's ridership (ranging from 7% to 67%)
- There are approximately 320,000 trips made on transit systems that neighbour Toronto (Durham Region Transit, York Region Transit, Brampton Transit, and MiWay) – of these, nearly 1/3 or nearly 100,000 trips cross-boundaries
- York Region Transit (YRT) has the highest proportion (67%) of its riders (over 55,000 trips per day) making cross-boundary trips.

The double fare could influence the remaining ~1.7 million auto trips travelling between Toronto and neighboring cities to not use transit; however new service, service integration, and other factors also influence the ability to grow transit ridership.

Table 2-1: Issue 1 - Number of trips that pay a TTC and Neighbour double fare (TTS Data 2016)

Origin	Total Daily Cross-boundary Trips (Begin or End in Toronto) - all modes	Total Daily Cross-boundary Trips (Begin or End in Toronto) - Municipal Transit Systems only	Cross-boundary Mode Share on Municipal Transit	Total Daily Municipal Transit System Trips (all trips made on system including local and cross-boundary)	Share of Municipal Transit System Trips that Cross Boundaries
Toronto	1,040,000	109,000	10.5%	1,530,000	7%
Durham	132,000	6,000	4.5%	42,000	14%
York	446,000	55,000	12.3%	82,000	67%
Brampton	89,000	13,000	14.7%	72,000	18%
Mississauga	224,000	28,000	12.5%	123,000	23%
Total Cross-Boundary	1,931,000	211,000	11%	1,849,000	11%

Example of Issue 1

Double Fare, Short Distance

York → York University

York University is served by four agencies each offering **high levels of transit service**, so transit should be well integrated and attractive

8,100 students travel from York Region to the University each day, but **YRT and GO buses serving this market no longer enter the campus**

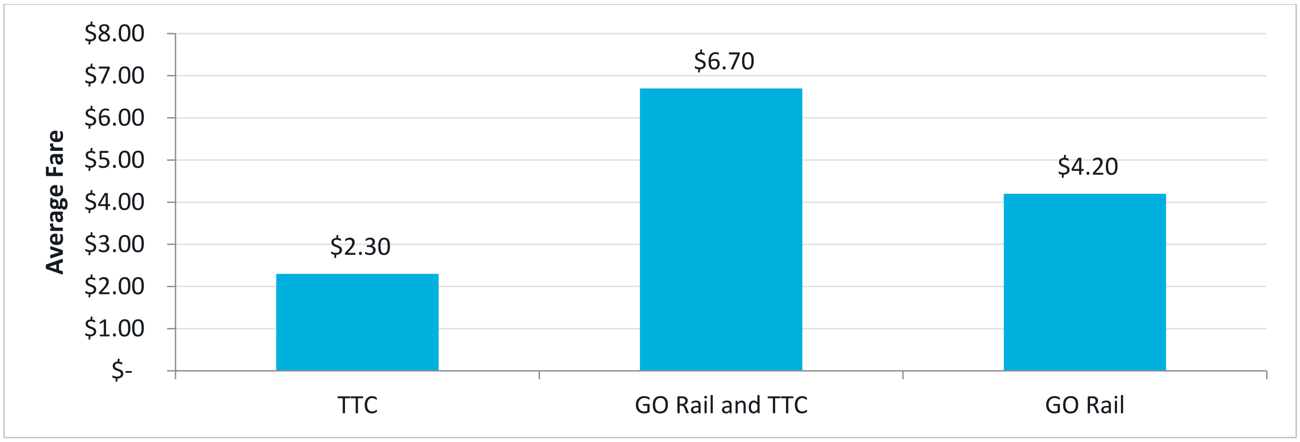
Riders wishing to reach the campus centre must transfer to the subway for only one or two stops, **doubling the cost** of their commute

The majority of students who take YRT buses to Pioneer Village station are more likely to **walk up to 15 minutes to their destination**, adding 30 minutes to their daily commute

Issue 1 Today – GO + TTC Double Fare

Pre-COVID data suggested up to 5,000 – 20,000 trips a day used GO and TTC in concert. **Figure 2-9** provides a summary of average fares today for GO Transit (alone), GO Transit and TTC, and TTC (alone) for all trips that begin and end in Toronto. This illustrates how the use of TTC and GO Rail together carries a significantly higher fare than using either system alone. Demand analysis suggested there is a market potential of over 90,000 – 140,000 trips a day in Toronto that could make use of the GO Rail network and TTC together – this includes trips using the TTC today as well as trips using automobile or other private modes. This business case explores how changes to fares could grow ridership in this market.

Figure 2-9 - **Average Fares** for Trips in Toronto Using GO Rail, GO Rail and TTC, and TTC Alone (source: FAST Model, CUTA Factbook)



Impact in the Future

Many key transit infrastructure investments are intended to be used as part of a seamless network. The following investments (totaling over $80 billion) face a benefit risk (lower ridership) and may not reach their full potential with the double fare:

- **Eglinton Crosstown West Extension** – connections at Renforth would pay a double fare (MiWay, GO)
- **Yonge North Subway Extension** – connections north of Steeles would pay a double fare (York Region Transit, YRT, + TTC)
- **Scarborough Subway Extension** – connections to Durham Region Transit (DRT) and GO Transit pay a double fare
- **Ontario Line** – double fare with TTC and GO at East Harbour and Exhibition
- **GO Expansion** – double fare with TTC and GO at all stations in Toronto

Across these projects, the double fare barrier is likely to reduce ridership for customers who are unable to or unwilling to pay the two fares. This could result in underperforming investments (lower ridership and user benefits) and increased congestion on the regional road network.

GO Expansion and Fare Integration

GO Expansion will transform the GO Rail network into an express rail network with two-way all-day service. The program will also provide 15-minute or better frequency on five GO Rail lines. In Toronto, this will allow riders to use GO Rail in a manner similar to the TTC. This service will be delivered from 2025-2031.

The Full Business Case for GO Expansion identified fare integration with the TTC as a key enabler of ridership.

This IBC includes analysis for a 2041 forecast year that illustrates GO Rail performance after GO Expansion has been delivered.

Understanding Issue 2: Current GO fares are more costly than other system fares for short distance trips

Under the existing GO Transit fare structure, fares for short distance trips are much higher than other transit system fares, which limits use of GO services for short trips – even when they are faster or more convenient.

What is the issue?

The existing GO Transit fare structure has higher fares than other transit systems for short distance trips. For example, for trips less than 10km, GO Transit costs $4.40 in cash ($3.70 with PRESTO). The same trip on another agency would cost less, for example $3.25 on TTC in cash ($3.20 with PRESTO). This issue makes GO Transit uncompetitive with other transit modes from a fares perspective for short trips, even when it may be the fastest mode. Average fares for GO Rail are compared with local transit fares for set distances in **Figure 2-10** using CUTA 2019 data and the FAST model (averages reflect a blended fare considering all potential discounts, passes, and products).

Figure 2-10 - Average GO Transit Fares Compared to Local System Fares for Set Distances Alone (source: FAST Model)

Why is this an issue today?

This price structure has two key consequences:

- Customers making shorter trips (defined as 0-10 km) may not make use of the fastest service for their trip – meaning they will have longer travel times to complete their trip; and
- Available capacity being delivered today and expanded capacity being delivered with short term service increases may not be used to its fullest extent.

In 2019, Metrolinx reduced the GO Transit base fare to $4.40 in cash ($3.70 with PRESTO) to encourage short distance travel. This key issue explores potential challenges related to the remaining gap between local transit system fares and GO Transit fares for shorter trips.

Impact of Issue 2 Today

For trips across the region, GO Transit might be the fastest option, but its high price for short travel limits its affordability and, potentially, its overall ridership. Issue 2 means customers may be choosing transit that is more affordable but less convenient (fast or direct) or may be choosing to drive, which increases congestion. GO Rail lines could offer a different route to downtown Toronto, however the price may make GO Rail less attractive and shift demand to the subway, which in turn increases crowding.

Prior to COVID, only 5,000-8,000 trips a day on GO were short distance. A market analysis using Transportation Tomorrow Survey data was conducted in 2018-2019 to understand how many trips could use GO Transit today for short trips, but opted for other modes. Analysis included:

- Trips using auto
- Trips using a different, but slower, transit mode than GO Transit

This analysis suggested that there are 55,000-80,000 on municipal transit systems or made by auto, (inclusive of some of the trips identified in Issue 1) that could make use of GO Transit. These trips were identified based on the following criteria:

- Their trips origin and trip destination are both within walking distance (<800m) or transit (<5km) of a GO Rail station or GO Bus stop/station; and/or
- Other travellers make a comparable trip on GO Rail or GO Bus (for example: one person may drive from their origin to destination or take another transit service, while another person may make a similar trip using GO Rail or GO Bus).

Impact of Issue 2 in the Future

The GO Expansion program, which will transform GO Rail into a Regional Express Rail program will provide increased two-way all-day service within municipalities. A key consideration for this program is providing 'subway like' service on railway corridors to allow travellers fast and frequent travel for work or leisure. However, with the existing higher base fare, it is anticipated that the full potential of this program is supressed: some travellers will continue to choose a less expensive mode rather than make use of this investment.

Potential ridership gains from reducing the GO fare are explored in this business case for the existing network and future network in Chapter 4: the Strategic Case.

Understanding Issue 3: Regional fares are inconsistently applied

Regional trips have different prices depending on the transit service(s) used for a trip. This could encourage travellers to not use the fastest or most convenient service for their trip.

What is the issue?

Today, regional trips are served by two service providers: TTC and GO Transit. Regional trips have been defined as trips that are longer distance (>10 km) and cross a municipal boundary. There are currently three types of regional fares in the region:

- A single flat fare if a customer uses station parking, automobile drop off, or walks to a TTC station in York Region ($3.25 TTC flat fare cash, or $3.20 PRESTO)
- A double fare if a customer uses York Region Transit to access the TTC subway ($7.50 cash or $7.08 PRESTO)
- A fare loosely based on distance traveled (or 'fare by distance') when using GO Transit ($8.15 cash or $6.86 PRESTO)

Why is this an issue today?

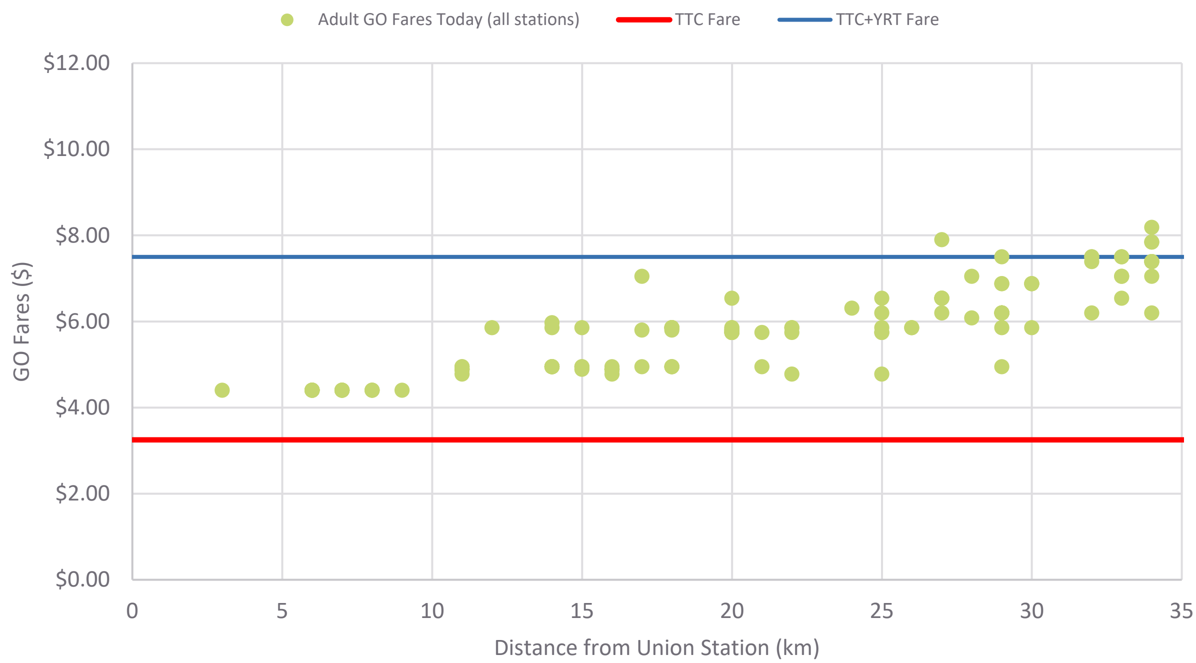
The existing GO Transit fare structure is based on 97 zones. Generally, a customer's fare increases the more zones they travel through. This fare structure was built up over time as service and network changes occurred. The aim of the structure was to facilitate long distance travel, while generating revenue targets. This structure is shown in **Figure 2-11**. This has led to different fares for trips of the same distance on GO Transit (depending on station pair) and different fares for similar trips using municipal transit systems.

Figure 2-11: Existing GO Fare Structure (Zone Boundaries are Indicative for Illustration Purposes)

Impact of Issue 3 Today

Figure 2-12 illustrates the three types of fares a customer can pay when using regional services: TTC fare (red), TTC+YRT (blue), and GO Fares (green). Regional trips (>10 km) have a range of fares depending on the station pair or services used.

Figure 2-12: Comparing Different Regional Fares by Distance Travelled – Cash Fares (source: GO Transit Fare Table, Agency Fare Tables)



While subway and local transit service is the most convenient mode for many trips, there are some longer trips where GO Transit may provide a faster or more direct ride large fare discrepancies may incentivize use of subway and local bus instead of using GO Transit – even if GO Transit is a faster mode. This pricing may encourage customers to make the following decisions:

- Drive to access transit, while agency and regional plans prioritize transit access for higher order modes. For example: Using Park and Ride to get to the subway instead of a local bus, adding congestion to the region, and then paying $3.25 for a long subway trip from Vaughan Metropolitan Centre to Downtown Toronto
- Use a slower mode or combination of modes for their trip
- Use more congested modes for their trip (whether that is a crowded subway or a congested highway) when there is available capacity elsewhere

Combined, these decisions may lead to additional impacts: customers who have multiple service options are 'pulled' to a lower priced service, which increases crowding and may 'push others' from using the lower priced service (including those without other choices). These customers may choose to drive, which could further increase congestion on the roads network.

Impact of Issue 3 in the Future

When the Yonge North Subway Extension (YNSE) and GO Expansion are complete, the existing pricing approach would further encourage use of the subway instead of GO Rail, adding further to existing congestion. This could mean:

- Increased use of park and ride to access subways, which contributes to regional congestion and may decrease demand on local buses
- Travellers choosing to use the subway for long distance trips that could be served by GO Rail or Bus (even when GO Transit offers a faster trip)

The consequences of these potential challenges are:

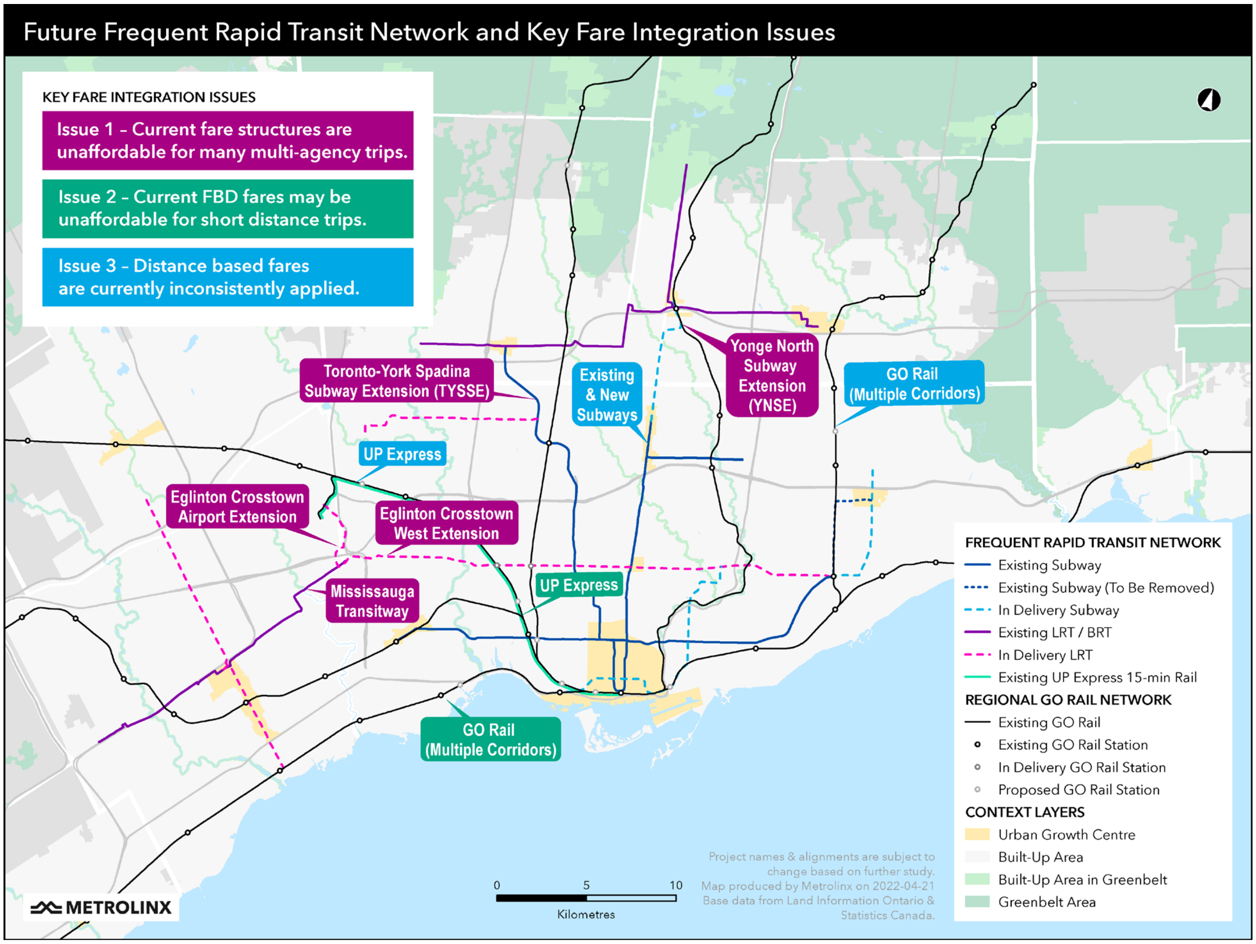
- Degraded experience and operational impacts on TTC Line 1. Crowding could increase, which would worsen customer experience and may lead to operational impacts as the line could be overloaded.
- Lower use of available GO capacity. The significant improvement in speed, frequency, and capacity from the GO Expansion program could have lower ridership.

Summary: How do these issues impact customers?

The three issues have a significant impact on customers travelling on transit within the region.:

- **Fares do not encourage customers to make use of the complete network**
    - Trips on both TTC and neighbouring systems require customers to pay two full fares when travelling across the City of Toronto border and transferring between systems (Issue 1).
    - Trips using GO Transit and TTC require customers to pay two full fares when travelling on both GO and TTC (Issue 1).
- **Fares may price customers off potentially faster modes for short trips – leading to longer travel times and increased crowding**
    - Fares for travel on GO Transit are higher than fares for travel on TTC when travelling within Toronto or for short distances elsewhere, which results in some customers choosing a slower trip to save money (Issue 2).
- **Fares are not aligned for long distance trips (greater than 10km, between municipalities) – leading to longer travel times and increased crowding**
    - Fares for regional trips are not coordinated, which may incentivize customers to use a slower or more congested mode while capacity is available elsewhere (Issue 3).
- **Fares are not ready for the future network – including the Frequent Rapid Transit Network (Metrolinx 2041 RTP) and the network envisioned in *Connecting the GGH: A Transportation Plan for the Greater Golden Horseshoe***
    - As the frequent rapid transit network expands with new subway extensions and the introduction of frequent GO rail service across the region, the current fare structure does not provide flexibility to allow for increasing cross-border travel (all issues) – See **Figure 2-13** as an illustration of how each issue could impact the future network.

Figure 2-13: Future Frequent Rapid Transit Network and Key Fare Integration Issues



Impact of the Three Issues on the Customer

The three issues discussed in this chapter impact the travel choices available to customers:

- Customers may choose a mode that is less convenient because it is cheaper
- Customers may choose not to travel at all
- Customers may choose the best mode for their trip and pay for it, but this means money may not be available for other purposes

These impacts occur for a range of travellers, including those who make cross-boundary travel by customers who complete their trip by using more than one transit system. These issues may also impact customers who use multiple systems over the course of a month (for example: they may only have a pass for one agency, and therefore only use one agency or do not use transit for trips not covered by the pass). Note – passes will be explored further in future business cases.

Role of Customer Impacts in the IBC

As discussed in Chapter 1, the IBC is intended to aid decision makers in understanding the potential impacts of a wide range of fare integration variations. A key principle for this analysis is understanding impacts to customers – both from a pricing and experience perspective.

The current phase of analysis included a focused and high-level scope of work related to customers to identify segments for inclusion in the IBC and in future analysis. This analysis does not constitute detailed customer analysis, customer engagement, service design research, or other tools that are being considered for future stages. As a result, customer analysis in the IBC should be considered preliminary and intended to inform future research efforts.

As the study area continues to grow, it is anticipated that the number of customers and trips impacted by these issues will increase in absolute terms, but will also represent a larger share of all trips made. A customer segmentation exercise has been launched to better understand how these issues impact customers and how potential fare integration variations could benefit customers. This is a multi-step process that will include collaboration with transit systems and direct engagement with customers throughout the Metrolinx business case lifecycle (see Chapter 1).

What is Customer Segmentation?

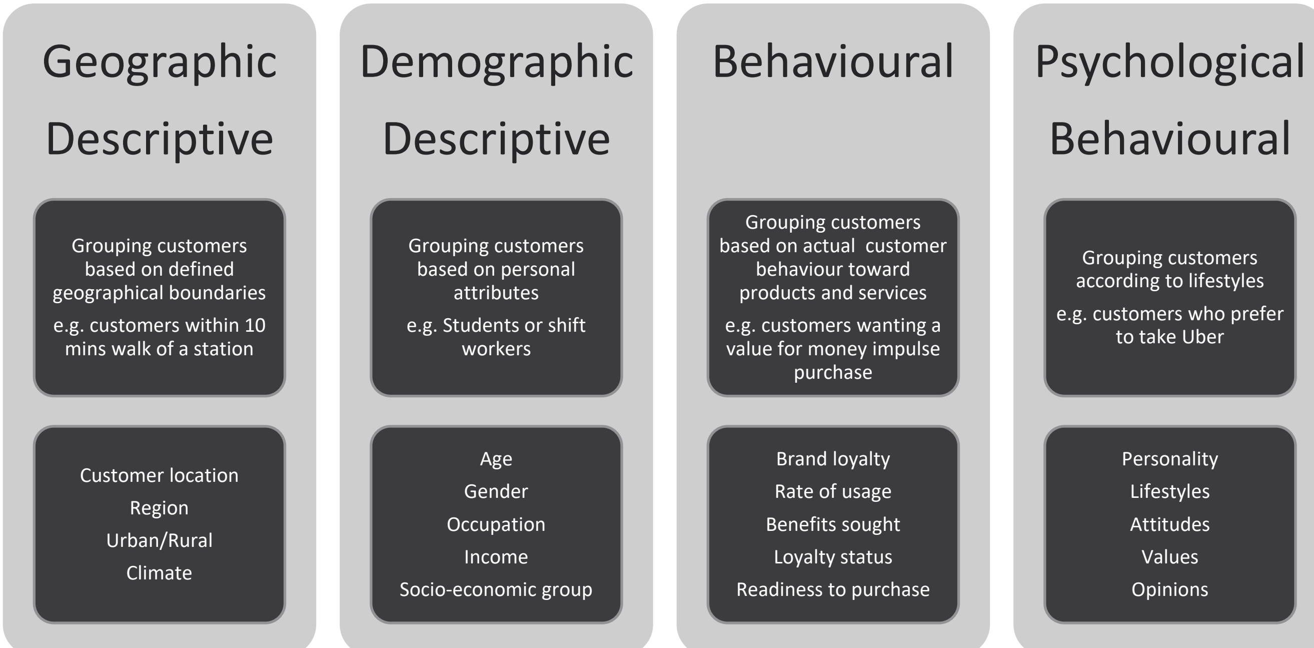
Customer segmentation aims to achieve the following objectives:

- To identify the need and motive of the target audience
- To group customers on the basis of their common characteristics
- To provide products/services according to the needs of customers
- To develop a personalised/targeted marketing matrix and subsequent strategies, targets and goals

Importantly this work will help Metrolinx, MTO, and fare integration partners to create **committed relationships and engaged communities –** identifying customers by common characteristics, building user profiles that can inform personalization strategies.

Customer segmentation achieves these objectives by exploring the range of potential customers a transit system could serve based on a range of factors, including those below in Figure 2-14.

Figure 2-14: Customer Segmentation



This segmentation aims to understand what customers -current or potential – look for in transit and how a proposed service or policy change impacts their choices as well as their welfare. Typical segmentation will consider a range of factors, including: cost, convenience, comfort, and control (the extent to which customers feel a sense of agency over their choice).

Why use segmentation for fare integration analysis?

In peer jurisdictions, successful fare integration analysis relies on a range of tools, including: policy development, quantitative modelling, cost estimation, benefit cost analysis, stakeholder, engagement, and customer segmentation. Segmentation plays a complementary roles to other tools in that it:

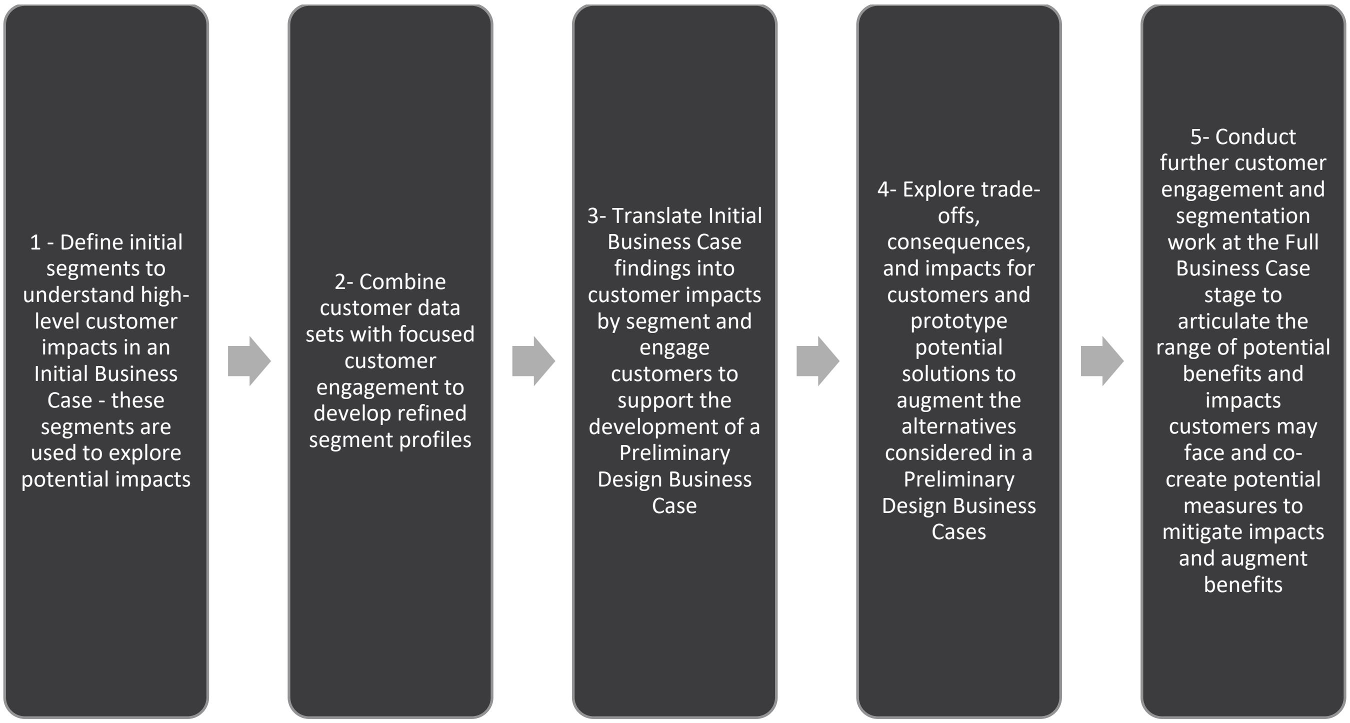
- Starts from the premise all passengers are not the same
- Focuses on market potential based on motivations, service uses, needs and desires
- Identifies who is using a service and what they require
- Allows for a targeted approach by providing insights into how to appeal to a specific group

It is a 'micro tool' (it focuses on the customer or specific groups of customers) that can be successfully deployed in concert with more macro-tools, such as demand models that focus on millions of customers at once, to unlock greater insights and scope more robust proposals.

Customer Segmentation Program

A customer segmentation program could consider the following steps in Figure 2-15.

Figure 2-15: Potential Customer Segmentation Program



Metrolinx incorporated customer analysis into this IBC including ‘step 1’ in the above figure and conducted the following work:

- Co-developed customer segments with transit systems
- Assessing how these segments are impacted by the three issues (issue 1 - double fares between TTC and other agencies, issue 2 - current GO fares are more costly than other system fares for short distance trips; and issue 3 - regional fares are inconsistently applied)
- Conducting quantitative and qualitative analysis in Chapter 4

These initial actions, included in step 1, are intended to:

- Define segments to identify high-level or strategic issues from available data and models
- Explore qualitative impacts to customers that can be validated and explored in future stages – for example, at this stage, Metrolinx has explored specific known changes to customer experience (for example: requiring a customer to tap off, providing zone fares) that are inherent to the variation being analyzed. The specific impacts of these changes (example: whether customers find tapping off a challenge or think zones are more simple) will need to be defined through subsequent substantial engagement.

This work is an initial assessment which will be used to illustrate potential impacts but not draw conclusions on customer impacts in the absence of more detailed study. Following this IBC, Metrolinx will develop a robust process for further segmentation work which could involve Metrolinx and transit systems.

Customer Segment Identification Survey and Workshop

Metrolinx recently conducted a survey of transit systems to better understand the range of potential customers that could be impacted by fare integration. The survey asked transit systems to:

- Share existing customer segmentation or profiles where they existed
- Provide their definition of low-income customers, and
- Identify which trip purposes, periods, durations, and lengths should be analyzed

Based on survey responses, a number of potential customer segments were identified. The process also included refining these customer segments during a Deloitte-facilitated Greenhouse workshop. The session's key aim was identifying opportunities for how the knowledge of transit systems might be leveraged to identify key rider segments. Based on group discussions of the survey data, transit systems collectively identified six customer profiles. During the session it became evident that transit systems consider customers to be 'theirs' and aimed to best meet their needs even if parts of the journey are spent with another operator. This identified areas of opportunity and learning as we chart a path forward for a more integrated understanding of shared customer groups.

The role of customer segmentation is to bring structure and depth to the understanding of transit customers to be able to identify the challenges and opportunities that may reside in each group. The intent for grouping transit customers is that they are neither completely different from one another nor completely the same. By identifying shared groupings of customers that are important for the understanding of fare integration, transit systems have brought a cohesive customer lens to this analysis. Future work will provide a deeper dive on customer segments and how different options impact the customer experience.

Meet the Segments

The survey and workshop identified six segments for initial analysis:

- Short trips
- Long trips
- Commuter trips
- Cross-boundary trips
- Low-income trips
- Specialized transit

These segments are intended for use as a 'starting point' to explore the range of customers who could benefit from or be impacted by fare integration. They are used throughout the business case to provide tangible examples and identify areas for further research and development. To aid in this process, an illustrative persona was developed for each segment.

Based on this consensus the following personas were developed:

- Krystina (short trips)- Krystina lives near the Toronto boundary and typically takes short trips. When her travel is within one municipality, she takes transit. However, she drives to avoid paying two fares for those short trips that cross a municipal boundary.
- Munir (long trips) - Munir lives in Toronto but regularly visits his parents in the suburbs. When he does, it amounts to $13 in local transit fares. As a result, he often just drives and parks for free.
- Beverly (commuters) - Beverly lives in York Region. Her best and fastest ride downtown is the GO train. However, she walks to her nearest subway station instead because it is cheaper.
- Wei (cross-boundary trips) - Wei lives in Toronto but works in Mississauga. He takes two transit systems to his job, which makes his trip very expensive. He is thinking about getting a job in Toronto to save money.
- Henry (low income) - Henry relies on the GO train to get into Toronto but can't afford to pay a second fare to take the subway. As a result, he walks the rest of the way to school which wastes a lot of his time.
- Michelle (specialized transit) - Michelle pays two fares, and it takes a long time to transfer between specialized transit vehicles for trips into Toronto.

Potential Next Steps – Example: Henry

In Step 2, Metrolinx could construct a further profile of 'Henry', including:

- What times does Henry travel?
- Are his travel times/days fixed?
- What type of work does Henry do?
- What alternate modal options would be open to Henry beyond subway?
- Does Henry take benefit from loyalty schemes in other areas (example: grocery)?

The impacts of the problem statement and three key issues are felt by customers like those described above. **Table 2-2** identifies specific pain points that are revisited in Chapter 4 under Impact 5.

Table 2-2: Customer experience by issue

Customer Segment		How are they impacted by Issue 1? (TTC Double Fare)	How are they impacted by issue 2? (high cost of short distance GO Transit)	How are they impacted by issue 3? (inconsistent regional pricing)
Short trips (Krystina)	Short trips of similar distances are priced differently depending on whether they cross a municipal boundary.	Trips crossing the Toronto-905 boundary cost significantly more than trips within a single agency. This disincentivizes use of transit and leads to increased auto travel, a higher proportion of riders' budget spent on transportation, and may limit job and housing choices.	Customers are financially disincentivized from using GO Transit as base adult cash fare is \$4.40 (cash, \$3.70 PRESTO) vs \$3.25 (Cash, \$3.20 PRESTO) on TTC.	Inconsistent GO Transit and subway fares could result in increased crowding on TTC and added time for commuters who avoid GO even if it is a faster option.
Long trips (Munir)	The cost of double fares makes driving a more attractive option, especially when parking is free.			
Commuters (Beverly)	The cost of regional (GO Transit) fares relative to local transit makes a slower mode a more attractive travel option from a financial perspective.			
Cross-boundary trips (Wei)	The cost of double fares across municipal boundaries affects choices about where people live and work.			
Low-income (Henry)	Available capacity in the network is not utilized and customers are encouraged to adopt less time-efficient modes such as walking when they would rather take transit.			
Specialized transit (Michelle)	The cost of double fares is an additional burden to specialized transit customers transferring between systems.			

Opportunity Statement

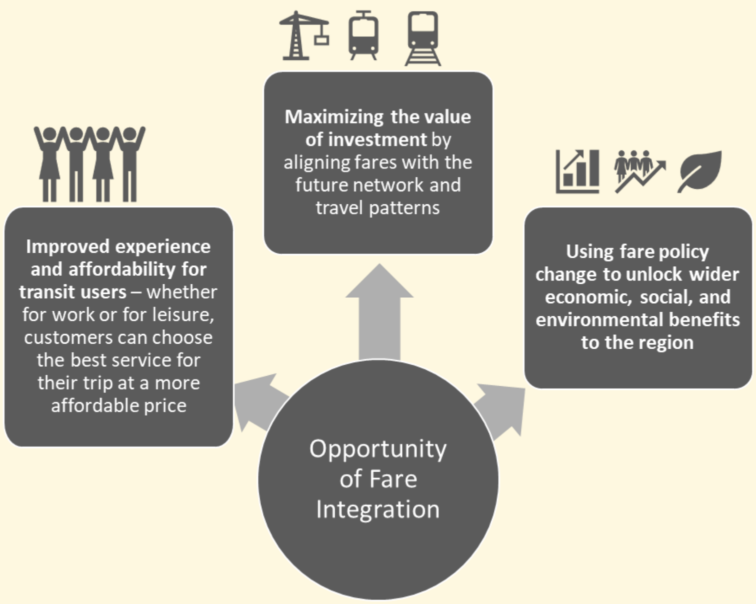
The Opportunity: Integrate Fares across the GTHA and Neighbouring Communities

Today and in the future, the three key issues could impact transit use, leading to increased congestion on roadways, lower transit ridership, and underperformance of key transit investments.

