METROLINX

March 1, 2018

Attachment A

Technical Report:
GO Expansion RER New Stations Business Case Analysis

Executive Summary

As the regional transportation authority for the Greater Toronto and Hamilton Area, Metrolinx is successfully advancing the delivery of an integrated multi-modal transportation network. This vision is laid out in the GTHA Regional Transportation Plan (RTP) and identifies GO expansion Regional Express Rail (GO RER) as important to meet the region's rapid growth. Electrified trains running every 15 minutes or better, all day and in both directions, throughout the network, will dramatically transform the way this region moves.

The Province of Ontario has committed $16 billion through the Moving Ontario Forward plan to support priority rapid transit projects in the GTHA, including commitments to the capital costs of GO Regional Express Rail (GO RER). The commitment to GO RER in 2015 created an opportunity to take a system-wide approach to the addition of new stations. New stations can be catalyst for new development, improve overall access to employment opportunities and provide travellers with increase convenience.

A business case analysis is used by Metrolinx to evaluate potential transportation investments in a consistent and informed manner. The business case analysis is focused on transit benefits and costs which are complementary to other factors that are used in decision-making such as broad economic objectives, increased economic activity, employment benefits, equity etc. Each business case is developed using the same framework to ensure a flexible, consistent and comparable approach across a wide range of investments. An overview of Metrolinx's business case approach can be found at:
http://www.metrolinx.com/en/regionalplanning/projectevaluation/benefitscases/benefits_case_analyses.aspx

Business cases progressively follow the lifecycle of a project, beginning with an initial business case. This Technical Paper contains the Preliminary Design Business Cases for twelve station locations and updates to Initial Business Cases for five station locations.

Since 2015, in a two-step process, Metrolinx considered 120 potential GO station locations and working with local municipal officials, reduced this to 17 potential station locations. In 2016, each of these 17 locations underwent Initial Business Case (IBC) analysis and twelve of these station locations were advanced to the Preliminary Design stage.

Since 2016, the GO RER program has progressed significantly. Key policy, infrastructure and operational details have been confirmed. This increased level of scope definition has informed the business case work. Based on the current Preliminary Design Business Cases in this Technical Paper, all twelve station locations, including six stations that are part of the City of Toronto SmartTrack program, have seen improved benefits that are greater than costs.

From the other five station locations where, Initial Business Cases were done in June 2016, the Park Lawn station location has benefits that are greater than costs and therefore should advance to the next stage for Preliminary Design Business Case.

Strong evidence-based decision-making is a key enabler to the selection and effective delivery of the required infrastructure to support the Metrolinx mandate to transform mobility in the GTHA.

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1. Benefits Management and the Business Case Life Cycle

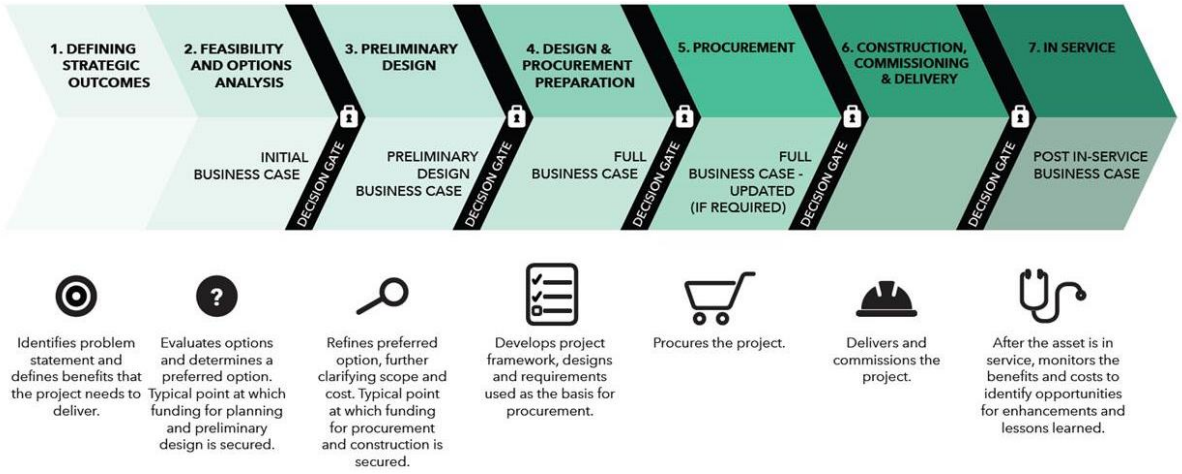
Metrolinx has a mandate to advance an integrated multi-modal transportation network in the Greater Toronto and Hamilton Area (GTHA). Strong evidence-based decision-making is a critical requirement to ensure that Metrolinx can provide sound advice on transportation investments. Business case methodology has been maturing over the last decade. Business case analysis, is now more deeply embedded at Metrolinx through corporate policy and practices and executive decision-making.

Business cases for investments in public infrastructure such as high-order transit look at several different options within the context of a broad range of considerations, including:

- transportation user benefits compared to the financial impact;
- value for tax-payer dollars;
- socio-economic and environmental benefits of the various alternatives;
- impacts that a project has on surrounding communities; and
- alignment with the public policy objectives.

Business cases are progressively more detailed and are done at four stages of the project life cycle (see Fig 1). At each stage they incorporate new information as the project develops and evolves.

Figure 1: Business Case Analysis in the Project Lifecycle



In the project life cycle business cases identify options for solving a problem/opportunity through a four-case analysis: Strategic, Economic, Financial, Operations and Deliverability. The business case selects a preferred option for a project for further refinement and design. The Initial Business Case (IBC) compares strategic investment options and selects preferred options for further refinement. IBCs are an important tool to ensure major transportation infrastructure investments are comprehensively assessed and achieve the goals and objectives of the Regional Transportation Plan. Following an IBC, the next stage in the project life cycle is the Preliminary Design Business Case (PDBC). For more information on business cases, please refer to the Business Case Overview document at the following address:
http://www.metrolinx.com/en/regionalplanning/projectevaluation/benefitscases/Business_Case_Overview.pdf.

2. Three Key Advancements

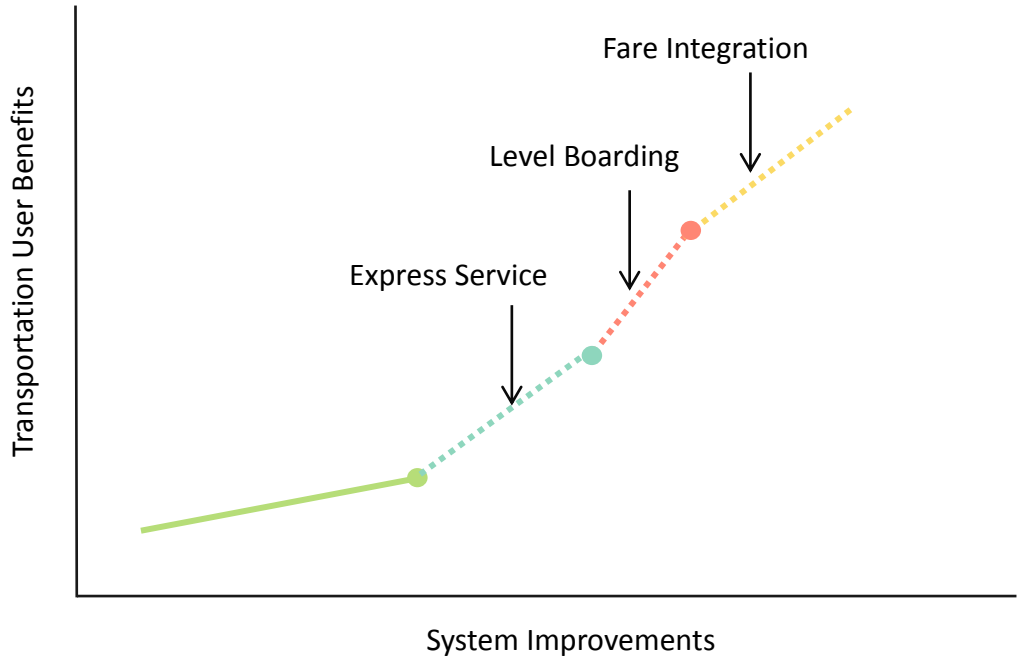
As the GO RER program has advanced, opportunities for Metrolinx to optimize investments and improve overall network efficiency continue to be studied. The current business case analysis (both PDBC and IBC levels) takes into consideration a lifecycle (60-year) view of stations, assessing station performance outcomes for opening day infrastructure and services, as well as initiatives that are anticipated to come online over the lifecycle of a station. The following three system-wide initiatives have been considered in the current business case analysis as they have the potential to significantly benefit overall network performance:

- Express (Non-Stop) Services
- Level Boarding
- Fare Integration

While assumptions have been made to incorporate these initiatives in the station business cases, each initiative is being evaluated and assessed on its own merits through independent business case analysis. These inputs will be integrated with the GO RER Full Business Case currently being developed. Inputs will also vary in terms of timing, phasing and details of implementation, which will impact how they affect the system and individual station performance. Specific details and implementation decisions will be confirmed as part of the GO RER Full Business Case.

Each of these inputs apply to the entire network, the business case for each station is evaluated under the assumption that these key advancements are in place. The question being posed through the PDBC is *How would the station perform if express service, level boarding, and fare integration were in place?* This also means though, that system-level and programmatic costs and benefits are allocated to the overall program and not to the individual station.

Figure 3: Cumulative benefits of potential system improvement scenarios (illustrative, not to scale)



Results suggest that the transportation user benefits trend upwards as these advancements are included in the analysis (see figure 3 below). Reducing upstream impacts (via express service levels) result in significant positive trends for some of the Barrie and Stouffville Stations, reduced dwell times (via level boarding) results in a positive trend at all stations, and the removal of fare barriers (via fare integration) results in a positive ridership trend especially for Toronto stations.

These three advancements included in the model assumptions are: the use of express services, in the same way that other jurisdictions do; the introduction of level boarding; and removing fare barriers. In all the cases the benefits have increased.

- An all-stop service (as in the IBC) means that the upstream riders are delayed at every new station, which is a negative economic benefit. This negative benefit is compared to the positive economic benefit from the new riders joining at the station and the time savings they will make from using GO. It is much more optimal to have an express service (rather than all-stop) that selectively stop at those stations and at those intervals when the new riders joining would be substantial enough to justify the stop. This is best practice in service planning in all jurisdictions.

- By the same logic of minimizing the time of every stop at every station by implementing level boarding (as opposed to low platforms and a delay from stepping up/down and positioning the train) reduces the negative impact of the station on the economic benefits of the upstream riders.

- The business cases now assume that all fare barriers have been removed with an integrated fare system in place. The economic benefits of fare integration are estimated to exceed the cost by a factor of 12 (i.e. a BCR or Benefit Cost Ratio of 12).

2.1 Future Service Patterns

Express (non-stop) and tiered service patterns typically have trains serving outer stations. They typically run non-stop past inner stations which are served for by other trains. Such tiered service patterns impact business case assessment in the following key ways:

- **Reduces the number of upstream riders** that need to travel through the station. Upstream users that are travelling through may now choose to use a faster express train to reach their destination. This reduces upstream delays and the number of riders that switch to other modes. This will have a positive impact on station performance.
- **Reduced train frequency** at stations without express service (i.e. trains that previously stopped at the station can now skip some stations). Riders may also divert to stations with express services resulting in a negative impact on station performance.

As the GO RER service plan is still evolving, a conceptual service plan has been developed for modelling purposes only, which considers the following express or tiered inner/outer service concepts on the Lakeshore West, Barrie and Stouffville corridors.

- Lakeshore West corridor: Alternating trains with bi-directional 15 minutes service on the corridor with stops at Mimico and Park Lawn stations. Mimico and Park Lawn stations would therefore receive 30 minutes service inbound and outbound all day.

- Barrie corridor: Outer service stopping at all stations between Allandale Waterfront and Aurora; trains will also stop at Downsview Park and Spadina stations, otherwise, express to Union Station. Inner services will serve all stations between Union Station and Aurora
- Stouffville corridor: All-stop peak direction outer service between Lincolnville and Unionville stations; trains will also stop at Kennedy and East Harbour stations, otherwise, express to Union Station. "Inner" services will stop at all stations between Unionville and Union Station.

2.2 Level Boarding

Metrolinx is currently preparing an Initial Business Case (IBC) for level boarding across the GO rail network. The dwell-time savings of level boarding are significant. The run-in and dwell time at stations built for level boarding is expected to be reduced by at least 30 seconds. Riders can board and alight more easily and efficiently. Dwell times will be reduced as it will not be necessary to deploy the accessibility ramp, although use of the accessibility ramps may need to continue during a transition period at stations not equipped for level boarding, until they are modified. All new stations are anticipated to be built for level boarding from the outset. This reduces the impact on upstream riders, taking the incremental trip time impact from 2 minutes down to about 1.5 minutes. On the TTC subway for example, which has always had level boarding, station dwell times can be 15 seconds or less.

2.3 Fare Integration

The business cases also considered the impact of removing the fare barriers between GO and municipal operators for all transit trips (i.e., a specific journey would cost the same whether a passenger takes GO or TTC and could transfer between the systems at no extra cost). The PDBCs also consider what ridership that could be achievable if fare did not factor into a transit rider's choice between transit options in Toronto. This scenario can be considered a test of what may happen to station ridership and economic benefits if a specific journey cost was the same whether a passenger takes GO or TTC and could transfer between the systems at no extra cost.

Removal of fare barriers has a positive impact on the business case analysis through increased station ridership, particularly in markets where the TTC provides a competitive alternative to GO and the existing fare differential with GO is significant. For modelling purposes transit riders are simply provided with the option to choose GO if it is a more convenient option for all or part of their trip. Ridership uplift at the new station includes both riders that are new to GO and riders that would have already been using another GO station with an integrated fare system in place.

3. New Stations Business Case Analysis

The overall methodology and approach to modelling used in carrying out the business case analysis is consistent with the approach used in undertaking the 2016 IBC's and has been independently peer-reviewed and validated. In particular, the current business case analysis measures and captures the same key benefits (e.g. new station users benefit from the station) and impacts (e.g. delays to upstream riders due to the station). The current business case analysis for new stations take advantage of updated input information, including GO rail service assumptions, land use, connecting rapid transit infrastructure, and a refined approach to ridership forecasting and modelling.

The analysis also takes a long-term view by considering the opening day infrastructure and service, together with system-wide initiatives that are anticipated to come online over the lifecycle of a station investment. See Section 2 for more details.

3.1 Analytical Differences between IBC and PDBC

What also differentiates the IBC level analysis from the PDBC level analysis is the level of design detail informing the modelling work including scope and cost estimates. PDBC level of business case analysis reflects additional design details and Class-3 cost estimates that provide greater cost certainty. The five proposed station locations with Updated IBC level of analysis, utilize station designs that are mostly unchanged. Higher level of contingency and other allowances has been applied as is appropriate for this level of costs certainty. Both PDBC and IBC analyses cost estimates for the economic cases exclude the cost of property.

3.2 Analysis Methodology

The economic and financial cases for each new station depend on forecasts of how travellers will respond to the presence of a new station. Stations can support increased system ridership by providing a new access opportunity that may be closer to household locations and employment, school, or other travel destinations. Individuals who use the new station benefit by saving time relative to their previous travel option – travelling farther to another GO station, or using a different transport mode such as subway, bus, or auto. Existing GO passengers that do not use the station, on the other hand, can be delayed if they travel on a train that now stops at the new station. Examining travel time savings, delays, and modal shifts is the focal point of the business case analysis.