Fare Integration has been identified as a potential solution to this issues, including:

- **Tackling issue 1 -** Setting fares across agencies where double fares exist today to make transit more affordable and to grow ridership
- **Tackling issue 2 –** Adjusting short distance fares on GO Transit to make them more affordable for short trips
- **Tackling issue 3 -** Aligning fares for regional trips (>10 km, crossing a municipal boundary) that travel a comparable distance

This IBC is focused on exploring potential fare structure variations that address these issues to generate key benefits for customers, and the region:



Five strategic principles were developed with MTO and municipal systems to assess the benefits, costs, trade-offs, and consequences of Fare Integration:

Within this opportunity, a solution statement was developed to guide the development of fare integration variations (see chapter 3):

> Focus on transit customers first, prioritize the network perspective across the whole region, and take a long-term view to achieve meaningful mode shift to transit

Acting on the problem statement and the three issues is an opportunity to grow ridership and unlock expanded benefits from future transit – for customers and the wider region. Within this IBC, fare integration focuses solely on:

- Changes to fares for a single continuous trip made on multiple systems (issue 1)
- Changes to GO Transit fares for short trips to allow customers expanded choice (issue 2)
- Changes to fares where a customer pays different fares for a similar regional trip (trips >10 km that cross municipal boundaries) depending on the systems used (issue 3)

These three changes are not the only elements of a complete fare integration program. They have been identified as 'fundamental' changes that could be used to address the problem and should be considered alongside broader changes to fare policy – including equity programming, changes to passes and products or caps, and other structural elements (such as off-peak pricing). In addition, changes the transit network – including service integration – may also provide solutions to the problem. These broader changes may be considered in future planning and business case analysis.

Additional Considerations: Concessions, Fare Capping and Passes

In addition to the issues above, there is also a need for greater regional alignment of fare concessions for equity deserving groups and other segments of the customer base. Concessions and social fares are inconsistent and are not effective at lowering the cost of transit for those who need it the most. For example, 120,000 low-income households and 15% of the region's jobs are located within 5km of the Toronto border, and current municipal low-income programs limit mobility choices.

Ongoing work by the TTC is another example of progress towards more equitable fare structures. If monthly passes are replaced by a fare cap for trips, customers will not be required to pay in advance for a monthly pass they may not end up fully utilizing. Under the proposed new regime, if a set number of trips per month are used, the remainder of trips in that month would be free. Limits can also be set at different thresholds to address specific customer segments such as low-income groups. Broader regional adoption of this approach will require further alignment of agencies.

Metrolinx will review potential fare equity benefits and negative impacts that could be realized by implementing fare integration. Future stages of work will include these benefits and impacts and identify a range of additional fare measures required to mitigate negative impacts and enhance benefits.

Broad Policy Alignment

Fare Integration is a key element of the following Metrolinx and Provincial plans and policies:

- Metrolinx 2041 Regional Transportation Plan – included as an enabling policy
- Connecting the GGH: A Transportation Plan for the Greater Golden Horseshoe – included as an enabling policy
- Metrolinx Station Access Plan – included as an enabling policy, with fare integration supporting non-automobile access to GO Rail stations across the study area
- GO Expansion – embedded as a modelling assumption for all revenue and ridership forecasts

Business Case Framework

The remainder of this IBC is focused on different fare integration model, including definitions of fare structure variations in Chapter 3 and a multi-dimensional evaluation of their performance and requirements for success in Chapters 4-7. **Table 2-3** illustrates how the strategic principles in the opportunity statement are applied across the business case to explore:

- The variety of potential fare integration structures
- The overall potential benefits of the fare integration program
- Specific lessons learned and key findings across the fare structure variations and any ensuing findings for consideration in future analysis

Table 2-3: Business Case Framework

Chapter	What questions do the chapters answer?	Simplicity	Ridership Growth	Affordability and Equity	Fiscal Sustainability	Future Ready
3. Fare Integration Structures	• What are potential fare integration structures for consideration in further studies?	Chapter 3 defines how the fare structure variations were developed, including discussion of how these principles were used to short list and refine variations for consideration in the IBC				
4. Strategic Case	• How do the fare structure variations align with the strategic principles for fare integration set by Metrolinx, the Province, and transit system partners?	Customer experience impacts are directly assessed	Ridership is directly assessed	Affordability and equity are directly assessed	Revenue impacts to the region are assessed	Potential impacts in a future year (2041) are explored and compared to current year impacts
5. Economic Case	• What is the approximate real value of all strategic benefits for each fare structure variation in economic terms? • How does the value of benefits compare to the resource costs required to deliver fare integration?	Monetized user and external benefits illustrate how changes to simplicity, ridership, and affordability/equity benefit travellers and the region in 2022-dollar economic terms.			Required capital, operatin, and renewal costs are monetized in economic terms.	A sensitivity test with 2041 results is included
6. Financial Case	• What are the funding and financial requirements for each fare structure variation?	The required capital, operating, and renewal costs alongside revenue impacts are estimated to illustrate the financial impact of delivering the strategic performance outlined in chapter 4. This represents the total 'net cost' of delivering Fare Integration.				
7. Deliverability and Operations Case	• What are the requirements to successfully deliver and operate the fare structure variations? • What are the risks and how do they vary by variation?	A comparative review of the technical program and key risks associated with delivering and operating each variation to determine what is 'required' to realize the strategic benefits in chapter 4.				

3

Variations

3 Variations (Potential Fare Integration Structures)

Introduction

This chapter provides an overview of four fare integration variations that have been developed to address the key issues identified in Chapter 2. Each variation represents an illustrative future fare structure that is evaluated in Chapters 4-7 to understand its performance and lessons learned for future fare policy development.

This chapter includes:

- **Variation Development Process –** a summary of process used to identify and scope four fare structure variations
- **Business Case Variations –** a detailed description of each variation and how they impact fares compared to today

Variation Development Process

Between Fall 2021 and March 2022, an iterative and collaborative process was undertaken between transit systems, Metrolinx and MTO. This process aimed to:

- Identify key issues related to fare integration for consideration to refine a Problem Statement
- Explore a long list of 10 regional fare options to understand range of options
- Confirm a set of 5 strategic principles and develop a corresponding evaluation framework to arrive at a short list of options for further analysis in the business case

This process included 14 transit systems in and around the Greater Toronto and Hamilton Area, and the Provincial government. The key elements of this process are defined in **Figure 3-1**, which is followed by a summary of each part of the process.

Role of the IBC and Variations Evaluated Within It

As discussed in Chapter 2, Fare Integration has been identified as an opportunity to make transit more affordable, grow transit ridership, increase the benefits of in-delivery transit, and generate wider benefits to the region.

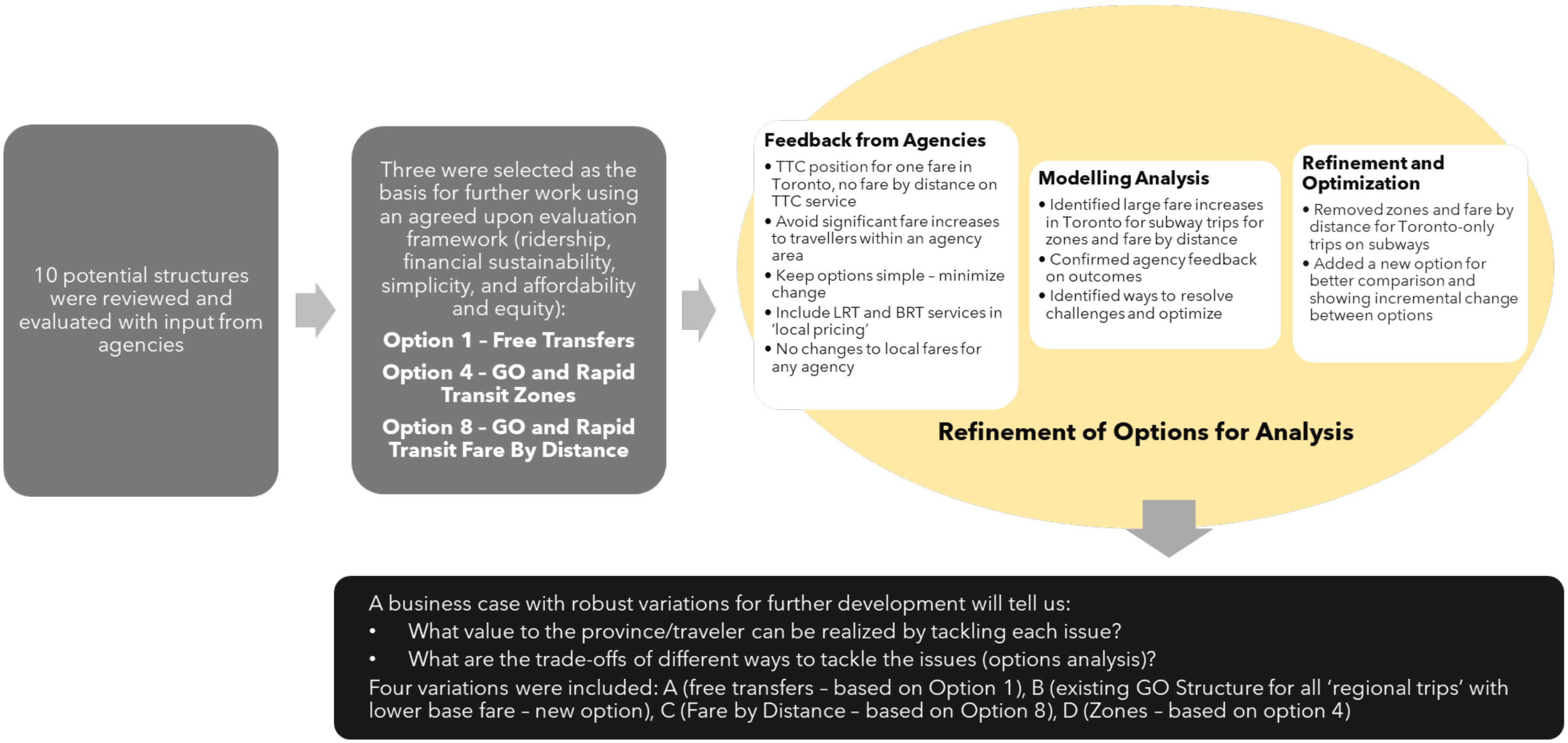
This opportunity is at the Initial Business Case (IBC) stage, which Metrolinx uses to explore mutually exclusive and meaningfully different approaches to act on a problem or opportunity. In line with the requirements and purpose of an IBC, Metrolinx has identified four structures that allow decision makers to explore:

- Different ways to integrate fares;
- Incremental value of addressing the three issues; and
- Potential benefits, costs, trade-offs, requirements, and consequences for fare integration.

This exploration is at a 'strategic level' which is used to inform future study. As a result, all Variations are scoped at a high-level to allow comparison, however key questions required to deliver Variations are not explored here. These questions could be explored in future stages. If Metrolinx is directed to advance fare integration, further analysis would be conducted on a set of Variations at the Preliminary Design Business Case stage, based on lessons learned from this IBC. The final business case stage, the Full Business Case, will review Variations for implementation.

As a result, the Variations in this business case are not intended for direct implementation and will only be used for further study.

Figure 3-1: Variation Development Process



Variation Development and Analysis Tool: FAST

Metrolinx used the Fare Strategy (FAST) model for all forecasts included in this business case. FAST is a third party reviewed tool that was developed in 2015-2016 and has been subsequently updated three times to expand its functionality and make use of recent data. It is a choice model derived from the GGHMv4 network model used for most Metrolinx business cases and plans. The tool allows for testing of different fare scenarios and predicts changes to revenue and ridership across the study area for a 2019 network (demand and network structure) and a 2041 network (including demand forecasts and the funded and in-delivery transit network). In particular, the FAST model:

- Estimates mode preference for trips made as a function of cost, time, and trip attributes (for example: trip purpose, time of day, access to free parking, etc.); and
- Can suggest optimal scenarios to fit a principle or objective (for example: ridership growth).

The FAST model can analyse the following variables:

- Average fare, with differentiation by mode or agency (average fares are used for the choice model, which is annualized to represent the actual revenues generated by agencies in 2019);
- Products and product choice (cash, pass, caps, etc.);
- Structures: flat fares, zones (defined by shape or boundary) or distance (defined by steps or slopes);
- Transfer agreements between modes and operators;
- Time of day (example: peak/off-peak); and
- Service levels (example: change in frequency).

This tool is consistent with approaches applied by other agencies, including TransLink, in developing their future fare strategy. It was audited by an external peer review panel and updated to improve the model's fit for use in the GGH. The following assumptions were applied to the FAST model when forecasting the impacts of each fare structure variation:

- Trips must be carried out wholly within the Greater Toronto and Hamilton Area (GTHA) (planning districts 1 – 46), being trips whose origin and destination reside within the confines of the GTHA, using 2016 TTS data;
- Trip must occur on a weekday either in the peak (6am-9am and 4pm-7pm) and/or off-peak (9:01 am - 3:59 pm and 7:01 pm - 9:00 pm) periods; and
- Trips could be carried out via a variety of modes, either in isolation or combination, including local bus or streetcar, GO Bus, GO Rail, subway and auto driver.

Once run, the model provides the outputs listed below. Annual ridership and revenue estimates were calculated by applying expansion factors to the daily outputs from the model.

- Ridership per service type (mode)
- Revenue per service type (mode)
- Changes in Vehicle Kilometres Travelled (VKT)
- Travel Time Savings from mode shifts

The key functionality and limitations for the FAST model are outlined in **Table 3-1**.

Table 3-1: FAST Model Features and Limitations

Can (Model Design Features – Core Use Cases)	Cannot (Model Limitations - Interpret with Caution)
• Support compare & contrast analysis of a wide range of options for various customer trip types • Reveal sensitivity of variables in a fare structure and help to direct optimization • Provide order of magnitude and direction of change in comparison to 'Business as Usual' (2019) • Give a picture of 'perfect state' change for majority of trips taken • Allow for more complete end-to-end journey analysis than using current fare system or operational data • Fit the purpose of Stage 0-2 Project Life Cycle analysis and decision-making	• Predict current or post-COVID behaviours • Provide results for the broader Greater Golden Horseshoe *(but work is underway to expand for future analysis)* • Predict when 'impact' will hit; does not consider how customer behaviour change takes time • Detect nuances related to customer preferences for products/discounts (example: monthly passes or capping programs) or discretionary travel • Determine how to settle or allocate fare revenue between agencies (transit system ridership & revenue impacts need to be inferred from geography and mode selection) • Model airport demand (for air travel purposes) or specialized transit demand

The FAST model includes two model years to allow a range of analysis:

- 2019 network – a network representing the state of transit in 2019. This network is used as a proxy to understand how fare changes could impact demand today. Service and capacity are consistent with the 2019 service offer across all bus, streetcar, subway, GO Bus, and GO Rail services. Changes to capacity that may be required due to increased fare integration ridership are handled with separate approaches outside of the FAST model (see Assumed Operating and Capital Program in this Chapter). All analysis presented in this business case, aside from Impact 8 – Future Network Impacts uses the 2019 network.
- 2041 network – the 2041 network includes all projects that are funded and committed, including the LRT program (Finch LRT, Eglinton LRT, Hamilton LRT, and Hazel McCallion Line), the subway program (Yonge North Subway Extension, the Scarborough Subway Extension, the Eglinton Crosstown West Extension) and GO Expansion. It also includes minor changes across local transit networks that are consistent with the Metrolinx GGHMv4's assumption for local service changes. Similar to the 2019 network, changes to capacity that may be required due to increased fare integration ridership are handled with separate approaches outside of the FAST model. The future network is only used in the strategic case for Impact 8.

Disclaimer on COVID-19

Readers should note that the analytic models used in this business case draw on multiple datasets collected and refined prior to the spread of COVID-19. As a result, they do not model the impact or potential long-term outcomes of the current global pandemic. There is currently insufficient data or information available to allow the models employed in this business case to reasonably analyze the impact of the COVID-19 outbreak on this project or for the models to be used to comment on the expected changes in the forecasts described in this business case.

Metrolinx is currently exploring the potential long-term impacts of COVID-19, however the specific impacts of COVID-19 on Fare Integration and the future network have not been forecast. As of the date of distribution of this business case, the COVID-19 pandemic has had a material impact on the movement of people and goods, including travel patterns and behaviours. Readers of this business case should consider its findings in this context.

Long List Development

This task involved agency engagement on 10 fare structure options representing a wide range of 'theoretically' possible structures. This long list was intended to be comprehensive and includes:

- Promising practices from elsewhere – including other jurisdictions served by multiple systems or operators
- Previously studied fare structures in the Greater Toronto and Hamilton Area

This long list spanned a range of potential structures that explored changes to prices of all modes and services and was divided into two categories:

- **Municipal Focused Fares –** as shown in **Figure 3-2**, these options included fare structures where municipal boundaries played a strong role in setting fares. This means that crossing a boundary has a stronger influence on fare than distance travelled. For example, crossing three municipal boundaries would have a higher fare than crossing two (option 2). Moving from option 1 through option 5, the role of municipal boundaries weakens.
- **Distance options –** as shown in Figure 3-3, these options include fare structures where distance travelled is a stronger determinant of fare paid. This means that the further a customer travels in measured distance – regardless of municipal boundaries – the higher their fare will be. As options increase from option 5 to 10, the role of distance increases. For example, Option 5 is based on hexagonal zones for an approximate measure of distance, while in Option 10 all modes are prices per km travelled.

Primer - Types of Fare Structures

Around the world, transit operators use a wide variety of approaches to fares. There are countless possible fare structures which can be organized into fare structure types by looking at how they answer two questions:

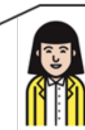
- **Does the fare reflect the type of service?**
  - Uniform fare for all service types – the fares between any two places are the same, regardless of whether one takes a fast, reliable transit service (like a regional train) or a slower, more traffic-affected service (like a local bus)
  - Differential fare based on type of service – transit options are grouped into multiple service categories, and fares take the category into account
- **Does the fare reflect the length of the trip?**
  - Region-wide flat fares – one single fare for a trip of any length across the region – distance does not play a role in fares
  - Fare by zone – fares are determined by zones crossed; roughly approximating distance travelled
  - Fare by distance (FBD) – fares determined by a formula based on distance travelled
  - Hybrid - fares reflect different approaches to length depending on the type of service

There are numerous other ways a fare structure can be further customized. The rules applied to transfers or stopovers made during a trip can significantly affect how much that trip costs. Fares can also potentially vary depending on what time of day it is or be capped at certain amount over a certain time period.

Figure 3-2: Long List of Fare Options – Municipal Focused Options

OPTION	1	2	3	4	5
Name	Status Quo + Free Transfers Between Agencies	Pure Municipal Zones	Cellular Zones (TRBOT Proposal)	Circular Zones	Toronto + Circular Zones
Customer Story	*"My municipal service fares are the same as today, but now I can transfer between any municipal service across the region for free. When using GO, my municipal connection to/from is free."* 	*"I can travel anywhere within my city on any transit service for one fare. If I leave, I pay the fare of the next city and can travel again on any transit service."* 	*"If I'm travelling 1-2 zones I pay the fare in the zone pair chart. If I'm travelling 2+ zones, I count the number of zones that I will cross and refer to the chart for my fare. I can use any transit service and it's the same fare."* 	*"I can travel on GO & Rapid Transit for the same fare, but my fare increases with each zone crossed. I can travel on local bus/streetcars for one fare and any transfer is free."* 	*"I can travel on any service in Toronto for one fare. Outside of Toronto, local bus fares remain the same and Rapid Transit and GO fares increase with zones crossed. Transfers between services are free."* 
Core Concept	• Municipal services are still defined by municipal borders, while GO remains fare by distance • Free municipal to municipal transit transfers and to/from GO	• Zone boundaries are defined by municipal borders • All services have the same fare within the zone, set by the municipality	• Zones approximate municipal boundaries with a few larger municipalities divided (e.g. two zones for Toronto, Durham & York) • While all services have the same fare within the zone, there are two fare charts for different distances travelled	• 10km uniform circular zones from Union Station for GO & Rapid Transit only • Local bus/streetcar services remain flat fare • Free local transit transfers to/from all services, including from Rapid Transit & GO	• Toronto as 1 Zone with 10km circular zones from Toronto boundary for GO & Rapid Transit only • Local bus/streetcar services remain flat fare • Free local transit transfers to/from all services
Illustrates	• What happens if we only address the double fare barrier and no additional structural change	• What happens when GO fares are flat within municipal boundaries	• What happens when local fares are changed, and when GO is flat within a zone	• What happens with uniform zones that have bias towards travel patterns from 905 to downtown Toronto • What happens when you introduce distance pricing for Rapid Transit and GO	• What happens when you keep Toronto closer to 'status quo', smooth out GO's distance pricing, and introduce zone pricing for Rapid Transit

Figure 3-3: Distance Focused Options

Option	6	7	8	9	10
Name	Hexagon Zones	GO FBD Only + Regional Flat Fare for Municipal Services	GO FBD = Rapid Transit FBD + Regional Flat Fare for Local Services	GO FBD > Rapid Transit FBD + MSP Flat Fare for Local Services	All modes FBD
Customer Story	*"My local bus/streetcar fares are the same as today, but my fare for GO & Rapid Transit increases as I cross zones, more closely reflecting the trip taken."* 	*"Municipal services are the same price no matter where I start my trip and I can transfer from one service to the next for free. GO fares are based more consistently on distance travelled."* 	*"I can travel on either GO or Rapid Transit on one fare for short trips (<10km) and it's priced the same as other local bus/streetcar services in the region. After 10km, I pay for the distance I travel on GO or Rapid Transit. Transfers to/from local services are free."* 	*"I pay more to travel on GO than Rapid transit, but my fares are comparable for the distance I travel. My local service connections are always free. If I'm only taking a local bus/streetcar, my fare is based on the city where I start my trip, with free transfers after that."* 	*"My fare always reflects the distance I travel; however, I pay lower fares for slower services and higher fares for faster services."* 
Core Concept	• First 10 km is a flat fare and then 4.5km hexagons after, applies to GO & Rapid Transit only • GO starting rate $4.40 and Rapid Transit starting rate $3.25 • All local transit keep jurisdictional fares	• First 10km on GO is $4.40 and after that $/km rate decreases with distance travelled • All municipal services have the same flat fare • Transfers between municipal services and to/from GO are free	• GO and Rapid Transit services have the same fare by distance structure ($3.25 for first 10km and $/km rate that decreases with distance) • All local services have same flat fare; transfers between services are free • When transferring between GO & Rapid Transit the rate simply continues with distance travelled	• GO and Rapid Transit have fare by distance structures with different rates (first 10km on TTC is $3.25 whereas it's $4.40 on GO) • When transferring between GO & Rapid Transit, a credit of $3.25 is reduced from the fare, and the rate continues • Local services are priced by jurisdiction, but transfers between services are free • Transfers on local services to/from GO & Rapid Transit are free	• Fare by distance structures apply to all services, but rates are consistent by mode vs. agency • When transferring from one service to the next, the rate continues
Illustrates	• What happens with really small uniform hexagon zones, and no geographic bias to Union Station	• What happens with more optimization of GO's FBD structure and more consistency for municipal travellers	• What happens when GO & Rapid Transit have the same fare to make all short distance trips consistent and comparable to local services	• What happens when GO has a higher FBD rate than Rapid Transit, but is comparable for short-distance trips, and when MSPs keep their fares comparable vs. the same • Transfer credit between GO & Rapid Transit offsets the impact of short distance transfers	• What happens when FBD applies to local bus/streetcar as well as GO & Rapid Transit

Short List Selection

An evaluation framework was used to select a short list of three options with high potential to support ridership growth, affordability, financial sustainability, and simplicity/customer experience (the strategic principle identified through engagement with partner systems and included in the opportunity statement in chapter 2). This evaluation framework, shaped by agency and Provincial input, shortlisted the following options:

- Option 1 (Free Transfers)
- Option 4 (Circular Zones: GO & Rapid Transit Circular Zones, MSP Flat Fare, Free Transfers)
- Option 8 (Fare by Distance: GO & Rapid Transit FBD, Regional Flat Fare, Free Transfers)

Options (1, 4 & 8) were the stronger performing options overall, but each had different strengths. Option 1 (Free Transfers) is strong on affordability, while Option 4 (Circular Zones) and Option 8 (GO and Rapid Transit FBD + Regional Flat Fare) are both strong on ridership growth. Options 4 and 8 also illustrate the potential impacts (including benefits and drawbacks) of broader changes to the regional fare structure.

The rationale for screening out the remaining seven options was:

- Options 3 (Cellular Zones) and 10 (FBD on All Modes) performed poorly and were screened out. In particular, Option 3 is poor for simplicity and financial sustainability, and Option 10 is poor for affordability and ridership growth.
- Option 2 (Pure Municipal Zones), Option 7 (GO FBD + Regional Flat Fare) & Option 9 (GO FBD>Rapid Transit + MSP Fares) performed poorly for one principle and were screened out. Options 2 and 7 are poor for financial sustainability, and Option 9 is poor for simplicity.
- Option 5 (Toronto + Circular Zones) had moderate performance but performed lower than other zonal options and was screened out, while Option 6 (Hexagon Zones) has the lowest score of the top options.

The shortlist was shared with systems for feedback. Key feedback included:

- Option 1 (Free transfers) received support from systems
    - This option is seen as the most customer-focused and convenient solution, protects GTHA agency fare policy structures, and addresses the issue of double fares barriers with TTC.
    - There was support for removal of double fares and use of products/concessions to increase affordability of transit.
- Systems want autonomy to set their own fares to reflect increasing costs: specific fare elements (for example: Regional Flat Fare and Zone Options 3, 4, & 5) remove this autonomy.
- It was recommended that rapid transit be defined to include subways but to exclude in-delivery and planned LRTs and existing and planned BRTs.

While all transit systems supported Option 1 (Free Transfers), feedback from the systems expressed shared concerns over Zone and FBD options. Additional feedback was provided on these options and what should be considered for future analysis:

- Assessing impacts to a range of customer segments (example: low-income, specialized transit rider) and clearly articulating incremental cost to riders and impact to transit systems.
- Maintaining existing flat fare structures, which were positioned as a key element of equity by transit systems.
- Exploring how Option 4 Zone boundaries could divide communities.

Developing Refined Options for Business Case Analysis (inclusion in this IBC)

Metrolinx undertook an option review and refinement process based on agency and Provincial feedback. This process included:

- Detailed analysis of the three options as defined in the long-listing process.
- Exploring option performance using the business case framework to understand their benefits, costs, trade-offs, and the key issues raised by agency and Provincial feedback.

The following specific actions (defined in **Table 3-2**) were taken to respond to key agency feedback during this analysis process.

Table 3-2: Agency Feedback and Action Taken on Fare Options

Feedback	Action Taken
LRT and BRT should not be priced in the regional rapid transit category	Removed LRT/BRT from regional pricing
Applying Zones or FBD to the subway network could impact ridership and affordability	Tested a range of pricing scenarios to understand potential impacts, removed higher cost for subway trips that start and end in Toronto
TTC / Council direction to not price TTC services with distance or zones	Reviewed a range of sub-options that do not apply distance-based pricing to trips that start and end in Toronto on TTC subway
Fare structure impacts on equity should be included in IBC	Developed a % paying more/less metric and conducted geographic analysis of which neighbourhoods could see a fare increase (expanded analysis presented in Chapter 4)
A single region-wide flat fare for all buses and streetcars should not be pursued in the fare structures	Retained transit system fares for all local (bus, streetcar, BRT, LRT) services
Assess impacts to low income and specialized riders	Low income analysis was expanded in the IBC, specialized transit impacts cannot be assessed in the FAST model – plans for further analysis are being made

In addition, options were updated to include the March 2022 free transfer policy between GO and 905 local systems in all analysis.

Feedback was reviewed using the FAST model and additional technical analysis. The review of options 4 and 8 identified the following key considerations:

- Validated feedback that applying zones and FBD to Toronto could reduce ridership and create affordability issues (as shown in **Figure 3-4**, which illustrates the forecast loss in ridership in Toronto from shifting from a flat subway fare to a distance or zonal fare for subway trips).
- Changes to GO Transit and subway fares can generate significant ridership for longer distance inter-municipal travel markets (Trips between GGH and Toronto, for example, in **Figure 3-4**), however these increases are accompanied by losses for trips on the TTC subway due to the application of distance or zonal fares (which raise prices).
- These changes also create fluctuations across the GO Transit network – meaning some customers will pay more and some will pay less (today the structure is loosely based on distance, a shift to a single fare curve leads to fare impacts). This led to some new ridership but also losses.

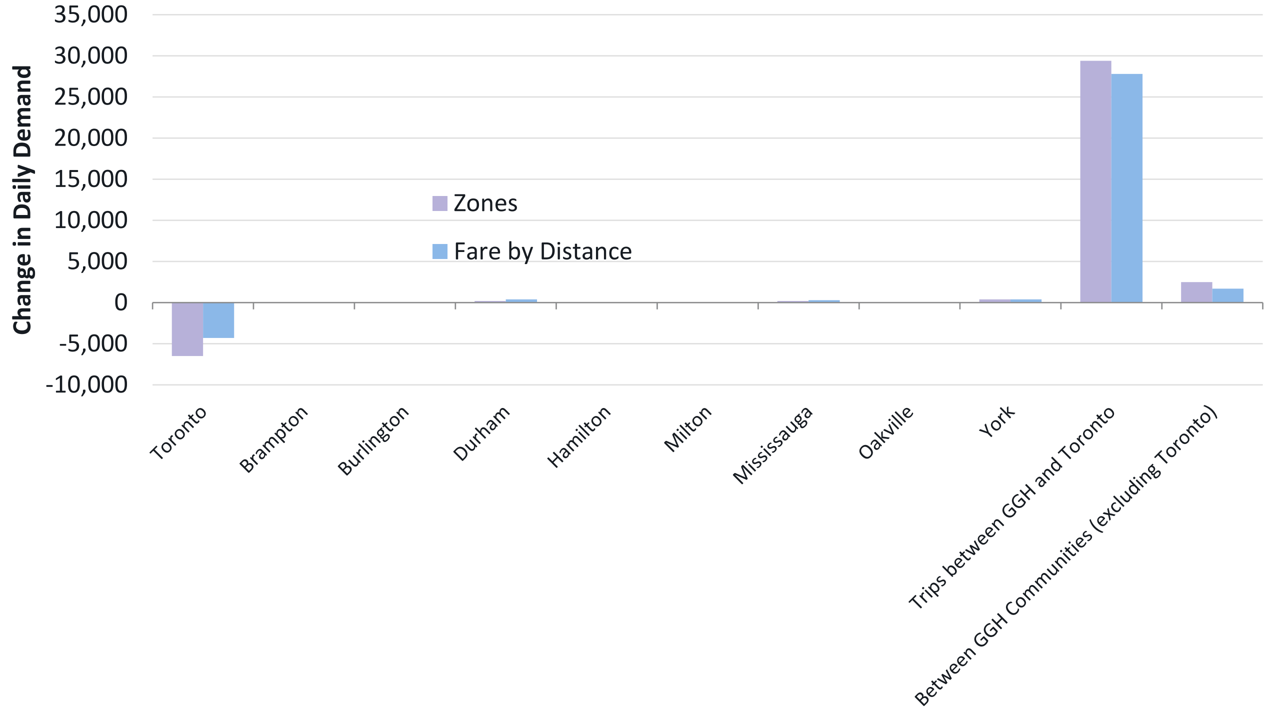
Based on this analysis, options 4 and 8 were deemed functionally infeasible and an option refinement process was developed that sought to:

- Carry forward the benefits of these options, including the significant gain in ridership for longer distance markets.
- Mitigate fare increases and ridership decreases for subway trips in Toronto and ensure affordability

To summarize, **Figure 3-4** illustrates the following findings:

- If fare by distance or zonal fares are applied in Toronto, there are likely to be ridership losses due to fare increases.
- Fare by distance has little impact on travel in other jurisdictions.
- Fare by distance will likely grow ridership for longer distance trips from the GGH to Toronto.

Figure 3-4: Change in daily trips by geography



Based on these impacts, the application of fare by distance or zones to subway service for trips within a single municipality was removed from further consideration. A design principle was also applied to minimize the number of trips with a fare increase and the extent to which fares increase where changes occur.

Variation Development – Key Takeaways From Initial Analysis

This analysis resulted in four variations – including carrying forward Option 1 without further revision, and three variations based on the intention and principles for Options 4 and 8. These variations continue to explore approaches to solve Issues 2 and 3 as well as broader changes to transit fares in the GTHA and neighbouring areas. Variations were developed using a consistent approach to illustrate fare structure performance and to:

- Retain all existing transit system fares for trips wholly within one municipality on all modes (example: all TTC subway trips within Toronto do not get a price change) – no customers using a single municipal system within a single municipality will see a fare change;
- Minimize the number of customers who pay more if a new fare structure for regional trips is included in the variation (defined as cross-boundary trips over 10 kilometres on subway, and GO Transit trips over 10 kilometres); and
- Use consistent price changes between variations (example, minimize the amount of differences in average fare between variations) to illustrate how structure, not price, drives performance.

Business Case Variations

Four variations were developed for consideration in this business case. These variations are described in **Table 3-3** including how each is different from the existing fare structure, why it was included in this business case, which issue from the problem statement it responds to, and which fare structure option they are based on. These changes are further highlighted in **Figure 3-5**.

Table 3-3: Fare Integration Variations

Variation	Key Changes from Existing Structure	Rationale For Inclusion in Business Case	Responds to Issue (see Chapter 2)	Based on Short List Option
A - Free Transfers	Remove all double fares between GO-TTC and TTC-905 agencies (free transfers for all trips)	Understand benefit of unlocking multiagency travel between Toronto and the rest of the GTHA and surrounding area.	1	1
B - Regional Trips Use GO Zones	Remove double fares, lowers base GO Fare to $3.25, and brings subway trips that cross a municipal boundary into existing GO zones-based pricing	Same as A, but also explores the benefit of harmonizing all regional trip fares with minimal change (compared to FBD/zones in C/D)	1,2, and 3 (partial)	New option, informed by 1, 4, and 8
C - Regional Trips Use FBD	Remove double fares, lowers base GO Fare to $3.25, and uses a new standardized distance-based fare structure on all GO Transit trips and subway trips that cross a municipal boundary	Same as A, but also explores if there are further benefits unlocked by making more significant changes to the regional fare structure using a single FBD pricing curve or zones (compared to today's GO Fare structure that varies line by line)	1,2, and 3	8
D - Regional Trips Use Zones	Remove double fares, lowers base GO Fare to $3.25, and uses a zone structure for all GO Transit trips and subway trips that cross a municipal boundary		1, 2, and 3	4

Variation B – a new Variation in this IBC

Variation B was developed based on analysis of Options 4 and 8, which transformed the GO Transit and subway fare structures. These transformations may lead to a large fraction of customers with fare increases and lower ridership growth.

A new Variation that aims to achieve the goal of Options 4/8 (align regional trip pricing) was developed that would minimize changes to fares by using the existing GO Transit fares for all GO Rail, GO Bus, and regional subway trips (cross a boundary and are longer than 10 km).

This allows decision makers to explore different ways to integrate regional pricing with simpler changes.

Figure 3-5 Variation Relationship to Options from Short List

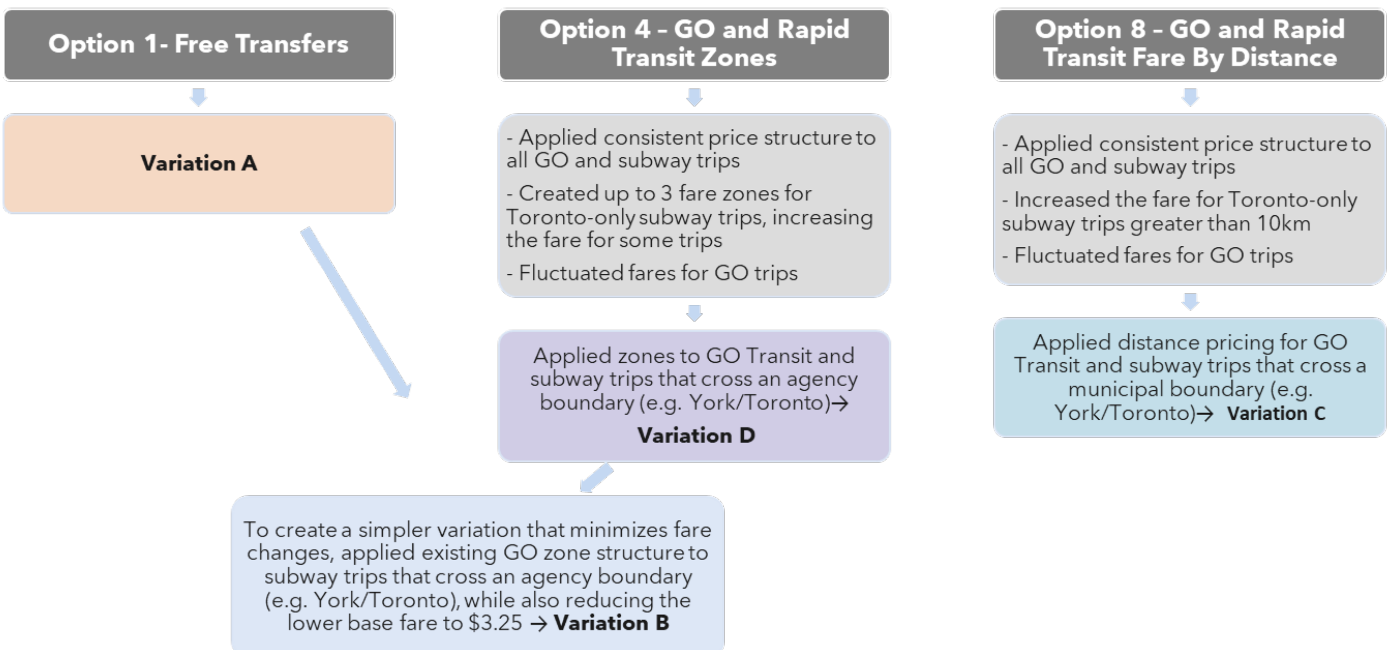


Table 3-4 shows how each variation considered in this business case either addresses or does not address each issue presented in the problem statement.

Table 3-4: Four Business Case Variations and Key Issues

Variation	Does it address issue 1 and remove double fares for trips using TTC and other systems?	Does it address issue 2 and make GO Transit more affordable for short trips?	Does it address issue 3 and make Regional Fares more consistent?
A - Free Transfers	Yes – allows cross-boundary trips using combinations of bus and subway across all transit systems and removes the double fare for GO+TTC trips	No	No – a bus + subway fare for a long regional trip between Toronto and York is now much less expensive than a GO Transit fare
B - Regional Trips Use GO Zones		Yes – makes GO less expensive for short trips <10 km	Yes – GO and subway have the same fares for cross-boundary trips between Toronto and York that are >10 km
C - Regional Trips Use FBD		Yes – makes GO less expensive for short trips <10 km	Yes – GO and subway have the same fares for cross-boundary trips >10 km
D - Regional Trips Use Zones		Partial – makes GO less expensive for some trips, but short cross zone boundary trips may remain unaffordable	Yes – GO and subway have the same fares for cross-boundary trips >10 km

How do variations impact transit systems fares?

The following sub-sections provide a detailed summary of each variation. From a transit system perspective, these variations could impact the following fares:

- Remove the second fare (double fare) paid when a customer transfers between GO and TTC, or TTC and neighbouring transit systems (**all variations)**
- Apply a form of fare by distance for Line 1 subway trips that are >10km in distance and begin or end in different cities (Toronto → York Region or York Region → Toronto) (Variations B, C, and D)
- Apply a standardized approach to fare by distance or zones across all GO Transit trips (Variations C/D)

No variations change fares for any municipal transit system for trips wholly within that system's service area. This means the following fares will not change under any variation:

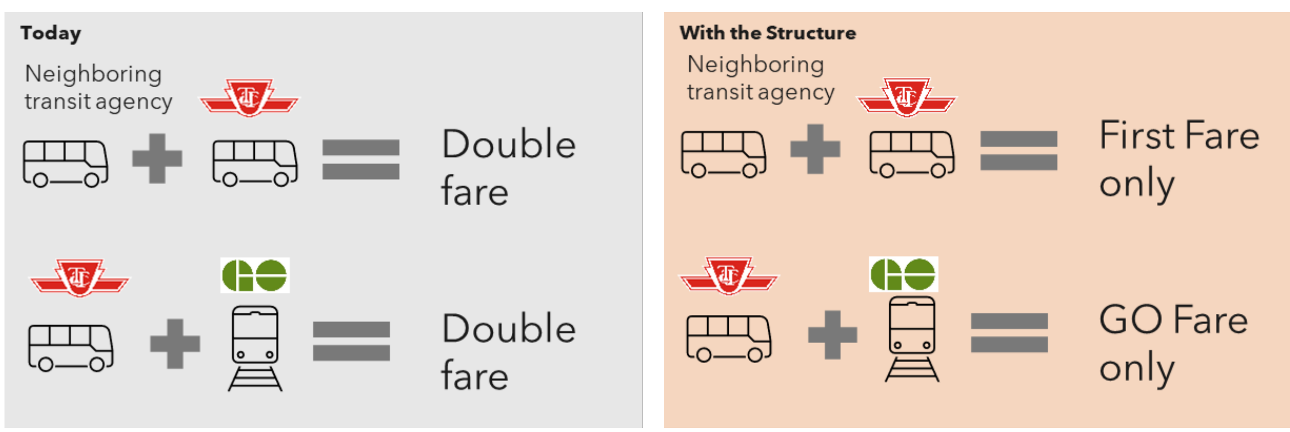
- Bus and streetcar trips on one systems – if a trip uses two systems, the above discount is applied
- Subway trips within the City of Toronto or within York Region
- Light Rail Transit and Bus Rapid Transit fares

Variation A – Free Transfers/Remove Remaining Double Fares

This Variation makes two key changes: removing double fares between TTC and neighbouring transit systems and removing double fares between TTC and GO. No other changes to fares are made. **Table 3-5** shows the key changes to today's structure if Variation A were to be implemented in relation to the three main regional issues presented in the problem statement.

Table 3-5: Variation A – Key Changes

Key Changes	Does it address issue 1 and remove double fares for trips using TTC and other systems?	Does it address issue 2 and make GO Transit more affordable for short trips?	Does it address issue 3 and make Regional Fares more consistent?
1. Removes the double fare between TTC-905	Yes – allows cross-boundary trips using combinations of bus and subway across all transit systems	No	No – a bus+subway fare for a long regional trip between Toronto and York is now much less expensive than a GO Transit fare
2. Removes the double fare between GO and TTC	Yes – allows travellers to use GO and TTC in concert as well as with other transit systems	No	No



Variation B – Regional Trips Use GO Fares

This Variation builds on Variation A (free transfers) as well as:

- Reduces the GO Base fare to $3.25; and
- Uses the new GO fare structure for all subway trips that are over 10 kilometers and are cross-boundary trips (i.e., between Toronto and York Region).

The graph in **Figure 3-6** shows the average fare for a set distance travelled on GO Transit and for regional subway trips (greater than 10 kilometers, that start and end in different cities). This variation allows for regional subway, GO Bus, and GO Rail trips to have price consistency with minimal change compared to Variations C and D:

- This graph is generated using the existing GO zone structure, with a flat fare of $3.25 for any trips under 10 kilometers.
- Fares are calculated on a zone-to-zone basis: no trips over 10 kilometers have a fare change on GO Transit and only subway trips over 10 kilometers between Toronto and York Region will see a fare increase.
- The maximum fare for these subway trips is roughly the same as a double fare on YRT to/from TTC trips today.

Figure 3-6: Variation B Fare Structure

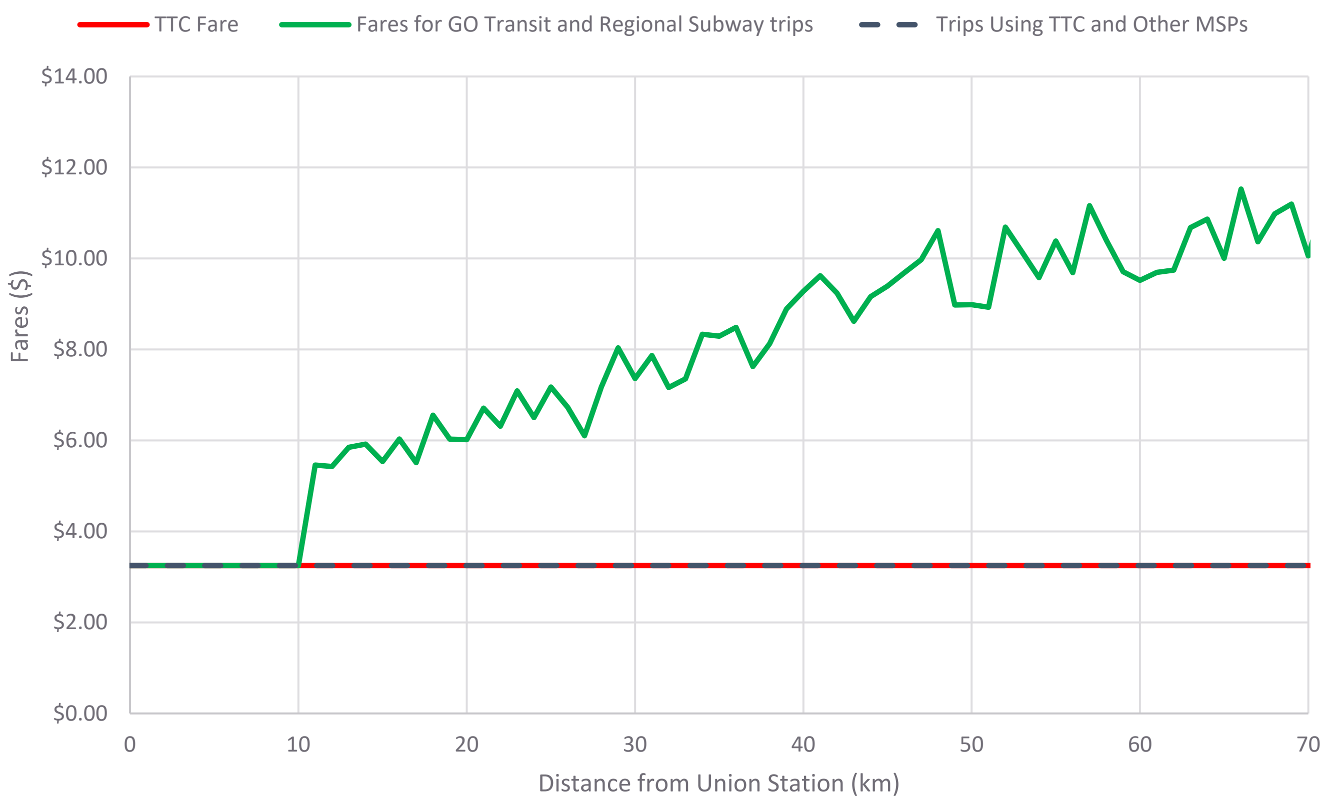


Table 3-6 shows which trip fares remain the same as today, and which fares change with Variation B.

Table 3-6: Variation B Fare Changes

Fares that do not change	Fares That Change	Change to…
All local service fares	TTC+ GO	Free transfer – only pay GO Fare
All subway fares that begin and end in one city	TTC + Neighboring agency	Free transfer – only pay TTC fare
All GO-Fares longer than 10 km	Short distance GO	Reduce to $3.25 for first 10 km
	Subway between York Region and Toronto with a distance >10km	$3.25 for first 10 km, use same fares as GO Transit for trips > 10 km

Table 3-7 shows the key changes to today's structure if Variation B were to be implemented in relation to the three main regional issues presented in the problem statement.

Table 3-7: Variation B – Key Changes

Key Changes	Does it address issue 1 and remove double fares for trips using TTC and other systems?	Does it address issue 2 and make GO Transit more affordable for short trips?	Does it address issue 3 and make Regional Fares more consistent?
Removes the double fare between TTC-905	Yes – allows cross-boundary trips using combinations of bus and subway across all transit systems	-	-
Removes the double fare between GO and TTC	Yes – allows travellers to use GO and TTC in concert as well as with other transit systems	-	-
Reduces GO Base Fare to $3.25	-	Yes – reduces fare for GO for short trips <10 km	-
Applies GO Fares for subway trips >10 km between York and Toronto	-	-	Yes – GO and Subway have the same fares for trips >110 km (between municipalities)

Variation C – Regional Trips Use a Fare by Distance

This Variation builds on Variation A – it retains free transfers and uses a unified FBD structure for regional trips (GO Transit and subway trips between cities over 10 kilometers), where fares start at $3.25 for the first 10 kilometers and then increase at a price per kilometer. **Figure 3-7** illustrates the fare structure with Variation C.

Figure 3-7: Variation C Fare Structure

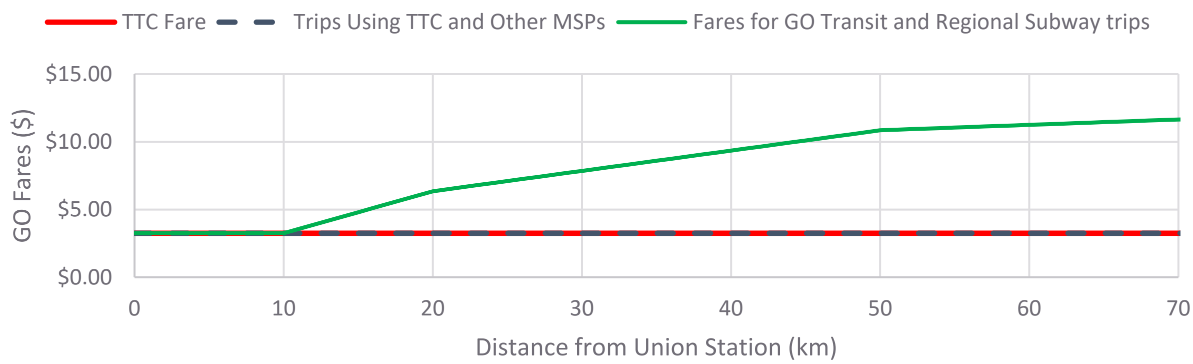


Table 3-8 shows which trip fares remain the same as today, and which fares change with Variation C.

Table 3-8: Variation C Fare Changes

Fares that do not change
All local service fares
All subway fares that begin and end in one city

Fares That Change	Change to…
TTC+ GO	Free transfer – only pay GO Fare
TTC + Neighboring agency	Free transfer – only pay TTC fare
Short distance GO	Reduce to $3.25 for first 10 km
Subway between York Region and Toronto with a distance >10km	$3.25 for first 10 km, use new FBD curve for trips that are >10km
All GO-Fares longer than 10 km	New FBD with all customers paying the same or less than today

Figure 3-8 shows the key changes to today's structure if Variation C were to be implemented in relation to the three main regional issues presented in the problem statement.

Figure 3-8: Variation C – Key Changes

	Key Changes	Does it address issue 1 and remove double fares for trips using TTC and other systems?	Does it address issue 2 and make GO Transit more affordable for short trips?	Does it address issue 3 and make Regional Fares more consistent ?
1	Removes the double fare between TTC-905	Yes – allows cross-boundary trips using combinations of bus and subway across all transit systems	-	-
	Removes the double fare between GO and TTC	Yes – allows travellers to use GO and TTC in concert as well as with other transit systems	-	-
2	Moves GO and Subway to a FBD structure with a base fare equal to the TTC fare	-	Yes – reduces fare for GO for short trips <10 km	Yes – makes subway (cross-boundary, >10km) trips and GO trips the same,

Variation D – Regional Trips Use Zones

This Variation builds on Variation A – it retains free transfers and uses a unified 10-kilometer zone structure for regional trips (GO Transit and subway trips between cities and over 10 kilometers). **Figure 3-9** illustrates the fare structure with Variation D.

Figure 3-9: Variation D Fare Structure

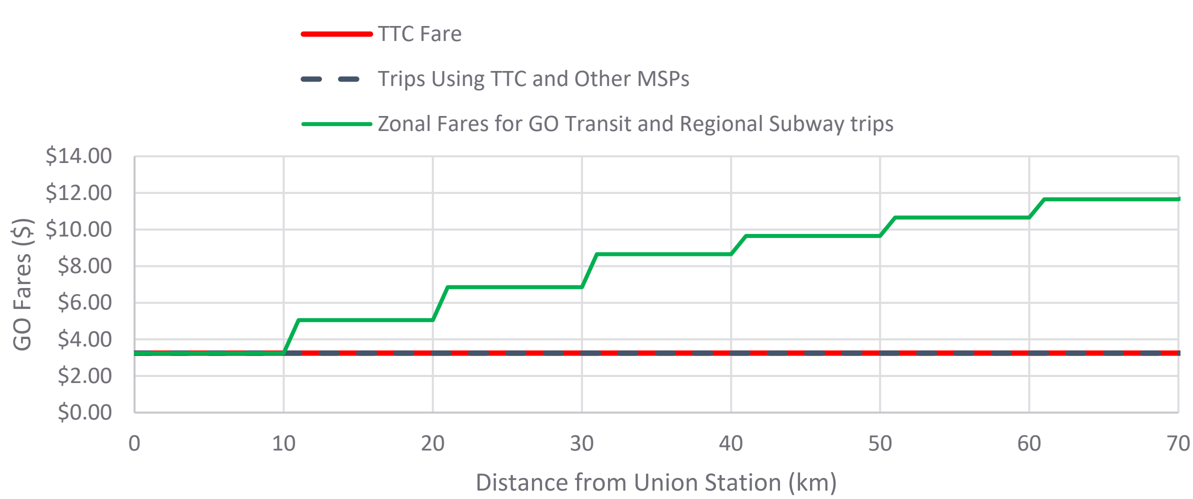


Figure 3-10 shows an example of what a zone-based fare structure could look like in the GGH.

Figure 3-10: Example Zone Fare Map

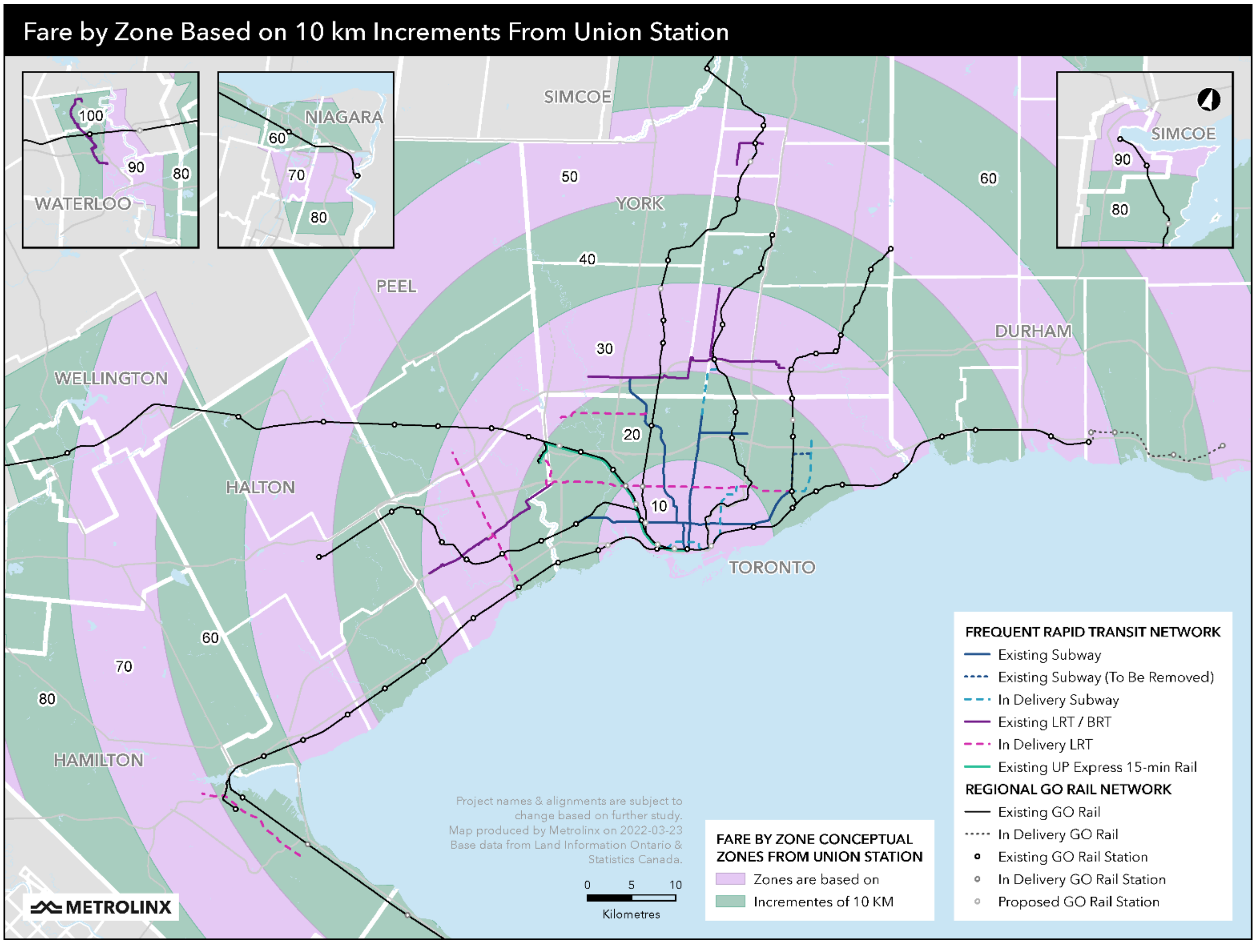


Figure 3-11 shows which trip fares remain the same as today, and which fares change with Variation D.

Figure 3-11: Variation D Fare Changes

Fares that do not change
All local service fares
All subway fares that begin and end in one city

Fares That Change	Change to…
TTC+ GO	Free transfer – only pay GO Fare
TTC + Neighboring agency	Free transfer – only pay TTC fare
Short distance GO	Reduce to $3.25 for first 10 km if within one zone
Subway between York Region and Toronto with a distance >10km	Use zone structure - $3.25 for first zone, ~$2.70 for each additional zone

	All GO-Fares longer than 10 km	Use zone structure - $3.25 for first zone, ~$1.70 for each additional zone with all customers paying the same or less than today

Figure 3-12 shows the key changes to today's structure if Variation D were to be implemented in relation to the three main regional issues presented in the problem statement.

Figure 3-12: Variation D – Key Changes

Key Changes	Does it address issue 1 and remove double fares for trips using TTC and other systems?	Does it address issue 2 and make GO Transit more affordable for short trips?	Does it address issue 3 and make Regional Fares more consistent ?
Removes the double fare between TTC-905	Yes – allows cross-boundary trips using combinations of bus and subway across all transit systems	-	-
Removes the double fare between GO and TTC	Yes – allows travellers to use GO and TTC in concert as well as with other transit systems	-	-
Moves GO and Subway to a zonal structure with a base fare equal to the TTC fare	-	Partial – makes GO less expensive for some trips, but short cross zone boundary trips may remain unaffordable	Yes – makes subway (cross-boundary, >10km) trips and GO trips the same

IBC Variations Summary

Table 3-9 shows a summary of the four shortlisted options explored in this business case and what the fare structure would be compared to today for different trip types. Note, Variations B-D all include the same free transfers as Variation A.

Table 3-9: Variation Structural Changes

<table>
<tr><th>Criteria</th><th>Business As Usual (BAU) Status Quo</th><th>Variation A - Free Transfers</th><th>Variation B – Regional Trips Use GO Zones</th><th>Variation C – Regional Trips Use Fare by Distance</th><th>Variation D – Regional Trips Use Zones</th></tr>
<tr><td>Local Transit Fares (Bus/Streetcar/LRT)</td><td colspan="5">Each Agency Sets Their Own Base Fare
(Bus, Streetcar & LRT Ranges from $3.10-4.25)</td></tr>
<tr><td>Subway Fares</td><td colspan="5">Existing TTC Base Fare ($3.25)</td></tr>
<tr><td>GO Rail/Bus Fare</td><td colspan="2">Existing GO Base Fare ($4.40), All GO Fares Remain Unchanged</td><td colspan="3">Lower GO Base Fare ($3.25), No Fares Increase</td></tr>
<tr><td>Fares For All Travel on Local Transit</td><td colspan="5">Base Fare for All Travel on Local Transit (Bus, Streetcar & LRT) &
Free Transfer to/from Subways & GO</td></tr>
<tr><td>Fares for All Travel on Subway</td><td colspan="2">Status Quo $3.25 for All Subway Trips</td><td>No Change to Toronto Trips, York-Toronto Trips Use Existing GO Fare Zones, but first 10km are flat fare of $3.25</td><td>No Change to Toronto Trips, York-Toronto Trips $3.25 up to 10 km, Fare Then Escalates by Distance Travelled</td><td>No Change to Toronto Trips, York-Toronto Trips $3.25 in 1st Zone, Fare Then Escalates by Number of Zones</td></tr>
<tr><td>Transfers Between TTC & 905 Systems</td><td>Double Fare</td><td colspan="4" rowspan="3">Base Fare for All Travel on Local Transit
& Free Transfer to/from Subways & GO</td></tr>
<tr><td>Transfers Between GO & TTC</td><td>Double Fare</td></tr>
<tr><td>Transfers Between GO & 905 Systems</td><td>Base Fare & Free Transfer</td></tr>
</table>

Table 3-10 shows the fare outcome for different trip types for each variation compared to today. Note, these prices are considered ‘reference prices’ that were used to test and compare the variations. Each pricing point was optimized to minimize the number of customers who would pay more. Future stages of analysis will confirm optimal pricing.

Table 3-10: Current Fares and Changes for Key Travel Markets

Trips	Mode of Travel	Business As Usual Status Quo	Variations			
			Variation A - Free Transfers	Variation B - Regional Trips Use GO Zones	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Trips Within Toronto	Subway, LRT or Bus	$3.25	No Change to Any Trips Within Toronto, Remains $3.25			
Trips From York Region to Toronto	Bus Only (YRT + TTC)	$7.50 [1]	$4.25 YRT Fare and Free Transfer (Save $3.25)			
	YRT Bus + Subway	$7.50 [1]	$4.25 YRT Fare and Free Transfer (Save $3.25)	Free bus to subway transfer, subway uses form of distance pricing, with fares from York Region to Toronto (Union) ranging from $3.25 for trips up to 10 km, and up to $7.50 for longest trips (Vaughan Metropolitan Centre to Union Station)		
	Subway Only	$3.25	No Change	$3.25 Base Fare for Short Trips up to 10 km, up to $7.50 for Longest Trip		
GO Transit Trips	GO Transit Only	$4.40 and Higher [2]	No Change	Lower $3.25 GO Fare for Short Trips, no changes to trips >10km	Lower $3.25 GO Fare for Short Trips with some decreases for trips >10km, No Fares Increase (some save up to $1.15) Variation D – some GO customers who make a short trip over a zone boundary may pay more (<1% of all demand)	
	GO Transit & TTC Subway	$7.65 [3]	$4.40 (Save $3.25)	Lower $3.25 GO Fare for Short Trips (Save up to $4.40), no changes to trips >10km	Lower $3.25 GO Fare for Short Trips, No Fares Increase (Save up to $4.40)	
Trips From Mississauga to Toronto (representing other municipalities)	Bus and/or LRT	$7.25 [4]	$4.00 MiWay Fare and Free Transfer (Save $3.25)			
Trips Within or Between Cities Outside Toronto	Bus and/or LRT	$3.00 to $4.25	No Change to Any Trips outside Toronto, Free 2-hour Transfers Already in Place for All Systems			

Legend
No change
Customers either see no change or get a fare decrease
Some customers could see a fare increase

Note: All Fares based on adult cash fare for illustration:
[1] $4.25 YRT fare + $3.25 TTC fare = $7.50
[2] $4.40 is GO base fare and $31.25 is current longest GO Fare from Barrie to Niagara Falls
[3] $4.40 GO fare + $3.25 TTC fare = $7.65

[4] $4.00 MiWay fare + $3.25 TTC fare = $7.25

Assumed Operating and Capital Program

Metrolinx has developed a set of assumptions for operating and capital costs for each of the variations. These costs reflect the following categories outlined below in **Table 3-11, which are described in greater detail on the following page**. Costs are explored in real terms in Chapter 5 and in nominal terms in Chapter 6.

Table 3-11: Cost Assumptions

Metric	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D- Regional Trips Use Zones
Capital Costs – Presto software	• Minor changes to software to accommodate free transfers	• Minor changes to software to add subway trips between York/Toronto > 10 km to GO Zones	• Major changes to subway and GO Transit fare structures	• Major changes to subway and GO Transit fare structures
Subway Station Impacts	No impacts	• Fare gate upgrades at TTC subway stations • Station renovations to add fare gates where there are free body transfers	• Fare gate upgrades across whole GO and TTC networks • Station renovations to add fare gates where there are free body transfers	• Fare gate upgrades across whole GO and TTC networks • Station renovations to add fare gates where there are free body transfers
Capital Costs – Bus	• Additional fleet to accommodate new demand – approximately 55 new buses	• Additional fleet to accommodate new demand – approximately 40 new buses	• Additional fleet to accommodate new demand – approximately 65 new buses	• Additional fleet to accommodate new demand – approximately 55 new buses
Operating Costs – Bus	• Additional operating hours (service hours) to accommodate new demand – approximately 450 hours per day	• Additional operating hours (service hours) to accommodate new demand – approximately 320 hours per day	• Additional operating hours (service hours) to accommodate new demand – approximately 540 hours per day	• Additional operating hours (service hours) to accommodate new demand – approximately 450 hours per day

Capital and Operating Cost Estimation

Costs were estimated using a combination of agency input and the FAST model.

For bus requirements – including capital cost and operating costs:

- FAST model outputs were used to explore change in boardings by agency
- Change in boardings were used to estimate the number of new service hours required in the peak period to accommodate new demand on an agency-by-agency basis – some systems assumed an up to 5% increase in current demand could be accommodated, while other systems assumed 0% net new demand could be accommodated
- Change in service hours was used to estimate an annual region wide operating cost
- Change in service hours was used to estimate the number of new buses required on an agency basis
- Agency-provided bus capital costs were used to estimate total bus capital costs

These cost estimates are considered preliminary and high-level. While they are sufficient to illustrate costs in an IBC, the following limitations are noted:

- Service changes are based on geographic changes in boardings by mode – they are not based on specific routes
- Costs per boarding are conservative and based on reported total operating costs divided by provided service hours

PRESTO and Subway Station Cost Estimation

PRESTO costs were estimated based on existing known hardware and installation pricing. All costs are incremental to the planned shift to account based ticketing that is underway.

For variation A, the costs are expected to be the lowest as only software changes are required.

Variations B-D have the same assumed PRESTO and subway station costs. They will require fare gates at all subway stations, which may include renovations and capital works to provide required fare gates. In particular, for subway stations where 'free-body transfers' occur (example: a customer can exit the bus and board the subway within a single fare paid zone) additional station changes may be required. PRESTO costs should be considered with the following caveats:

- Estimating civil works in existing TTC legacy subway stations is complex and costly. New station design work and engineering consulting alongside TTC will be needed to bring the variance level down on the estimates.
- For PRESTO a project of this size is normally a 24-36 month program as it involves extensive equipment change with long lead time items like vending devices.
- PRESTO costs will heavily be shaped by the timing for transition if a new fare structure is advanced.

Further analysis will be required in subsequent work to refine these cost estimates.

4

Strategic Case

4 Strategic Case

Overview

The Strategic Case summarizes the performance of the variations against the strategic principles set for fare integration (see Chapter 2 – Opportunity Statement). These principles were developed in conjunction with transit systems and were applied to this IBC Strategic Case to review each variation's ability to solve the problem and unlock value for travellers and the region. This chapter is structured around the five strategic principles, with each principle having one or more impacts assessed in this chapter, as defined in **Table 4-1**.

Table 4-1: Strategic Metrics

Principles	Impacts	Tools Used
Ridership Growth	• Impact 1 – change in ridership • Impact 2 – change in automobile vehicle kilometres travelled	FAST Model
Simplicity (Customer Experience)	• Impact 3 – change in customer experience • Impact 4 – change in travel time	Qualitative Analysis and FAST model
Affordability and Equity	• Impact 5– changes in average fare by customer segment • Impact 6 – change in employment accessibility	FAST model
Fiscal Sustainability	• Impact 7 – annual change in revenue	FAST model
Future Ready	• Impact 8 – Future Network Impacts	FAST Model

All analysis in the Strategic Case (except for Impact 8) is presented using the FAST model and the 2019 transportation network and demand levels.

Role of the Strategic Case at the IBC Stage

This Strategic Case explores a range of quantitative and qualitative evidence across the five key principles established by Metrolinx, transit systems, and the Province. This analysis applies these principles within the broader Metrolinx business case framework to enable decision makers to understand the benefits, impacts, and trade-offs of fare integration.

This Strategic Case has been conducted at a high-level using key metrics that readily compare and contrast the variations to aid in identifying key principles and ideas for consideration in future studies. It is anticipated that if a Preliminary Design Business Case is conducted, additional detailed analysis will be included for each of the principles.

Ridership Growth

Overview

This principle is focused on understanding how fare structures impact transit ridership and overall travel in the Greater Toronto and Hamilton Area (GTHA) and adjacent communities. Two key impacts have been assessed to compare the four variations:

- Impact 1 – change in ridership by market
- Impact 2 – change in automobile vehicle kilometres travelled

Impact 1 - Change in Ridership

Fare Integration has the potential to grow ridership by 25,000 to over 42,000 new transit trips per day, without any systems losing boardings.

Impact Overview

This impact focuses on understanding how fare integration can grow ridership across the region. It focuses on comparing variations based on:

- The quantity of net new riders that switch to transit based on changes to the fare structure
- The travel 'markets' or geographies (example: within a municipality, between municipalities) that see changes in transit ridership

This impact is included in the IBC to enable decision makers to compare potential ridership gains between variations as a key consideration for Fare Integration.

Impact Analysis

This impact is measured using two metrics:

- Change in ridership by geography
- Change in boardings by agency

Both metrics were estimated using the FAST model based on the pricing assumptions outlined in Chapter 3.

Ridership by Geography

Figure 4-1 and **Table 4-2** show the sum of all transit trips across all operators serving a given geography, including:

- Trips within a single geography (municipal boundary) – the trip starts and ends in one municipality
- Trips between geographies (the trip begins and ends in different municipalities)

Each geography outlined in the table is inclusive of all services operated within the geography – for example: Toronto would include all trips that begin or end in Toronto inclusive of using the TTC or GO Transit or both. However, trips that begin or end outside of Toronto are not included. Cross-boundary trips between geographies are included in the figure as follows: GGH to/from Downtown Toronto, GGH to/from Toronto outside the core, and trips between GGH community (excluding Toronto).