As summarized in Figure 2, the following key benefits and impacts are identified for each station:

Benefits

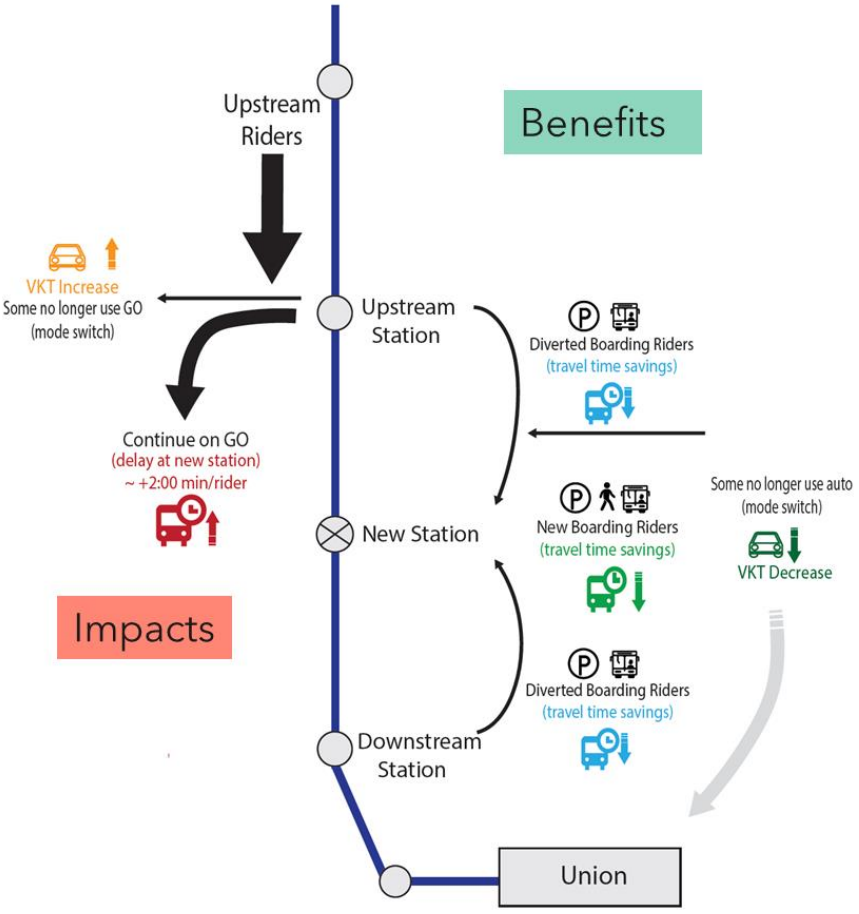
- Travel Time Savings for New Station Users
    - The new station provides a new connection that can provide a faster route between a rider's origin and destination. This includes riders that previously did not use GO Rail and existing GO Rail riders that would choose to switch to the new station. New station users save time and these travel time savings are monetized in the economic analysis.
- Auto Usage Decrease
    - A proportion of the new GO Rail users at the station would have previously used the automobile for their trip. This type of modal switch results in a reduction in automobile vehicle kilometres travelled

(VKT), which has environmental, safety, congestion, and auto operating cost reduction benefits. These benefits are monetized in the economic analysis.

Impacts

- Delays to Upstream Passengers
  - Most upstream riders continue to use GO Rail even if they happen to be delayed by the new station (extra time required for the train to slow down, stop and get back up to speed). These travel time delays are monetized in the economic analysis and offset the time savings benefits to new station users. These delays vary depending on the new station's location on the GO Rail network; stations located closer to Union generally impact more upstream riders.
- Auto Usage Increase
  - A small proportion of upstream GO Rail riders may switch to other modes (i.e. subway, bus, or auto) due to the delay from the new station. The number of individuals that shift to another mode depends on how competitive GO Rail is with other transit options and auto travel. The number of upstream riders that switch to the automobile would cause an increase in VKT, which has environmental, safety, congestion and auto operating cost impacts. These VKT increases offset the VKT reductions associated with auto usage decreases from new station users.

Figure 2: New Station Benefit and Impact Analysis



3.3 Modelling Approach

The Greater Golden Horseshoe Model (GGHM) version 3 regional travel demand model has been applied to support the assessment of the benefits and impacts for each proposed new station site. The model is a standard practice four-stage regional travel demand model that has been used as part of past major regional planning and rapid transit business case studies. The GGHM is also being used to generate key ridership growth inputs to the overall Full Business Case for GO Expansion. The direct use of the GGHM ensures greater consistency between these two related work streams.

The GGHM is a proven tool that forecasts ridership and complements the spreadsheet-based analysis used for the IBCs undertaken in 2016. The model generates 2031 AM peak period forecasts (expanded for economic analysis over a 60-year period) using land use and the regional transportation network as key inputs.

As part of the 2016 IBC, the GGHM was applied in a more limited manner to grow observed 2013 GO Rail ridership data to a 2031 forecast horizon year using line level growth rates. The primary benefits of more fully utilizing the GGHM travel demand modelling tool are as follows:

- **Network-Based Assessment**: The model includes a GGH-wide representation of the regional transportation network including both roadway and transit networks across all modes (i.e. GO Bus, GO Rail, subway, LRT, and other local surface transit). This allows for a more fulsome comparison of the attractiveness of the new access opportunity provided by each new station relative to competing transportation modes. The model also provides the opportunity to account for key changes to the rapid transit system resulting from, the recently opened Toronto York Spadina Subway Extension (TYSSE), the Eglinton Crosstown LRT currently under construction, and, the planned Scarborough Subway Extension.

- **Population and Employment Growth**: The model generates forecasts of future trip-making and ridership using traffic zone level future population and employment projections as an input. As noted in more detail below, municipally provided population and employment forecasts have been used as a starting point for the PDBC analysis. Station ridership is highly influenced by development patterns around station sites; AM peak alightings depend on nearby employment and school destinations while AM peak boardings come from nearby residential areas particularly for stations without Park-and-Ride provisions.

The GGHM v3 has been used as the starting point for most inputs to the PDBCs economic and financial analysis, including station ridership, travel time savings, and modal shift/auto usage changes. Expanded usage of the GGHM introduces greater complexity but also allows for the independent verification of key IBC assumptions related to ridership, travel time savings, and VKT. All model outputs have been carefully reviewed and compared against the IBC assumptions and benchmarks for reasonableness.

3.4 Business Case Inputs and Assumptions: Modelling & Forecasting

3.4.1 Land Use

The forecasted growth in population and employment across the region is a fundamental input to the GGHM's projections of future trip making and transit ridership. Over 3,000 traffic zones are used by the model to capture both the intensity and distribution of population and employment growth across the GGH. The model can capture the impacts of proposed growth near station sites and broader growth in surrounding areas. This is an

important change relative to the IBC since it allows the PDBCs to consider the impacts of proposed development on station ridership.

Population and employment inputs at the traffic zone level relied on municipally-derived forecasts from past forecasting work as a starting point. New information was provided by municipalities and utilized as a direct input to the model including Kirby and Hwy 7/Concord station area development provided by the City of Vaughan, and Citywide traffic zone level forecasts provided by the City of Toronto (including zones near station areas and the rest of the city).

Where explicit new information was not provided, the model's population and employment forecasts were reviewed against the IBC's assessment of the development potential and intensification for surrounding areas (i.e. anticipated Population + Jobs / ha within 800m of the station site). Modelled traffic zone level forecasts were updated to reflect the high-end of the Population + Jobs / ha range where applicable.

The same land use has been assumed to be in place both in the Base (without station) and the With Station scenarios. This is a conservative assumption that allows for a consistent basis of comparison between scenarios.

3.4.2 Regional Transit Network

When considering the entire network, the model assumed the latest available GO Expansion service concept in place, including electrification and 15-minute or better all-day service on the Lakeshore East and West, Stouffville and Barrie lines. The rapid transit and local transit network was assumed to include Toronto York Spadina Subway Extension, including Downsview Park GO station; Eglinton Crosstown LRT, including Caledonia and Mount Dennis GO stations; Scarborough Subway Extension (one stop to Scarborough Centre); Sheppard LRT and Finch LRT; and York Viva BRT

In terms of the connecting local transit network, changes were made in response to major rapid transit projects and a targeted review of local transit connections to station areas based on municipal input. This review was focussed on making sure that appropriate connections to local transit were provided where expected. For example, the buses serving the Lawrence Avenue East corridor were reviewed and confirmed to have higher frequencies of at least three minutes.

3.4.3 GO Expansion Service Concept

The most current working GO Expansion service concept was used as a starting point for all analysis. This includes electrification and 15-minute or better, all day service on the inner stations of the Lakeshore East, Lakeshore West, Kitchener, Stouffville, and Barrie lines. Outer stations of these corridors receive less frequent two-way all-day services. The GO EXPANSION scenario also reflects the June 2016 announcements by the Province regarding additional GO rail extensions.

The modelled GO Expansion service concept introduces potential express or inner/outer service patterns on the Barrie and Stouffville lines (see Section 2 for details) whereas the IBC analysis only considered express services on the Lakeshore East, Lakeshore West, and Kitchener corridors, which have long sections with three and four tracks. Express services play an important role in reducing travel times and limiting delays. The rail network service planning will continue to evolve as engineering designs and program requirements are confirmed.

3.5 Business Case Inputs and Assumptions: Costing & Station Design

3.5.1 Costing and Station Design

PDBC stations

Since the completion of the IBCs, Metrolinx has continued with the design development for the 12 approved stations. The designs for these twelve stations have advanced to the Reference Concept Design (RCD) stage, based upon which Metrolinx developed a Class-3 cost estimate for the stations. These indicative estimates are based on unit-pricing for major station components and materials (e.g. volume of concrete required for platforms or surface areas to be paved with new asphalt). As station designs are able to be further refined, it will allow for a transition from a unit cost analysis to a more elemental cost analysis based on specific requirements and assumptions, and higher degree of cost certainty. In general, though the costs have increased since the 2016 IBCs. Major differences in the costing can be attributed to:

- site-specific analysis of property costs, including indirect costs associated with the property acquisition process;
- additional analysis into site specific technical constraints, including third party utilities and heritage considerations;
- additional track and station infrastructure to support new service and operations initiatives, such as express service and level boarding;
- temporary track diversions, shoring works and phased construction methods to minimize road and rail operational disruptions during construction;
- additional scope items identified through the design development, such as rail signal modifications and additional track realignments;
- additional requirements from emerging Metrolinx standards and guidelines, including Design Excellence and Customer Experience focused elements such as canopies along the full length of the platform;
- requests from local municipal stakeholders, such as infrastructure required to provide enhanced connectivity with adjoining communities across the rail corridor and connections from the station building to the City of Toronto's PATH network.

The Class-3 cost estimates include all works that will be undertaken at each site through a common procurement/ construction contract. For the financial and economic analyses, costs were further refined to derive a cost estimate for the base station including those elements required to implement a fully functioning station, to meet Metrolinx's Design Requirements Manual (DRM), 2016 GO Rail Station Access Plan, and emerging station design excellence guidelines.

3.5.2 Operating Costs

Operating costs take into account direct station operating and maintenance costs (such as elevator maintenance, platform snow removal, etc.), station attendants, additional labour on trains resulting from longer run times, additional energy required for train acceleration, and additional wear on train brakes. These costs represent the bulk of new costs that would be attributed to a new station. Further costs related to wear and tear on the trains resulting from increased ridership are not anticipated to be significant.

3.6 Business Case Inputs and Assumptions: Strategic & Policy Context

3.6.1 Service and Fare Integration

Since the 2016 IBCs, progress continues on the work Metrolinx and transit agencies across the GTHA are undertaking toward a consistent and seamless approach to transit fares and service in the region. The PDBC analysis assumes:

- introduction of Presto on all TTC services across the City of Toronto;
- the current discounted double fare agreement between the City of Toronto and Metrolinx – a $1.50 discount is applied when an adult Presto user's journey includes both a TTC and GO segment;
- the planned TTC 2-hour transfer to make the TTC more aligned with 905 transfer policy, planned for implementation in August 2018; and
- progress by all transit agencies on addressing removal of fare barriers and improved service integration.

As a starting point, the base fare structure as of December 2017 is assumed for the PDBC analysis. A future looking full fare integration scenario was also tested to examine impacts on ridership and the overall economic case for each station where no fare barriers exist, as described further in Section 3.0.

3.6.2 Environmental Factors

Environmental conditions around the station sites were reviewed to reflect any changes since 2016. Changes to environmental conditions were examined on a site-by-site basis.

See Appendix I and II for specific details about each station site.

3.6.3 Provincial Plans

The Growth Plan for the Greater Golden Horseshoe (2017) was prepared and approved under the Places to Grow Act (2005) and took effect on July 1, 2017. The 2017 Growth Plan sets out a broad vision for where and how to grow within the Greater Golden Horseshoe (GGH) with a focus on increasing density along priority transit corridors and around major transit station areas.

Density targets for major transit station areas on priority corridors that are served by the GO train will be planned for higher densities than in the past, with a minimum density target of 150 residents and jobs combined per hectare. Land uses that would adversely affect the minimum density targets are to be prohibited. The Province may, later, identify additional priority transit corridors and planning requirements for major transit station areas on priority corridors to support the optimization of transit investments across the GGH.

3.6.4 Municipal Plans

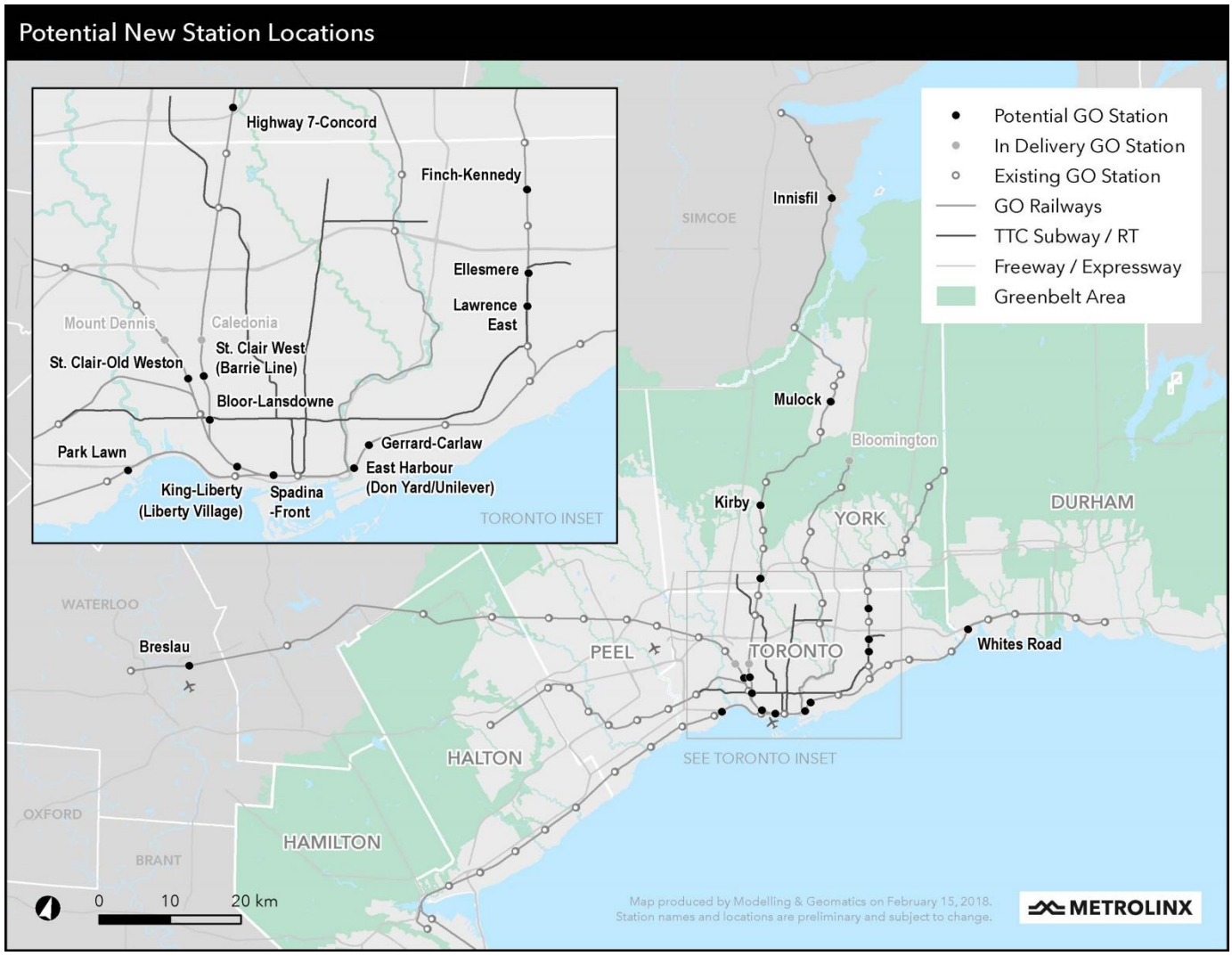
Municipalities in the GGH are required, under the Planning Act and Places to Grow Act, to bring their official plans into conformity with the Growth Plan by 2022. The municipal drive to conformity with the Growth Plan (2017) in the coming years will result in changes to planning and densities along GO corridors. All regional and municipal Official Plans are currently in different stages of being updated.