Figure 4-1: Net Change in Daily Trips by Geography

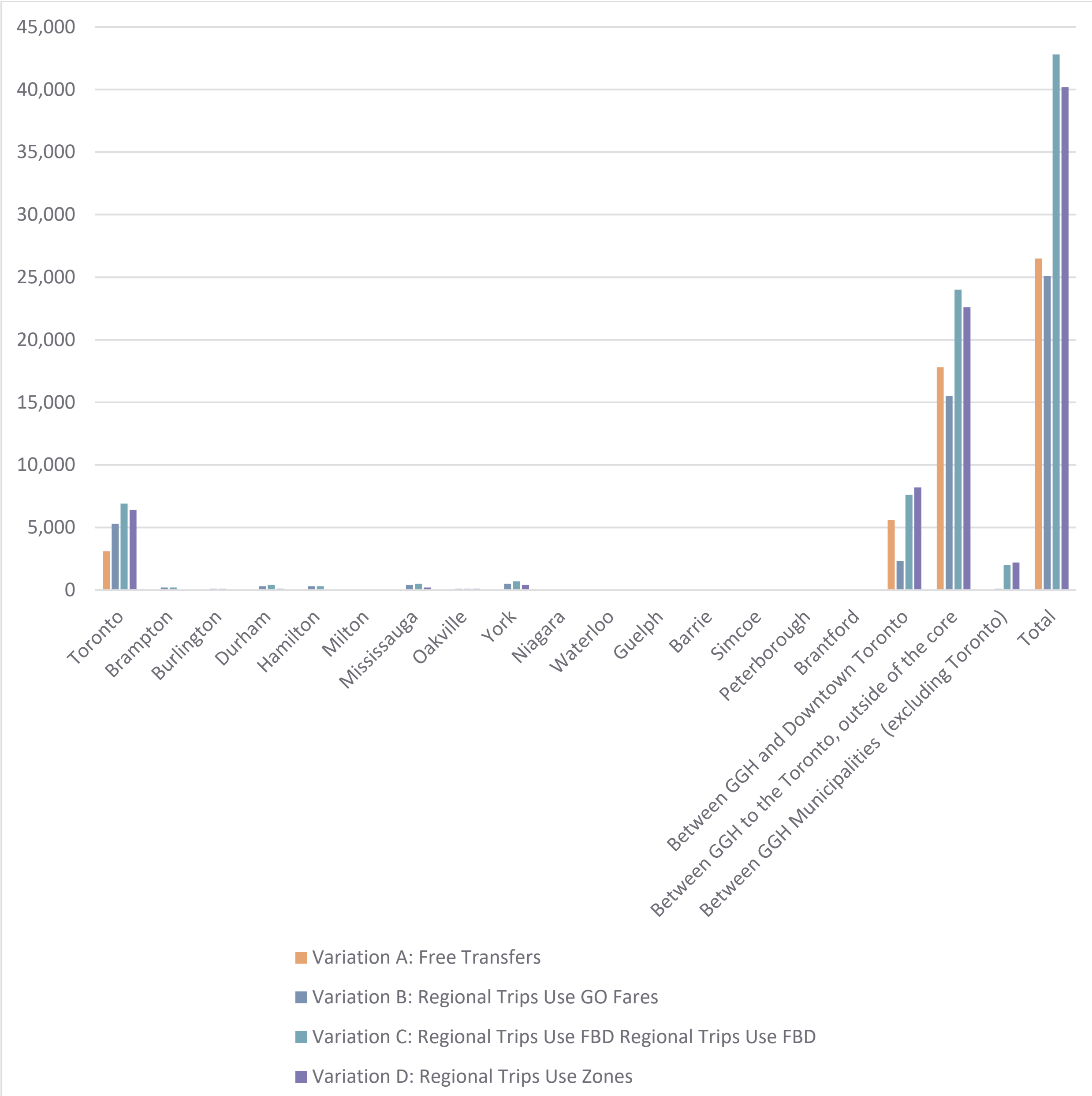


Table 4-2: Net New Ridership Impacts by Geography (Absolute and Relative)

	BAU	Variation A: Free Transfers	Variation B: Regional Trips Use GO Fares	Variation C: Regional Trips Use FBD Regional Trips Use FBD	Variation D: Regional Trips Use Zones	Variation A: Free Transfers	Variation B: Regional Trips Use GO Fares	Variation C: Regional Trips Use FBD Regional Trips Use FBD	Variation D: Regional Trips Use Zones
Toronto	1,304,000	3,100	5,300	6,900	6,400	0.2%	0.4%	0.5%	0.5%
Brampton	31,900	0	200	200	0	0.0%	0.6%	0.6%	0.0%
Burlington	5,600	0	100	100	0	0.0%	1.8%	1.8%	0.0%
Durham	28,200	0	300	400	100	0.0%	1.1%	1.4%	0.4%
Hamilton	63,700	0	300	300	0	0.0%	0.5%	0.5%	0.0%
Milton	1,500	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Mississauga	54,900	0	400	500	200	0.0%	0.7%	0.9%	0.4%
Oakville	6,700	0	100	100	100	0.0%	1.5%	1.5%	1.5%
York	41,800	0	500	700	400	0.0%	1.2%	1.7%	1.0%
Niagara	8,000	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Waterloo	24,000	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Guelph	5,000	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Barrie	2,000	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Simcoe	<100	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Peterborough	1,000	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Brantford	2,000	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Between GGH and Downtown Toronto	215,600	5,600	2,300	7,600	8,200	2.6%	1.1%	3.5%	3.8%
Between GGH to the Toronto outside of the Core	142,600	17,800	15,500	24,000	22,600	12.5%	10.9%	16.8%	15.8%
Between GGH Municipalities (excluding Toronto)	39,400	0	100	2,000	2,200	0.0%	0.3%	5.1%	5.6%
Total	1,977,900	26,500	25,100	42,800	40,200	1.3%	1.3%	2.2%	2.0%

Figure 4-1 and **Table 4-2** notes that:

- Each variation generates net new transit ridership (shift from automobile)
- There are some new trips in Toronto (based on TTC+GO free transfer and in B/C/D the lower GO Base fare), this is a net improvement compared to the results from the initial shortlisted options.
- There are some (minimal) gains in municipalities outside of Toronto based on the lower GO base fare for Variations B, C, and D.
- Addressing issues 1 and 2 generates ~25,000 new trips per day (included in all options).
- Variations C/D generate an additional ~15,000 trips per day by addressing issue 3 with a new GO Fare structure that does not increase any traveller's fare. This means that under the consistent price curves in these variations (either fare by distance in C or zones in D) many station-pairs see a fare decrease (typically 10-15% on average), which leads to higher ridership. By addressing all three issues, Variations C/D generate an additional ~35,000 trips per day in total. These additional trips are unlikely to be generated by an inherent feature of the structures used in C and D (fare by distance and zones) – rather they are driven by the station pairs that see a 10-15% fare decrease. Similar ridership gains could be realized in A/B with a similar level of GO transit fare discount.

Combined this analysis suggests that:

- Under all variations, thousands of people switch to transit to make cross-boundary trips on multiple municipal systems, while others also make new trips using GO and TTC.
- The primary gains in ridership are for trips between the 'Toronto, outside of the core' (City of Toronto area roughly covering Scarborough, Etobicoke, York, East York, and North York) and the GGH. For all variations 50-70% of all new trips are in this market. This ridership gain is primarily on municipal systems.
- This increase in ridership – raging from 15,500 to 24,000 new trips per day on transit – primarily connects people travelling between non-downtown Toronto and Brampton, Mississauga, York Region, and Durham Region. This illustrates how benefits are shared across a large geography.
- There are also significant gains in ridership for trips wholly within Toronto (3,100 to 6,900 or 10-20% of all gains) who make use of the free-transfer between TTC and GO (all variations) and/or lower GO base fare (variations B-D).

Where are ridership gains in the study area?

Figure 4-2 to **Figure 4-5** illustrate the change in trip density for each variation. Trip density is used to illustrate how many trips start in a 'transportation analysis zone' (TAZ). An increase in density illustrates more trips being made on transit, while a decrease illustrates fewer trips being made on transit. Typically, a fare increase can result in trip density decrease, while a fare decrease may result in an increase in trip density. Combined, these figures note that:

- The benefits of fare integration are spread across the whole study area – including in key equity deserving areas
- There are some locations where tip density decreases – these include areas around Vaughan Metropolitan Centre subway station (Variations B-D) where some customers may pay a higher subway fare

Figure 4-2: Change in Trip Density by Traffic Analysis Zone – Variation A

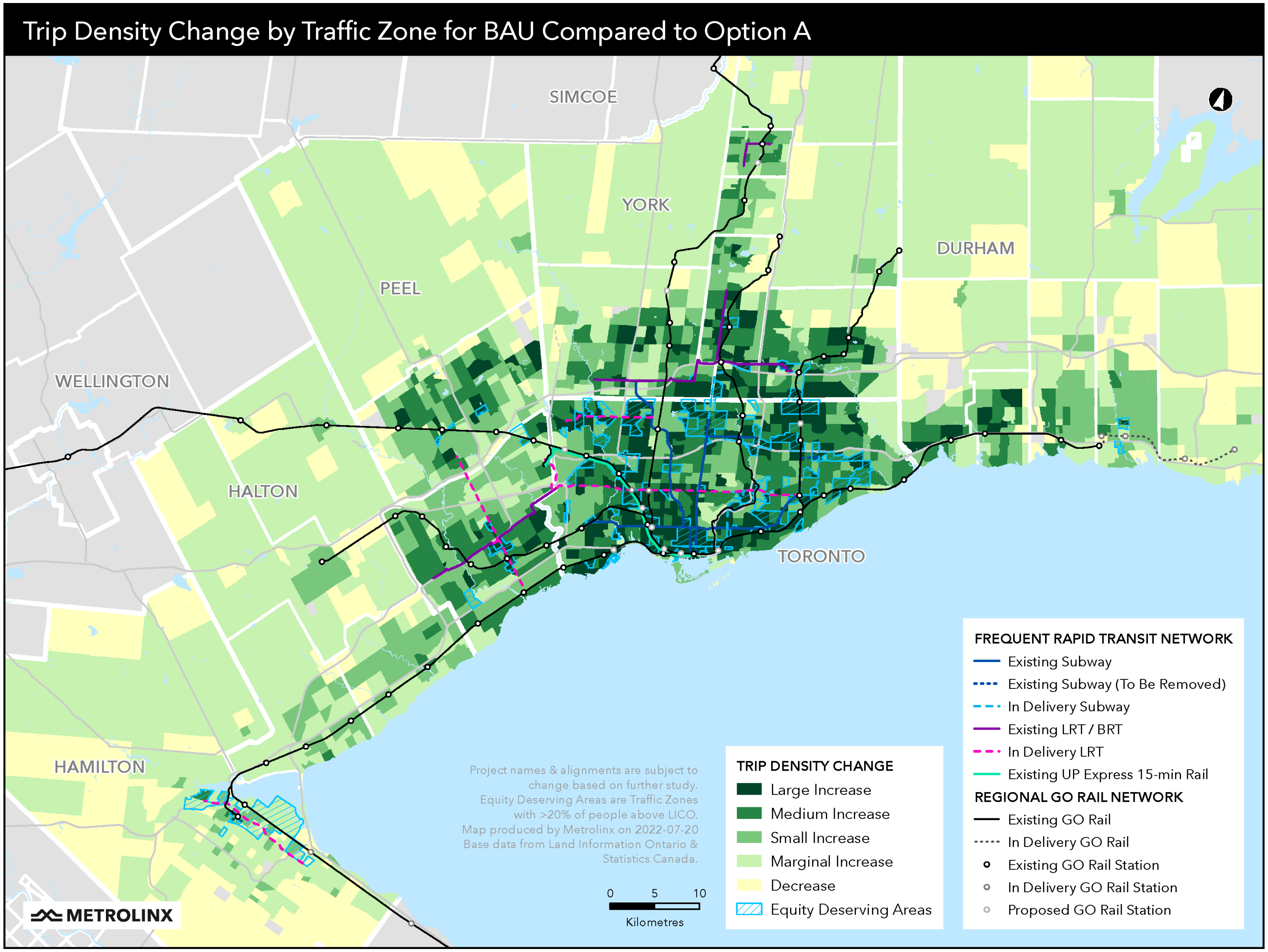


Figure 4-3: Change in Trip Density by Traffic Analysis Zone – Variation B

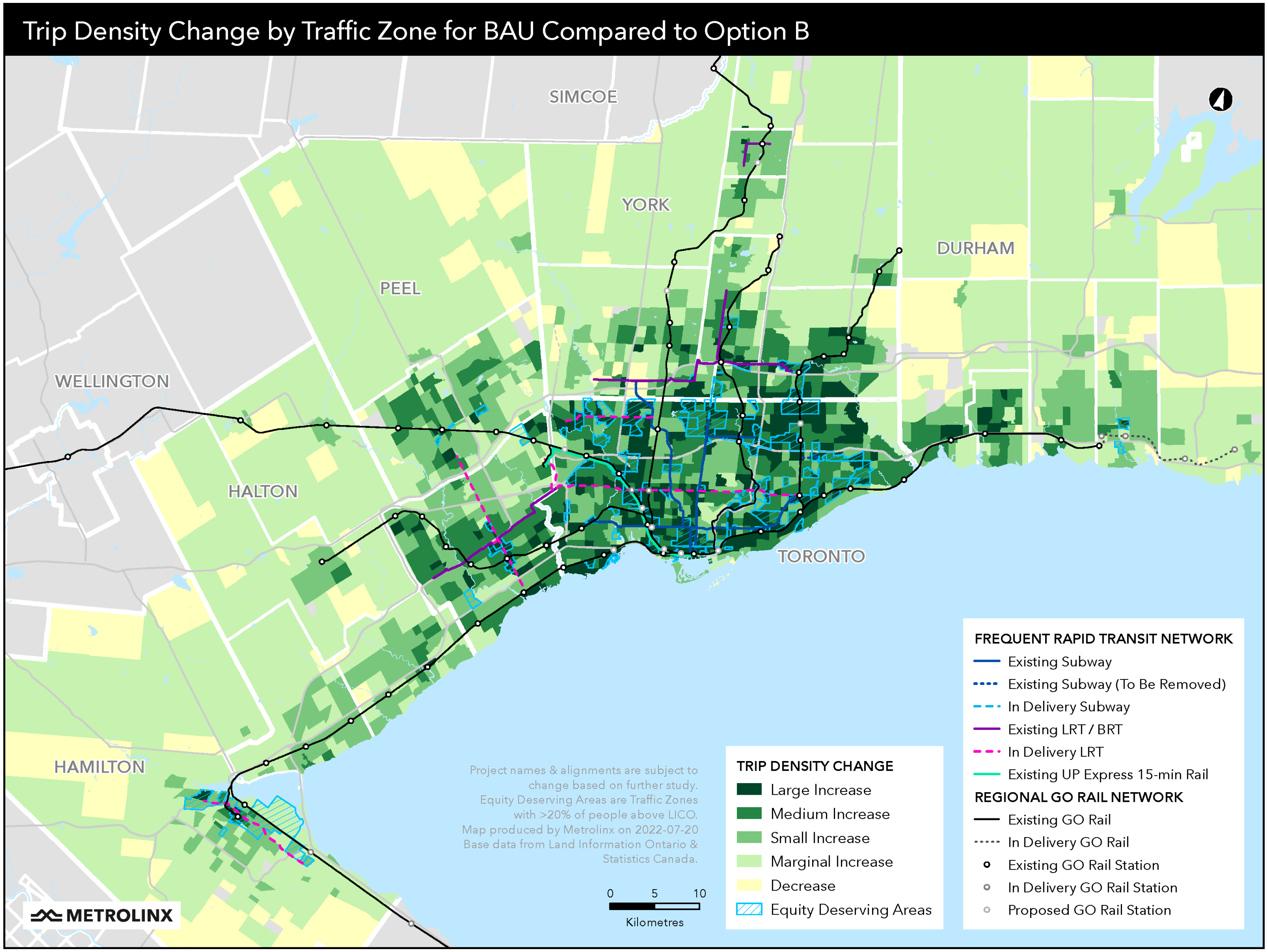


Figure 4-4: Change in Trip Density by Traffic Analysis Zone – Variation C

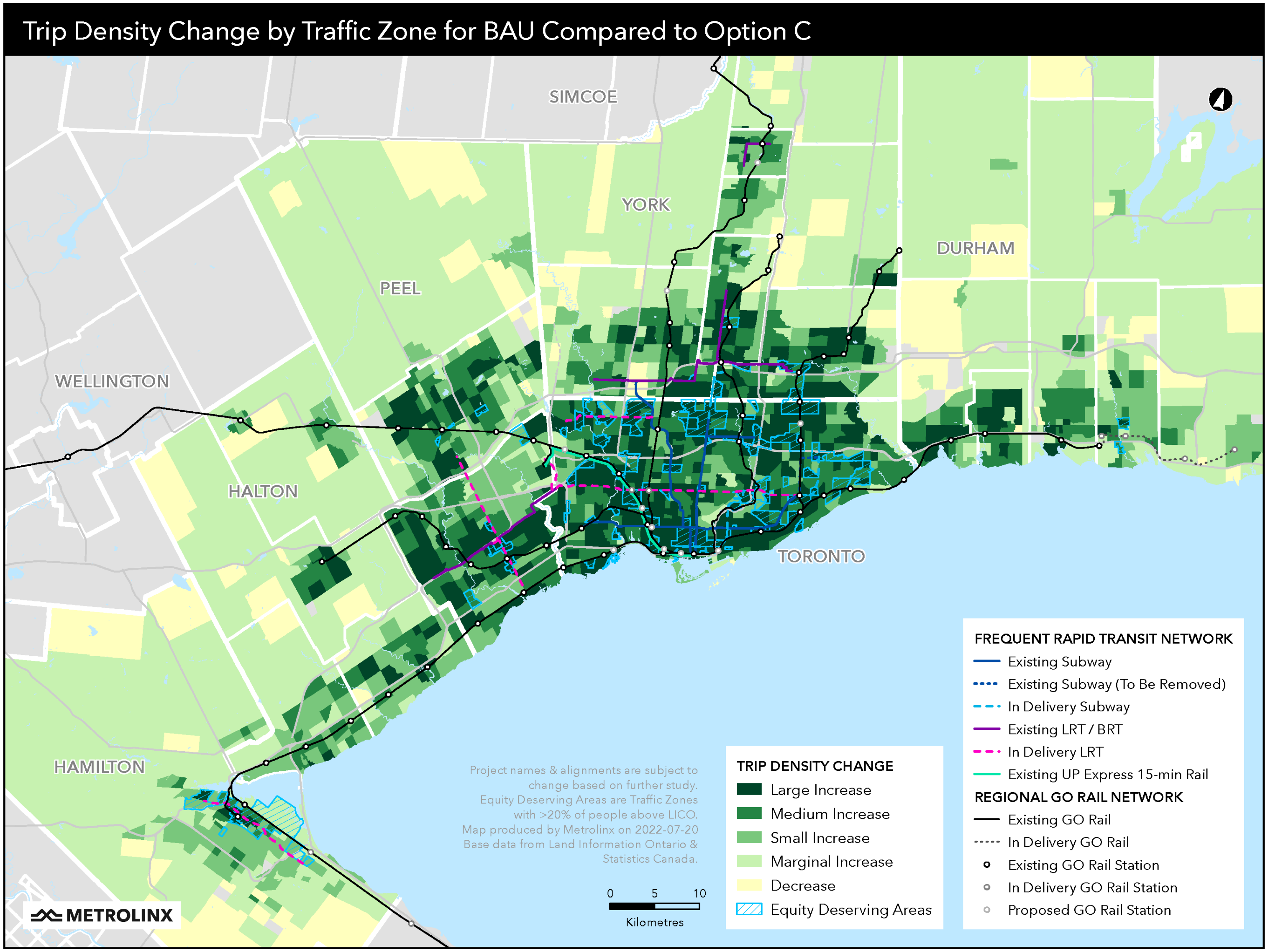
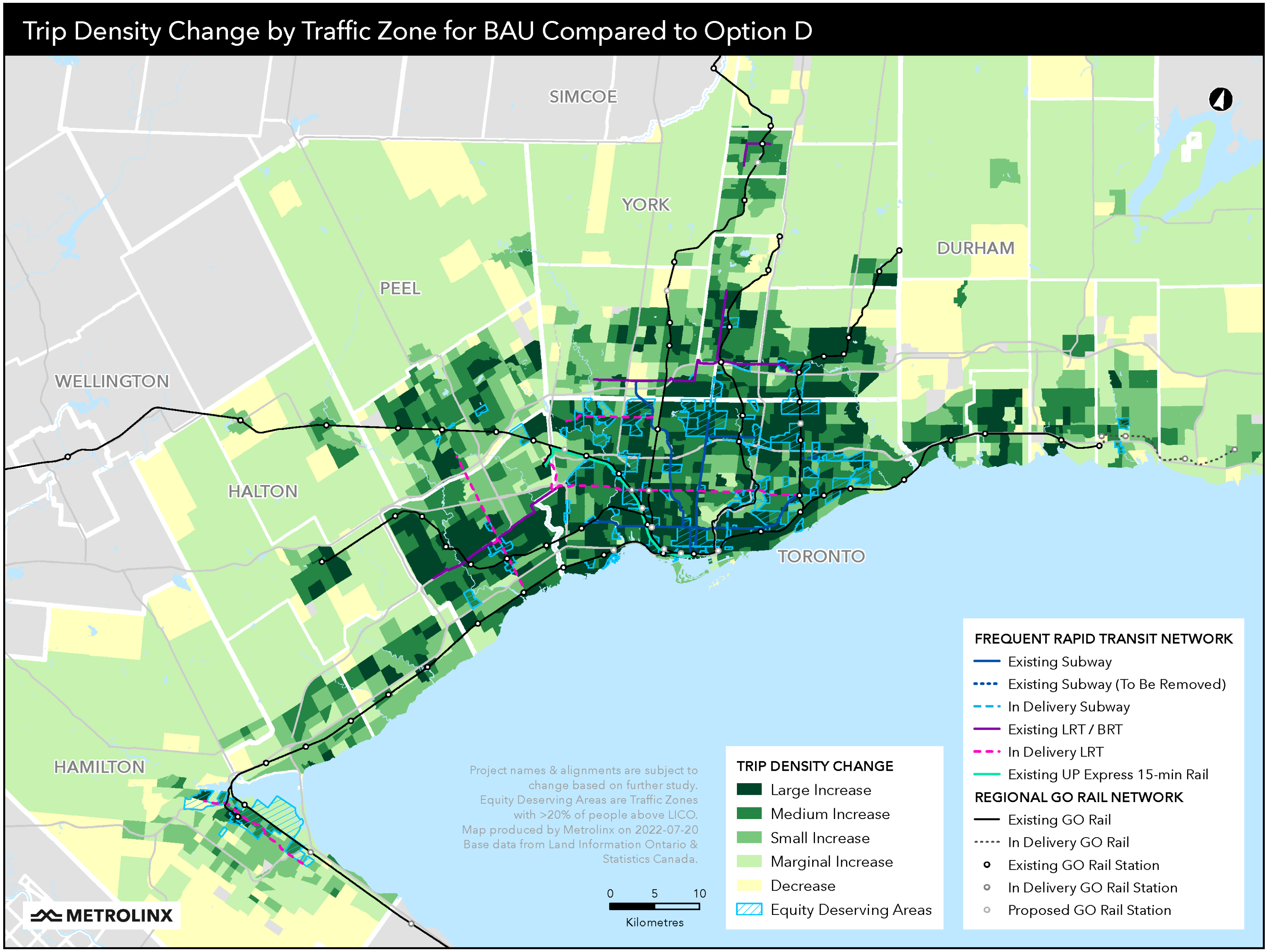


Figure 4-5: Change in Trip Density by Traffic Analysis Zone – Variation D

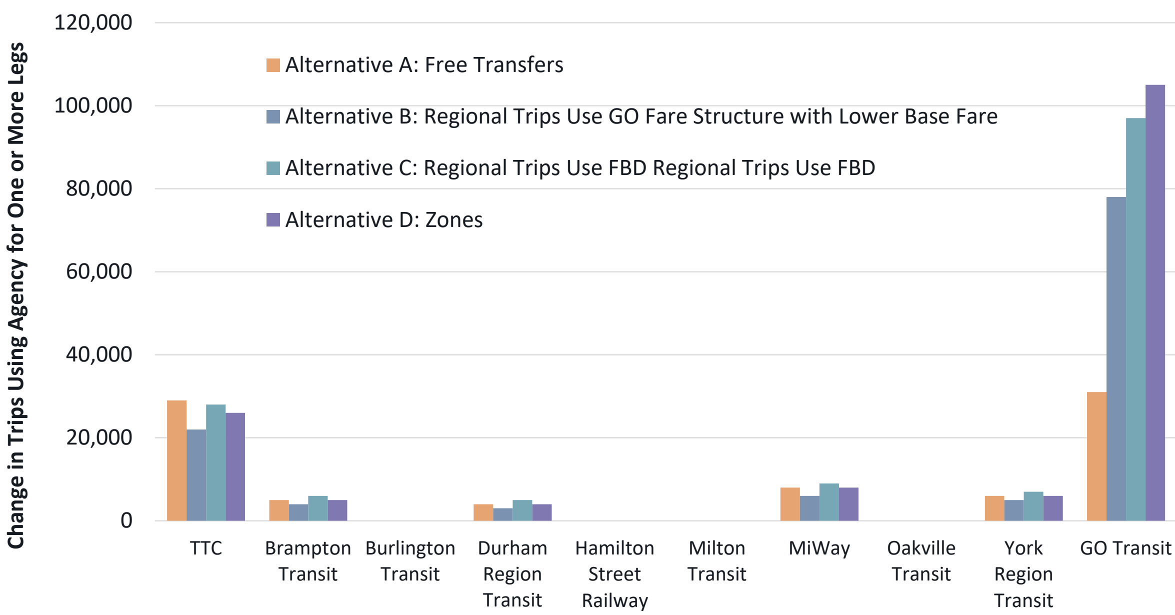


Change in Boardings by Agency

Figure 4-6 shows the change in boardings by agency in the Greater Toronto and Hamilton Area (note, there were no changes in boardings for agencies in the broader study area) – this is inclusive of the new trips discussed previously as well as changes in service usage by existing trips. Note some boardings captured in this figure occur on multiple systems – for example, a net new TTC boarding could also later use a GO Transit service.

Change in boardings by agency will not sum to change in ridership discussed in previous figures. Change in ridership is the 'net change' in total daily trips using transit across all modes within a geographic area. It includes all trips that used to use other modes, such as private auto, and switch to transit due to the fare structure change. Change in boardings reflects the net change in number of times a customer uses each system. One trip could include multiple boardings (for example: a trips using TTC and GO would count for both TTC and GO).

Figure 4-6: Change in daily boardings by Agency



Initial modelling analysis suggests that no systems will see a loss in boardings. TTC and neighbouring systems are anticipated to see increased boardings (measured as one or more legs of a trip using the operator) due to the removal of double fares in all variants. TTC will also see an increase in boardings in all variants due to the removal of the GO and TTC double fare.

GO Transit will see a significant increase in boardings that are associated with: the reduced double fares (solving issue 1, all variations), lowering the base fare (solving issue 2, Variations B-D); and broader changes to the GO Fare structure, resulting in many trips paying less (solving issue 3, Variation C-D).

In the Case for Change (chapter 2) potential new trips using GO Transit were estimated to be:

- 90,000 to 140,000 trips per day that could use GO Transit, that are supressed due to either the high GO Transit shore distance fare or the double fare.
- Variation A suggests that up to 31,000 of these trips are realized through removing the double fare.
- Variations B-D unlock an expanded number of new GO Transit trips each day, ranging from 80,000 to 120,000, suggesting this market potential is largely realized by these variations.
- Variation A has fewer boardings because under all cases the subway is cheaper than GO (the GO base fare is not lower and subway is not brought into the regional structure as per Variations C-D)

Impact 1 - Key Findings

Variation performance for impact 1 is summarized in **Table 4-3**.

Table 4-3: Regional Ridership Impact Summary

Metric	Variation A – Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Overall Change in Ridership (Change in total transit trips)	+26,500 (8.1 million trips a year, 1.4% increase)	+25,000 (8 million trips a year, 1.3% increase)	+41,000 (12.9 million trips a year, 2.2% increase)	+39,000 (12.3 million trips a year, 2.1% increase)
Change in Boardings by Agency				
Brampton Transit	5,000	4,000	6,000	5,000
Burlington Transit	-	-	-	-
Durham Region Transit	4,000	3,000	5,000	4,000
GO Transit	31,000	78,000	97,000	105,000
Hamilton Street Railway	-	-	-	-
Milton Transit	-	-	-	-
MiWay	8,000	6,000	9,000	8,000
Oakville Transit	-	-	-	-
TTC	29,000	22,000	28,000	26,000

York Region Transit	6,000	5,000	7,000	6,000

The analysis in Table 4-3 identifies the following variation specific findings:

- The variations have comparable boarding gains for most transit systems, with the exceptions being TTC and GO Transit.
- Variation A has higher TTC boarding increases (~30% higher than Variation B) because the pricing structure makes trips using a 905 system and the TTC subway much less expensive than GO Rail (due to the reduced double fare).
- Variations B, C, and D have more GO Transit boardings compared to A due to the lower base fare (B, C and D). In addition, C and D have higher boardings than A because they offer reductions to GO Transit fares, roughly 10-15% on average due to the fare standardization process.

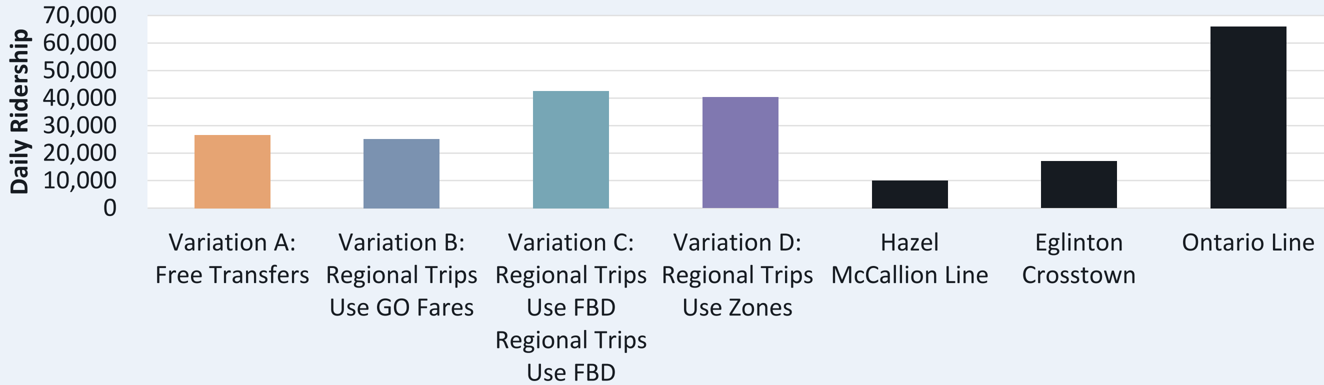
Combined, the preceding analysis notes that fare integration is likely to have a significant positive impact on ridership in the region:

- All variations can grow ridership across the study area – with benefits concentrated on trips between Toronto and surrounding communities.
- As per the variation refinement process, no variation results in a loss in ridership in any geography, with each variation generating net new transit ridership (shift from automobile). The primary gains in ridership are for trips between Toronto and the rest of the GGH, with some new trips in Toronto (based on the TTC and GO free transfer across all variations and for Variations B, C, and D the lower GO Base fare), this is a net improvement compared to the initial shortlisted options. Additionally, there are some (minimal) gains in municipalities outside of Toronto based on the lower GO base fare.

Benchmarking Ridership Gains

Fare Integration Variations could generate net new ridership that exceeds some in-delivery rapid transit projects. Unlike most transit infrastructure, the net increase in ridership (1.3% to 2.2%) is distributed across the region. **Figure 4-7** compares net new ridership between each fare integration Variation and other major transit projects underdevelopment in the GTHA.

Figure 4-7: Comparing Net New Daily Ridership between FI and Other Major Projects



Impact 2 – Reducing Vehicle Kilometres Travelled

Fare Integration could reduce automobile vehicle kilometres travelled by 145 to 240 million per year – this means fewer cars on the road, resulting in decongestion and 800,000 to 1.4 million hours of time saved for drivers, alongside reduced collisions, and reduced emissions.

Impact Overview

This impact focuses on two key considerations for transportation policy:

- Reducing congestion on roadways, which can result in time saved by travellers who choose to drive.
- Reducing the negative externalities of automobile use by reducing the amount of vehicle kilometres travelled (VKT) on the region's road network.

Fare Integration influences demand for automobile usage, and therefore VKT, by changing prices for transit. As discussed in Impact 1, Fare Integration can grow transit ridership, which means a corresponding reduction in auto use and VKT. This impact compares how each variation changes auto demand (measured by VKT) and the ensuing range of external benefits.

This impact can be used by decision makers to understand how fare integration benefits expand beyond transit – including benefit drivers and the region as a whole.

Impact Analysis

A set of four metrics were assessed for this impact:

- Change in auto VKT and auto demand – a FAST estimate for each variation (change in auto demand and VKT are default outputs from the model)
- Change in decongestion – estimated using change in VKT and an assumed decongestion rate of 0.01 hours saved per auto VKT removed during the peak period
- Change in collisions – estimated using historic rates of collisions per auto VKT
- Change in energy and emissions for transportation – estimated using historic emission rates in the region

Impact 2 – Key Findings

A summary of each Variation's performance is outlined in **Table 4-4**. These impacts are presented across the study area, future business case analysis (such as a Preliminary Design Business Case) may present local VKT impacts.

Table 4-4: Impact 2 – Performance Assessment

Metric	Variation A – Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D – Regional Trips Use Zones
Change in Auto VKT per year	-240,000,000	-140,000,000	-240,000,000	-145,000,000
Change in auto trips per day	-19,000	-19,000	-34,000	-30,000
Decongestion (hours of travel time saved by drivers per year)	-1,440,000	-840,000	-1,440,000	-870,000
Change in Collisions (reduction in collisions over 10 years)	-180	-110	-180	-110
Change in Energy Used by Automobiles (reduction in litres of fuel consumed per year)	-13,000	-7,000	-13,000	-8,000
Change in Emissions (reduction in tonnes of GHG Emissions per year)	-6,500,000	-3,800,000	-6,500,000	-3,900,000

Overall, fare integration has the potential to reduce auto VKT travelled by 140 million to 240 million kilometres per year. This means fewer cars on the road, resulting in reduced congestion and time saved for drivers (up to 1.4 million hours saved per year) and reduced collisions and emissions on the road network.

The following findings were drawn **Table 4-4** to aid in comparing the variations:

- Variations A and C have the highest VKT reduction and associated benefits
- Variation B and D have lower VKT reduction and associated benefits due to the types of trips attracted from automobile.
- Variation B has lower VKT change than other variations because it attracts fewer long distance subway trips (compared to A, where all subway trips have a flat fare) and it offers fewer fare decreases for GO Transit (compared to C and D).
- Variation D has a lower auto VKT reduction than Variation C.

Why does Variation D have lower auto VKT reduction than C?

Today, GO Fares are inconsistent with respect to distance. Each fare is based on the stations used. Each station fits into a GO fare zone. As a result, two trips of the same distance (example: 15 km) that use different station pairs will have different prices.

Both variations C and D change the GO fare structure and generate similar ridership – however because of the way prices are set relative to the existing structure hey have different vkt change.

This is because a zone fare structure moves in steps (example: fare goes up $1.70 every 10 km) instead of slopes (fares increase per km). This means some trips will be more expensive with zones than with fare by distance. As a result, each alternative attracts different trips to GO, and Variation C ends up with longer auto trips switching to GO and a higher VKT reduction.

Simplicity and Customer Experience

Overview

This criterion is focused on understanding how fare structures impact the fare payment experience, as well as how customers interact with the transit network. Two impacts have been considered in this IBC:

- Impact 3 – Change in Customer Experience
- Impact 4 – Change in Transit Travel Time

Impact 3 – Change in Customer Experience

Fare Integration presents the opportunity to improve customer experience by reducing the number of rules a customer must understand, but it can also increase the complexity of customer experience by adding onerous or challenging new fare rules.

Impact Overview

This impact assesses the potential customer experience impacts of fare integration using qualitative analysis. Distinct from the fare paid, the fares experience analyses how customers travel through the network. For this analysis, customer experience considers the entire journey a customer may make, including:

- Complexity of fare structure; and
- How customers pay for their trip and board and alight from transit.

This impact can be used by decision makers to understand the specific changes to customer experience for each variation and how to study these changes in subsequent planning exercises.

Limitations of Current Customer Analysis

The work presented under impact 3 is intended to illustrate potential impacts based on 'what changes' under each variation. The value customers assign to these changes (is it negative or positive? Is it simpler or more cumbersome?) will be reviewed in greater detail following the IBC. The goal of this IBC is to illustrate potential impacts, while future work will be used to draw conclusions on customer experience (see Chapter 2)

Impact Analysis

Table 4-5 summarizes the customer experience for each mode by the changes per option. Option A has relatively no changes for the journey experience, while Options B and C would require a tap-off for subway trips. To determine fares for Options B and C, customers would only need to look up their fares in advance of "non-regular trips", or those that would cross more zones or travel longer distances than their typical daily journeys. All options benefit from free transfers between modes, where only the highest fare is paid for their trip.

Table 4-5: Consideration 3 – Customer Experience Summary

Metric	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D- Regional Trips Use Zones
How customers access information about their fares	**What changes?** • Customers no longer need to look up multiple fares for trips involving the TTC and other systems – they only need to know their first fare **What remains the same?** • All other fares remain unchanged	**What changes?** • Customers no longer need to look up multiple fares for trips involving the TTC and other systems – they only need to know their first fare • Subway trips between York Region and Toronto >10 km have a fare change to use 'distance fares' and may require new information to learn their fare **What remains the same?** • All other fares remain unchanged	**What changes?** • Customers no longer need to look up multiple fares for trips involving the TTC and other systems – they only need to know their first fare • Subway trips between York Region and Toronto >10 km have a fare change to use 'distance fares' and may require new information to learn their fare • All GO Transit fares are moved to fare by distance **What remains the same?** • All other fares remain unchanged	**What changes?** • Customers no longer need to look up multiple fares for trips involving the TTC and other systems – they only need to know their first fare • Subway trips between York Region and Toronto >10 km have a fare change to use 'distance fares' and may require new information to learn their fare • All GO Transit fares are moved to zones **What remains the same?** • All other fares remain unchanged
How customers pay for their trip (board and alight)	**What changes?** • No changes **What remains the same?** • 905 bus: tap on, flat fare • TTC bus: tap on, flat fare • TTC subway: tap on, flat fare • GO bus/rail: tap on and off, GO zone fares	**What changes?** • Subway trips may require tap on and tap off **What remains the same?** • 905 bus: tap on, flat fare • TTC bus: tap on, flat fare • GO bus/rail: tap on and off, GO zone fares	**What changes?** • Subway trips require tap on and tap off **What remains the same?** • 905 bus: tap on, flat fare • TTC bus: tap on, flat fare • GO bus/rail: tap on and off, GO zone fares	**What changes?** • Subway trips require tap on and tap off **What remains the same?** • 905 bus: tap on, flat fare • TTC bus: tap on, flat fare • GO bus/rail: tap on and off, GO zone fares
Overall Impact	**Minor – no major changes**	**Moderate – changes to experience for select customers**	**Major – changes for most customers in the region**	**Major – changes for most customers in the region**

Customer Segment Analysis

Customer segments were identified in chapter 2 to explore how different structures may benefit or impact key customer types. These segments were identified in collaboration with municipal transit systems. A set of personas was created for these segments to aid in interpreting potential customer impacts. Table 4-8 explores how these segments are impacted by the variations.

Table 4-6: Customer Impacts by Persona

Persona	What are the benefits of Variation A?	Are there incremental benefits of B-D?
Short trips (Krystina)	Krystina no longer needs to take the car for trips crossing municipal boundaries because the remaining double fares are eliminated. Her short trips cost the same – whether within or outside of her municipality. She has the freedom to make her trips without worrying about crossing lines on a map. However, short trips on GO Transit still cost more.	Krystina's short trips across municipal boundaries benefit from the elimination of double fares and short trips on GO Transit are now also an option for her at the same price.
Long trips (Munir)	Double fares used to mean that it was cheaper to drive from Toronto to his parent's house in the suburbs where parking is free. Now, with the elimination of double fares, transit is a price-competitive choice.	
Commuters (Beverly)	Beverly still takes the subway downtown instead of the faster GO train because it remains more expensive compared to her walking to the subway.	Beverly no longer must take the long ride on the subway downtown because the GO train is now cost-competitive. As a result, she can choose to take the fastest mode without penalty.
Cross-boundary trips (Wei)	Wei decided to stay with his employer in Mississauga after all since he no longer must pay a double fare to get to work.	
Low-income (Henry)	Henry still must pay an extra fare to take the subway after his trip on the GO Train, so he continues to walk to school.	Henry pays an integrated fare for GO Transit and the subway which makes it cost-competitive for him to ride the whole way to school. He no longer must take long walks from the GO train.
Specialized transit (Michelle)	It is still inconvenient to transfer between specialized transit services, but at least it no longer costs twice as much.	

Impact 3 Key Findings

The preceding analysis highlights the following considerations for future fare structure development:

- The following types of trips will not see a change in experience – trips on a single system within a single municipality, trips using two 905 systems
- Variations A and B will not impact the GO customer experience, while C and D will require customers to learn a new structure
- All variations may improve customer experience between 905-TTC and TTC-GO by removing double fares, which may be a generally 'more simple' fare structure to understand
- Variations B-D will impact customer experience for travellers using TTC subway – under both structures a new fare structure will need to be learned for some trips, and all customers will likely need to tap-off when exiting a subway[3]
- These variations will also require customers to tap on to the subway if accessing it from a bus that is currently used as a free body transfer

Future Customer Analysis

This IBC used a simple set of customer metrics to explore potential impacts to customer experience.

Further analysis is planned for subsequent stages that will consider direct customer research to understand:

- Impact of fare structure change on comprehension and likeliness to use transit; and
- Impact of payment, boarding, and alighting experience change on likeliness to use transit

These impacts should be considered as a starting point for further development and do not constitute a complete assessment of customer impacts.

[3] Further research is required to explore alternative approaches to including distance/zone fares on the TTC subway for regional trips (trips >10km that begin and end in different cities). The current assumption is a network wide tap-off is required.

Impact 4 – Change in Customer Travel Time

Fare Integration can enable customers to choose faster and more convenient modes that may be currently unaffordable – this could result in 2.7 million to up to 9 million hours of time saved per year by transit travellers.

Impact Overview

This impact assesses how fare integration can encourage mode-shift to modes with an overall lower travel time – inclusive of in-vehicle time, waiting time, and reliability. Travel time is a key determinant of a customer's likelihood to use transit and strong proxy for their overall experience using transit.

Time savings are achieved when a change in fare structure makes transit more affordable, for example:

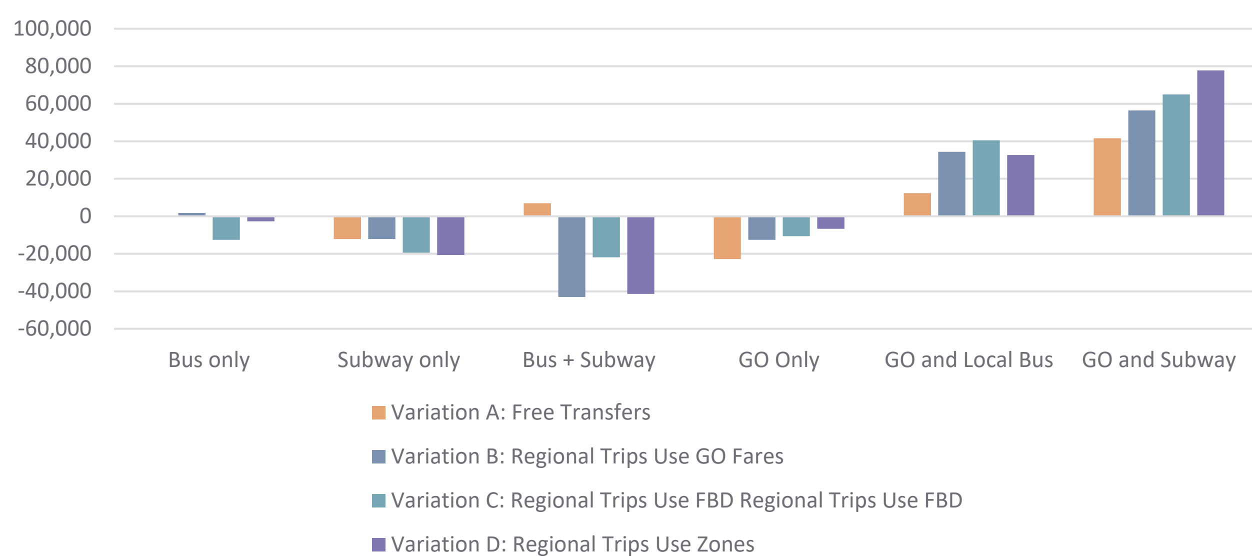
- Reducing short distance GO Transit fares and double fares can encourage use of GO individually or as part of a multimodal trip, which may be faster in some instances.
- Reducing double fares that allow customers to use two modes, which may be faster than using a single mode.

This impact can be used by decision makers to understand how fare integration benefits travellers on a day-to-day basis.

Impact Analysis

The FAST model was used to conduct this analysis. Variations lead to shifts in mode choice across the region, including a significant increase in trips using systems and GO together. **Figure 4-8** shows the sum of all transit boardings across all operators. Combined with **Table 4-5**, illustrates how customers gain access to faster travel and time savings.

Figure 4-8: Change in trips by mode combination



As noted in Impact 1, no agency will see a decrease in total boardings, rather customers will use local routes and the subway alongside the GO Transit network where it is faster or more convenient and take advantage of the new fares. All variations lead to increased use of the combination of GO and Transit system trips; the free transfer (in all variations) leads to 54,000 new trips per day using GO and municipal services together, while the $3.25 base fare for 10 kilometers (Variations B, C, and D) and broader changes to the GO fare structure (Variations C and D) can add an additional 35,000 to 50,000 trips per day (approximately a combined 90,000 to 115,000 trips per day total for B, C and D).

Impact 4 – Key Findings

Table 4-7 outlines the change in travel time realized by customers shifting modes. As discussed in **Table 4-9**, the fare structures all shift demand that used to just use municipal transit (bus, subway, streetcar, etc) to also use GO Transit for some or all of their trip. These customers who shift tend to do so to realize a travel time benefit, which has been estimated across all trips in the study area.

Table 4-7: Change in Travel Time on Transit

Metric	Variation A – Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Annual Transit Travel Time Savings (Hours)	2.7 million	6.3 million	7 million	9 million

The following analysis should be considered when interpreting **Table 4-7**:

- Variation A causes some trips to shift from GO Transit to Bus and Subway as the free transfer leads to a lower fare than GO Rail, this leads to some slower trips.
- Variation A has higher TTC boarding increases (~30% higher than Variation B) because the pricing structure makes trips using a 905 system and the TTC subway much less expensive than GO Rail (due to the reduced double fare).
- Variation C has additional benefits compared to B due to fare decreases for longer distance trips that switch from transit or other modes.
- Variation D has the highest benefits as it offers lower fares for medium distance trips ‘within a single fare zone’, leading to more mode shift to GO Transit where it is a faster mode.

Affordability and Equity

Overview

This strategic criterion is focused on how Fare Integration can make transit more affordable. However, it also considers how changes to fares can impact equity policies – including impacts to equity deserving communities (which are visualized in the benefit analysis below). This criterion helps decision makers understand how fares can benefit transit users while also identifying key issues to mitigate if fare integration proceeds to further development.

Equity is a key requirement for the implementation of any future fare structure. Any variations carried forward for further analysis needs to be complemented by additional programs to ensure fares are affordable for riders across the region.

The impacts identified in this IBC can be used to understand the scale of potential equity impacts and then be used to inform equity program development.

Two impacts are included in this analysis:

- Impact 5– changes in average fare by customer segment
- Impact 6 – change in employment accessibility

Impact 5 – Changes in Average Fare by Customer Segment

Fare integration could result in 280,000 to 500,000 trips paying a lower fare each day.

Impact Overview

This impact explores change in average fare for a range of traveller types. Average fare changes were organized into three categories:

- Trips paying >5% more
- Trips paying >5% less
- Trips paying roughly the same (between a decrease of 5% or less and an increase of 5% or less)

This impact can be used by decision makers to understand who pays more, who pays less, and by how much. This analysis aids in understanding the case for integration, the impacts of the price points used in this IBC, and potential mitigation measures required if fare integration is advanced.

Impact Analysis

The FAST model provides granular detail on the number of people who will pay more or less. These details are crucial to understanding local impacts of regional fare structure changes. Additional spatial analysis was also done to examine local equity deserving areas and the changes in trips and fares from these home locations. This includes two types of analysis:

- Equity analysis
- Customer segment analysis

Overall Affordability Impacts

Table 4-8 illustrates the affordability of each variation at a high-level, with subsequent analysis providing a deep dive into specific customers.

Table 4-8: Affordability by Variation for All Customers

Variations	Trips Paying >5% More		**Trips Paying >5% Less**		**Trips with a minimal change (-5% to +5 %)**	
Variation A Free Transfers	0%	-	14.20%	280,000	85.8%	1,680,000
Variation B Regional Trips Use GO Fare Structure with Lower Base Fare	1.40%	27,000	15.3%	296,000	83.5%	1,640,000
Variation C Regional Trips Use FBD	0.60%	11,000	25.20%	500,000	74.2%	1,470,000
Variation D Zones	1.50%	29,000	24.60%	490,000	73.9%	1,460,000

Table 4-8 notes that:

- Addressing Issues 1/2 (all variations) results in 280,000 to 296,000 trips paying less
- Changing the GO Fare structure to address issue 3 (C/D) results in an additional ~200,000 trips having a lower fare (480,000 to 500,000 total)

Figure 4-9 to **Figure 4-12** show the percent of population who will experience a 10% or greater decrease of fares compared to today's BAU fares. In addition, **Figure 4-13** to **Figure 4-15** show the percent of the population who will experience a 10% or greater increase of fares compared to today's BAU fares.

Who pays more in B, C, and D?

Travellers who drive or walk to the subway and make a trip between Toronto and York Region that is longer than 10 km may have a fare increase in variations B, C, and D

If they use the subway today, these trips use a TTC Fare – variations B, C, and D bring these trips into a regional fare structure based on distance travelled so some trips may see a fare increase on the subway.

The highest fare for a long-distance subway trip between York Region and Toronto is approximately the same as the existing double fare. This results in these customers paying the same price as they do today if they use TTC and YRT together.

Variation D (zones) results in some trips paying more because short trips over a zone boundary may see a fare increase compared to today's GO Fare structure

Figure 4-9: Percent of Trips per Traffic Zone with a Fare Decrease >10% – Variation A

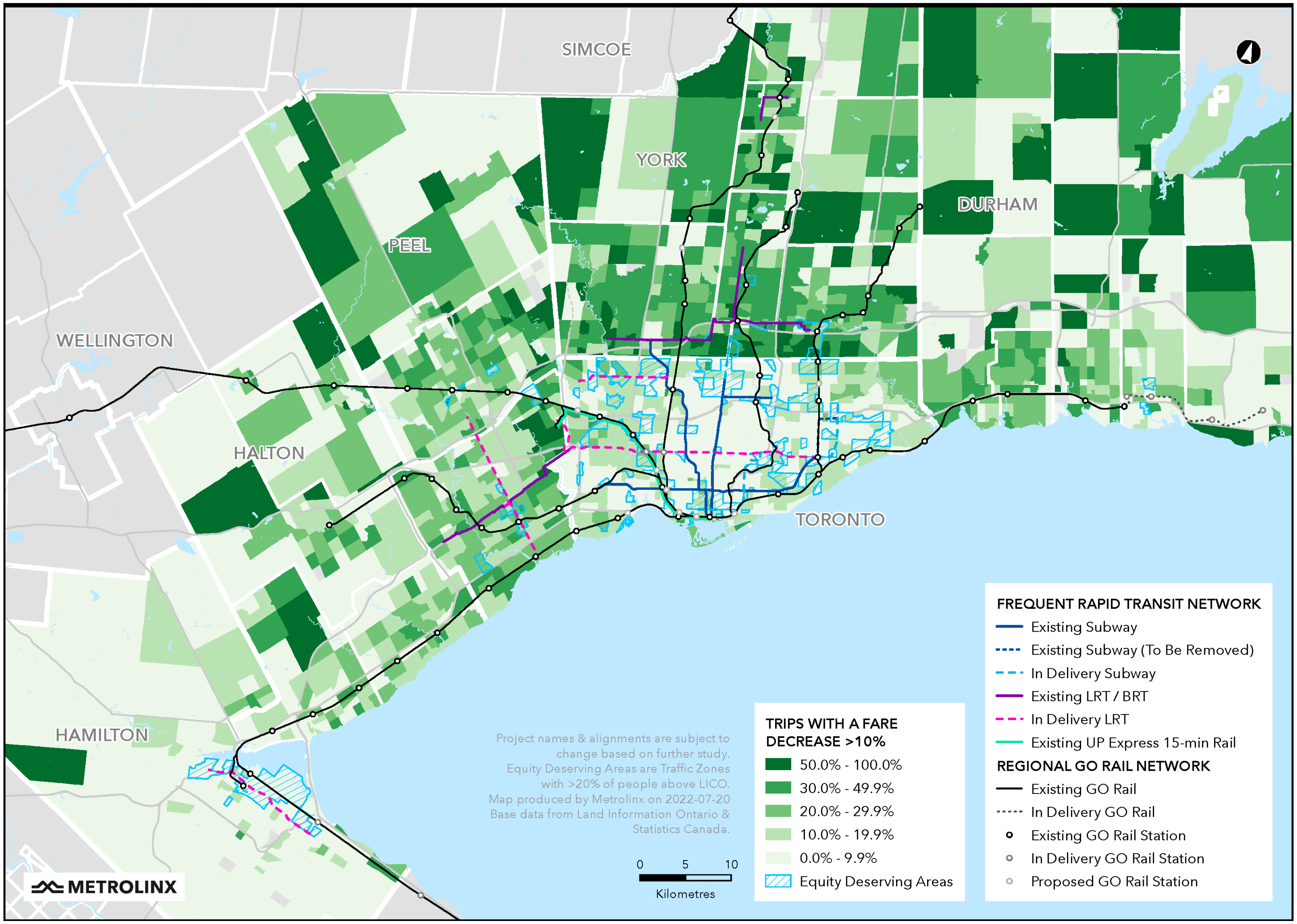


Figure 4-10: Percent of Trips per Traffic Zone with a Fare Decrease >10% – Variation B

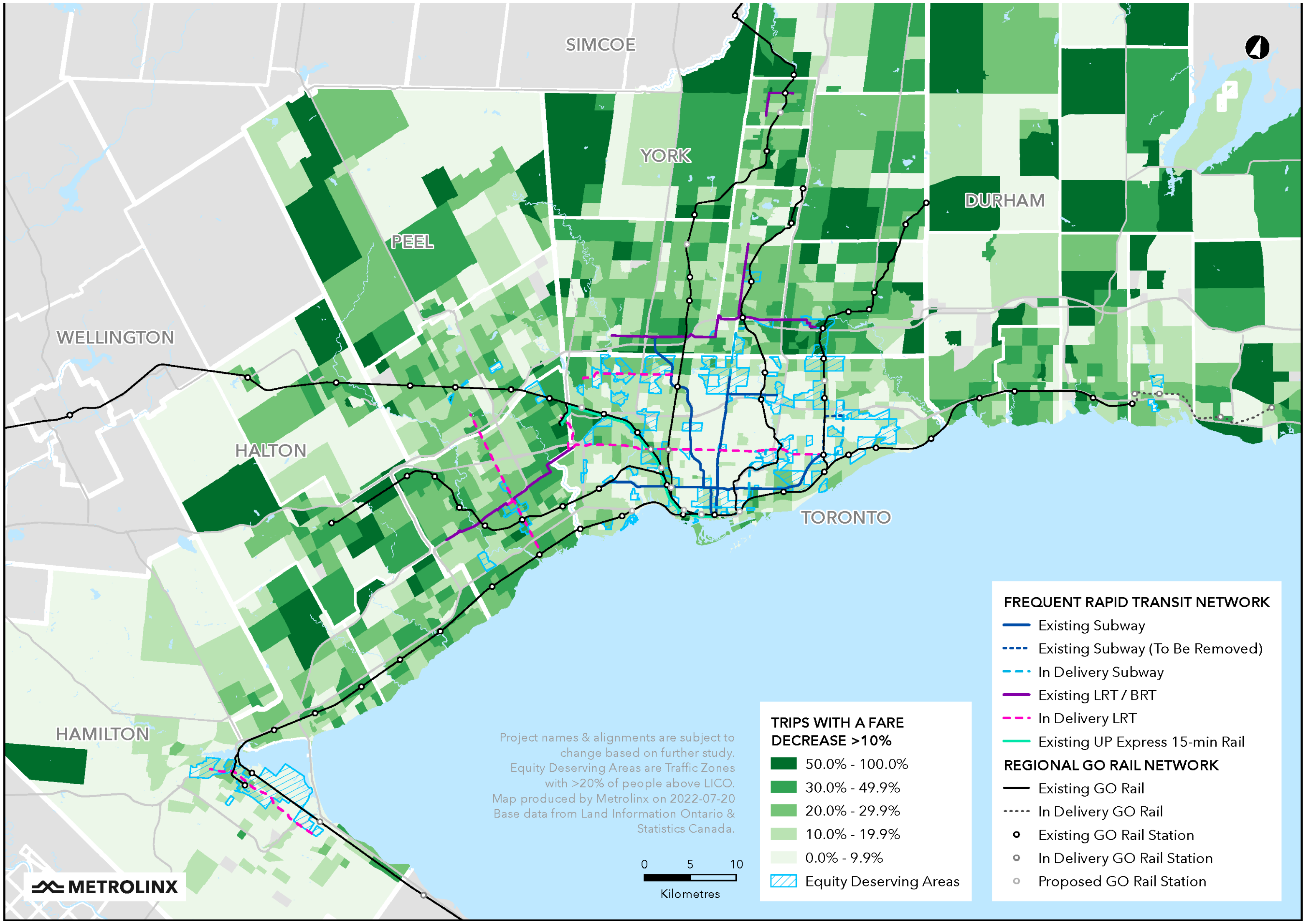


Figure 4-11: Percent of Trips per Traffic Zone with a Fare Decrease >10% – Variation C

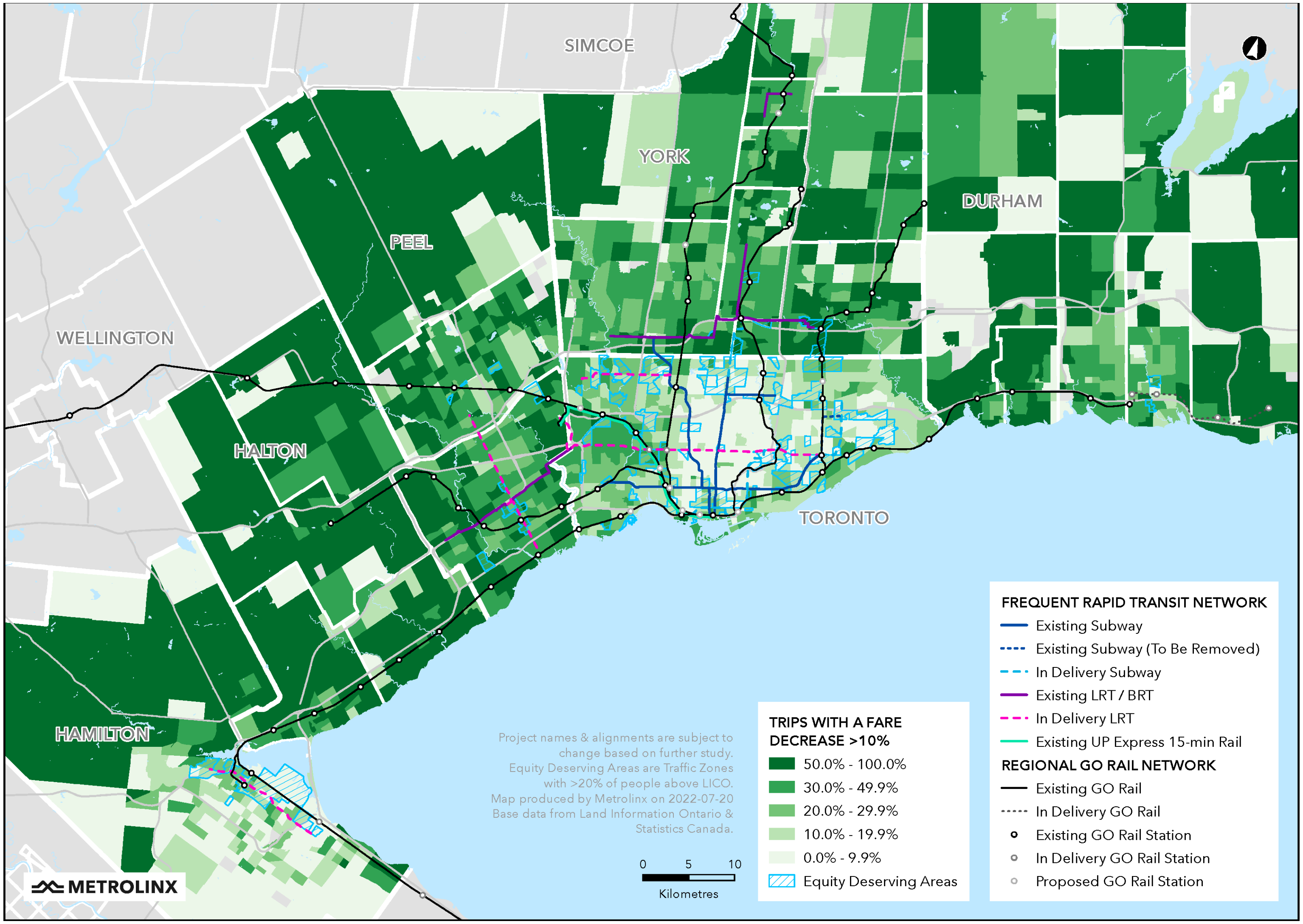


Figure 4-12: Percent of Trips per Traffic Zone with a Fare Decrease >10% – Variation D

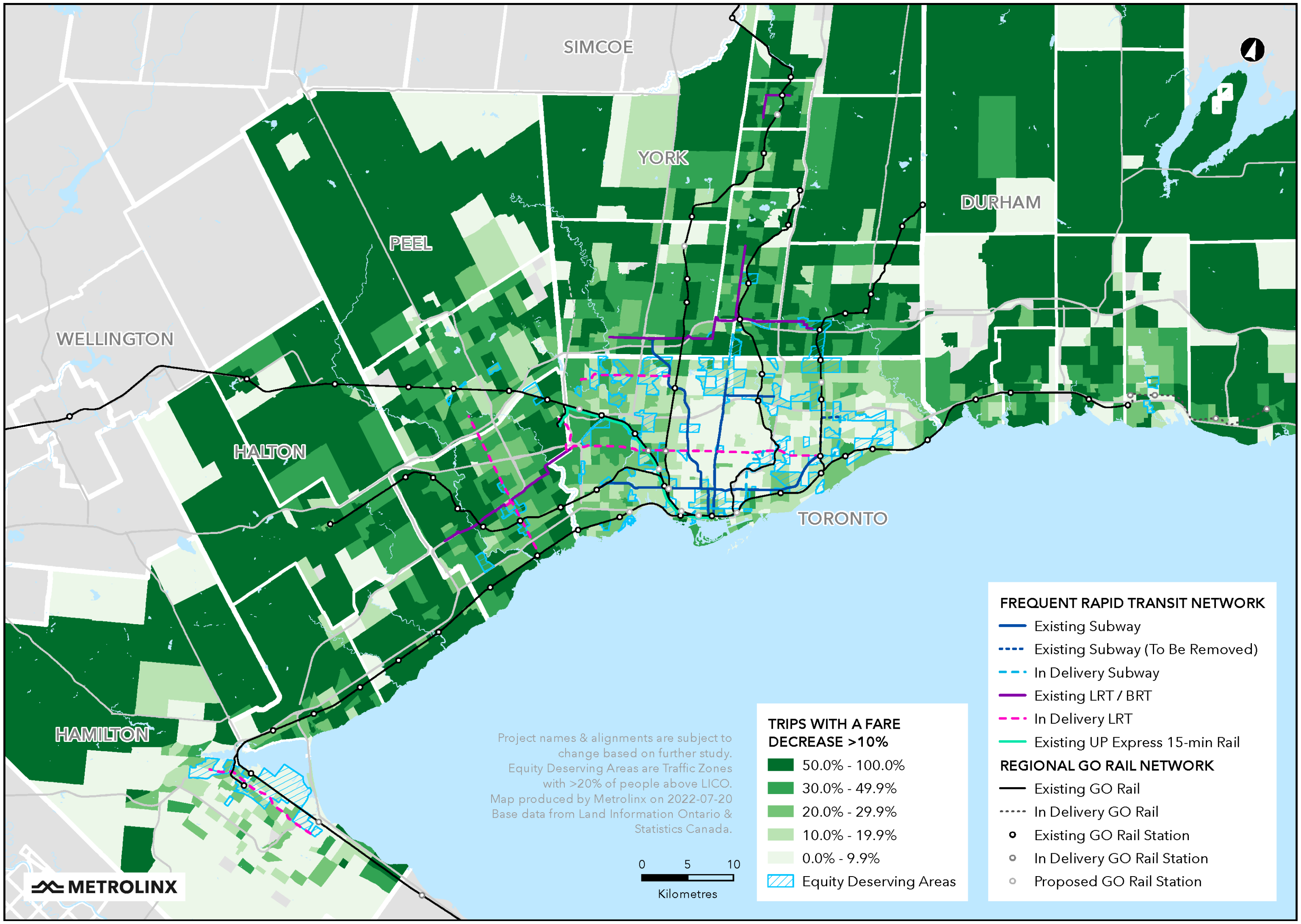


Figure 4-13: Percent of Trips per Traffic Zone with a Fare Increase >10% – Variation B

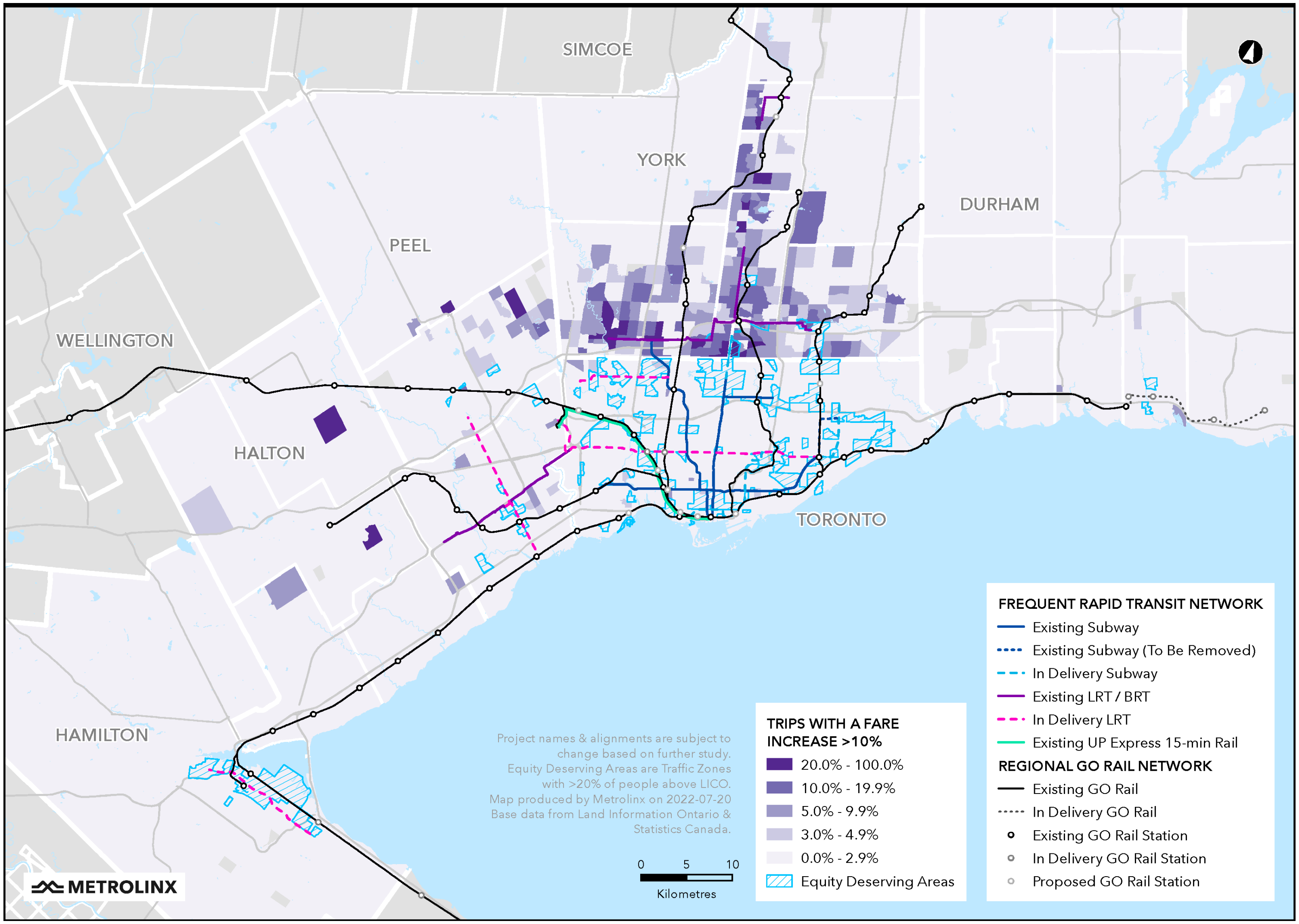


Figure 4-14: Percent of Trips per Traffic Zone with a Fare Increase >10% – Variation C