In undertaking the PDBCs, Metrolinx worked with the Province and municipalities to ensure that their most current information on land use, planning controls, new developments and transportation planning (including the

future of local transit service and details around committed service expansion) for the station catchment areas were reflected.

In most of cases, municipal planning information incorporated into the PDBC and updated IBC modelling was based on plans in preparation by the municipalities. This is consistent with the overall approach and reflects the Growth Plan and other provincial directives in the PDBCs. PDBC assumptions around new ridership would increase where more optimistic growth projections and density targets could be applied based on the significance of the GO service expansion proposed.

Context Map: Proposed New Station Locations



Appendix I: Preliminary Design Business Cases

1. Bloor-Lansdowne

1.1 Description

The proposed Bloor-Lansdowne station is located west of the intersection of Lansdowne Avenue and Bloor Street, along the Barrie GO corridor, in the City of Toronto. The location was selected based on policy direction in the City of Toronto's Official Plan. The station site is located in a mixed use area, which is slowly transitioning from its former industrial character to a more residential one. The site is surrounded by medium-density residential buildings and low-density employment/ commercial uses. There are also vacant and underused properties around the site with redevelopment potential.

The scope of work at the planned rail-to-rail grade separation of the Davenport Diamond (intersection of CP and Barrie GO corridors) includes a multi-use path beneath and along the eastern side of the overpass, from Davenport Road to Bloor Street. The path is planned to continue south beside the east platform, connecting to the West Toronto Rail Path (WTRP) at Dundas Street. The path provides a connection between the GO station and Lansdowne subway via Wade Avenue.

1.2 Station Concept

Following the Initial Business Case evaluation in Spring 2016, the station was recommended by the Metrolinx Board of Directors on June 28, 2016. In Fall 2016, the City of Toronto confirmed the location, general design concept and support for station. The Metrolinx Board committed to include the station as part of the GO Expansion RER program procurement on December 8, 2016. Through 2017, Metrolinx engaged with the City and internal stakeholders to refine the IBC station concept plan. Metrolinx worked closely with the City to develop the design based on ongoing operational needs assessment, pre-environmental assessment studies, workshops, discussion, and a technical advisory committee process. Design changes are ongoing in coordination with stakeholders.

Since the Initial Business Case concept illustration (2016), the station design has been modified to:

- Supplement the environmental assessment of the Davenport Diamond Grade Separation to include a multiuse path connection, new pedestrian bridge over Davenport Road to Earlscourt Park
- Coordinate alignment of the Barrie Corridor tracks and electrification infrastructure through the station project
- Construct a multi-use path along the east edge of the rail corridor to connect north of the Bloor Street.

1.3 Business Case

1.3.1 Strategic Case

The station continues to align with municipal and regional land use and transportation policies and is supported by the Toronto Official Plan and the *Dundas West Gateway Hub*. Since June 2016 no significant changes to land use in the surrounding area have been identified.

The station continues to facilitate integration between the GO and TTC networks. A future at-grade connection to Lansdowne subway station is planned and there is an opportunity for the future development fronting Bloor Street between the rail corridor and Lansdowne Avenue to provide a higher-quality pedestrian link to Lansdowne subway station. A high quality connection to Wade Avenue is proposed as part of the station's opening day

condition, and a setback area along Wade Avenue to improve multi-use path/station connectivity and visibility is being investigated through the design of the station.

Boardings at the station are expected to primarily use walking and transit access modes. Many of the recommendations in the 2016 GO Rail and Station Access Plan for walk and cycle access call for close collaboration with the City of Toronto. A new pedestrian bridge over Davenport Road to Earlscourt Park would provide connectivity to potential future trails at the park site.

The model's ridership forecasts indicate that the Bloor-Lansdowne station could attract approximately 8,500 daily riders by 2031. The total includes new and existing riders that would switch from other stations on the Barrie corridor, or Bloor station on the Kitchener corridor.

The model also shows that the majority of forecasted trips would be inbound Barrie corridor riders that transfer to the Lansdowne TTC subway station and continue their journey on the Bloor-Danforth (Line 2) subway. A high quality connection between these stations station will have an impact on the attractiveness of the transfer. The station would provide a new outbound connection to the Barrie corridor, allowing Toronto residents to connect to employment locations in York Region.

1.3.2 Financial and Economic Case

	Bloor-Lansdowne
2031 Ridership (AM Peak Period) boardings + alightings	2,200
2031 Ridership (Daily) boardings + alightings	8,500
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive but Less Than Costs**
Transportation User Benefits (60yr lifecycle)	**$11 M**
Travel Time Savings	**-$4 M**
Vehicle Operating Cost Savings	**$12 M**
Decongestion or Road Network	**$2 M**
Safety Impacts	**$1 M**
Environmental Impacts	**$0 M**

The introduction of express service would have a significant role in reducing the number of upstream users that are impacted by Bloor-Lansdowne station. However, the introduction of express services would also results in a reduction in ridership at Bloor-Lansdowne, due to the less frequent train service.

The model results suggest that the majority of the riders at Bloor-Lansdowne station would be existing users who would otherwise use another station. New riders at the station would have previously used their automobile or taken local transit to reach their destination. The mode shift results in a decrease in vehicle kilometers travelled (VKT), which results in auto network decongestion, auto operating cost, and environmental benefits.

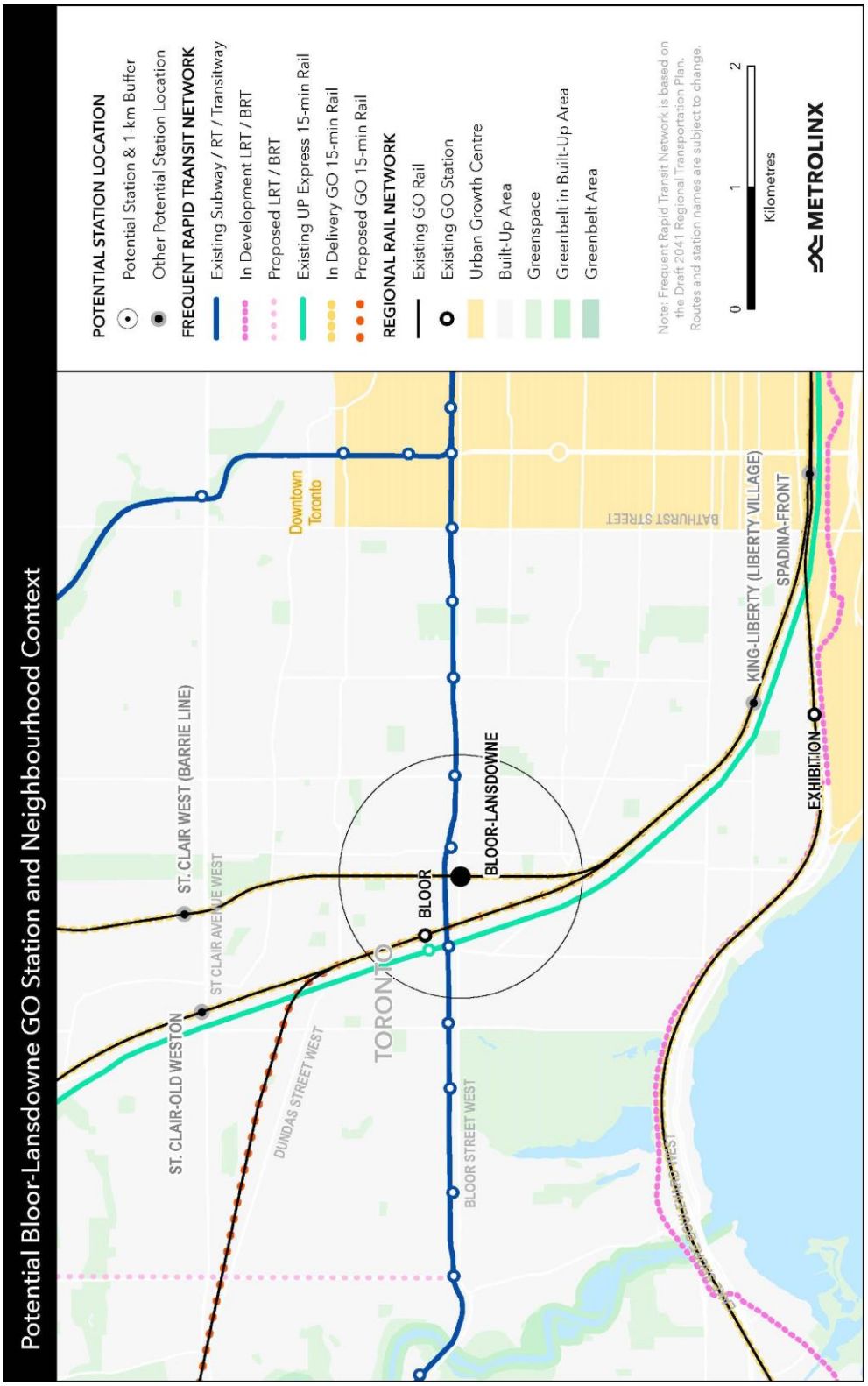
The model indicates that transferring users at Bloor-Lansdowne connect to a range of destinations, particularly west to Etobicoke and Mississauga via the TTC subway Line 2, and to the north along the Barrie corridor in York Region. The Barrie corridor's Downsview Park station can also be used as a direct connection to the subway system. In terms of travel time savings, the primary consideration is the amount of time that the new station saves relative to a previous transfer at Downsview Park, which would require an additional transfer to the Bloor-Danforth line at Spadina or St. George station. Local area users destined for downtown Toronto would save less time.

1.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- The grade separation and the track gradient north restrict the location of the station to south of Bloor Street.
- Due to the location of the multi-use path, between the eastern platform and the main station building, there is a potential for conflict between trail users and passengers accessing the platform. The interface between trail and station requires further examination in the detail design phase, including implementation of traffic calming areas.
- Track alignment will require coordination with the Barrie Rail Corridor Expansion (BRCE) project in order to accurately place the platforms. Two tracks are considered in the BRCE Environmental Assessment and being planned within the rail right-of-way.
- Staging the construction is needed between the BRCE and Davenport Diamond Grade Separation.
- GO Expansion RER track work will need to account for the demolition and construction of the rail bridge over Bloor Street while maintaining operations of one set of tracks. Closures may be required and defined as the design progresses.
- Additional property acquisition may be required to provide access and staging for construction west of the rail corridor since Contractor would not have access to the staging area east of the rail corridor in order to maintain rail corridor operational during construction.
- Due to City Planning requirements and site constraints, limited passenger pick-up and drop-off will be provided - this may result in ad hoc drop-offs in and around the station. Mitigation measures and further dialog with the City of Toronto is required to ensure impacts to surrounding road networks are minimized.
- A signal mast is required approximately 15m north of Bloor Street.
- Freight restrictions or alternative routing should be considered to address operational concerns and physical constraints through this corridor.

1.4 Proposed GO Station and Neighbourhood Context Area



2. Breslau

2.1 Description

The proposed Breslau station is located along the Kitchener GO corridor west of Greenhouse Road and south of Highway 7 in the Township of Woolwich. The station site is designated as "urban area" and "proposed GO station" by the Town, with the surrounding area intended to accommodate a range of low to medium density residential and non-residential uses. Approximately half of the lands (primarily to the south and east) within an 800m radius of the site will remain undeveloped as they are within an environmental protection area. A transit oriented development (TOD) is under construction directly north of the station.

2.2 Station Concept

Following the Initial Business Case evaluation in Spring 2016, the station was recommended by the Metrolinx Board of Directors on June 28, 2016. The Township of Woolwich and Region of Waterloo confirmed the location and general design concept and the Metrolinx board committed to include the station as part of the GO Expansion RER program procurement on December 8, 2016. Through 2017, station design has progressed based on pre-environmental assessment work, workshops, discussion, and a technical advisory committee process with stakeholders. Design changes are ongoing in coordination with stakeholders.

The preliminary Breslau station concept plan prepared for the IBC was largely based on the station layout from the 2009 *Georgetown to Kitchener Rail Expansion EA*. Since the Initial Business Case concept illustration (2016), the station design has been modified to reduce the initial parking area to meet Station Access Plan requirements, consolidate tunnel access and pavilions, and increase the number of bus bays required.

2.3 Business Case

2.3.1 Strategic Case

The station is consistent with regional and local transportation and planning policies for the location of growth and new rapid transit. While the future density around the station is below the minimum density target for Regional Rail identified in the Mobility Hub Guidelines, the station will serve a large catchment area.

The Breslau Settlement Plan complements the Breslau station, recognizing it as a commuter station requiring adequate parking and employment, retail and commercial opportunities in the vicinity as well as appropriate residential densities. The Settlement Plan also includes provisions towards better connectivity. As part of this, the Township committed to preparing an EA for a connector road to link the new Thomasfield development on the east side of the Hopewell Creek with the rest of Breslau. If a road were to be built, the connectivity to the station could be improved, potentially leading to increased ridership for the station.

The Region will consider options to bring transit to the station. In the interim, access to the station will be primarily from the proposed TOD development via walking, cycling and passenger pick-up and drop-off and Drive and Park.

Ridership forecasts suggest that a Breslau station could attract approximately 3,100 riders in 2031. The total includes new and existing riders, the latter of which who would divert to the new station over their previous location (e.g. Kitchener and Guelph). The model results indicate that Breslau Station would serve as a park-and-ride station for residents of the Kitchener, Waterloo, and Cambridge area. The majority of trips forecasted to use

Breslau station in the AM peak period are comprised of boarding riders, travelling from their residence to the station to another destination (primarily to Toronto). Very few walk or transit access trips are expected at this station.

2.3.2 Financial and Economic Case

	Breslau
2031 Ridership (AM Peak Period) boardings + alightings	1,100
2031 Ridership (Daily) boardings + alightings	3,100
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Decrease**
Benefits Compared to Cost	**Benefits are Positive and Exceed Costs**
Transportation User Benefits (60yr lifecycle)	**$286 M**
Travel Time Savings	**$7 M**
Vehicle Operating Cost Savings	**$210 M**
Decongestion or Road Network	**$44 M**
Safety Impacts	**$21 M**
Environmental Impacts	**$3 M**

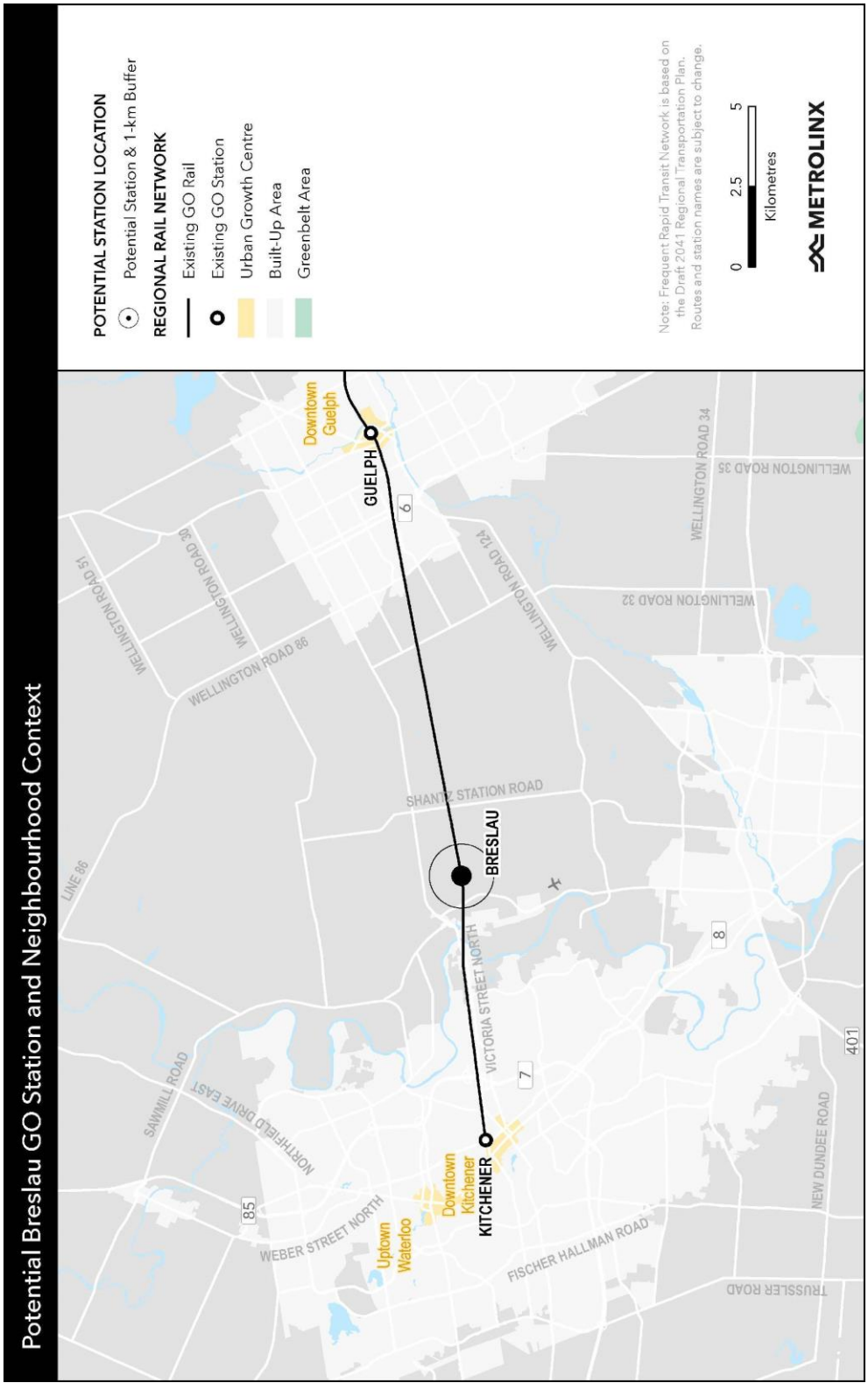
The model results indicate that existing GO riders would divert to this station, and would save automobile access time relative to their previous GO access station choice. Breslau station is located near the end of the line, and therefore would only impact existing users who board at Kitchener station; therefore, the benefits for even a small number of riders boarding at the station outweigh the upstream impacts.

2.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- A future rail crossing in this vicinity has been proposed. A preferred option will need to be developed by the Township as part of a future Breslau East Connector Road EA. Station design must accommodate several potential future options including consideration of at-grade, above- and below-grade crossings connecting to Greenhouse Road or Iron Horse Road.
- Station construction triggers a requirement for an access road ahead of the Town and developer's original timeline. Further discussion is required.
- The existing single track will be re-aligned and shifted north to serve the north platform. Provision and operation of a second track within the station project timeframe is to be determined. Additional track requirements such as future passing track(s) between the platforms or high speed rail may impact design.

2.4 Proposed GO Station and Neighbourhood Context Area



3. East Harbour (Don Yard/Unilever)

3.1 Description

The proposed East Harbour station is a SmartTrack station located on the Kingston subdivision, just east of the limit of the Union Station Rail Corridor (USRC). The platforms span the Don River, and will service the Lakeshore East and Stouffville corridors. The City of Toronto Official Plan designates the station area as *Employment Areas*, for uses such as offices, warehousing, manufacturing, and hotels, and the necessary supportive functions of retail stores and services. A major development proposal on the adjacent Unilever site is under consideration by the City of Toronto and informed the potential ridership of the East Harbour station. Some low-rise residential is located a few blocks north-east from the station site. Across the Don River, on the former Pan American Games Athlete's Village site is the recently developed Corktown Common and Canary District, which will represent significant densities once fully developed.

3.2 Station Concept

The Don Yard station was recommended by the Metrolinx Board of Directors on June 28, 2016. In Fall 2016, the City of Toronto confirmed the location, general design concept and inclusion of the station in their Smart Track program. Metrolinx worked closely with the City to develop the design based on ongoing operational needs assessment, pre-environmental assessment studies, workshops, discussion, and a technical advisory committee process. Design changes are ongoing in coordination with stakeholders.

Since the Initial Business Case concept illustration (2016), the station design has been modified to:

- Include side platforms serving Lakeshore East and Stouffville trains.
- Incorporate pedestrian connections to the multi-use path west of the Don River
- Accommodate the Broadview Avenue extension
- Relocate the platform between the Don Yard and Unilever sites to optimize access to the existing and emerging land uses.

3.3 Business Case

3.3.1 Strategic Case

The area is an emerging transit node within a developing and intensifying area. There are planned connections to the Broadview streetcar extension and future Relief Line. The station platforms and path connections are planned to act as a bridge between the west and east side of the Don River, with entrance structures anchoring each side. Cycling facilities adjacent to the station would service two distinct, but complementary, functions by providing local connections to and from the station and by forming part of the larger cycling network. A multi-use path connection from the west Don River entrance across to the main entrance can be incorporated to connect to the Don Trail.

Ridership forecasts predict that an East Harbour station would attract approximately 68,100 daily riders by 2031. The total includes new GO riders and those that would have otherwise transferred elsewhere. The model results also indicate that the majority of trips forecasted at the station in the AM peak period are comprised of alighting riders; the station is located in the immediate vicinity of a proposed development that is projected to add approximately 50,000 jobs when fully developed. The station would also provide a connection to the Port Lands and Corktown Common, located immediately to the south and west of the station, respectively. The majority of station users would access it via walking or local transit. Note that the modelling assumes development at the

East Harbour site, but does not assume the Broadview Extension or the Relief Line, which are currently unfunded projects.

3.3.2 Financial and Economic Case

	East Harbour
2031 Ridership (AM Peak Period) boardings + alightings	17,700
2031 Ridership (Daily) boardings + alightings	68,100
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive and Exceed Costs**
Transportation User Benefits (60yr lifecycle)	**$3,846 M**
Travel Time Savings	**$3,779 M**
Vehicle Operating Cost Savings	**$52 M**
Decongestion or Road Network	**$9 M**
Safety Impacts	**$5 M**
Environmental Impacts	**$1 M**

The model forecasts travel time savings benefits for users of East Harbour station, as today riders travel to Union Station and reach the neighbourhood via local transit. Many upstream users would also be impacted by the stop, since it is located immediately east of Union Station at the point where trains are generally carrying the most passengers along the line. All Stouffville corridor trains are assumed to stop at this station, while the Lakeshore East corridor express services are not expected to serve the station. Despite these travel time impacts, this station would provide net travel time savings for GO users due to the large number of alighting users and the time savings that are forecast for each rider.

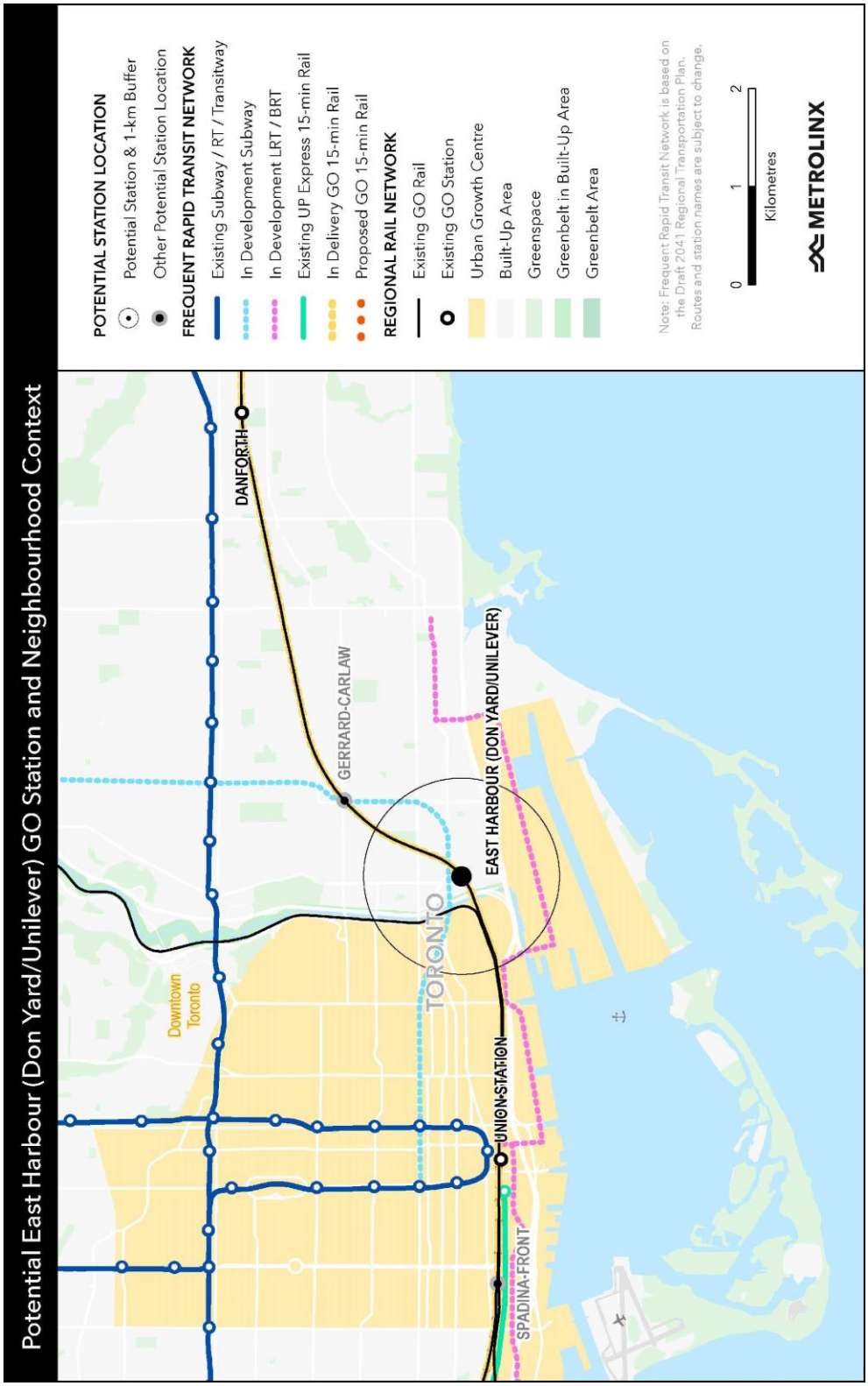
3.3.3 Deliverability and Operations Case

The site is complex with several overlapping initiatives. The evaluation of the constructability of a potential station and its impacts on GO operations found:

- Issues related to curvature, grade and super-elevation of the track at platform level would be operationally challenging and require mitigation to avoid impacts on passenger safety, comfort and operator sightlines. Trains stopping on the west side of a platform would require extra equipment for viewing the length of the platform from the train.
- The future extension of a Broadview streetcar will eventually connect to this station at a new underpass, to be constructed as part of the project.
- A Paralleling Station to support corridor electrification is planned north of the rail corridor, immediately east of the Don Valley Parkway (DVP), which may impact station configuration and construction.
- Construction staging must align with, and will be complicated by:
    - Integration with the East Harbour (First Gulf) development
    - Flood protection landform construction north and south of the rail embankment
    - Connecting to the Relief Line
    - Gardiner ramp reconstruction
    - Broadview Avenue extension projects

- Additional detail required to fully assess the impact to operating costs of long pedestrian connections.
- Pedestrian pick-up and drop-off will be addressed by the City in the Unilever Precinct Plan.
- A signal bridge will be located approximately 90m west of the DVP.
- Challenges related to the track include a horizontal curve through the station site, a turnout to Don Yard approximately 65m west of the DVP and a turnout to the fourth main track approximately 250m east of Eastern Avenue.

3.4 Proposed GO Station and Neighbourhood Context Area



4. Finch-Kennedy

4.1 Description

The proposed Finch-Kennedy station is a SmartTrack station located on the Stouffville GO corridor in the City of Toronto, between Agincourt and Milliken stations. The station is surrounded by a mix of industrial, commercial and employment lands to the north of Finch Avenue East, and low-rise suburban residential neighbourhoods to the south. The lands within the immediate station are mainly single family residential and low density employment uses, including a single storey plaza and surface parking lot in the northwest quadrant of the Finch Avenue/rail corridor intersection, and a storage facility to the northeast.

4.2 Station Concept

Following the IBC evaluation, the station was recommended by the Metrolinx Board of Directors on June 28, 2016. In Fall 2016, the City of Toronto confirmed the location, general design concept and inclusion of the station in their Smart Track program. The Metrolinx Board committed to continue to include the station as part of the GO Expansion RER program procurement on December 8, 2016. Through 2017, Metrolinx engaged with the City and internal stakeholders to refine the station concept plan. Metrolinx worked closely with the City to develop the design based on ongoing operational needs assessment, pre-environmental assessment studies, workshops, discussion, and a technical advisory committee process. Design changes are ongoing in coordination with stakeholders.

The preliminary station concept plan has evolved as new information has emerged. The station concept has been modified to:

- Shift platforms south to permit a new rail over road grade separation, in order to facilitate seamless connections with the bus facilities below the platforms.
- Remove parking and structured passenger pick-up and drop-off from the site, minimizing property requirements.

4.3 Business Case

4.3.1 Strategic Case

The station at Finch-Kennedy continues to conform to provincial, regional and local transportation and land use policies. Real estate demand and development potential remain low, as do population and employment densities. Per the Growth Plan, which identifies the stretch of the Stouffville corridor where Finch-Kennedy station is to be built as a priority corridor, more work is being undertaken with the City to support achieving the density target of 150 residents and jobs per hectare (at 53.3 P+J/ha current and 55 P+J/ha by 2031).Several nearby under-utilized or vacant lots could become transit-oriented developments (TOD) and integrate with the station facility, such as the vacant lot at the north end of the platform on the east side of the corridor.

Most passengers are anticipated to arrive by transit, walking or cycling. This station offers optimized intermodal connections by relocating the adjacent Finch Avenue bus stops under the new rail overpass, with dedicated lay-bys. Many of the recommendations in the 2016 GO Rail Station Access Plan for walk and cycle access call for close collaboration with the City of Toronto.

Ridership forecasts predict that the Finch-Kennedy station could generate approximately 4,200 daily riders by 2031. The total includes new and existing riders, with existing riders expected to divert from their previous point

of access (Milliken or Agincourt stations). The majority of trips forecasted at Finch-Kennedy station in the AM peak are boardings, with the station primarily attracting riders that live along the Finch Avenue East corridor between Victoria Park Avenue and McCowan Road.

4.3.2 Financial and Economic Case

	Finch-Kennedy
2031 Ridership (AM Peak Period) boardings + alightings	1,100
2031 Ridership (Daily) boardings + alightings	4,200
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive but Less Than Costs**
Transportation User Benefits (60yr lifecycle)	**$16 M**
Travel Time Savings	**$8 M**
Vehicle Operating Cost Savings	**$7 M**
Decongestion or Road Network	**$1 M**
Safety Impacts	**$1 M**
Environmental Impacts	**$0 M**

The introduction of express service on the Stouffville corridor has a role in reducing the number of upstream users that are impacted by Finch-Kennedy station. This impact is greater than the reduction in ridership associated with less frequent train service at the station. Model results indicate that ridership would be comprised of existing GO users as well as new users. The modelling analysis also provides an estimate of the number of upstream GO riders that would switch to another mode due to delays associated with the introduction of the new station. At Finch-Kennedy station and other upstream stations near Toronto, local transit is a competitive option, and relatively few riders would have previously used an automobile to reach their destination.