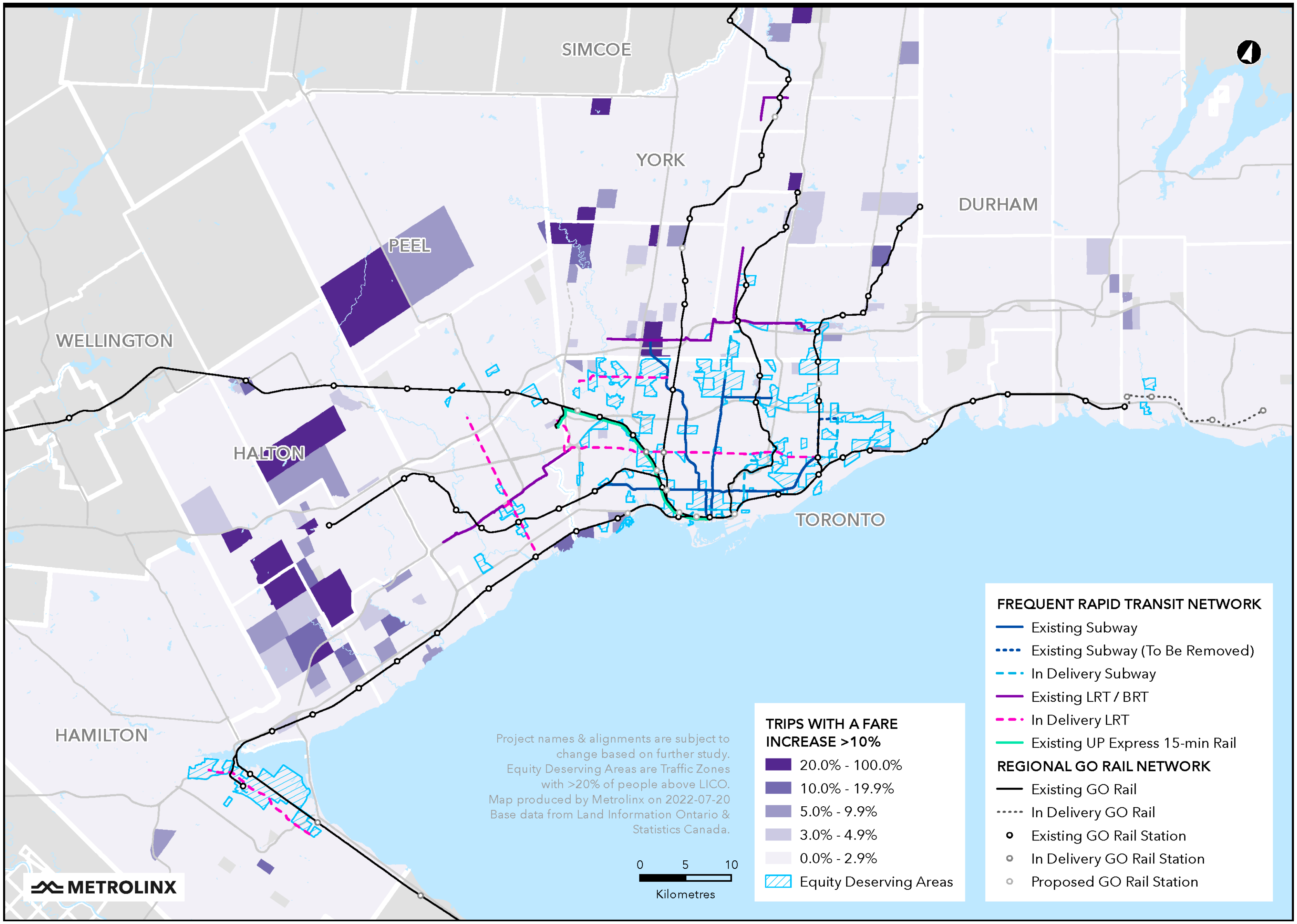
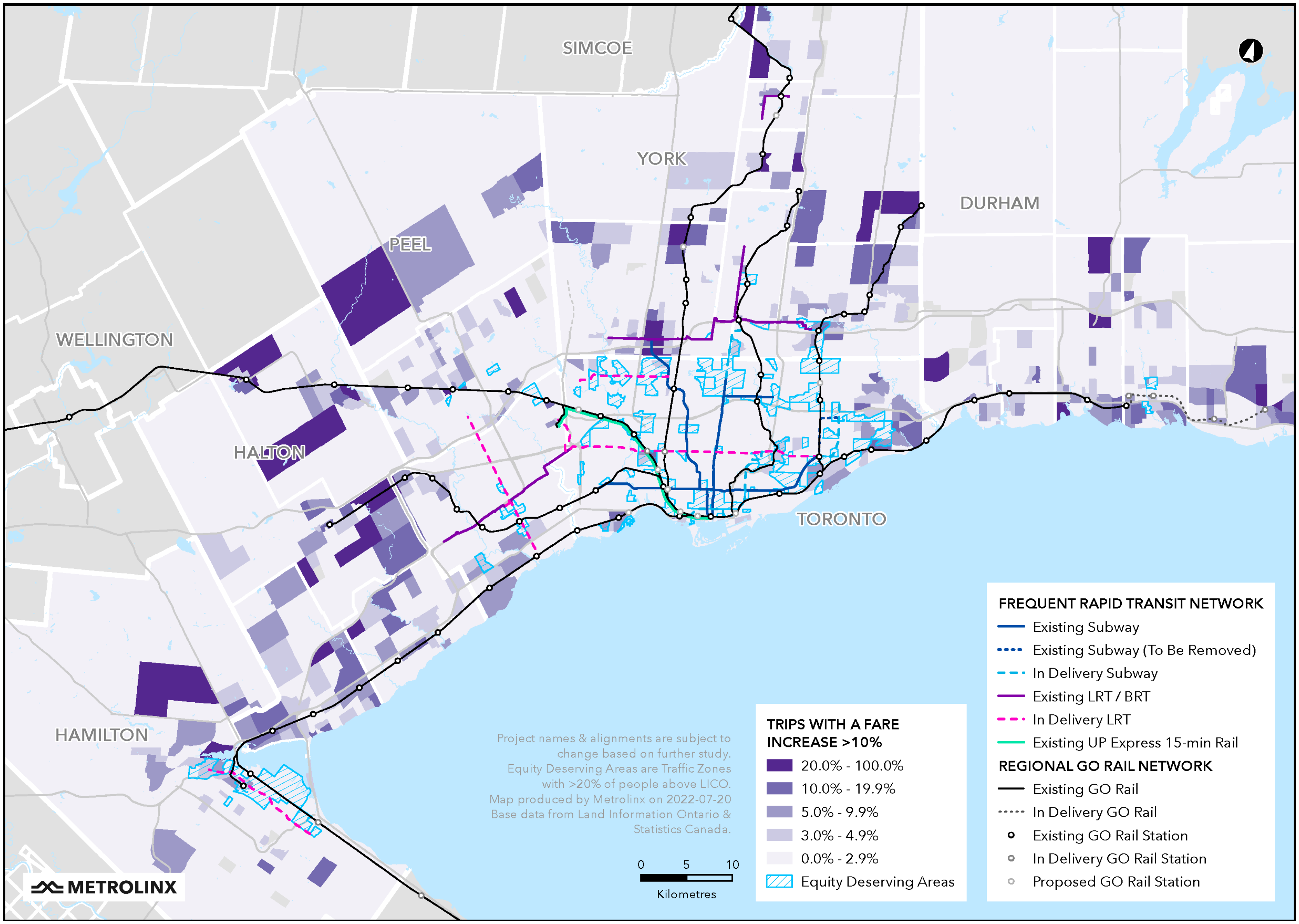


Figure 4-15: Percent of Trips per Traffic Zone with a Fare Increase >10% – Variation D



Equity Impacts

As reported in the Metrolinx 2041 Regional Plan, despite improvements since the recession of 2008, poverty is becoming increasingly common in the GTHA. In Toronto, for example, the proportion of seniors living in poverty increased from 10.5% in 2011 to 12.1% in 2014. In 2011, more than one-third of all households and 43% of renters spent more than 30% of their income on housing, a common marker of affordability. Low-income households ten to depend more on transit, but are also more likely to live in areas with poor access to frequent rapid transit, which can limit access to employment opportunities, healthcare, education and other services.

Figure 4-16 shows "Equity Deserving Areas" which represent Traffic Analysis Zones where over 20% or more of the population is low-income, as defined by the Low-Income Cut-Off (LICO) threshold determined by Statistics Canada for the 2016 Census. These are communities that face barriers to equal access, opportunities, and resources due to disadvantage and discrimination, and actively seek social justice and reparation. The background yellow-pink shows the same data by gradient of low-income per Census Dissemination Areas (DAs). Trips that originate from home locations within the blue outlined Equity Deserving Areas were used as a basis to understand potential impacts of fare structures on travel behaviour and fare cost changes. The increase or decrease in fares paid is the fare before products, concessions, or additional programs are applied.

The potential equity impacts for each variation are as follows:

- Variation A – no increases in fares, removed double fares may benefit some equity communities.
- Variation B – same as A, however, some subway trips between Toronto and York Region may see a fare increase (trips >10 km between Toronto and York Region).
- Variations C and D – same as B, however some GO Transit trips may see a 10-15% fare decrease, making GO more accessible for equity communities.

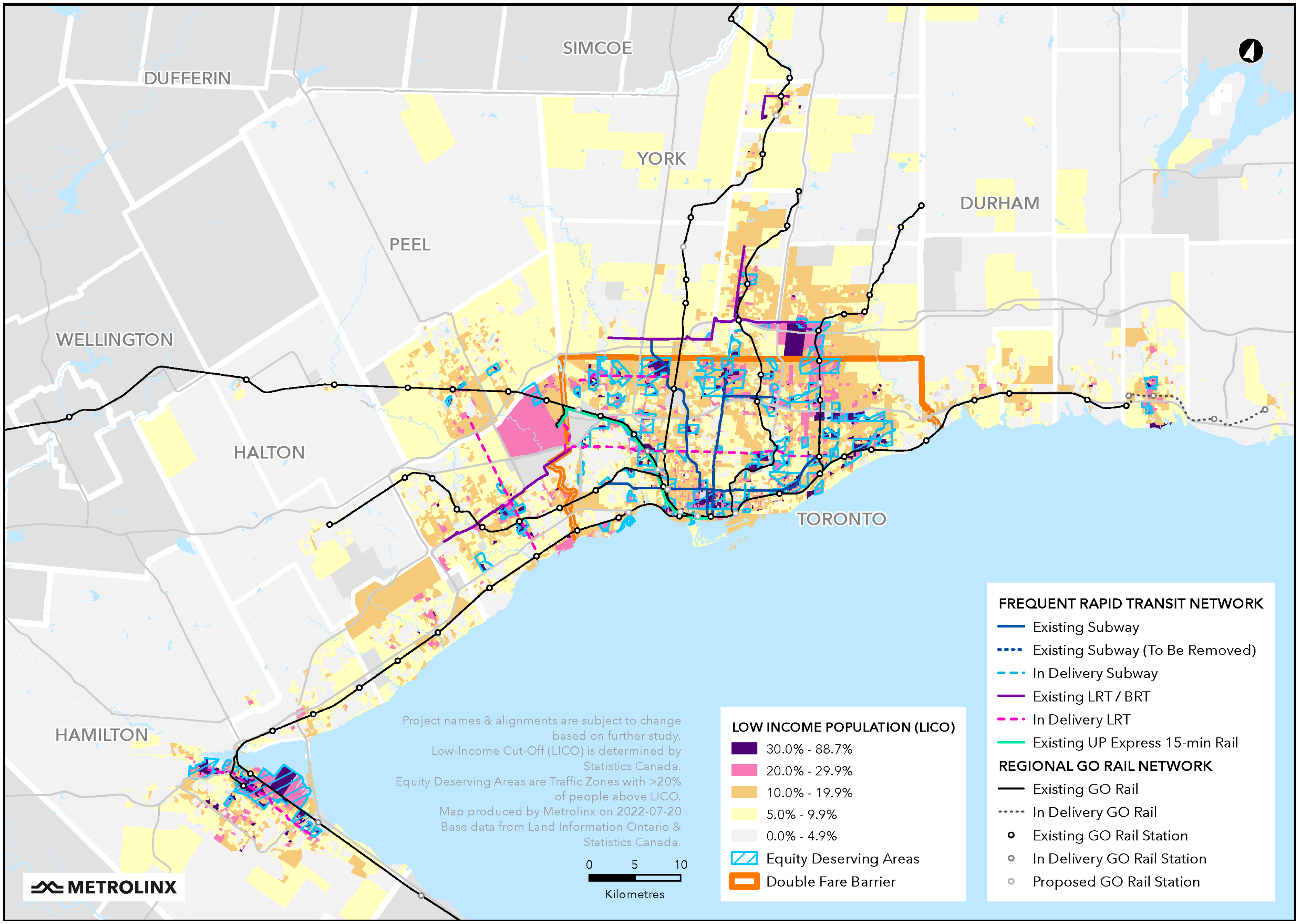
Impact 5 – Key Findings

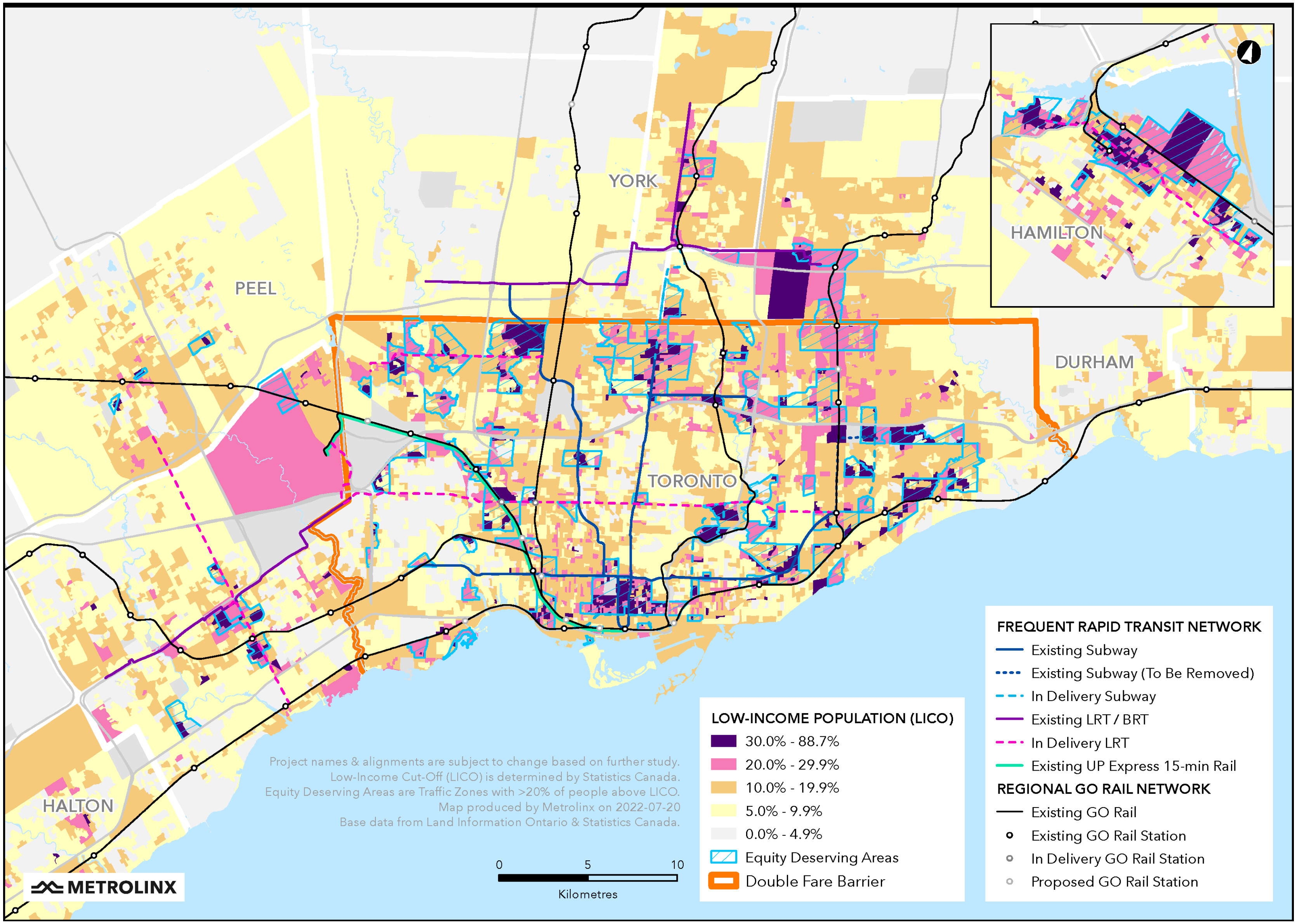
Table 4-9 outlines the specific findings for different traveller types discussed under impact 5. To complement the persona analysis in Table 4-8, additional customer segments identified in collaboration with the transit systems were analyzed including:

- All customers
- Multi-agency trips
- Short distance (0-10 km) trips
- Medium distance (10- 30 km) trips
- Long distance (30km+) trips
- Customers only using one agency

Each group was analyzed based on who pays more, who pays the same, and who pays less at a trip level based on origin and destination of trip, services used, fare paid in the BAU, and fare paid under each variation.

Figure 4-16: Low-Income Population & Equity Deserving Areas





YORK
PEEL
DURHAM
TORONTO
HALTON
HAMILTON
FREQUENT RAPID TRANSIT NETWORK
Existing Subway
Existing Subway (To Be Removed)
In Delivery Subway
Existing LRT / BRT
In Delivery LRT
Existing UP Express 15-min Rail
REGIONAL GO RAIL NETWORK
Existing GO Rail
Existing GO Rail Station
In Delivery GO Rail Station
Proposed GO Rail Station
LOW-INCOME POPULATION (LICO)
30.0% - 88.7%
20.0% - 29.9%
10.0% - 19.9%
5.0% - 9.9%
0.0% - 4.9%
Equity Deserving Areas
Double Fare Barrier
Project names & alignments are subject to change based on further study.
Low-Income Cut-Off (LICO) is determined by Statistics Canada.
Equity Deserving Areas are Traffic Zones with >20% of people above LICO.
Map produced by Metrolinx on 2022-07-20
Base data from Land Information Ontario & Statistics Canada.
0
5
10
Kilometres
METROLINX

Table 4-9: Fare Changes by Customer Type

Name	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Study Area Wide Results				
Trips Paying >5% More	0%	1.40%	0.60%	1.50%
	-	27,000	11,000	29,000
Trips Paying >5% Less	14.20%	15.30%	25.20%	24.60%
	280,000	296,000	500,000	490,000
Trips with a minimal change (-5% to +5 %)	85.80%	83.50%	74.20%	73.90%
	1,680,000	1,640,000	1,470,000	1,460,000
Average Fare Change	-6% with nobody paying more	-4.3% with 11x more people paying a lower fare than those paying higher fare	-9.4% with 40x more people paying a lower fare than those paying higher fare	-9.0% with 17x more people paying a lower fare than those paying higher fare
Low Income Trip Impact				
Trips Paying >5% More	0.0%	1.0%	0.4%	1.2%
Trips Paying >5% Less	11.3%	13.2%	18.1%	17.2%
Trips with a minimal change (-5% to +5 %)	88.7%	85.8%	81.5%	81.6%
Average Fare Change	-6% with nobody paying more	-11% with 130x more people paying a lower fare than those paying higher fare	-9% with 45x more people paying a lower fare than those paying higher fare	-8% with 14x more people paying a lower fare than those paying higher fare
Traveller Segment Analysis				
Multi-Agency Trips (TTC+905, TTC+GO), 905+905, 905+GO)	Free transfers reduces the cost of trips by -30% on average	Free transfers, flat GO fares (for 10 km) and a shift to regional fares for regional subway trips reduces fares by -25% on average	Free transfers and a shift to a new FBD curve for GO Transit and regional subway trips reduces fares by -37% on average	Free transfers and a shift to a new zonal structure for GO Transit and regional subway trips reduces fares by -33% on average
Short Distance Trips (0-10 km)	-1% to -2% fare decrease on average	-2% to -5% fare decrease on average, with 5-10km trips benefitting the most	-2% to -6% fare decrease on average, with 5-10km trips benefitting the most	-2% to -5% fare decrease on average, with 5-10km trips benefitting the most
Medium Distance Trips (10- 30 km)	-3% to -16% fare decrease on average, with 25-30 km trips benefiting the most	-5% to -7% fare decrease on average, with 25-30 km trips benefiting the most	-8% to -16% fare decrease on average, with 25-30 km trips benefiting the most	-6% to -14% fare decrease on average, with 25-30 km trips benefiting the most
Long Distance Trips (30 km +)	-11% to -18% fare decrease on average, with 40-50km trips benefitting the most	-5% to -7% fare decrease on average, with 30-40km trips benefitting the most	-16% to -20% fare decrease on average, with 30-40km trips benefitting the most	-11% to -18% fare decrease on average, with 30-40km trips benefitting the most
Customers who only use one Transit system (excluding GO)	0% change in fare	0% change in fare	0% change in fare	0% change in fare
Customers Who Only Use GO	0% change in fare	-3% change in average fare	-10% change in average fare	-4% change in average fare

Impact 6 – Change in Employment Accessibility

Fare Integration could make over 100,000 additional jobs accessible, on average, for customers paying $3.25 for transit, while also making 123,000 to 194,000 jobs accessible for $3.25 when using GO and municipal systems together for one trip.

Impact Overview

A key consideration of fare integration is its ability to support increased access to destinations for residents of the study area. Accessibility can be increased by simplifying fare payments and decreasing fares. This impact focuses on access to employment as a proxy for wider affordability of transit because job access is typically correlated with access to other activities. For example, education and healthcare centres are also typically employment centres. This impact can be used by decision makers to understand how fare integration facilitates travel across the region.

Impact Analysis

This impact is measured through assessing how many jobs a traveller can access, on average, for a given price point. **Table 4-10** shows the number of jobs accessible on average for fares of $3.25, $5.00, and $7.50.

Table 4-10: Number of jobs accessed for $3.25, $5,00, and $7.25 for different systems.

Mode	BAU	Variation A	Variation B	Variation C	Variation D
		Jobs accessible on average for $3.25			
Municipal Systems Only	294,000	404,000	404,000	404,000	404,000
GO only	-	-	47,000	47,000	47,000
GO + Municipal Systems	-	-	159,000	159,000	123,000
		Jobs accessible on average for $5.00			
GO only	98,000	98,000	99,000	95,000	147,000
GO + Municipal Systems	51,000	178,000	258,000	302,000	313,000
		Jobs accessible on average for $7.25			
GO only	179,000	179,000	179,000	201,000	249,000
GO + Municipal Systems	248,000	323,000	345,000	409,000	433,000

Impact 6 – Key Findings

Table 4-10 notes that:

- Fare integration is likely to significantly increase job access for commuters in the study area
- Major improvements occur across all variations by removing the double fare barrier between TTC and neighbouring agencies, which allows for an additional 130,000 jobs to be accessible on municipal transit for a fare of $3.25 (cash) – this means that a given traveller could access more employment opportunities using municipal systems
- Fare integration also allows GO transit to be used to access more jobs in the study area
    - Variations B-D have the most significant benefits as they reduce the base fare to $3.25, allowing GO To be used to access a range of jobs when used alone (up to 159,000) – Variation D has slightly lower benefits at $3.25 because it uses zones, meaning instead of measured distance (meaning not all 10 km trips will be $4.25, including short trips across a zone boundary)
    - Variations A-D all have significant improvements for job access at the $5.00 and $7.00 mark
    - Variation C and D tends to have higher average job access than B because they make substantial changes to the GO fare structure, which result in some station pairs having a lower fare and therefore cheaper job access
- This benefit can be considered alongside impact 4 – which illustrates how reducing the fare for GO Transit can allow travellers to save time; time savings for commuters have been correlated with improved economic productivity

Fiscal Sustainability

This strategic principle is used to understand how fare integration could impact revenue generated by transit systems. In the context of this IBC, this is used to illustrate the revenue loss impacts compared with the performance indicated across all other strategic impacts. It does not address overall funding approaches.

Impact 7 – Annual Change in Revenue

Impact Overview

This evaluation includes changes in revenues generated across the study area, which has been subdivided into key geographies. Individual agency revenue losses have not been calculated in this exercise:

- The FAST model works on a trip basis, not an agency basis – therefore revenue is generated at a geographic basis (Example: within a city, between cities) and modal basis (example: local only, local and GO Rail used together). This means that the revenues outlined in this section on a geographic basis (example: Toronto) do not reflect agency revenues, but all revenues generated across all transit systems that serve that geography.
- The majority of revenue changes are for multi-system trips. A revenue allocation mechanism has not been identified at this stage of analysis, so lost revenue from changing transfer rules cannot be allocated to a single system. Therefore, revenue change for each agency is not presented in the IBC.

This impact can be used by decision makers to understand the level of revenue loss required to generate the benefits outlined in this business case; however, further analysis and policy development is required to identify an overall funding formula.

Impact Analysis

Impacts were assessed using the FAST model, which generates potential revenue losses for a given change in fare structure. Revenue changes by geography (sum of all transit revenue changes for trips that begin and end in each geography, inclusive of all systems) are shown in **Figure 4-17**. As per Impact 1, these revenues reflect revenues generated from all trips that begin **and** end in a single geography. The revenue for each geography outlined in the figure is inclusive of all services operated within the geography. For example: Toronto would include all revenue from all trips that begin or end in Toronto inclusive of using the TTC or GO Transit or both. However, trips that begin or end outside of Toronto are not included. Cross-boundary trips and revenues are included as follows: GGH to/from Downtown Toronto, GGH to/from Toronto outside the core, and trips between GGH communities (excluding Toronto).

The following factors drive revenue loss:

- All variations
  - Removing double fares for TTC and neighbouring systems (in other words,. only one fare is paid instead of two, resulting in a revenue decrease) (impacts revenue from GGH to/from Downtown Toronto, GGH to/from Toronto outside the core)
  - Removing the TTC and GO Transit double fare (impacts revenues in Toronto primarily, some impacts for cross-boundary markets to Toronto)
- Variations C-D - reducing the GO Transit short distance fare (all geographies where short trips can be made)
- Variations B-D – changing GO fares such that no one pays more, while standardizing fares across the study area, resulting in some station pairs having a lower fare than today (impacts revenue from GGH to/from Downtown Toronto, GGH to/from Toronto outside the core)

Figure 4-17: Change in Revenue per Year by Geography

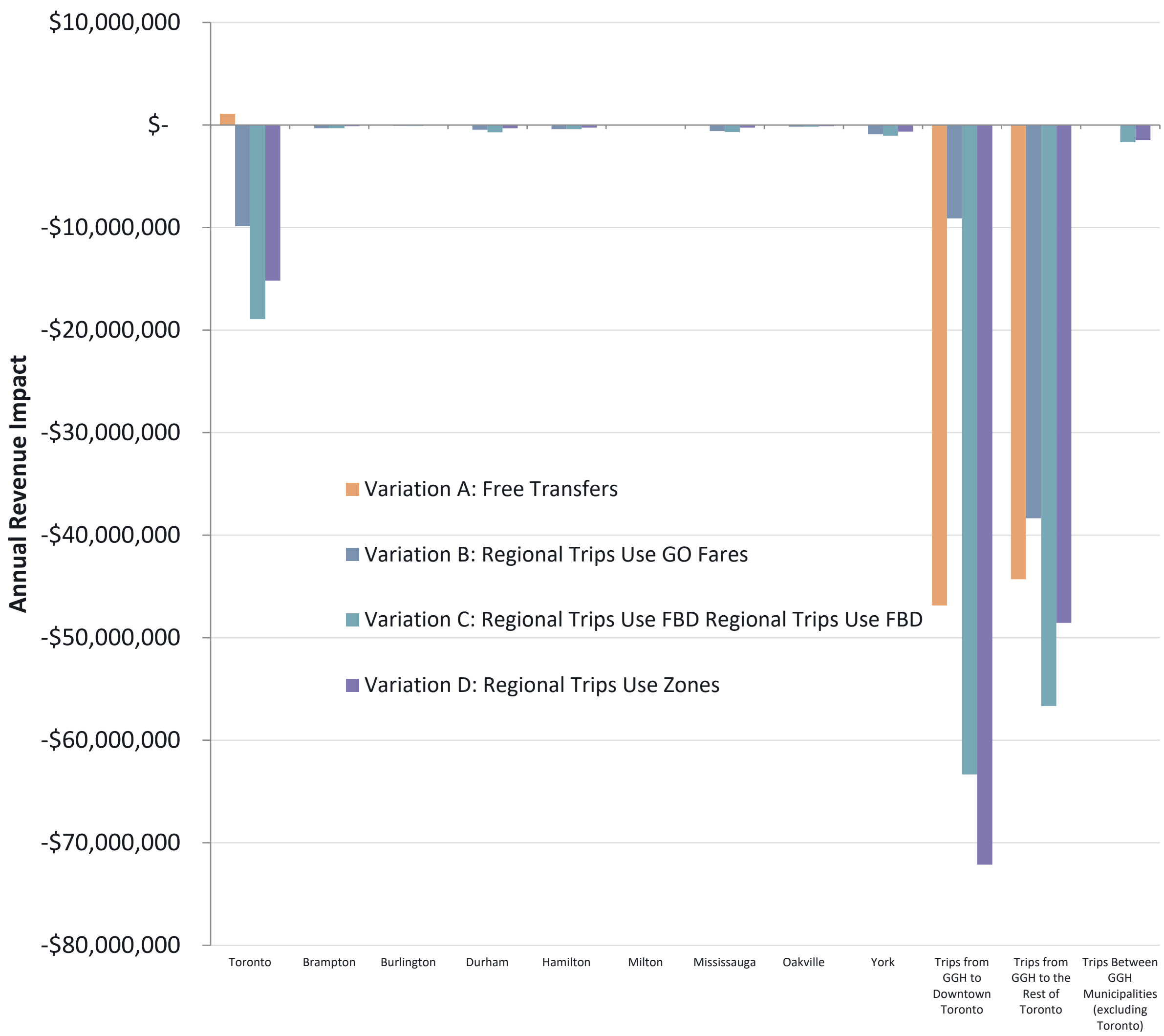


Figure 4-17 notes the following:

- The only 'travel markets' or geographies that see revenue changes are trips wholly within Toronto, trips between Toronto and other communities - there is potential for some net revenue gain in Toronto (minor gain) under Variation A due to increased use of GO Transit and TTC.
- Losses in Toronto are related to changes in the GO Transit fare structure (shifting to a lower base fare for Variations B-D) and removing the transfer fare (or double fare) for trips using TTC and GO Transit
- Losses for trips to/from Toronto and the rest of the GGH are related to a range of impacts
    - Variation A – removing transfer fares (double fares) for TTC and neighbouring systems. This leads to an additional revenue loss as some customers shift from GO Transit to TTC and a neighbouring agency to take advantage of the lower fare (which is lower than GO Fares, resulting in an additional loss).
    - Variation B – removing transfer fares and adding in regional pricing for subway trips between Toronto and York Region greater than 10 km. This results in additional revenues being generated and mitigates the potential losses from Variation A where some GO Transit trips shift to subway and local bus.
    - Variations C and D – similar impacts as B, but the shift to a generally 'lower' GO Transit fare leads to further significant losses.
- Any changes in other geographies are due to the change in GO Transit fares – as noted in Impact 1, there are no net reductions in boardings for any agency in the study area.

Impact 7 – Key Findings

Table 4-11 provides an overview of revenue losses per year for each variation. Combined, **Figure 4-17** and **Table 4-11** note that:

- Revenue losses are concentrated in trips between Toronto and other areas in the GGH – this change in revenue is primarily driven by removing double fares.
- All net revenue losses for trips that begin and end in Toronto (Variations B, C, and D) are losses due to the $3.25 fare for all GO Transit trips <10 km combined with free transfers.
- Variations C/D have higher losses due the standardized regional fare structure applied to GO Transit, which leads to many trips having a fare decrease.
- Under variation A some trips using GO Rail (paying a higher fare) shift to bus + subway to take advantage of the reduced double fare – for example: they may pay $7.50 for GO Rail today and switch to the $3.25 single fare for subway + bus, leading to an additional loss in revenue alongside the revenue lost from trips using subway + bus today. As a result, revenue loss is higher under Variation A than Variation B.

Overall, these findings indicate that Variation B has the lowest revenue loss and lowest cost per new rider. All variations will lose revenue to realize the level of benefits identified in this IBC.

Table 4-11: Revenue Impacts per Year

Metric	Variation A – Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Lost Revenue Per Year (million CAD)	$90	$60	$140	$140
Relative Change in Revenue	-4.6%	-3.1%	-7.3%	-7.1%
Cost Per Rider	$10.95	$7.70	$10.90	$11.15
Revenue Change by Geography (note: each geography may include multiple systems) million CAD/year				
Toronto	$1	-$10	-$19	-$15
Brampton	$0	-$0	-$0	-$0
Burlington	$0	-$0	-$0	-$0
Durham	$0	-$0	-$1	-$0
Hamilton	$0	-$0	-$0	-$0
Milton	$0	-$0	-$0	$0
Mississauga	$0	-$1	-$1	-$0
Oakville	$0	-$0	-$0	-$0
York	$0	-$1	-$1	-$1
Trips from GGH to Downtown Toronto	-$47	-$9	-$63	-$72
Trips from GGH to the Toronto outside the core	-$44	-$38	-$57	-$49
Trips Between GGH Municipalities (excluding Toronto)	-$0	-$0	-$2	-$1

Revenue Change by Geography (note: each geography may include multiple systems) Relative				
Toronto	0.1%	-1.0%	-1.9%	-1.5%
Brampton	0.0%	-1.3%	-1.3%	-0.5%
Burlington	0.0%	-1.8%	-1.8%	-1.2%
Durham	0.0%	-1.8%	-2.8%	-1.2%
Hamilton	0.0%	-1.0%	-1.0%	-0.6%
Milton	0.0%	-4.2%	-4.2%	0.0%
Mississauga	0.0%	-1.4%	-1.7%	-0.6%
Oakville	0.0%	-2.6%	-2.6%	-1.9%
York	0.0%	-2.0%	-2.4%	-1.5%
Trips from GGH to Downtown Toronto	-9.7%	-1.9%	-13.0%	-14.9%
Trips from GGH to the Toronto outside the core	-18.8%	-16.3%	-24.0%	-20.6%
Trips Between GGH Municipalities (excluding Toronto)	-0.1%	-0.1%	-3.4%	-3.0%

The four variations tested minimize fare increases and result in significant fare box revenue losses. There are a range of tools that can be used to either pay for these losses (subsidies, partnerships) or mitigate them (raising fares). However, if structures with higher fares are considered (and therefore, lower fare box revenue losses) their benefits will likely be lower than those identified in this IBC. MTO's upcoming analysis of governance and funding options will consider potential funding and allocation measures that would respond to changes in fare box revenues per transit system.

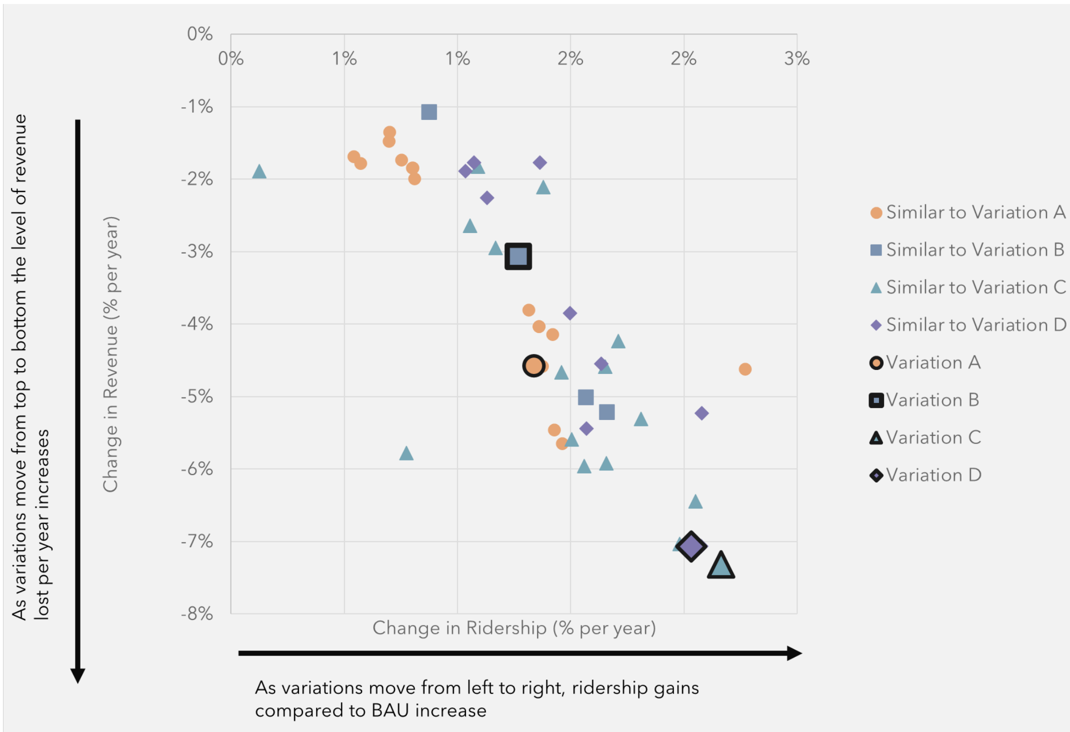
Figure 4-18 illustrates the ridership and revenue results for a range of fare structures based on the four variations in this IBC. Each of the four variations (A through D) were re-priced multiple times and run through the FAST Model to illustrate how pricing assumptions that allow for fare increases could minimize revenue losses. These additional model runs also illustrate how there is a direct relationship between lost revenue and ridership: as revenue loss is decreased through fare increases, total ridership benefits erode.