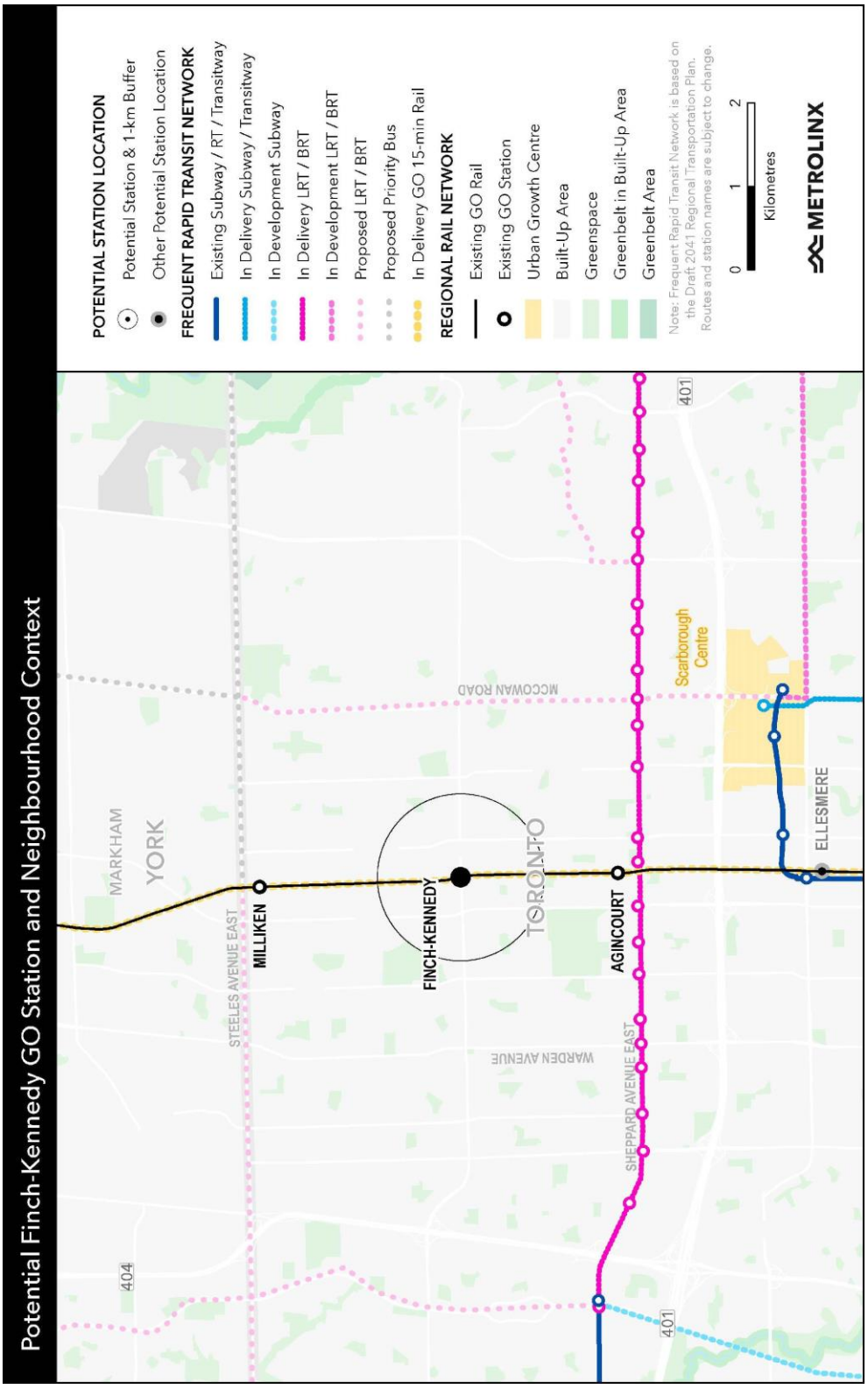
4.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- The grade separation will impact accesses to several businesses northeast of the grade separation. Alternative accesses to these properties must be identified and created.
- Grade separation design is dependent on the resolution of stormwater sewer relocation and pumping station issues. A pumping station and holding tanks may be required. Discussions with municipal engineers to facilitate City requirements for the pumping station (maintenance, etc.) and sewer diversions may be required.
- Construction staging of grade separations may require multiple road and rail track detours via traffic lane reductions/closures. Potential delay of second track commissioning until the new station is substantially complete could be considered, which would impose operational impacts.
- The sidewalk separates the main station entrance and the proposed bus layby, posing potential areas of bicycle-pedestrian conflict on Finch Avenue and requires further consideration.

- Due to City Planning requirements and site constraints, no passenger pick-up and drop-off will be provided - this may result in ad hoc drop-offs in and around the station. Mitigation measures and further dialog with the City of Toronto is required to ensure impacts to surrounding road networks are minimized.
- Grade separation at Finch Avenue should accommodate current and future capacity and protect for future express track
- Freight restrictions or alternative routing should be considered to address operational concerns and physical constraints through this corridor.
- Coordination is required with electrification works due to substandard clearance under the bridge.
- Station design and track configuration must consider potential impacts on any active customer spurs to the north. There is a turnout to an industrial spur approximately 635m north of Finch Avenue.
- There is a reverse curve through the station site.

4.4 Proposed GO Station and Neighbourhood Context Area



5. Gerrard-Carlaw

5.1 Description

The proposed Gerrard-Carlaw station is a SmartTrack station located between Carlaw Avenue and Pape Avenue along Gerrard Street East, on the Lakeshore East and Stouffville GO corridors. The station is two stops east of Union Station, on a curved portion of the track that extends between Queen Street East to the south and Jones Avenue to the east. The site is in a primarily low-density, residential and retail context and is zoned commercial/residential. The site is within a commercial/retail hub for the neighbourhood, with significant retail along Gerrard and close to Riverdale and Gerrard Square shopping centres.

5.2 Station Concept

Following the IBC, a Gerrard station was recommended on June 28, 2016. In Fall 2016, the City of Toronto confirmed the location, general design concept and support for station. The MX board committed to include the station as part of the RER program procurement on December 8, 2016. Through 2017, Metrolinx worked closely with the City to develop the design based on ongoing operational needs assessment, pre-environmental assessment studies, workshops, discussion, and a technical advisory committee process. Design changes are ongoing in coordination with stakeholders.

Since the Initial Business Case concept illustration (2016), the station design has been modified to:

- Be located at Gerrard Street, between Pape Avenue and Carlaw Avenue with two side platforms and pedestrian tunnels providing access.
- Consider a future connection to the Relief Line.
- Remove passenger pick-up and drop-off and on-site bus facilities, which will be provided on-street. This reduced the amount of property that would need to be acquired with station facilitates consolidated south of the corridor.
- Identify secondary entrances.

5.3 Business Case

5.3.1 Strategic Case

Gerrard-Carlaw station is located on land primarily south of the corridor currently zoned commercial/residential. The City of Toronto Official Plan identifies Gerrard Street East as an *Avenue*, designated for re-urbanization and a high quality pedestrian environment that is well accessed by transit. The station sits in an area planned for a multitude of uses, scales and densities, including transit-related facilities. The areas further away from the station are designated to remain as stable, low-rise residential neighbourhoods.

There are currently multiple development applications underway in the area, with several identified soft sites within an 800 metre radius of the station. Soft sites are parcels with higher potential to change such as parking lots and under-utilized sites, given current zoning. The *Mixed Use* designation along Gerrard Street East provides an opportunity for redevelopment that can support increased future ridership.

The station provides opportunities to integrate streetcar or bus stops for efficiency and convenience of intermodal transfers. A future Relief Line subway station is planned at this site, providing improved transit network connectivity. The majority of riders would access the station by walking or via local transit.

Ridership forecasts predict that a Gerrard-Carlaw station would attract 13,500 daily riders by 2031, including existing and new GO users. The model indicates that approximately two thirds of the riders forecast to use Gerrard-Carlaw station in the AM peak period are comprised of alighting riders that are destined for nearby employment areas. The model also indicates that the connecting streetcar network extends the station catchment area along the Gerrard Street and Dundas Street corridors as far west as Parliament Street and Jarvis Street and east to Coxwell Avenue. The station would also provide connections to points south of the station in Leslieville and Riverdale along Gerrard Street, Dundas Street, and Queen Street.

5.3.2 Financial and Economic Case

	Gerrard-Carlaw
2031 Ridership (AM Peak Period) boardings + alightings	3,500
2031 Ridership (Daily) boardings + alightings	13,500
Change in Cost from IBC	**Decrease**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive but Less Than Costs**
Transportation User Benefits (60yr lifecycle)	**$138 M**
Travel Time Savings	**$121 M**
Vehicle Operating Cost Savings	**$14 M**
Decongestion or Road Network	**$2 M**
Safety Impacts	**$1 M**
Environmental Impacts	**$0 M**

In terms of travel time savings, the primary consideration is the amount of time that the new station saves relative to alighting at another GO station, which would involve a longer combined walking or transit time to the ultimate destination via bus and/or streetcar. Model results show that alighting riders from points further upstream on the Lakeshore and Stouffville corridors generally save 20 or more minutes relative to a trip that previously alighted at Danforth or Union stations. Boarding riders would save less time for trips that would otherwise use the TTC streetcar network.

The introduction of express service on the Stouffville corridor would have a significant role in reducing the number of upstream users that are impacted by Gerrard-Carlaw station. Although express services also result in a reduction in ridership due to the less frequent service at the station, it provides an overall net benefit.

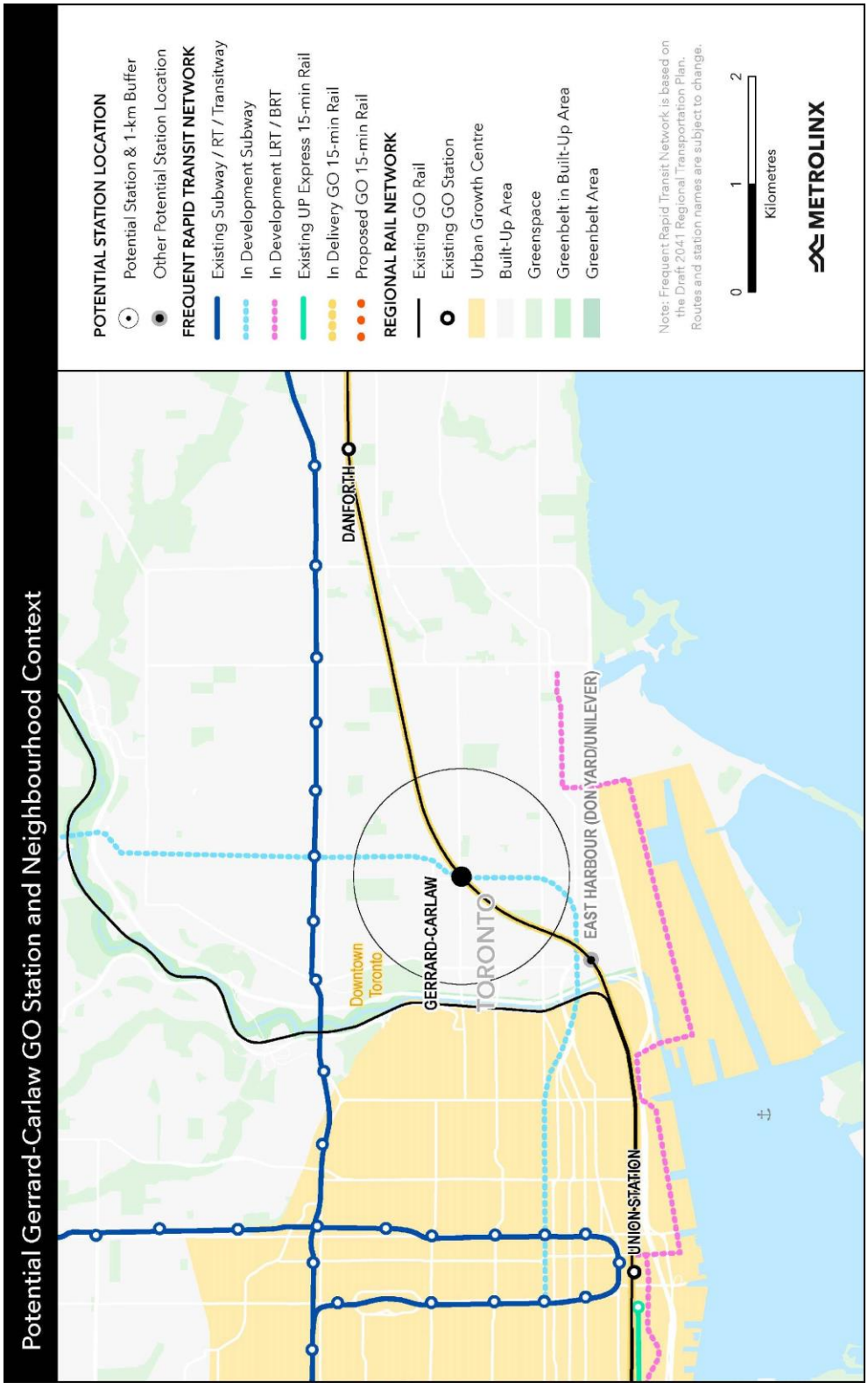
5.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- The existing rail viaduct, retaining walls and bridges need to be expanded along the length of the station for the new proposed side platforms and a fourth rail track. To accommodate platforms, widening of the Gerrard Street East and Carlaw Avenue rail overpasses is required, concurrent with fourth rail track expansion/alignment to reduce construction and staging impacts. The side platform configuration has reduced the need for track realignment and requisite structural modifications.

- There is a risk that Gerrard Street will be used for ad hoc drop-offs in and around the station. Mitigation measures and further dialog is required to ensure pedestrian and vehicular conflicts are minimized.
- Access to the Gerrard Square parking structure, which is provided by an access road at the east limit of the southern platform design needs to avoid impact.
- Station design is complicated by the structural challenge of installing connection tunnels (main building at Gerrard-Carlaw and at secondary building at Pape Avenue) under three live tracks.
- Station design must protect for a future connection to the proposed Relief Line.
- Gerrard and Carlaw bridges were recently accorded heritage status. The Heritage Impact Assessment is pending and therefore the impact on design and construction is not yet known.
- Alternative platform configurations should be considered that provide operational flexibility for train service as GO Expansion RER evolves and supportive infrastructure, such as Scarborough Junction, is commissioned.
- Signal bridge will be located approximately 170m west of Carlaw Avenue.
- There is a horizontal curve of the track through the station site.

5.4 Proposed GO Station and Neighbourhood Context Area



6. Innisfil

6.1 Description

The proposed Innisfil station is located on the Barrie GO corridor in the Town of Innisfil on the north side of 6th Line, east of 20th Side Road. The station is located adjacent to the settlement with surrounding lands designated for a range of residential and non-residential uses.

6.2 Station Concept

Following the IBC, the station was recommended by the Metrolinx Board of Directors on June 28, 2016 for inclusion in the GO RER program subject to confirmation by the Town of Innisfil's concurrence on the location and general design concept. This was received on October 19, 2016. The Metrolinx Board committed to include the station as part of the GO RER program procurement on December 8, 2016. Through 2017, Metrolinx engaged with the Town of Innisfil and internal stakeholders to refine the station concept plan. Since then, station design development has progressed based on pre-environmental assessment work, workshops, discussion, and a technical advisory committee process with stakeholders. Design changes are ongoing in coordination with stakeholders.

Since the Initial Business Case concept illustration (2016), the station design has been modified to:

- Include one main station building, pedestrian tunnel and secondary station building aligned to coordinate with subdivision plans to the east.
- Provide a bus loop with a dedicated access road.
- Illustrate a phased construction of surface parking lots to align with the GO Station Access Plan.
- Facilitate multi-use paths along the east and west side of the rail corridor.

6.3 Business Case

6.3.1 Strategic Case

The anticipated future density for the area is in alignment with the density targets for Regional Rail in the Metrolinx Mobility Hub Guidelines, predicated on the build out of the Alcona South Secondary Plan.

The Town is working to update its 2013 Transportation Master Plan. The update will include consideration of Metrolinx's GO Expansion RER program, fixed-route transit options in the Town which currently do not exist, and traffic management measures that could further improve station access.

The station will be accessible by cycling, walking, and passenger pick-up and drop-off including on-demand transit, which is currently operating in the Town through a partnership with Uber. Most users are expected to drive-and-park. The station is also being designed to accommodate future fixed route transit. Improving walk and cycle access will require collaboration with the Town of Innisfil.

Ridership forecasts indicate that Innisfil station would attract approximately 2,800 daily riders in 2031. The total ridership includes new and existing riders, who would now use this station rather than another such as Barrie South or Bradford. The majority of trips forecasted to use Innisfil station in the AM peak period are comprised of boarding riders, travelling from their residence to the station to another destination, primarily to Toronto.

6.3.2 Financial and Economic Case

	Innisfil
2031 Ridership (AM Peak Period) boardings + alightings	1,000
2031 Ridership (Daily) boardings + alightings	2,800
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Decrease**
Benefits Compared to Cost	**Benefits are Positive and Exceed Costs**
Transportation User Benefits (60yr lifecycle)	**$214 M**
Travel Time Savings	**-$16 M**
Vehicle Operating Cost Savings	**$173 M**
Decongestion or Road Network	**$36 M**
Safety Impacts	**$18 M**
Environmental Impacts	**$2 M**

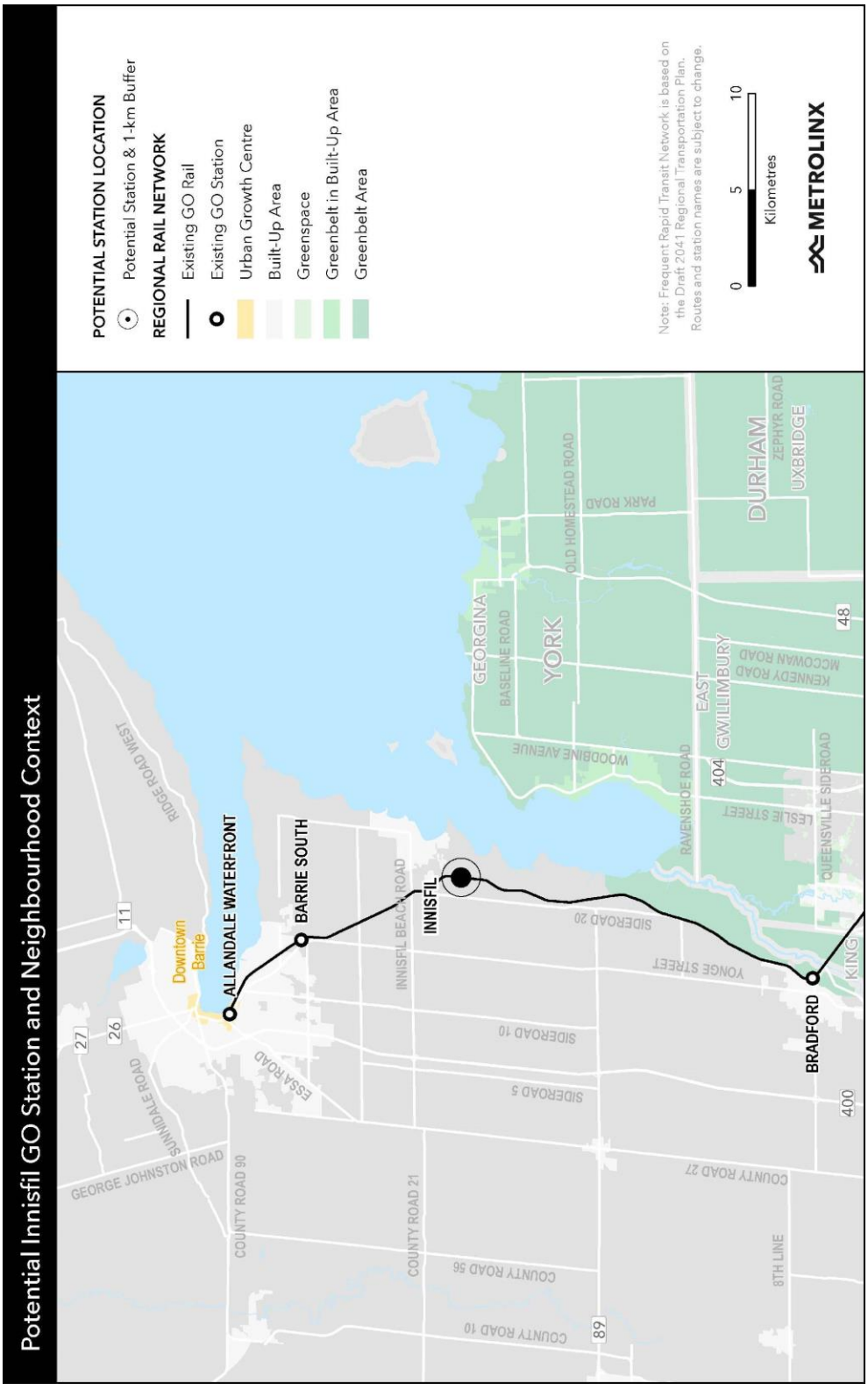
As this station is located near the end of the line, its additional dwell time only impacts users who board at Allandale Waterfront and Barrie South stations. Therefore, the benefits for even a small number of riders boarding at the station outweigh the upstream impacts.

6.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- Coordination will be required with planned work by the Town and Simcoe County to widen the 6th Line road and bridge to ensure it meets minimum clearances and sequencing required by the track works, new station and new parking lot.
- There are no switching facilities or signals in the immediate vicinity of the proposed station.
- Station platforms are being designed to achieve level boarding to reduce dwell time at this location.
- Updates to the GO Expansion RER service concept (Scenario 6: November 16, 2017 draft) have not impacted this station; 30-minute peak direction service is anticipated.
- Additional storm water management may be required due to the proximity to Lake Simcoe. Additional property may be required.

6.4 Proposed GO Station and Neighbourhood Context Area



7. King-Liberty

7.1 Description

The proposed King-Liberty station is a SmartTrack station located on the Kitchener GO corridor near Sudbury and Abell Streets, and Joe Shuster Way in the City of Toronto. The station is located amongst several high density mixed use neighbourhoods, including Liberty Village and West Queen West.

7.2 Station Concept

Following the IBC the station was recommended by the Metrolinx Board of Directors on June 28, 2016. In Fall 2016, the City of Toronto confirmed the location, general design concept and inclusion of the station in their Smart Track program. The Metrolinx Board committed to include the station as part of the GO Expansion RER program procurement on December 8, 2016. Through 2017, Metrolinx engaged with the City and internal stakeholders to refine the IBC station concept plan. Metrolinx worked closely with the City to develop the design based on ongoing operational needs assessment, pre-environmental assessment studies, workshops, discussion, and a technical advisory committee process. Design changes are ongoing in coordination with stakeholders.

Since the Initial Business Case concept illustration (2016), the station design has been modified to:

- Address operational need to introduce Kitchener service on tracks 1 and 4, rather than tracks 1 and 2, requiring two side platforms rather than a single island platform and shifting platforms north to accommodate additional width and changes to track geometry.
- Provide access via an overhead connection also serving as the proposed King Highline multi-use trail.

7.3 Business Case

7.3.1 Strategic Case

The station at King-Liberty generally aligns with current provincial, local, transportation and land use policy. It was found to offer strategic benefits including increased GO ridership and new pedestrian connections across the rail corridor, and regional significance in supporting the concept of a Waterloo-Toronto Technology Corridor. It facilitates broader transit integration by providing good connections to the King and Queen streetcars, local bus service, and the Exhibition GO station on the Lakeshore West corridor to the south and could help to alleviate congestion on existing TTC routes.

The Garrison Commons Secondary Plan, which includes the King-Liberty station, is currently under review, presenting an opportunity to enhance the public realm and pedestrian and cycling connections within the station area.

Ridership forecasts predict that King-Liberty station could attract approximately 19,600 daily riders by 2031. The total includes new and existing riders, who would now use this station rather than another such as Union, Exhibition or Bloor stations. Most users are expected to walk or take local transit to access the station.

The majority of trips forecasted at this station in the AM peak period are comprised of alighting riders. The station is located in the immediate vicinity of significant existing employment areas located to the south of King Street West. As a major destination, the station generates alighting riders both in the inbound to Union Station and outbound from Union Station directions. The station generally serves areas along King Street West between Jameson Avenue and Bathurst Street.

7.3.2 Financial and Economic Case

	King Liberty
2031 Ridership (AM Peak Period) boardings + alightings	5,100
2031 Ridership (Daily) boardings + alightings	19,600
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive and Exceed Costs**
Transportation User Benefits (60yr lifecycle)	**$426 M**
Travel Time Savings	**$412 M**
Vehicle Operating Cost Savings	**$11 M**
Decongestion or Road Network	**$2 M**
Safety Impacts	**$1 M**
Environmental Impacts	**$0 M**

The model results indicate that the majority of alighting riders at King-Liberty station would be existing users who previously would have used another GO station. Riders destined to the core employment node to the south, for example, would save over 25 minutes relative to a trip that terminates at Union Station and involves a transit ride to Liberty Village.

Although significant travel time savings benefits are forecast for King-Liberty station, many upstream users are also impacted by the stop since it is located immediately to the west of Union Station at the point where trains are generally carrying the most passengers along the line. However, impacts are somewhat mitigated since the Kitchener corridor includes express services. The King-Liberty station would provide net travel time savings for GO users.

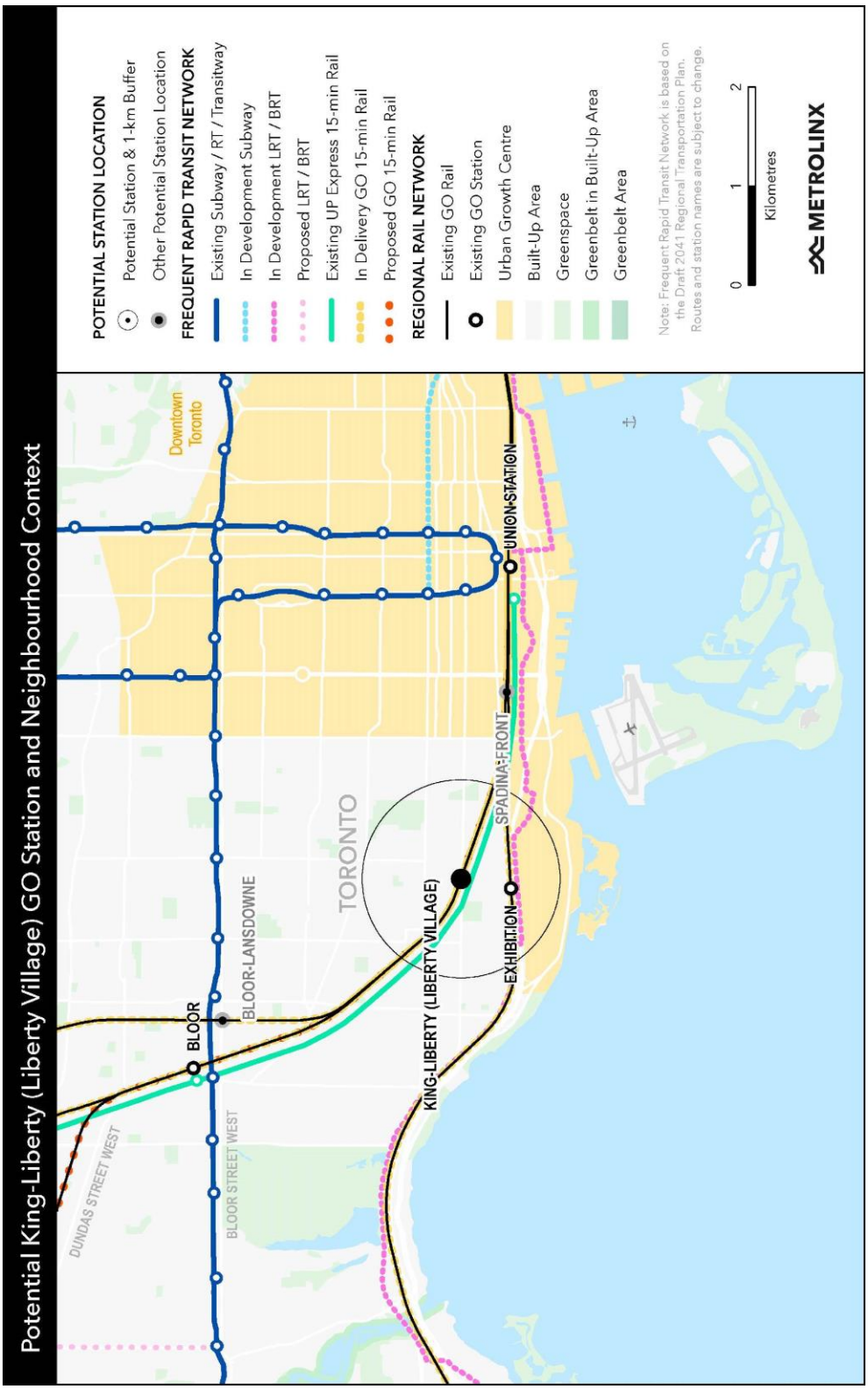
7.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- Service access to the corridor may be lost through this segment as space is allocated for platforms. The maintenance roadway along the south side of the corridor could be removed to provide additional area for the tracks to shift to the south.
- The staging area is limited in size and alternative or additional staging areas will be required. Potential construction staging areas are also limited in size and location, adding to complexity.
- The station should integrate with existing plans for the King High Line multi-use trail and West Toronto Rail Path. The south landing of this proposed bridge has already been constructed as part of the development of 1100 King Street West.
- Secondary access from King Street may have limited capacity to accommodate amenities, accessibility, pedestrian and cyclist flow. Design and function must be carefully considered.
- There are potential impact on existing signal bridges approximately 75m east (Mile 1.9) and 590m west (Mile 2.36) of King Street.
- Impact on adjacent roads is expected, in order to fit in platforms, access, electrification and tracks. Abell Avenue and Sudbury Street intersection and local road realignment may be required.

- Freight restrictions or alternative routing should be considered to address operational concerns and physical constraints through this corridor.
- Challenges related to the track include a horizontal curve through the station site, multiple cross-overs, starting at approximately 255m east of King Street, and sharing of the corridor with the Barrie and Milton corridors and the Union Pearson Express.

7.4 Proposed GO Station and Neighbourhood Context Area



8. Kirby

8.1 Description

The proposed Kirby station is located on the Barrie GO corridor in the City of Vaughan in the North Maple area. The station is located south of Kirby Road and west of Keele Street, and primarily east of the rail corridor, in an area known as Block 27, designated as a New Community Area. The surrounding area presently is largely made of farmland and natural open space, with the exception of two residential subdivisions and a few commercial and industrial establishments.

The catchment area is anticipated to attract a high mode share of drive and park users. The station will require parking to align with medium-term operational requirements indicated in the GO Rail Station Access Plan (2016). A passenger pick-up and drop-off facility is included east of the rail corridor. Bus service will be accommodated in an on-site bus loop for YRT service. Roadside bus bays for GO emergency service recovery have also been included.

8.2 Station Concept

Following the IBC the station was recommended by the Metrolinx Board of Directors on June 28, 2016. The City of Vaughan and Region of York confirmed the location and general design concept on November 15, 2016. The Metrolinx Board committed to include the station as part of the GO Expansion RER program procurement on December 8, 2016. Through 2017, station design development has progressed based on pre-environmental assessment work, workshops, discussion, and a technical advisory committee process with stakeholders. Design changes are ongoing in coordination with stakeholders.

Since the Initial Business Case concept illustration (2016), the station design has been modified to:

- Accommodate a larger number of parking spaces, as identified in the GO Rail Station Access Plan (2016).
- Consider the City of Vaughan draft masterplan for the Kirby Hub Sub-Study that illustrated closer integration of high density mixed use development and additional community amenities.
- Consider a grade separation of Kirby Road below the rail corridor was requested by the City of Vaughan.
- Avoid impacts to Provincially Significant Wetlands (PSW) in the vicinity of the station, identified by the provincial Ministry of Natural Resources and Forestry.

8.3 Business Case

8.3.1 Strategic Case

A station at Kirby continues to conform to provincial, regional and local planning policy. Work is in progress on the Block 27 Secondary Plan and the Kirby GO Transit Hub Sub-Study (initiated in April 2016). Work is also progressing on the North Vaughan and New Communities (NVNC) Transportation Master Plan which is looking at planning for a well-integrated and sustainable transportation network in north Vaughan for 2031 and beyond.

York Region is undertaking its Municipal Comprehensive Review, which will include updated density targets. Increases to density will depend on an expanded transit and transportation network, with a GO station at Kirby

being considered as an integral part of the East Vaughan Transportation Grid, which is intended to underpin the City's land use planning to 2041[1].

The identification of Provincially Significant Wetlands (PSW) in the vicinity of the proposed station site limits the land available for development and will require new analysis as to the potential density and land uses in the area remaining after construction of station facilities.