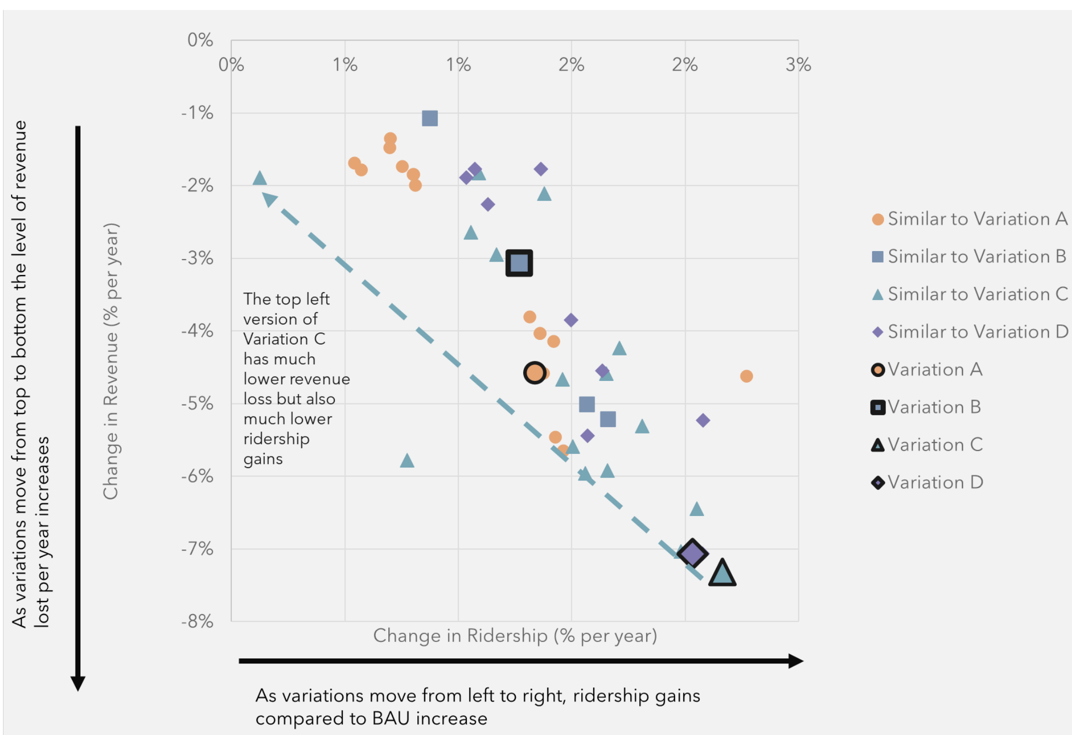
Figure 4-18 illustrates a range of pricing tests for each variation and their change in ridership (x-axis, moving to the right means higher ridership) and change in revenue (y-axis, moving down means greater revenue losses) compared to existing conditions. All variations are based off of the four variations in this IBC, but they include different pricing assumptions – for example, pricing so that fare increases occur. A second version of this graph is shown below illustrating this trade-off for Variation C (comparing the variation Cpricing scenario in this IBC to a higher-fare test). This relationship shows that as fares are increased, ridership gains decrease and revenue is increased.

This figure (4-18) allows decision makers to understand the potential impacts of deploying the variations with higher fares – including some customers paying more. For example, all options that are towards the 'top' of the figure (mitigated revenue losses) tend to also be closer to the left of the figure (lower ridership gain). The options included in this figure include:

- Changes to variation A to include a lower discount (example: a 50% instead of 100% transfer discount) or some fare increases for travellers
- Changes to variations B-D that include fare increases for more travellers – for example adding fare increases to GO Transit and regional subway trips

Figure 4-18: Ridership vs Revenue Impacts for Fare Structure Variations at Different Price Points, Compared to the BAU





Future Ready

By 2051, the GGH is projected to grow to 14,870,000 people and 7,010,000 jobs. Growth is continuing and travel patterns are changing. Transportation is expected to be influenced by several factors including growth continuing and growth patterns changing, changing equity and income issues, the demographic profile of the region changing, and more. In response to this growth, the Province is delivering a range of major rapid transit projects, including:

- The subway program – including the Ontario Line, Yonge North Extension, Scarborough Subway Extension, and Eglinton Crosstown West Extension
- GO Expansion - transforming GO Rail to include two-way all day faster and more frequent service
- Hamilton, Hazel McCallion, and Finch LRT
- Potential Bus Rapid Transit projects
- GO Bus network development

While these projects will unlock a step-change in service for the region, fares will play a crucial role in achieving the potential of these investments, 'making transit work for the region' and to enabling the benefits of these significant investments. This strategic principle assesses if key performance measures vary in the future once these investments are complete.

Impact 8 – Future Network Impacts

By 2041, the benefits of fare integration are anticipated to increase significantly – meaning the subway program, GO Expansion, and municipal systems will all see benefits that grow overtime. However, some variants may incur greater revenue losses based on the IBC price assumptions.

Impact Overview

Fare Integration aims to address challenges today – and into the future. Among these is the potential to grow ridership on the planned future 'Frequent Rapid Transit Network' specified in the 2041 Regional Transportation Plan and Provincial Subway Plan[4].

[4] This analysis does not include the 2051 future transit infrastructure and services set out in *Connecting the GGH: A Transportation Plan for the Greater Golden Horseshoe*

This impact assesses whether there are any key differences between variation performance when comparing the existing network of services and demand patterns to those in the future. This impact can be used by decision makers to understand how variations may perform differently in the future.

> This IBC presents a preliminary analysis of future network impacts to understand how the benefits of fare integration scale into the future. This initial analysis shows how fares could impact ridership on the future network.
>
> Future analysis should consider broader factors – such as service optimization and integration, new technologies, and changes to infrastructure that could be deployed synergistically with fare integration. In addition, this analysis focuses on assessing the future state of the region using a 2041 network consistent with all other Metrolinx business cases and models. Additional future analysis should consider changing customer needs and travel patterns beyond those that can be captured in currently available models and data sets.

Impact Analysis

This benefit includes a consideration of the change in boardings on each mode as well as a restatement of benefits 1 and 7 for a 2041 network, showing the daily increase in ridership and annual changes in revenue in absolute and relative terms.

This allows decision makers to understand:

- How ridership and revenue would be different than a 2041 scenario without fare integration
- How fare integration can impact proposed infrastructure investments and in-delivery network expansion based on daily boardings

A limitation of this analysis is that it does not fully illustrate the long run benefits of fare integration (for example: what broader behaviour changes occur over a 5-10 year period with fare integration in place). These results do not reflect a strategic approach to delivering fare integration – including phased fare increases over time to reduce revenue losses. These results should be considered point estimates that illustrate the potential of fare integration to shift ridership patterns. Note – model data for 2041 was used that reflects the funded and in-delivery network for the study area included in the GGHMv4. As a result this analysis does not include future transit changes identified in the province's plan for 2051, *Connecting the GGH: A Transportation Plan for the Greater Golden Horseshoe.*

The impacts on each of these investments can be understood by reviewing the change in daily boardings across all major modes in the study area. These are shown in 2041 in **Table 4-14**. Note – a change in boarding is the sum in all trips using a mode (example: local) for one or more legs of a trip. For example, a trip using local and subway would be counted twice in both modes.

Table 4-12: Change in Boardings by Mode in 2041 (daily)

Total Change in Boardings

	BAU	Variation A: Free Transfers	Variation B: Regional Trips Use GO Fares	Variation C: Regional Trips Use FBD Regional Trips Use FBD	Variation D: Regional Trips Use Zones
Bus	2,083,000	2,127,000	2,378,000	2,403,000	2,107,000
Subway	1,316,000	1,368,000	1,411,000	1,458,000	1,329,000
GO Rail	398,000	427,000	538,000	559,000	553,000
GO Bus	54,000	61,000	77,000	80,000	79,000

Incremental Change in Boardings

		Variation A: Free Transfers	Variation B: Regional Trips Use GO Fares	Variation C: Regional Trips Use FBD Regional Trips Use FBD	Variation D: Regional Trips Use Zones
Bus		44,000	295,000	320,000	24,000
Subway		52,000	95,000	142,000	13,000
GO Rail		29,000	140,000	161,000	155,000
GO Bus		7,000	23,000	26,000	25,000

Table 4-14 identifies the following core findings:

- All alternatives will significantly increase boardings on the subway and GO Rail network – the two networks with the most investment over the next 10 years
- For GO Expansion, this means that ridership could exceed the ridership identified in the full business case (400,000 trips per day) under each variation, with Variations B-D having a more significant impact (over 130,000 new boardings, compared to fewer than 30,000 new boardings per day in Variation A)
- For the subway program, this means significantly higher ridership on subway alone as well as for trips using subway and GO expansion together
    - Alternative A generates an additional 52,000 boardings through the free transfer with neighbouring systems and a free transfer with GO Rail
    - Alternative B has an increase of 95,000 due to the addition of a lower fare for short distance GO Rail trips, which means more travellers use subway and GO Rail (taking advantage of the free transfer and lower base fare)
    - Alternative C has the highest gains, due to the use of a distance-based fare curve, which has less severe price impacts for more trips than Alternative B (the fare curve is lower for all GO rail and subway trips for C than B, resulting in more multi-modal trips and subway trips than B)
    - Alternative D has the lowest performance due to zones resulting in sudden fare increases for many subway trips from York Region to Toronto and sudden increases in GO Fares compared to the more gradual increases in Alternative B and C

Table 4-13 expands on this analysis to consider the change in ridership, revenue, and cost per rider in 2041 compared to today to understand if there is a variation

Table 4-13: Future Impacts of Fare Integration

Metric	Variation A – Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Change in Ridership per day compared to BAU (2041)	+40,000	+26,000	+50,000	+60,000
	1.4%	0.8%	1.8%	2.1%
Change in Ridership per day compared to BAU (today)	+26,500	+25,000	+41,000	+39,000
	1.4%	1.3%	2.2%	2.1%
Annual Revenue Impact compared to BAU (2041)	-$120m	-$11.5m	-$155m	-$155m
	-4.0%	-0.4%	-5.3%	-5.2%
Annual Revenue Impact compared to BAU (today)	-$90m	-$60m	-$140m	-$140m
	-4.6%	-3.1%	-7.3%	-7.3%
Cost per rider (2041)	$8.85	$1.40	$8.75	$7.50
Cost per rider (today)	$10.95	$7.70	$10.90	$11.15

Table 4-13 was used to identify the following considerations when differentiating variations:

- **Variation A -** due to GO expansion, there are significantly more GO Rail riders in the BAU. When bus and subway fares are decreased, more people choose bus and subway instead of GO Rail, resulting in lost revenue as customers use a lower cost mode to complete their trip.
- **Variation B –** conversely, revenue losses are much lower in 2041 than they are anticipated to be in the short term. This is because fewer customers shift modes and the addition of distance fares to the Yonge North Subway Extension replaces some lost revenue from the removal of double fares. Ridership growth (absolute) is the same as today, however it is a smaller relative increase. This is likely due to the fact that many of the new trips identified in current year modelling (see Impact 1) may switch to transit to make use of the new rail and rapid transit projects regardless of fare policy. For example – a short distance GO Rail trip may switch to GO Rail once GO Expansion is complete, even without the fare reduction.
- **Variations C and D –** carry heavier revenue losses due to the significant fare reductions applied to GO Transit. These reductions increase revenue loss compared to today as they apply to more customers. The FAST model suggests that pre-COVID there would be approximately 300,000 trips per day on GO Transit with the March 2022 free-transfer policy between 905 systems and GO Transit. In 2041, there are anticipated to be over 450,000 trips on GO Transit, which illustrates how there are more trips in 2041 that lose revenue compared to a change in fare structure today.

Impact 8 – Key Findings

Overall, the preceding analysis indicates that:

- Fare integration can grow demand in the future by allowing travellers to make better use of the in-delivery transit network .
- This means the subway program and GO Expansion will both have higher daily ridership and that municipal systems will have higher volumes of cross-boundary trips and trips connecting to rail and subway infrastructure.
- However, the analysis also suggests that fare integration is likely to generate significant revenue losses if deployed alongside the future network due to the general increase of cross-boundary travel and travel across multiple operators. Compared to today, in the future there will be more trips that receive a 'discount' if double-fares are removed than there are today. For example, the number of GO to TTC transfers is expected to be much higher in the future when the Ontario Line connects to GO services at Exhibition and East Harbour, while TTC-905 transfers will also increase when the Yonge North Subway Extension connects directly to YRT services.

Strategic Case Summary

Table 4-14 provides a summary of the Strategic Case.

Table 4-14: Strategic Case Summary

Impact	Variation A – Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Impact 1 – change in ridership (daily, current year)	+26,500 (8.1 million a year, 1.4% increase)	+25,000 (8 million a year, 1.3% increase)	+41,000 (12.9 million a year, 2.2% increase)	+39,000 (12.3 million a year, 2.1% increase)
Impact 2 – change in automobile vehicle kilometres travelled (VKT/year)	-240,000,000	-140,000,000	-240,000,000	-145,000,000
Impact 3 – change in customer experience	Minor changes	Moderate changes	Major Changes	Major Changes
Impact 4 – change in travel time (hours per year)	2.7 million	6.3 million	7 million	9 million
Impact 5 – changes in average fare by customer segment	0% pay more / 14% pay less	1.2% pay more / 15 % pay less	0.4% pay more / 24.2 % pay less	1.3% pay more / 24.2 % pay less
Impact 6 – change in employment accessibility	Moderate increase in job accessibility	Moderate increase in job accessibility	Significant increase in job accessibility	Significant increase in job accessibility
Impact 7 – annual change in revenue	-$90 million/year	-$60 million/year	-$140 million/year	-$140 million/year
Impact 8 – future network impacts (Daily ridership gain in 2041)	+40,000	+26,000	+50,000	+60,000

A summary of each variation's overall performance is included in **Table 4-15**.

Table 4-15: Trade-Off Analysis

Variation	Overall Performance	What differentiates the variation?	What drives performance?
Variation A – Free Transfers	Moderate against all principles	• Lowest impact to customers • Higher revenue loss and cost per new rider	• Removing the double fares for TTC+GO and TTC + neighbouring systems for all trips • This encourages use of transit on multiple systems, but also encourages some customers to switch from GO Transit to bus + subway, which increases crowding and increases revenue loss
Variation B - Regional Trips Use Existing GO Fares	Moderate against most principles, best fiscal sustainability performance	• Similar performance to Variation A but with lower revenue loss and higher time savings	• Removing all double fares and adding subway to the GO Transit fare structure for trips >10km that are between Toronto and York region • This grants similar ridership as Variation A but does not cause customers to switch from GO Transit to the now free bus + subway, mitigating some of the revenue loss in Variation A • The lower GO Transit base fare encourages use of GO Transit for short trips and yields greater time savings than Variation A
Variation C - Regional Trips Use Fare by Distance	Strong against ridership growth, poor against financial sustainability	• Higher ridership, time savings, and VKT reductions but also highest revenue losses	• Same as Variation B, however the new fare by distance curve for GO Transit and subway trips (>10km between York Region and Toronto) leads to further revenue losses (this curve is set so no one pays more, and all regional trips are priced the same, this means some existing fares decrease) – this results in1.6 x the ridership gain for more than 2x the lost revenue and some additional time savings as more travellers switch to GO due to lower fares
Variation D - Regional Trips Use Zones	Strong against ridership growth, poor against financial sustainability	Higher ridership, time savings, and VKT reductions but also highest revenue losses	• Same as Variation C, however the new zone price structure for GO Transit and subway trips (>10km between York Region and Toronto) leads to further revenue losses (zones are priced is set so no one pays more, and all regional trips are priced the same, this means some existing fares decrease) – this results in1.6 x the ridership gain for more than 2x the lost revenue (compared to B) and some additional time savings as more travellers switch to GO

This analysis was used to generate a set of key trade-offs, summarized in **Table 4-16**.

Table 4-16: Trade-Off Analysis

Trade Off	Description	Variations
Revenue Loss vs. ridership gain/VKT reduction/travel time savings	With the exception of Variation A, as revenue loss increases (B-D) the level of benefit realized also increases	• Variation B – lower revenue loss and lower benefits • Variations C/D – higher revenue loss and higher benefits
Simplicity to customer vs. revenue and crowding optimization	Variation A is the simplest but also loses more revenue than Variation B	• Variation A – higher revenue losses but fewer travellers see a structure change, more crowding on subways • Variation B – more customers see a fare change, but fewer customers shift from GO transit to subway, resulting in less crowding and lower revenue losses
Simplicity to customer vs lower potential benefits	Variation A may be simplest for customers to understand, but also has the lowest benefit potential of all variations across most impacts	• Variation A – simple • Variations B/C/D – more complex but higher benefits
Degree of change and revenue loss	Variation B requires less fare structure change to integrate subway and GO transit for regional trips compared to variations C/D. Variations C/D require fare cuts for many GO transit customers to be delivered without customers paying more (see Issue 3). This results in significant revenue losses. Variation B maintains the existing GO structure and has lower losses.	• Variation B – minimal change to regional structure (bring subway into existing GO fare structure) and lower revenue losses • Variations C/D – major changes (new structure for GO Transit and subway regional trips) and higher revenue losses
Standardization vs. revenue flexibility	Variations C/D standardize all GO fares. Today GO Fares are based loosely on station to station prices, which gives GO Transit increased flexibility to align prices with customer willingness and ability to pay on a geographic level. Moving to a standardized fare by distance or zone structure could reduce GO Transit's ability to align fares with system revenue needs or customer ability to pay. For example: under C/D tow 20 km trips that have different prices today would have the same fare.	• Variation A/B – use existing GO Fares – no one pays more, no one pays less – GO retains ability to strategically set fares • Variations C/D – all trips of same distance pay same fare, even if they pay different fares today. GO transit is unable to set fares based on the geographies served.

5

Economic Case

5 Economic Case

Overview

The Economic Case is one of two chapters focused on the rationale for pursuing an investment (the other being the Strategic Case). While the Strategic Case evaluates options based on a project specific policy/plan-oriented evaluation framework, the Economic Case determines if the expected benefits of this investment exceed the costs required to deliver it and articulates the overall benefit to society and economic viability of each investment option.

The Economic Case enables decision-makers, project partners, and wider stakeholders to understand the relative value for money of investing in a new fare structure for the Greater Toronto and Hamilton Area. All results included in the Economic Case are incremental to a business-as-usual scenario (no change in fare structure) – meaning they are the net new benefits that can be realized, and the new costs required to provide Fare Integration at a societal level. All analysis presented in this chapter is in real 2022 dollars, while **Chapter 5 – Financial Case** presents data in nominal values. Real values do not include the impact of general inflation but do consider real growth. A social discount rate is also applied to reflect society's time value preference for consumption – a benefit or cost incurred tomorrow may be less 'valuable' than the same benefit or cost incurred today.

The analysis presented in this chapter considers the magnitude of costs and benefits over a 10-year lifecycle (the evaluation period) and determines the following metrics:

- Benefit Cost Ratio (BCR) – the net benefits divided by the net costs, which is used to the indicate benefits that are realized per dollar spent
- Net Present Value (NPV) – the net benefits minus net costs, which is used to indicate total net benefits to the region

The Economic Case includes the following sections:

- **Assumptions** – a summary of the core economic analysis assumptions and approaches used in this IBC
- **Cost Analysis** – estimated economic costs for a new fare structure
- **Impacts Analysis** – estimated economic impacts of a new fare structure
- **Economic Case Summary** – a summary of the economic benefit cost analysis for a new fare structure, including the BCR and NPV

Role of the Economic Case in this IBC

This Economic Case has been developed to compare the relative value of the four fare structure variations using a benefits analysis methodology consistent with all Metrolinx IBCs.

This chapter enables decision makers to explore the monetized value of benefits in **Chapter 4** compared to the costs of delivering fare integration.

At future stages of the business case lifecycle, it is anticipated that variations will be refined further, with consideration of investment grade analysis.

Assumptions

The Economic Case makes use of assumptions and parameters throughout the chapter's analysis. Assumptions, set out in **Table 5-1**, are provided by the Metrolinx Business Case Manual Volume 2: Guidance. The values presented in the Economic Case are the total lifecycle costs and benefits of the project in real terms in 2022$ and assume an economic discount rate of 3.5 per cent.

Table 5-1: Economic Case Assumptions

Input	Impact Type
Analysis Approach	All benefits/costs are expressed in real terms in 2022$ and Appraisal begins in 2022
Evaluation Period	10 years (includes implementation period from 2023-2024 and 10 years of operations beginning in 2025)
Economic Discount Rate	3.5%
Value of Time (VoT) (2022$)	$19.92/hour
VoT Growth Rate	0%
Ridership Growth Rate	2%
Auto Occupancy	1.077
Auto Operating Cost Savings (2022$)	$0.10
Safety Improvements (Accident Mitigation/Relief) (2022$)	$0.10
GHG Emissions (2022$)	$54.5/Tonne $0.01/ auto VKT
Operating Cost Growth Rate	1%

Why is fare revenue not included in the Economic Case?

Changes in revenue **are not included because they are not resource costs**. **Fare revenue is a transfer from the customer to an operator but not a resource cost –** for example a bus that costs $100/hour to operate still costs $100/hour to operate regardless of the amount that a customer pays for and the amount the government pays for. Revenue changes are outlined and captured in the Financial Case (Chapter 6).

The Economic Case is not concerned with 'who pays' but rather how many resources are consumed. As a result, fare revenue is not included as a cost or benefit in business cases.

Economic analysis is concerned with how societal resources – such as time, labour, and materials are allocated and their ensuing benefits. As with all Metrolinx business cases, market rates for resources (including labour and materials) are used to represent the opportunity cost of allocating these resources to the proposed investments – in this case, fare integration. This means only net new resource expenditure – such as materials for new fare readers, labour to develop fares software, and expenses on new transit fleet and operators to accommodate the demand growth from fare integration are included.

Modelling Assumptions

The Fare Strategy (FAST) model is a key tool applied to generate the Economic Case reporting metrics. The details on the model are defined in Chapter 3 (Variation Development and Analysis Tool: FAST).

Typically, Metrolinx uses a 60-year lifecycle for infrastructure analysis, which is based on the renewal period for major infrastructure.

Because the key investment for fares is new fare technology which carries a shorter renewal period, a 10-year lifecycle was applied to capture the benefits and costs of the program. It was assumed that implementation of each variation would take one year before the 10-year operational lifecycle period.

Cost Analysis

The costs or 'required investment' to deliver a new fare structure are divided into two categories, as outlined in **Table 5-2**.

Table 5-2: Cost Categories

Cost Category	Description	Costs Included
Capital Costs	Fixed one-time costs incurred during the implementation of the investment. The capital costs include the labour and materials required for to implement a new fare structure, as well as contingency.	• New buses • New fare hardware • New fare software • Station changes (variations B-D)
Operating and Maintenance Costs	Changes in day-to-day transit operating costs due to the change in fare structure. Includes the ongoing costs required to operate the new service, provide day to day maintenance, and complete any rehabilitations needed throughout the lifecycle of the option.	• Increased bus service provided

The capital, operating and maintenance costs for the lifecycle of a new fare structure are listed in **Table 5-3**. These costs are incremental to the BAU scenario and have been discounted based on the approach outlined earlier in the chapter. Capital costs account for upgrades in the PRESTO system, related to physical and technological capability updates (software and hardware such as fare gates). Also, the capital costs include bus fleet size expansions, to account for additional ridership in the system. Operating and maintenance costs focus on the additional operational requirements for the overall system, given the changes in demand, bus fleet in service and ensuring required service hours to meet changes in demand.

Table 5-3: Fare Variation Costs (million 2022$)

Cost Category	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Capital Costs	$140	$170	$210	$90
Operating and Maintenance Costs	$150	$110	$180	$150

Total Present Value of Costs	**$290**	**$280**	**$390**	**$340**

Costs vary between options based on the following considerations:

- **Station and faregate upgrade program –** Variations B-D require expanded fare gates (to facilitate tap-off) on all subway stations, while Variation A does not, contributing to its overall lower PRESTO-related capital costs
- **Changes to PRESTO software –** all variations require a change to PRESTO software, while the changes in C-D are considered more complex, resulting in increased costs
- **Level of bus service and number of new buses required –** each variation requires a different level of service and number of buses based on the systems and services that accommodate new demand resulting from the fare change

Impacts Analysis

Impact analysis assesses how a new fare structure could benefit or disbenefit travellers and the broader GTHA over the course of the project lifecycle. A Metrolinx Business Cases consider the impacts in two broad categories, discussed in **Table 5-4**.

Table 5-4: Impact Categories

Impact Category	Description
User Impacts	Changes in generalized travel time for transit users and other travellers due to the delivery and use of a new fare structure in the region
External Impacts	Changes in the externalities of the regional transportation network (example: change in auto emissions emitted and accidents in the road network) due to the delivery and use of a new fare structure in the region. Transportation investments are an opportunity to reduce these social costs by improving the economic efficiency of the transportation system – meaning less impact for the same amount of travel

Subsequent subsections outline the analysis conducted for each impact category.

User Impacts

User impacts are a key area of analysis for transport and transport-related investments. They capture how the investment could improve the welfare of transport network users or travellers in the Region. The following impacts are generated by Fare Integration:

- **Travel time benefits –** the variations being tested will result in travellers, both existing and new to the network, a greater ability to switch between modes when making a trip. If customers can make use of a faster mode, then they receive a benefit though time savings. If a user is 'priced off' a faster mode to a slower mode, they receive a disbenefit through the added time spent in transit
- **Auto operating cost savings –** when a traveller switches from auto to transit they receive a benefit equal to the unperceived auto operating costs per km multiplied by the distance they used to drive. Unperceived auto operating costs are costs related to owning and using a vehicle that are not factored into day-to-day trip choices

  Decongestion – as travellers switch from auto to transit they reduce congestion on roadways. This leads to an additional time saving for drivers who continue to use the now 'less congested' roadways in the region

All user impacts displayed in **Table 5-5** are the "net impacts" of the investment across the transportation network, or the sum of benefits and disbenefits to all travellers.

Table 5-5: User Impacts of Fare Integration Variations (million 2022$)

User Impact Type	**Impact Type (Million 2022$)**	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D- Regional Trips Use Zones
Transit	Travel Time Benefits	$630	$1,500	$1,700	$2,100
Auto	Direct Cost (Auto Savings)	$100	$180	$100	$170
	Decongestion	$200	$360	$210	$210

Table 5-5 outlines the following findings for the variations:

- Variations C-D have higher user benefits because they have the lowest price for GO Transit. This means more customers can switch to GO Transit services (see Strategic Case) and make use of faster transit operations. This results in a higher transit time saving compared to Variations A-B.
- Variation B has higher travel time benefits than Variation A because of the lower base-fare for GO Transit tested. This means more trips use GO Transit for short distances and benefit from the time saved.

Future Benefit Analysis

A key limitation of the FAST model is that it does not allow for crowding benefits and disbenefits to be calculated. These are not included in this analysis. They may be considered in future business cases.

External Impacts

In addition to the user impacts listed in the previous section, a new fare structure could also generate external (or 'societal') impacts for transport network users or travellers in the Region. Every auto trip taken can contribute negative impacts to society – whether it is emissions that pollute the air or injuries that occur from collisions. These impacts are called external impacts, or the `social cost of transport'. Transportation investments are an opportunity to reduce these social costs by improving the economic efficiency of the transportation system – meaning less impact for the same amount of travel (measured in impact per passenger kilometre).

For instance, an improved regional fare integration system could lead to fewer auto trips and more trips made on a combination of the local transit and active transportation networks.

The external impact categories are:

- **Wellbeing** – Health Benefits from active travel (walking, cycling)
- **Safety** – reductions in auto collisions resulting in death or injury on the road network and
- **Environment** – greenhouse gas (GHG) emission reductions

External impacts are estimated based on the network-wide change in auto VKT as forecasted in the FAST model. The following approach was used to determine the value of each externality:

- **Wellbeing -** Walking benefits are estimated for new trips that switch from automobile to walking access. Each new trip is attributed with a 0.4 km distance to their stop/station to take transit.
- **Collision Reduction** is calculated based on the change in automobile Vehicle Kilometres Travelled (VKT) multiplied by the pro-rated cost per km of automobile travel associated with collisions
- **GHG reductions** are estimated from the change in VKT forecasted from the FAST model.

Table 5-6 summarizes each option's external impacts.

Table 5-6: External Impacts of Fare Integration Variations (million 2022$)

External Impact Type	**Impact Type (Million 2022$)**	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D- Regional Trips Use Zones
Wellbeing	Health Benefits (Active Travel)	$170	$160	$270	$250
Safety	Reduced Collisions	$280	$160	$280	$170
Environment	GHG Reductions	$30	$20	$30	$20

Variation performance is based on the following considerations:

- Net new transit ridership influences health benefits – variations with higher ridership (Variations C-D) have the highest health benefits as more users choose active modes to access the transportation network, while Variation A slightly outperforms Variation B due to higher ridership
- Safety and environmental benefits are based on the change in automobile vehicle kilometres travelled – this means that Variations C/D, which attract more auto users than the other options, and tend to encourage longer distance auto trips to use transit, have higher benefits

Economic Case Summary

This section provides a summary of option costs and benefits and their overall performance through Benefit Cost Ratio (BCR) and Net Present Value (NPV) calculations. **Table 5-7** summarizes the Economic Case.

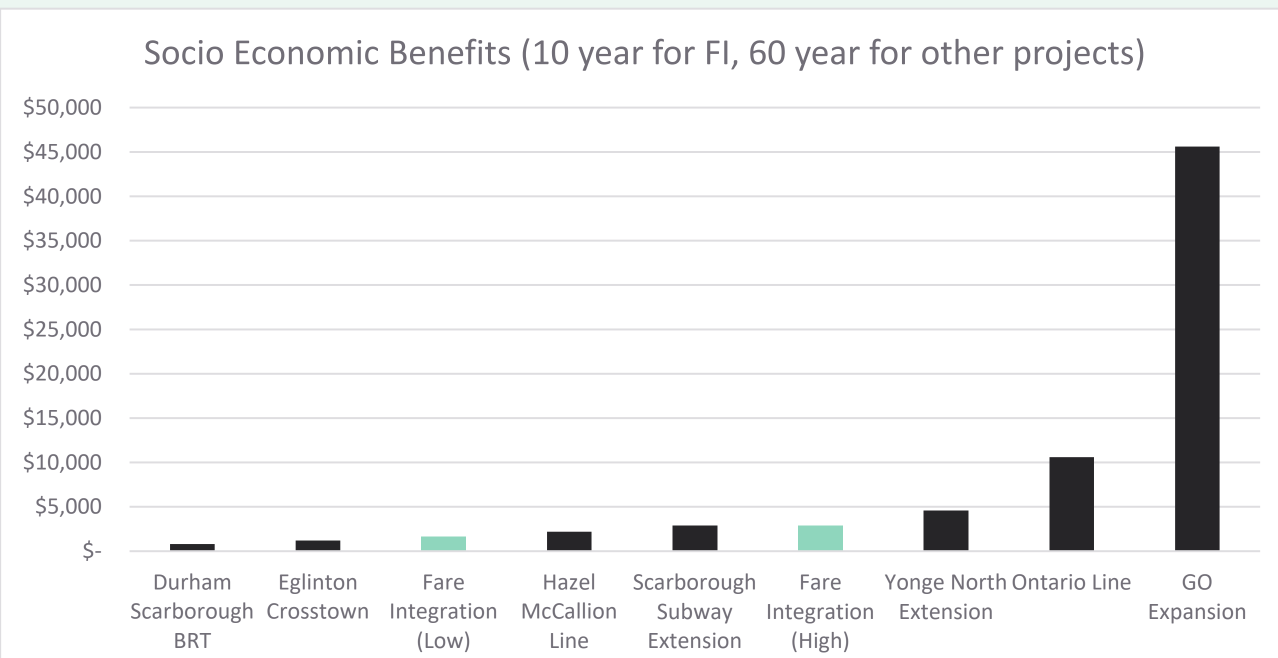
Table 5-7: Economic Case Summary (million 2022$)

Impact Type	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D-Regional Trips Use Zones
Total Costs	**$290**	**$280**	**$390**	**$340**
Capital Costs	$140	$170	$210	$190
Operating and Maintenance Costs	$150	$110	$180	$150
Total Impacts	**$1,630**	**$2,130**	**$2,800**	**$2,860**
User Impacts	$1,160	$1,800	$2,230	$2,420
External Impacts	$470	$330	$570	$440
BCR	**5.5**	**7.5**	**7.2**	**8.5**
NPV (2022 $)	**$1,340**	**$1,850**	**$2,410**	**$2,520**

The results of the Economic Case analysis suggest that all variations are anticipated to have socio-economic benefits that exceed socio-economic costs. The following conclusions for each fare structure option have been identified:

- All variations produce benefits in excess of project costs. For every dollar invested in new buses, operations, and fare technology, fare integration could generate between $5.50 to $8.50 in return on investment;
- This high socio-economic return on investment is due to the relatively low capital requirements compared to other infrastructure projects (which may require multi-billion dollar capital programs o generate similar levels of benefit);
- Variation A yields the lowest BCR due to the lower amount of benefits generated, primarily around User Impacts (travel time savings);
- Variation B and C have a BCR of 7.5 and 7.2, with similar benefits profile, but smaller costs of implementation for Variation B due to its lower fleet and operating cost requirements and thus a higher BCR; and
- Variation D achieves the highest BCR as it has the same benefits as Variation C but lower costs. As discussed in the Strategic Case, this variation tends to generate more ridership on GO Rail than on municipal services (which means taking advantage of existing capacity, rather than deploying new capacity on the bus network), resulting in a lower cost and higher BCR.

Fare Integration could generate $1.7 to $2.9 b over the next ten years alone – these benefits include monetized time savings for transit users, drivers and passengers, and society as a whole (due to fewer collisions and reduced emissions). These benefits are comparable to the socio-economic benefits generated by most rapid transit projects – **however, unlike these major infrastructure projects, fare integration can deliver these benefits in 10 years instead in of in 60 years**



6

Financial Case

6 Financial Case

Background

The Financial Case assesses the overall financial impact of proposed fare structure variations. While the Strategic Case and Economic Case outline how a policy achieves organizational goals and social value, the Financial Case is one of two cases (the other being the Deliverability and Operations Case) that focuses on the requirements to successfully deliver the policy. This includes a review of:

- **Capital Costs**
- **Operating Costs**
- **Revenue Impacts**
- **Financial Case summary**

Year-over-year financial flows over the 10-year evaluation period from the hypothetical service start date (2025) through to 2035 are estimated in nominal dollars (in other words the dollar figure expected to be paid or received expressed in the year of the payment). Nominal financial flows are calculated assuming an annual inflation rate of 2 per cent. The annual costs and revenues are discounted back to a single value using a nominal discount rate of 5.5 per cent. Once discounted, total capital costs and incremental operating costs are compared against incremental revenues to derive the net financial impact in 2022$ for the Financial Case. For these reasons capital costs, operational and maintenance costs and fare revenues reported in the Financial Case differ from those in the Economic Case.