Ridership forecasts suggest that Kirby station would attract approximately 10,600 daily riders by 2031. The total includes new and existing riders who formerly used Maple or King City stations. Ridership is driven by a combination of projected growth in the vicinity of the station and in the rest of the City of Vaughan. The station's proximity to Highway 400 (via Teston Road exit) serves to extend the station's catchment area to the north. The majority of trips forecasted to use Kirby station in the AM peak period are boardings, i.e. travelling from their residence to their destination (primarily to Toronto). Of the total riders at the new station, the model indicates that approximately two thirds would be drive-and-park users, while the remainder would walk or use transit to access the station.

8.3.2 Financial and Economic Case

	Kirby
2031 Ridership (AM Peak Period) boardings + alightings	3,800
2031 Ridership (Daily) boardings + alightings	10,600
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive and Exceed Costs**
Transportation User Benefits (60yr lifecycle)	**$437 M**
Travel Time Savings	**$293 M**
Vehicle Operating Cost Savings	**$108 M**
Decongestion or Road Network	**$22 M**
Safety Impacts	**$11 M**
Environmental Impacts	**$1 M**

The introduction of express service to the Barrie corridor would have a role in reducing the number of upstream users that are impacted. While this benefit is somewhat offset by a reduction in ridership associated with reduced services, there is an overall net benefit. The model results suggest that relatively few upstream users would switch to another mode as the next station to the north (Aurora station) would offer express service.

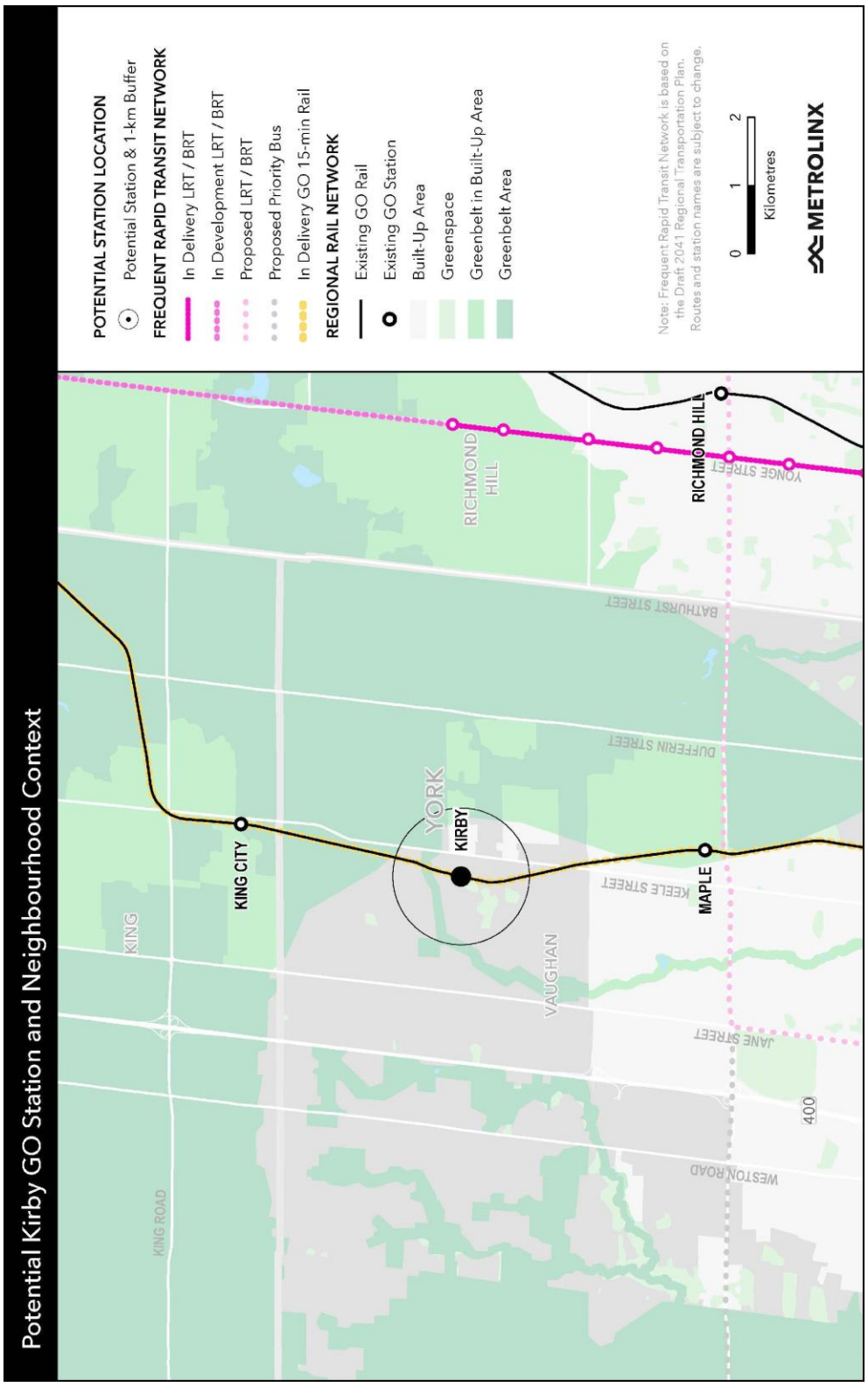
[1] *As identified in a report taken to Vaughan Committee of the Whole on October 3, 2017*

8.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- Provincially Significant Wetlands (PSWs) and associated setback requirements around the station site preclude placement of station facilities west of the rail corridor and increase the complexity of the design and engineering of the station.
- A grade separation is not required for station operation, but has been considered as part of the Environmental Assessment of the station area. Future construction will need to be coordinated with station work.
- The Transportation Impact Assessment for the planned development is based on road configuration that is not compatible with PSW restrictions. Road access from Keele Street and Kirby Road constructed to facilitate the station may impose design changes on Kirby sub-study area.
- Traffic studies indicate a need to provide access to Kirby Avenue as well as Keele Street from the station site, but future grade separation will constrain the potential intersection location. Ultimate configuration of access to Kirby station will influence overall design.
- Signal masts are located approximately 25m north and approximately 155m south of Kirby Road.
- Track turnouts to the second main train are approximately 35m south of Kirby Road and the turnout to the storage track is approximately 330m south of Kirby Road. There is a horizontal curve in proximity to the proposed platform, just south of the station.

8.4 Proposed GO Station and Neighbourhood Context Area



9. Lawrence-Kennedy

9.1 Description

The proposed Lawrence-Kennedy station is a SmartTrack station located on the GO Stouffville corridor in the City of Toronto. It would share the site of the existing Lawrence East Line 3 Scarborough station, allowing for the continued operation until the opening of the Scarborough Subway Extension (SSE).

The station is located within the suburban context of the Dorset Park neighbourhood, with low-rise residential uses to the southwest, apartments to the southeast, and various large industrial and office buildings to the north of Lawrence Avenue. Concentrated commercial and retail uses occur along nearby arterial roads. Large industrial buildings, surface parking and vacant lots prevail on both sides of the rail corridor.

9.2 Station Concept

Following the IBC the station was recommended by the Metrolinx Board of Directors on June 28, 2016. In Fall 2016, the City of Toronto confirmed the location, general design concept and inclusion of the station in their Smart Track program. The Metrolinx Board committed to include the station as part of the GO Expansion RER program procurement on December 8, 2016. Through 2017, Metrolinx engaged with the City and internal stakeholders to refine the IBC station concept plan. Metrolinx worked closely with the City to develop the design based on ongoing operational needs assessment, pre-environmental assessment studies, workshops, discussion, and a technical advisory committee process. Design changes are ongoing in coordination with stakeholders. Design changes are ongoing in coordination with stakeholders.

Since the Initial Business Case concept illustration (2016), the station design has been modified to:

- Allow for continued Line 3 operation until completion of the SSE and provide vertical pedestrian circulation from bus stops on the Lawrence Avenue overpass.
- Introduce two side platforms
- Include the main station at grade level, below the Lawrence Avenue overpass, with provision of bus loading/unloading areas, passenger pick-up and drop-off and parking.
- Retain required functions while limiting impact on Line 3.
- Accommodate circulation and waiting space for the volume of bus passengers.

9.3 Business Case

9.3.1 Strategic Case

Lawrence-Kennedy station continues to be supported by provincial and regional policy. In terms of local policy, the segment of Lawrence Avenue is targeted for future growth and development, and is designated as an *Avenue* in the City's Official Plan. The SmartTrack station would replace the Scarborough RT station at the same location. The new station would enhance transit connectivity for residents and businesses within the Kennedy-Midland-Lawrence Avenue neighbourhoods.

Greater emphasis is required beyond the station's site boundaries to strengthen connectivity and integration to current and future office, industrial, residential and retail demand which is currently not in close proximity.

Ridership forecasts predict that the Lawrence-Kennedy station would attract approximately 9,200 daily riders in 2031. The total includes new and existing riders, i.e. those who would choose the new station over their previous

location (Kennedy or Agincourt stations). The majority of trips forecasted at Lawrence-Kennedy station are comprised of boarding riders from the east and west of the station along the Lawrence Avenue East corridor between Victoria Park Avenue and Markham Road. The majority of riders would arrive at the station by walking or transit.

9.3.2 Financial and Economic Case

	Lawrence-Kennedy
2031 Ridership (AM Peak Period) boardings + alightings	2,400
2031 Ridership (Daily) boardings + alightings	9,200
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive but Less Than Costs**
Transportation User Benefits (60yr lifecycle)	**$69 M**
Travel Time Savings	**$67 M**
Vehicle Operating Cost Savings	**$2 M**
Decongestion or Road Network	**$0 M**
Safety Impacts	**$0 M**
Environmental Impacts	**$0 M**

The model indicates that riders boarding and alighting at the station experience travel time savings in the range of 10-15 minutes over a trip that would start or end at Agincourt or Kennedy stations. Most users of Lawrence-Kennedy station are destined to downtown Toronto, but a number of riders use the station to go north into Markham.

The introduction of express service on the Stouffville corridor would have a role in reducing the number of upstream users that are impacted by Lawrence-Kennedy station. The introduction of express services also results in some reduction in ridership at Lawrence-Kennedy station due to the less frequent service. At Lawrence-Kennedy station and other upstream stations near Toronto, today local transit is an attractive option; net new riders shifting from automobile to transit is limited.

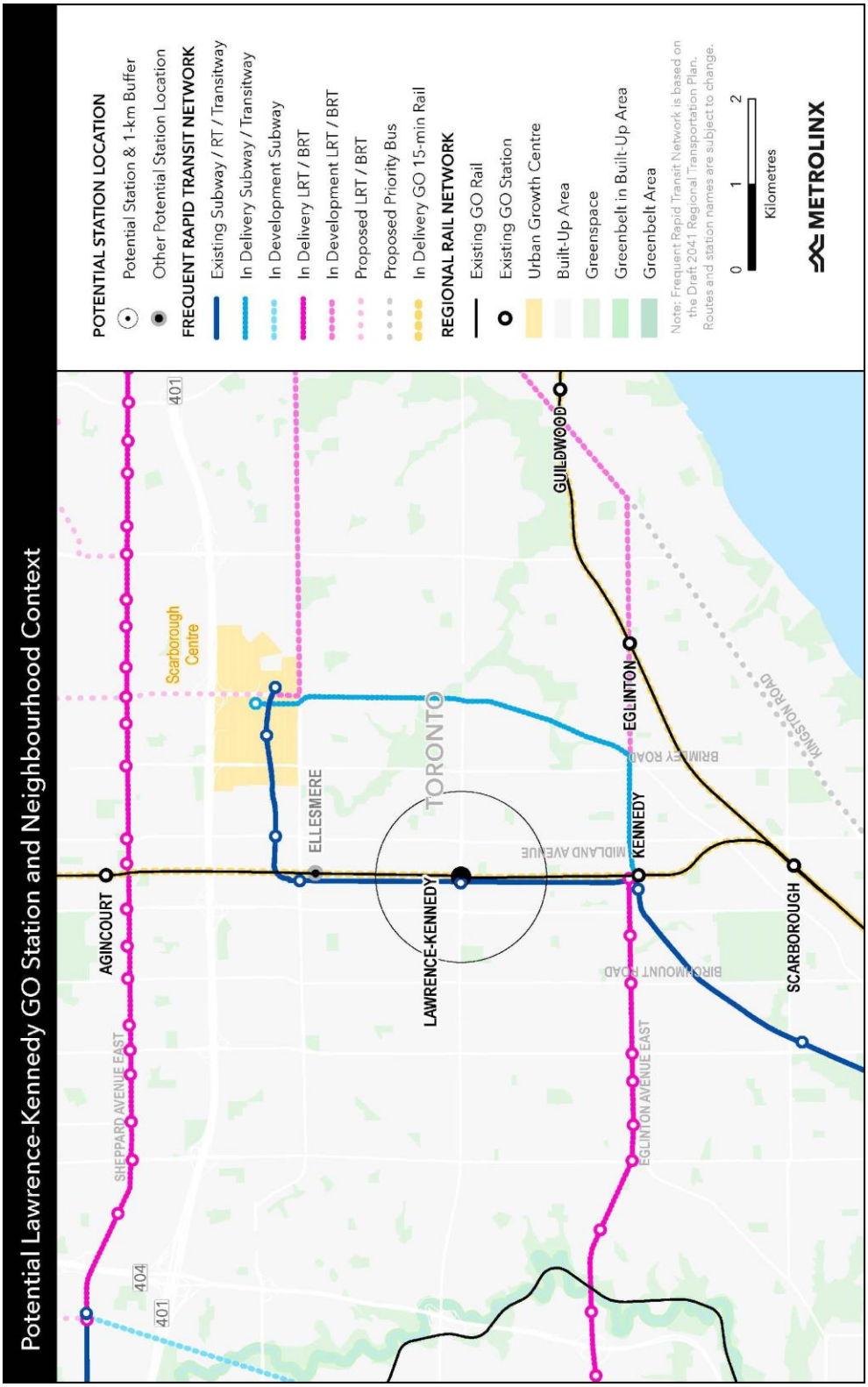
9.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- The Line 3 Scarborough is expected to continue operating, including service at the existing Lawrence TTC station until the Scarborough Subway Extension (SSE) is complete. The timing of station construction is expected to be earlier than SSE construction, and therefore the station design must accommodate continued operations of Line 3.
- Prior to removal of Line 3, access to west platform would be from the Lawrence bridge overpass and the east station platform, but not accessible from the area of the current Line 3 station. The station facilities and tracks will block direct access to the east until Line 3 is decommissioned.
- Exemptions will be required from Transport Canada and GO Design Requirements Manual clearance requirements due to the narrow space between the Line 3 station and the existing Lawrence bridge piers.

- Constructability and construction staging issues could be addressed by not commissioning the second track until after substantial completion of station construction, however, this would impose various operational challenges.
- In order to accommodate ongoing Line 3 operation, tangent track cannot be achieved without property and business impacts. The proposed 'S' curve to the platforms, may create uneven gaps between the train and platform, and reduce end-to-end visibility, requiring mitigation to improve safety.
- Tracks work must address turnouts to industrial spur lines approximately 370m, 425m, and 490m north of Lawrence Avenue.
- Signal mast to be located approximately 475m north of Lawrence Avenue.
- A crash wall at the Lawrence bridge piers is under construction through the Stouffville corridor expansion contract (double tracking). The crash wall will fall within the proposed east platform of the Lawrence-Kennedy station blocking the main access route to the platform in addition and impeding pedestrian circulation. Other derailment mitigation measures should be considered. As trains will be travelling at reduced speeds the platform could be designed to act as a guide/barrier and/or track guard rails installed eliminating of the need for a crash wall.
- Coordination is required with electrification works due to substandard clearance under Lawrence bridge.
- Facility design must address major utilities within the construction area (storm, water main, and gas).
- There is a risk that Lawrence Avenue will be used for ad hoc and unsafe drop-offs in and around the station. Mitigation measures and further dialog with the Municipality should take place to ensure pedestrian and vehicular impacts are minimized.
- Freight restrictions or alternative routing should be considered to address operational concerns and physical constraints through this corridor.