Table 6-1: Assumptions for Financial Case

Parameter	Value
Discount Rate	5.5% (nominal)
Inflation Rate	2%
Analysis Period	10 Years

Role of the Financial Case in this IBC

This Financial Case is intended to support decision makers in understanding the high-level financial impacts and associated requirements to successfully deliver each variation and realize their intended benefits.

This analysis was conducted using high-level data and strategic modelling and is suitable for understanding the expected level of financial impact for each variant based on a pricing model that minimized fare increases.

Future stages of analysis should consider investment grade ridership, revenue, cost recovery impacts, and cost estimates to expand on this IBC.

Capital Costs

Capital costs for the fare integration structures are presented in **Table 6-2**. These costs account for upgrades in the PRESTO system, related to physical and technological capability updates (software and hardware such as fare gates). Also, the capital costs include bus fleet size expansions, to account for additional ridership in the system.

Table 6-2: Capital Costs in Financial Terms, Discounted (million 2022$)

Line Item	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Total Capital Costs	**$140**	**$170**	**$210**	**$190**

Costs vary between options based on the following considerations:

- **Station and faregate upgrade program –** Variations B-D require expanded fare gates (to facilitate tap-off) on all subway stations, while Variation A does not, contributing to its overall lower PRESTO-related capital costs
- **Changes to PRESTO software –** all variations require a change to PRESTO software, while the changes in B-D are considered more complex, resulting in increased costs
- **Level of bus service and number of new buses required –** each variation requires a different level of service and number of buses based on the systems and services that accommodate new demand resulting from the fare change

Operating Costs

A summary of the of the operating costs is presented in **Table 6-3**. These elements focus on the additional operational requirements for the overall system, given the changes in demand, bus fleet in service and ensuring required service hours to meet changes in demand.

Table 6-3: Operating Costs in Financial Terms, Discounted (million 2022$)

Line Item	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Total Operating Costs	**$150**	**$110**	**$180**	**$150**

The core difference for changes in fleet and capital costs from a transit perspective is the level of bus service and number of new buses required. Each variation requires a different level of service and number of buses based on the systems and services to accommodate new demand resulting from the fare change. Variation B requires the lowest budget for future bus operations ($10m/year, compared to $15-20m/year in variations A, C-D) and fleet expansion (40 net new buses, compared to 55-65 in variations A, C-D) because more of its demand makes use of the GO network, resulting in fewer new boardings on municipal systems (see chapter 3 for an overview of how costs are estimated).

Revenue Impacts

Revenue changes in the system are quantified in **Table 6-4** and have been derived from the FAST model, to estimate ridership. Revenue impacts include revenue resulting from changes in the fare structure and number of trips taken. A review of annual revenue impacts is presented under **Impact 7** in the Strategic Case.

Table 6-4: Revenue Financial Terms, Discounted (million 2022$)

Line Item	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Total Fare Revenue Change	**- $1,200**	**-$800**	**-$1,800**	**-$1,800**

Key Financial Impact of Fare Integration – Reducing Customer Revenue Burden to Unlock Regional Benefits

Revenue burden is a central idea to understanding fare integration:

- Customers across the GTHA pay a fare for service – this is the 'customer revenue burden'
- Some customers pay more or less depending on what fare policies are in place – double fares or high short-distance fares on GO Transit are two examples where customers have a disproportionately high revenue burden compared to other travellers
- All systems require government subsidy – fares are insufficient to cover all operating costs – this is the 'government revenue burden' or 'non customer revenue'

If nobody pays more with fare integration, this means revenue is lost from the system. FI may recover some lost revenue or be revenue neutral if revenue burden is ''shifted" (for example: lowering double fares could be offset by raising someone else's fare). The results in this IBC assume few riders pay more, and all FI options result in revenue loss – between $60m and $140 m per year initially. By 2041, this change could range from $12m to $155m a year.

If the 'revenue losses' cannot be covered through non-customer revenue streams, the benefits of fare integration will erode:

- Smaller discounts can be offered OR
- Some customers pay more

Under both changes, the strategic and economic benefits will be lower than outlined in this IBC

Revenue impacts were previously discussed under Impact 7 in the Strategic Case:

- Revenue losses are concentrated in trips between Toronto and other areas in the GGH – this change in revenue is primarily driven by removing double fares
- Under variation A some trips using GO Rail (paying a higher fare) shift to bus + subway to take advantage of the reduced double fare – for example: they may pay $7.50 for GO Rail today and switch to the $3.25 single fare for subway + bus, leading to an additional loss in revenue alongside the revenue lost from trips using subway + bus today. As a result, revenue loss is higher under Variation A than Variation B.
- All net revenue losses for trips that begin and end in Toronto (Variations B, C, and D) are losses due to the $3.25 fare for all GO Transit trips >10 km combined with free transfers
- Variations C/D have higher losses due the standardized regional fare structure applied to GO Transit, which leads to many trips having a fare decrease

Financial Case Summary

Table 6-5 provides a summary of the of the overall financial impact of the fare structure variations.

Table 6-5: Financial Case Summary, Discounted (million 2022$)

Financial Case Metric	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Total Revenue Impacts	**-$1,200**	**-$800**	**-$1,800**	**-$1,800**
Total Capital Costs	$140	$170	$210	$190
Total Operating Costs	$150	$110	$180	$150
Total Costs	**$290**	**$280**	**$390**	**$340**
Net Financial Impact	-$1,490	-$1,080	-$2,190	-$2,140
Revenue Loss per New Rider (2022$)	**$10.95**	**$7.70**	**$10.90**	**$11.15**

The results of the Financial Case analysis suggest that all variations are anticipated to a negative net financial impact, as total capital and operating costs are not outweighed by fare revenue increases. The following conclusions for each fare structure option have been identified:

- Variation B has the lowest financial impact due to its lower annual revenue loss and lower operating cost impacts
- Variation C and D have a higher total net financial impact due to their higher revenue losses and higher operating cost and fleet requirements
- Variation A lands between all other variations with medium fare losses and capital and operating costs

7

Deliverability & Operations Case

7 Deliverability & Operations Case

Introduction

The purpose of the Deliverability and Operations Case is to provide decision makers insight into the technical requirements to successfully realize the benefits discussed in this business case. To do so, it reviews how Fare Integration and each of the variations can be delivered and operated. In particular, it focuses on high level considerations for:

- **Project delivery** – a high level assessment of the key technical requirements to deliver fare integration
- **Project operations and maintenance** – a high-level assessment of the key requirements to successfully operate fare integration
- **Risk an Impact Assessment** – a summary of the key risks for fare integration and for each variation.
- **Conclusion** – a summary of the key impacts associated with fare integration overall and specifically for each variation.

Deliverability and Operations Cases at the IBC Level

This IBC focuses on exploring the core technical dimensions related to deliverability and operations to aid decision makers in distinguishing between variations based on their requirements and risk profile and considering the overall ability of Metrolinx and project partners to deliver any of the variants.

If fare integration is advanced further, future business cases will provide a more detailed assessment and explanation of a specific delivery plan and governance model.

Service integration is not considered as part of this business case; however it will be considered in future work, as an important aspect to compliment fare integration.

Project Delivery

Project delivery assesses all key technical components of the fare integration program that are required to realize the intended performance outlined in **Chapters 3-4**.

These components are divided into two categories:

- **System requirements – including software (PRESTO changes and changes to customer engagement and marketing materials)**
    - Transfer Rules
    - GO Fare structure changes
    - Subway (regional trip) structure changes
    - Revenue allocation engine (the software used to apportion revenue on multiagency trips)
- **Infrastructure requirements – including changes to capital assets**
    - Replace existing fare gates for GO Transit or TTC subway
    - Additional fare gates for TTC subway - including capital programing required to support them, which may involve broader station renovations (modifying exits, entrances, modifying free-body transfers between bus or streetcar and subway)
    - Required Fleet

Table 7-1 provides an assessment of the technical requirements for project delivery.

Table 7-1: Key Technical Components by Variation

Component	Overview	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Transfer Rules	Changes to double-fare transfer rules	✓	✓	✓	✓
GO Fare structure changes	Transforming the GO Fare structure to the structure specified in the Variation			Yes – to FBD	Yes – to Zones
TTC Subway (regional trip) structure changes	Transforming the subway fare structure to the structure specified in the Variation		Yes – add to existing GO	Yes – to FBD	Yes – to Zones
Replace existing fare gates for GO Transit or TTC subway	Delivering new fare gates for GO and/or TTC to meet the needs of the new fare structure		Yes – new gates for all subway stations, no impact to GO	Yes – new gates for all subway stations, no impact to GO	Yes – new gates for all subway stations, no impact to GO
New revenue allocation engine			✓	✓	✓
Additional fare gates for TTC subway	Adding 'tap-off' exit fare gates at each TTC station, including supporting capital works such as changes to station entrances/exits and free-body transfers between bus/streetcar and subway		Yes – tap-off at all subway stations	Yes – tap-off at all subway stations	Yes – tap-off at all subway stations
Additional Fleet	New fleet required to meet expanded service hours (existing GTHA fleet is ~5,500 buses)	Additional fleet to accommodate new demand – approximately 55 new buses	Additional fleet to accommodate new demand – approximately 40 new buses	Additional fleet to accommodate new demand – approximately 65 new buses	Additional fleet to accommodate new demand – approximately 55 new buses
Overall Assessment	A summary of the total technical and capacity requirements to deliver the variation	Low requirements	Medium requirements	High requirements	High requirements

The following delivery conclusions can be drawn for each variation:

- **Variation A - Free Transfers** – overall lowest requirements - it does not require any changes to subway stations for successful delivery; however it does require the second largest fleet expansion (55 buses). The other requirements are software changes to PRESTO and customer experience/marketing material development to message the new fare structure to customers.
- **Variation B - Regional Trips Use Existing GO Fares –** medium requirements – it will require changes to the subway fare structure (for regional trips >10km between cities) and will likely require tap off gates and changes to subway stations (example: renovations to put gates in free-body transfer zones). It will also require more complex software changes than Variation A and additional customer engagement. This variation has the smallest bus requirement because more of its demand growth is on GO Transit than other variations.
- **Variation C - Regional Trips Use Fare by Distance and Variation D - Regional Trips Use Zones –** high requirements – they will require complete transformation to the GO Transit and regional subway fare structures, along with new hardware and devices – including fare gates at each subway station and accompanying capital works. The software change is the most complex of all variations and it will also likely require a more significant customer engagement and marketing program. These variations also require significant fleet expansion (55-65).
- Unlike Variation A, variations B, C and D require a revenue allocation engine. This occurs when subway and GO Transit share a fare curve. A revenue allocation engine determines how much of the revenue collected on a subway+GO Transit trip will be allocated to each agency. The engine also requires a policy to guide allocation – for example, by distance travelled.

Key Delivery Considerations

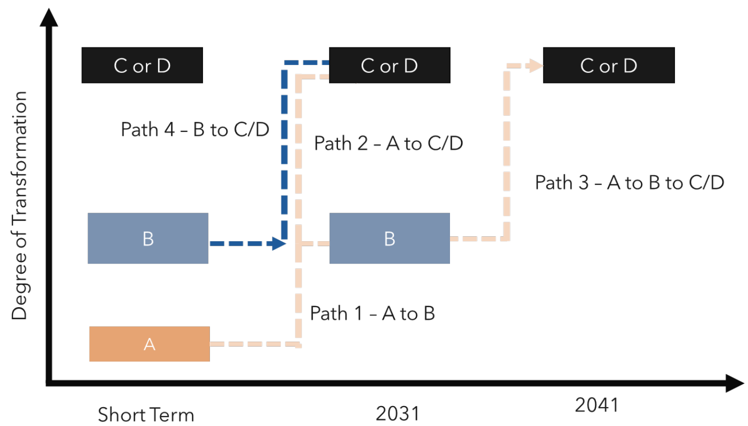
These delivery requirements should be reviewed during the lifecycle of the program alongside the following principles and considerations:

- All variations are delivered 'on top of' the current transition to account based PRESTO technology – this current transition will support the delivery of new fare structures, however additional works are required
- While some variations may have capital requirements (such as new fare gates and accompanying station renovations), this program is largely software and customer engagement focused, which means it may carry lower technical delivery risk than major infrastructure projects.
- Metrolinx and the Province are currently delivering GO Expansion and the subway program – advancing a fare integration program prior to the completion of these projects may minimize customer disruption once they are operational and potentially unlock additional benefits (see Impact 8, Strategic Case).
- Detailed analysis on fare integration may consider risks and opportunities to embed fare integration in the initial design and project agreements for these infrastructure projects, vs. embedding changes into the projects after they are operational.
- Further analysis should consider status of contracting, procurement, and design for capital projects impacted by fare change and opportunities to include fare integration within programs that are under development.
- Any changes to GO Transit and TTC subway stations could be sequenced alongside other state of good repair and capital improvement projects to minimize impacts to customers and agencies alike.
- Procuring additional fleet to meet the needs of fare integration should be considered alongside refined investment grade fare integration analysis, each agency's bus procurement plans and plans for service integration.
- Fare structure changes should be considered within the existing timelines to upgrade PRESTO and deploy new features – such as account-based ticketing – to streamline delivery.

Transformational Scenarios – How to Deliver Change?

Fare structure implementation can be considered in phases – while the analysis included in this document represents each Variation independently, Variations could be phased in the following paths:

- Path 1: **Variation A** to **Variation B**
- Path 2: **Variation A** to **Variation C or D**
- Path 3: **Variation A** to **Variation B** to **Variation C or D**
- Path 4: **Variation B** to **Variation C or D**



These different transformational scenarios provide flexibility in choosing the most feasible fare structure for the near future without excluding a different fare structure to meet the region's needs further into the future.

Note that Variations C and D are considered mutually exclusive as they represent different ways to transform regional fares. Future analysis will consider the impact to benefits and costs of a phased approach.

In addition to considering phasing, delivery should also consider the unique funding and governance considerations for each variation. These topics will be explored in future work.

Operations

This section defines the operating impacts estimated for each fare structure variation, including:

- Required service hours – estimated based on the methodology defined in Chapter 3, which considers the amount of new boardings in the peak period that cannot be accommodated by the existing service offer;
- Likely customer change management impacts; and
- Flexibility to set fares to meet revenue needs (for example: strategically raise or lower fares).

Table 7-2 provides an overview of these impacts. The service hour estimation methodology was outlined in chapter 3 and considered:

- Change in boardings on each agency in the peak period
- The amount of boardings that an agency can accommodate before service increases are required

Table 7-2: Operating Impacts by Variation

Component	Overview	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Required service hours	Requires transit service hours to accommodate new demand (in 2019 there were approximately 58,000 vehicle hours per day)	Approximately 450 hours per day	Approximately 320 hours per day	Approximately 540 hours per day	Approximately 450 hours per day
Likely customer change management impacts	All changes required to help customers make best use of the new fare structure	Low - only customers using TTC+GO and TTC + neighbouring systems need to be engaged	Subway customers must learn a new fare structure – tap on/off, new fares for regional trips (>10 km, between Toronto and York Region)	All GO Transit customers learn a new fare structure Subway customers must learn a new fare structure – tap on/off, new fares for regional trips (>10 km, between Toronto and York Region)	All GO Transit customers learn a new fare structure Subway customers must learn a new fare structure – tap on/off, new fares for regional trips (>10 km, between Toronto and York Region
Flexibility to set fares to meet emerging revenue needs	Ability of each system to change fares compared to their ability to do so in the BAU	No-change from BAU	No-change from BAU, except for subway that cross a municipal boundary	Major reduction in flexibility from BAU – GO fares can no longer be set on a station-station basis	Major reduction in flexibility from BAU – GO fares can no longer be set on a station-station basis
Overall Operating Complexity		Medium	Medium	High	High

The following delivery conclusions can be drawn for each variation:

- **Variation A - Free Transfers** – medium operating complexity – requires a large number of new bus service hours to be deployed across the region, primarily to connect to the subway and GO Rail network
- **Variation B - Regional Trips Use Existing GO Fares –** medium operating complexity – requires less service than Variation A (fewer net new trips on bus + subway, leading to lower operating requirements) but will require major change management for subway customers to understand new boarding, alighting (tap on/tap off), and payment structure
- **Variation C - Regional Trips Use Fare by Distance and Variation D- Regional Trips Use Zones –** high operating complexity – requires a significant amount of service hours and major change management for subway and GO Transit customers. It is anticipated that both structures will require the same level of change management due to the major shift from existing fares. Variation D has fewer required service hours because more of its net new demand uses GO transit than municipal services (potentially due to the zone structure shifting short distance demand from municipal systems to GO based on where zone boundaries are), while Variation C generates more demand using bus to access GO transit and subways. Further details on the differences in Variation C and D were discussed under Chapter 4 Impact 2.

Key Operating Considerations

These delivery requirements should be reviewed during the lifecycle of the program alongside the following principles and considerations.

- Refined service impact estimates are required to advance delivery planning. Future stages should conduct 'investment grade' analysis, This means conducting analysis at a route level, rather than at a regional level as per this IBC. These estimates should also consider service integration (potential opportunities to rationalize service networks that cross boundaries).
- Service expansion should also consider the deployment of new Bus Rapid Transit (BRT) routes that are under consideration by Metrolinx and the Province for delivery, as these routes may increase the level of bus service required to meet regional transit demand associated with fare integration.
- If fare integration is advanced, future analysis will explore how to manage significant change and ensure customers can understand and make best use of a new fare structure while minimizing operational impacts. This could include exploring a range of marketing, customer experience, and change management tools to create an easy-to-use customer experience for any fare structure changes.

Key Risks

Table 7-3 provides an overview of the key risks identified for the Fare Integration variations. Risk considers probability of occurrence, potential impact, and level of uncertainty.

Table 7-3: Risk Assessment

Risk	Impacts	Drivers	Mitigation	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Ridership Risks	• Ridership is lower than anticipated • Ridership is higher than anticipated, resulting in the need for increased operating and capital investment to meet demand	• Average fare changes outlined in this business case cannot be implemented • FAST model analysis does not align with post COVID-19 travel behaviour and patterns • Changing multiple fare structures substantially at once • Changing fares after a line is open, which may 'shock' travel demand	• Test a range of price points as the program evolves to understand price sensitivities • Conduct further customer research [5] • Refine forecasting tools	• Low	• Low-medium	• High	• High – zonal fares could encourage unintended behaviour change (example: driving further to access a GO Station across the zone boundary to pay a lower fare)
	• Fare structure is complex to use or does not align with customer needs	• Creating a system that is more complex and difficult for customers to make the right choice on	• Conduct customer experience research and engagement	• Low	• Low-medium	• High – it is unknown how customers may respond to major changes	• High – it is unknown how customers may respond to major changes

[5] Additional customer research should consider: willingness to pay (how much a customer wants to pay for service), ability to pay (how much a customer can pay), customer experience (including ability to understand and make use of the fare structure), and broader payment process/experience. This research should explore how to optimize the fare structure during planning, delivery, and operations and can be used to augment models and forecasts to improve their accuracy for future business cases.

Risk	Impacts	Drivers	Mitigation	Variation A - Free Transfers	Variation B - Regional Trips Use Existing GO Fares	Variation C - Regional Trips Use Fare by Distance	Variation D - Regional Trips Use Zones
Revenue Risks	• Revenue impacts are different from those estimated in this IBC	• FAST model analysis does not align with post COVID-19 travel behaviour and patterns • FAST model service patterns (based on pre-COVID 19 network) are inconsistent with service patterns deployed in the future	• Test a range of price points as the program evolves to understand price sensitivities • Conduct further research • Refine forecasting tools	• Low	• Low-medium	• Medium	• Medium
Delivery Risks	• Cost escalation (for example: more expensive station changes, software, or faregates) and time to completely deliver the program	• Level of complexity associated with fare structure and capital asset changes	• Conduct additional delivery scoping and planning, including engagement with impacted systems	• Low	• Low-medium	• Medium	• Medium
Operating Risks	• Services could be overcrowded or under utilized if ridership forecasts are incorrect • Cost estimates are inaccurate	• Reliance on high-level analysis techniques without detailed analysis and service planning	• Conduct additional operational scoping and planning, including engagement with impacted systems	• Medium (requires a high level of new service, may shift demand to TTC subway)	• Low	• Medium (requires a high level of new service compared to B)	• Medium (requires a high level of new service compared to B)
Overall Risk				• Low	• Medium	• High	• High

The key differentiators for risk cross the variations include:

- **Capital Delivery Risk**
    - Adding tap off and distance-based fares for inter-city subway trips >10 km – this will require tap off for local trips as well (wholly in Toronto) (Variations B, C, and D) – the required works (including station changes and required fare gate solution) have not been fully reviewed and requires further significant technical analysis to confirm costs, scope, and risks. For example, each station may require a unique design and engineering solution to accommodate tap-off gates.
- **Ridership and Revenue Risk**
    - Repricing the GO network – significant changes to the existing structure poses a greater ridership and medium revenue risk (Variations C and D) than variations that leave the GO Transit fare structure intact.
    - Variations B-D all carry a ridership risk for subway trips that are between York and Toronto and are longer than 10 km. Some of these trips may pay a higher fare than today, which could impact ridership.
- **Timing**
    - Variations with more significant changes (Variations B-D) could carry higher risk if deployed after new capital projects are complete.
    - This carries capital and operating risk (deploying new fare technology in 'live stations') as well as ridership and revenue risk (potential to impact ridership and revenue by changing fares shortly after a project opens).

Summary

Table 7-4 provides a summary of the Deliverability and Operations case for Fare Integration. While further analysis is required to determine specific impacts and requirements to deliver the variations, this analysis did not identify a fatal flaw or technical issue that would suggest the variations are undeliverable or infeasible to operate.

This chapter notes the following conclusions:

- **Variation A –** lowest overall requirements and risk, with the exception of required service hours and fleet (Variation B has lower requirements)

- **Variation B -** moderate requirements – this variation has more complex fare structure requirements (software, revenue engine, customer engagement and change management) and capital works (subway gates, station works) than Variation A, but also has lower bus and service hours requirements.

- **Variations C and D** – highest overall requirements. These variations have the most complicated fare structure changes and requirements, largest capital requirements, and largest service hour requirements.

Table 7-4: Deliverability and Operations Case Summary

	System Requirements and Considerations				**Infrastructure Requirements and Considerations**		**Operating Requirements and Considerations**	**Customer Change Requirements**		**Overall Relative Delivery Complexity**	**Overall Relative Risk**
	New Transfer Rules (multi agency)	New Fare Structure for GO	New fare Structure for Regional Subway Trips	New Revenue Allocation Approach	New Fare Gates	Expanded Fleet	Expanded Service Hours	Complexity of Change Management	Revenue Flexibility		
Variation A - Free Transfers	✓				N/A	55 new buses	450 hours per day	Low	Same as BAU	Low	Low
Variation B - Regional Trips Use Existing GO Fares	✓		✓	✓	All subway stations	40 new buses	320 hours per day	Medium (TTC customers)	Same as BAU	Medium	Medium
Variation C - Regional Trips Use Fare by Distance	✓	✓	✓	✓	All subway stations	65 new buss	540 hours per day	High (all GO +TTC)	Less flexible than BAU	High	High
Variation D - Regional Trips Use Zones	✓	✓	✓	✓	All subway stations	55 new buses	450 hours per day	High (all GO +TTC)	Less flexible than BAU	High	High

8

Business Case Summary

8 Business Case Summary

Business Case Summary

This IBC provides a summary of four potential integrated fare structure variations for the study area – spanning the Greater Toronto and Hamilton Area and systems that connect to GO Transit service in the Greater Golden Horseshoe. It was completed collaboratively with input from transit systems and the Ministry of Transportation (MTO).

Four variations (potential regional fare structures) were reviewed in this IBC to explore how different approaches to reducing transfer fees (between TTC+GO and TTC + neighbouring systems) reducing the higher cost of short distance travel on GO Transit, and aligning regional fares for regional trips (cross boundaries and are >10 km) could generate benefits for travellers and the region.

The general findings for fare integration (across the four variations included in this study) are shown in **Figure 8-1**, while **Table 8-1** provides a detailed summary by variation. This IBC will be considered alongside stakeholder feedback and MTO's review of governance, funding, and delivery to identify future steps for the fare integration program.

These findings should be reviewed alongside two key considerations:

- The four Variations tested minimize fare increases and, as a result, significant farebox revenue losses of $60 to $140m per year are projected. However, if structures with higher fares are considered in an effort to reduce overall farebox revenue losses, the benefits of the regional fare variations, including ridership on future transit investments, will likely be lower than those identified in this IBC.
- Fare Integration's benefits are likely to meet or exceed the benefits of many infrastructure projects – however these benefits can be realized with lower costs and delivery requirements and risk. In addition, fare integration is likely to enhance the benefits of the subway program and GO Expansion – the Full Business Case for GO Expansion also assumed fare integration would be in place upon operation.

Figure 8-1: Fare Integration Program-Wide Business Case Findings

Strategic Case

- Fare integration can make transit more affordable for 280,000 to 490,000 trips each day
- It can generate 25,000 to 40,000 net new trips per day (over 8-13 million trips per year) - this is more trips than many infrastructure projects under development
- It can add 30,000 to 160,000 more trips to GO Expansion

Economic Case

- The economic benefit of fare integration could range from $1.6 to $2.9 billion over the first ten years
- The cost to deliver fare integration ranges from $50 to $150 million over the next ten years (note: costs do not account for lost fare revenue)
- This results in a BCR of 5.5 to 8.5

Financial Case

- Fare integration could result in a farebox revenue loss of $60-$140 million per year
- Further analysis of funding options and revenue management will follow this business case

Deliverability and Operations Case

- Initial analysis suggests fare integration can be technically implemented and can build upon the current PRESTO upgrades
- It could be deployed in advance of the subway program and GO Expansion
- Further analysis on governance, technology, and phasing is required

Table 8-1 Initial Business Case Summary

Impact	**Variation A - Free Transfers**	**Variation B - Regional Trips Use Existing GO Fares**	**Variation C - Regional Trips Use Fare by Distance**	**Variation D - Regional Trips Use Zones**
Strategic Case				
Ridership Growth	+26,500 per day (8.1 million a year, 1.4% increase)	+25,000 per day (8 million a year, 1.3% increase)	+41,000 per day (12.9 million a year, 2.2% increase)	+39,000per day (12.3 million a year, 2.1% increase)
Simplicity - including degree of potential change to customer experience (for understanding fares and paying for transit)	Minor changes to customer experience	Moderate changes to customer experience	Major changes to customer experience – however structure for GO Transit may be perceived as more consistent	Major changes to customer experience – however structure for GO Transit may be perceived as more consistent
and transit travel time saved	2.7 million hours per year saved	6.3 million hours per year saved	7 million hours per year saved	9 million hours per year saved

Affordability and Equity	0% pay more / 14% pay less	1.2% pay more / 15 % pay less	0.4% pay more / 24.2 % pay less	1.3% pay more / 24.2 % pay less
Fiscal Sustainability (annual financial impact, cost per new rider)	$90 million/year	$60 million/year	$140 million/year	$140 million/year
	$10.95	$7.70	$10.90	$11.15
Future Ready (new daily trips in 2041)	+40,000	+26,000	+50,000	+60,000
Economic Case (million 2022 $)				
10-Year Benefits	$1,630	$2,130	$2,800	$2,860
10-Year Costs	$290	$280	$390	$340
10-year Benefit Cost Ratio	5.5	7.5	7.2	8.5
10-year net present value	$1,340	$1,850	$2,410	$2,520
Financial Case				
10-year Net Financial Impact	-$1,490	-$1,080	-$2,190	-$2,140
Deliverability and Operations Case				
Risk and Requirements	Low risk, low requirements	Medium risk, medium requirements	High risk, high requirements	High risk, high requirements
Overall Summary				
Lowest benefits	Intermediate benefits	Highest benefits	Highest benefits	Lowest benefits
Simplest technical requirements Intermediate revenue loss	Intermediate technical requirements Lowest revenue loss	Highest technical requirements Highest revenue loss (tie)	Highest technical requirements Highest revenue loss (tie)	Simplest technical requirements Intermediate revenue loss

Key Insights and Consequences and Trade-offs

Table 8-2 presents the key insights from this IBC with respect to the four fare structure variations.

Table 8-2: Variation Review

Variation	Key Findings	Trade Offs	What drives performances?

Variation A: Free Transfers	• Generates 26,000 (1.4%) trips per day • Reduces fares for 280,000 trips • Revenue loss of $90 million per	• **Pros** - Simplest to implement • **Potential Challenges** – high lost revenue, may incentivize use of slower or more crowded transit for longer trips (example: bus + subway)	• Removing the double fares for TTC+GO and TTC/neighbouring systems for all trips • This encourages use of transit on multiple systems, but also encourages some customers to switch from GO Transit to bus + subway, which increases crowding and increases revenue loss
Variation B: Regional Trips Use Existing GO Fares	• Generates 25,000 (1.3%) new trips per day • Reduces fares for 296,000 trips, raises fares for 28,000 • Revenue loss of $60 million per year	• **Pros** – addresses all three issues with minimum change and lower revenue impacts, lowest cost per new rider • **Potential Challenges** – deployment of fare gates on subway (increased time/budget), fare increases for some long-distance inter-city subway trips	• Removing all double fares and adding subway to the GO Transit fare structure for trips >10km that are between Toronto and York region • This grants similar ridership as Variation A but does not cause customers to switch from GO Transit to the now single fare bus + subway, mitigating some of the revenue loss in Variation A • The lower GO Transit base fare encourages use of GO Transit for short trips and yields greater time savings than Variation A
Variation C: Regional Trips Use Fare by Distance	• Generates 41,000 (2.2%)new trips per day • Reduces fares for 500,000 trips, raises fares for 11,000 • Revenue loss of $140 million per year	• **Pros** – highest ridership increase, • **Potential Challenges** – deployment of fare gates on subway (could increase time and budget to deliver), fare increases for some long-distance inter-city subway trips, highest revenue loss due to repriced GO Fare structure, reduced fare setting flexibility for GO Transit	• Same as Variation B, however the new fare by distance curve for GO Transit and regional subway trips (>10km between York Region and Toronto) leads to further revenue losses (this curve is set so no one pays more, and all regional trips are priced the same, this means some existing fares decrease) – this results in 1.6x the ridership gain for more than 2x the lost revenue the lost revenue of Variation B • 10-15% fare discount for some GO Transit customers drives higher ridership and other benefits compared to B (as well as higher revenue loss)
Variation D: Regional Trips Use Zones	• Generates 39,000 (2.1%)new trips per day • Reduces fares for 490,000 trips, raises fares for 29,000 • Revenue loss of $140 million per year	• **Pros** – higher ridership increase • **Potential Challenges** – deployment of fare gates on subway (could increase time and budget to deliver), fare increases for some long-distance inter-city subway trips, highest revenue loss due to repriced GO Fare structure, reduced fare setting flexibility for GO Transit	• Same as Variation C, however the new fare by zone approach for GO Transit and regional subway trips (>10km between York Region and Toronto) leads to further revenue losses (zones are priced so no one pays more, and all regional trips are priced the same, this means some existing fares decrease) – this results in 1.6x the ridership gain for more than 2x the lost revenue of Variation B and some additional time savings as more travellers switch to GO • 10-15% fare discount for some GO Transit customers drives higher ridership and other benefits compared to B (as well as higher revenue loss)

Closing

There is a clear strategic and economic Case for advancing fare integration:

- It can generate an additional 25,000 (Variations A-B) to 40,000 (Variations C-D) trips per day.
- It is anticipated there are 90,000 to 140,000 trips per day that could use GO Transit, that are supressed due to either the high GO Transit shore distance fare or the double fare. Analysis notes that 31,000 of these potential boardings are realized through removing the double fare while an 80,000 to 120,000 of these boardings can be captured with a lower base fare and integrated pricing for regional subway trips an GO Rail.
- By 2041, it is anticipated that fare integration could generate up to 60,000 new transit trips per day. It could also augment the success of the GO Expansion program by increasing GO Rail boardings by 30,000 to 160,000, increase subway boardings by 52,000 to 142,000, and add 44,000 to 320,000 bus boardings across the municipal systems each day.
- Fare Integration can also encourage travellers to make use of faster transit – where available- resulting in travellers saving 2.7 million to 9 million hours each year. This means less time in congestion and less time spent travelling to work, recreation, and other activities.
- As more travellers choose transit, the region's highway and road network could see significant decongestion ranging from 140 million to 240 million fewer automobile vehicle kilometres travelled per year, resulting in fewer collisions and GHG emissions as well as up to 1.4 million hours saved by drivers per year.
- The current fare structure in the region has significantly higher fares for trips using TTC+GO, TTC + neighbouring systems, and GO Transit for trips <10 km. Fare integration can address these fare barriers, resulting in fare reductions for 280,000 to 500,000 trips paying a lower fare each day.
- Combined, these and other strategic benefits carry a value of up $1.6 to $2.9 billion in socio-economic value (2022 $) over the first ten years of fare integration (see Table 8-1). These benefits are realized through an investment in $280 to $340 million in PRESTO software, fare gates, new buses, and new bus service, resulting in a BCR of 5.5 to 8.5 and a NPV of approximately $1.3 to $2.4 billion.

The requirements for the program have been scoped at a high-level in this IBC in the Financial Case and Deliverability and Operations Case. Combined, these chapters note that the level of benefit described above can be realized with:

- A $60m (Variation B) to $140m (Variations C-D) per year in lost revenue and $50m to $150m in capital and operating costs over the next ten years. If the fare structure is priced for a lower level of revenue loss, then the benefits will also decrease.
- Upgrades to the in-delivery PRESTO account-based technology and varying degrees of capital requirements, new buses, and new bus service hours. No major technical fatal flaws or technical delivery issues have been identified in this analysis. Further work in the next steps of the Business Case will refine technical requirements of PRESTO and how the PRESTO Modernization program can support Fare Integration policies.

How does FI compare to other investments?

The strategic and economic benefits of fare integration are comparable to major infrastructure projects (for example the Hazel McCallion Line and Eglinton Crosstown generate 10,000 to 17,000 trips per day) and require significantly lower capital investment and delivery requirements.

The benefits of fare integration could be worth $1.6 to $2.9 b over the next ten years alone – these benefits include monetized time savings for transit users, drivers and passengers, and society as a whole (due to fewer collisions and reduced emissions). These benefits are comparable to the socio-economic benefits generated by most rapid transit projects – **however, unlike these major infrastructure projects, fare integration can deliver these benefits in 10 years instead in of in 60 years.**

Next Steps

IBCs are the first stage of Metrolinx's business case lifecycle. Subsequent analysis should consider the following key questions:

- How far should fare integration go? Should it include free transfers (Variation A), applying the existing GO Fare structure for longer distance 'regional subway trips' between cities, and greater than 10 km (Variation B), or completely transform the fare structure for regional trips (Variation C and D)?
- How could fare integration be phased and delivered? For example, it could be phased from A to B, B to C/D, A to C/D, A to B to C/D, or starting with C/D. Note that C/D are different transformations of the GO structure to achieve similar goals and typically would not be delivered in sequence; they are considered mutually exclusive.
- What governance, funding, and revenue allocation models could be used to deliver fare integration?
- What barriers and enablers of success for fare integration need to be monitored?
- What are the specific agency and customer impacts of the Variations?
- How can fare integration be delivered alongside service integration and how do these programs influence each other?