9.4 Proposed GO Station and Neighbourhood Context Area



10. Mulock

10.1 Description

The proposed Mulock station is located on the Barrie corridor in the Town of Newmarket. It is located on Mulock Drive, approximately 1.5km east of Yonge Street in an area made up of a mix of industrial uses, commercial establishments (car dealerships, small restaurants and retailers), natural open space and single-family housing. The proposed station site is designated 'Business Park - General Employment' by the Town of Newmarket Official Plan, with part of the site falling within the flood plain of the East Holland River. The site contains two existing industrial establishments.

The station facilities are proposed south of Mulock Drive including a main station building and two side platforms with one pedestrian tunnel toward the north end of the platform and one access bridge south, and parking. Buses would use new east and westbound bays on Mulock Drive. The site will also contain a power switching station for Barrie Corridor electrification that would be separated from parking and public areas of the station by a storm water management pond. The main access to the station would be from Steven Court with access from Bayview Avenue and Mulock Drive. The proposal includes pedestrian/cycling access, and vehicle access to the passenger pick-up and drop-off lot.

10.2 Station Concept

Following the Initial Business Case evaluation in Spring 2016, the station was recommended by the Metrolinx Board of Directors on June 28, 2016. The Town of Newmarket confirmed the location and general design concept on October 24, 2016. The Metrolinx Board committed to include the station as part of the GO Expansion RER program procurement on December 8, 2016. During the Spring of 2017, Metrolinx engaged with the Town of Newmarket and internal stakeholders to refine the IBC station concept plan. Since then, station design development has progressed based on pre-environmental assessment work, workshops, discussion, and technical advisory committee process with stakeholders. Design changes are ongoing in coordination with stakeholders.

Since the Initial Business Case concept illustration (2016), the station design has been modified to:

- Identify a design solution that does not require the grade separation. The design does not preclude a future grade separation at Mulock Drive, which will be considered separately as part of a system-wide rail crossing analysis.
- Consider an additional access road to Bayview Avenue and potential road widening along Steven Court and Kent Drive.
- Provide pedestrian connections at the main station building, and at the secondary station pavilion, as part of future west platform construction.
- Provide bus bays along Mulock Drive in order to avoid operational delays associated with running buses through a bus loop at the site.
- Include a longer retaining wall along the watercourse (along the west edge of the future west platform), as recommended by the Barrie Rail Corridor Expansion project, to reduce potential impacts to the East Holland River and existing flood plain storage.
- Include a new Traction Power Facility at the south end of the station site with a dedicated access road to the facility.
- Provide surface parking to meet recommendations of the GO Station Access Plan (2016).

10.3 Business Case

10.3.1 Strategic Case

The station conforms broadly to transportation and planning policies. The Town is about to undertake a Secondary Planning exercise, which will review density, and connectivity in the station area. The Employment Use nature of the area is expected to remain. The Town is participating in York Region's Municipal Comprehensive Review (MCR) process which will provide guidance on local intensification targets, and possible land use changes for the Town's existing employment areas, which may influence the Mulock station area. The MCR is expected to come into effect in 2020.

There are no major developments or intensification plans approved that would suggest an increase to the existing density. This density does not meet Metrolinx's Mobility Hub Guidelines suggested minimum density for regional or express rail, and is below the target identified in the Growth Plan for a priority transit corridor.

Ridership forecasts indicate that Mulock station would attract approximately 4,200 daily riders by 2031. The total includes new and existing GO riders, who would now use this station rather than another such as Aurora and Newmarket stations. A new rider at the station would have previously used their automobile or taken transit to reach their destination. Approximately 75% of riders are expected to access the station via drive-and-park, and via some walk-in and transit access users from surrounding areas located between Leslie Street and Yonge Street. The Town is undertaking an Active Transportation Plan which will include recommendations for access improvements to GO Stations in Newmarket.

10.3.2 Financial and Economic Case

	Mulock
2031 Ridership (AM Peak Period) boardings + alightings	1,500
2031 Ridership (Daily) boardings + alightings	4,200
Change in Cost from IBC	**Decrease**
Change in Benefits from IBC	**Decrease**
Benefits Compared to Cost	**Benefits are Negative due to Network Impacts**
Transportation User Benefits (60yr lifecycle)	**-$131 M**
Travel Time Savings	**-$139 M**
Vehicle Operating Cost Savings	**$6 M**
Decongestion or Road Network	**$1 M**
Safety Impacts	**$1 M**
Environmental Impacts	**$0 M**

The model shows that the performance of Mulock station is impacted by its proximity to Aurora station. Aurora station, which is immediately downstream, is the proposed terminus end point for more frequent electrified service on the Barrie corridor. Significant ridership growth is expected at upstream stations, including Newmarket and East Gwillimbury stations; therefore Mulock station would delay additional riders that travel through the station to points further south.

Travel time savings are expected to be limited for users of Mulock station, since many users would save wait time by driving to Aurora station. Exploration of possible alternate GO Expansion RER service pattern (e.g., extension of 15-minute service further north) is underway and would impact Mulock station's performance. Corridor-level changes are being examined as part of a broader study of the service patterns on the Barrie corridor.

10.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential Mulock station and its impacts on GO operations found:

- There is limited room for future station expansion; the station design and configuration is constrained by environmental and natural heritage features including the East Holland River to the west, and the Hydro corridor and infrastructure north of Mulock Drive.
- Deliverability and operational challenges with a grade separation previously proposed, including loss of road access for properties along Mulock Drive between and extensive impact on Hydro lines and facilities. The grade separation will not be developed as part of this project, but will not be precluded from future consideration.
- Track alignment will require coordination with the Barrie Rail Corridor Expansion (BRCE) project in order to accurately place the platforms. Two tracks are considered in the BRCE Environmental Assessment and planned within the rail right-of-way in the future. Construction of a second platform (west) platform would coincide with future construction of the second track, and service pattern changes.
- Station platforms are being designed to achieve level boarding to reduce dwell time at this location.
- Electrification infrastructure (paralleling station) will be co-located on the station property. Additional service access and buffering will be required in the site design.
- There are no switching facilities or signals in the immediate vicinity of the proposed station.
- Updates to the GO Expansion RER service concept (Scenario 6: November 16, 2017 draft) have not impacted this station; 30-minute peak direction service is anticipated.
- Station infrastructure is adjacent to the East Holland River, and may impact adjacent Natural Heritage System.
- Removal of the existing industrial building from the flood plain provides flood management benefits and reduces flood risk impacts so use of the site as a rail station is preferred by the Lake Simcoe Region Conservation Authority over the existing factory, but mitigation and detailed consideration of storm water will be required.
- Construction staging can generally be accommodated in the area of the proposed parking lot.
- Steven Court Road widening and a new road connection to Bayview Avenue will require property acquisition and coordination with the Town of Newmarket.
- The proposed YRT bus bays on Mulock Drive may pose a safety risk to vehicles near on-grade rail crossing. Additional clarification is required around the future grade separation and likely impacts to the site.

10.4 Proposed GO Station and Neighbourhood Context Area

11. Spadina-Front

11.1 Description

The proposed Spadina-Front station would be located on the Barrie corridor in Toronto south of Front Street West, between Bathurst Street and Spadina Avenue in the Bathurst North Yard. The station would be located 1.5km from west of Union Station, in an area undergoing intensification, including several high-density residential towers.

11.2 Station Design

Following the IBC, the station was recommended by the Metrolinx Board of Directors on June 28, 2016. In Fall 2016, the City of Toronto confirmed the location, general design concept and support for station. As the station would serve the Barrie Corridor only, it was not considered part of the Smart Track program, which is focused on Stouffville and Kitchener service. The Metrolinx Board committed to include the station as part of the GO Expansion RER program on December 8, 2016. Through 2017, Metrolinx engaged with the City and internal stakeholders to refine the IBC station concept plan. Metrolinx worked closely with the City to develop the design based on ongoing operational needs assessment, pre-environmental assessment studies, workshops, discussion, and a technical advisory committee process. Design changes are ongoing in coordination with stakeholders.

Since the Initial Business Case concept illustration (2016), the station design has been modified to:

- Shift the platform south to serve the Barrie mainline track, and one yard track, reducing the impact on storage capacity.
- Consider overhead pedestrian access alternatives
- Eliminate a potential platform connection via the existing Puente de Luz pedestrian bridge which is determined to be unsuitable to serve station circulation. In the event of future uses above the rail corridor, the Puente de Luz will be removed.
- Enlarged and re-orient the station building and plaza as the primary station entrance.

11.3 Business Case

11.3.1 Strategic Case

The Spadina-Front station continues to conform with current provincial, regional and local transportation and land use policy. Due to its location in a designated Urban Growth Centre and within Toronto's dense Downtown and Central Waterfront, the area has and will continue to intensify with residential and employment growth due to strong market demand.

Since the IBC, the Toronto City Council voted in favour of planning for the Rail Deck Park, which would be located above the Spadina-Front station. A private application for development over the rail corridor was submitted for the same location without Toronto City Council support currently. Any overbuild land uses could be expected to reinforce the site as a destination and contribute to ridership. The PDBC modelling assumed the existing land use designation.

Ridership forecasts indicate that Spadina-Front station would attract approximately 39,300 daily riders by 2031. The total includes new and existing riders, who would now use this station rather than another, such as Union Station. The model results indicate that the Spadina-Front station would generate a relatively small number of new GO riders in comparison to its high overall ridership. The majority of trips forecasted at Spadina-Front station

in the AM peak period are comprised of alighting riders; the station is located in the immediate vicinity of both existing and future employment hubs. The employment that drives ridership is either already in place or part of in-progress development. Station access would primarily be via walking and local transit.

11.3.2 Financial and Economic Case

	Spadina-Front
2031 Ridership (AM Peak Period) boardings + alightings	10,200
2031 Ridership (Daily) boardings + alightings	39,300
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive and Exceed Costs**
Transportation User Benefits (60yr lifecycle)	**$1,300 M**
Travel Time Savings	**$1,366 M**
Vehicle Operating Cost Savings	**-$51 M**
Decongestion or Road Network	**-$9 M**
Safety Impacts	**-$5 M**
Environmental Impacts	**-$1 M**

The model results suggest that the majority of the riders at Spadina-Front station would be existing users who previously would use Union Station. This reflects the competitiveness of GO Rail for trips from the areas that the Barrie corridor serves to downtown. Rail network geometry and speeds, and the large number of forecast alighting riders in this location will require specific design and operational measures to minimize the risk of dwell time increases. All Barrie corridor trains are assumed to stop at this station. The model indicates that despite impacts to upstream riders, Spadina-Front station provides net travel time savings for GO users due to the large number of alighting users and the significant time savings that are forecast for each rider (in excess of 15 minutes).

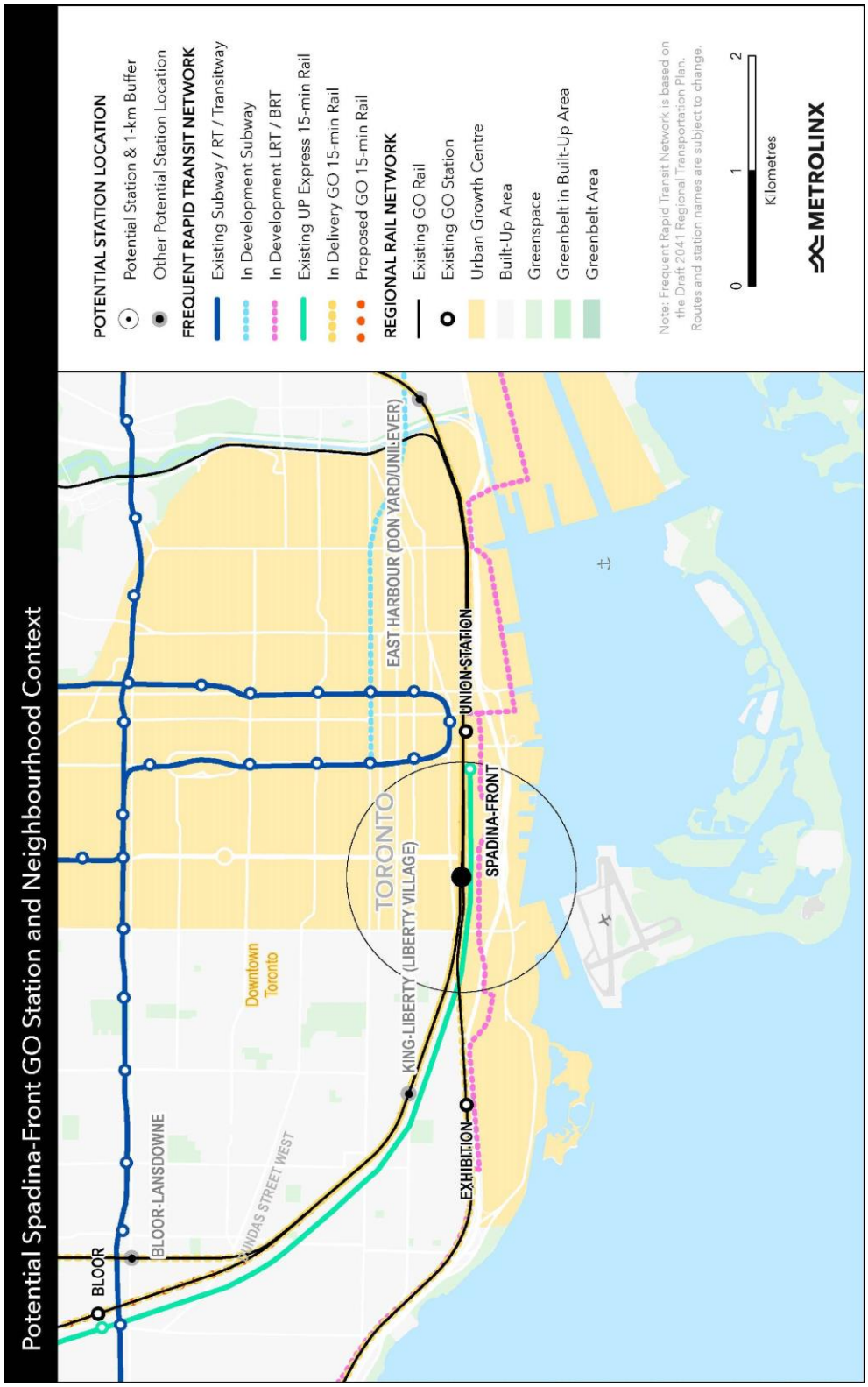
11.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- The proposed configuration eliminates 1.25 yard tracks from service. Loss of train storage capacity will have detrimental effects on overall network operation. From a design perspective, removing 2 yard tracks could help eliminate the proposed tapering of the platform. Suitable alternative train storage facilities must be identified for the viability of Spadina-Front station.
- The degree of enclosure on opening day and in the future must be considered from the perspective of fire safety, ventilation and exit requirements. Detailed evaluation of the feasibility to meet these requirements may define the ultimate configuration of Spadina-Font station.
- Toronto City Council is proceeding with plans for the Rail Deck Park. Toronto has requested consideration of a decking structure in the planning, design and engineering work of the station, including, but not limited to, the station's Transit Project Assessment Process (TPAP) or addenda.

- There are some concerns about the capacity and operational reliability of the station, and the platforms may need to be shifted southward. Details will be considered and worked out in the Reference Concept Design phase of the station design.
- Construction is anticipated to temporarily utilize Bathurst Yard, resulting in major impacts to operations.
- Current design results in the loss of one of two service roadways. Further consideration is required to determine if maintenance access needs can still be achieved.
- Station design must respect clearances around existing/proposed signal bungalows and yard buildings at northeast corner of Bathurst North Yard.
- Access to the platform is constrained by circulation elements. Further analysis is required to determine adequate vertical access points are available and placed to accommodate event crowding.
- Several challenges exist related to the tracks surrounding the station, including the horizontal curves east and west of the station site, the turnout beneath the Puente de Luz bridge, the ladder track north of the station site at the Bathurst North Yard, and the shared use of the rail corridor with the Union Pearson Express, the Kitchener corridor and Lakeshore West corridor.
- A signal bridge is required approximately 55m east of Spadina Avenue and 35m west of the Puente de Luz bridge. A signal mast is required approximately 90m east of the Puente de Luz bridge.

11.4 Proposed GO Station and Neighbourhood Context Area



12. St. Clair-Old Weston

12.1 Description

The St. Clair-Old Weston station (Kitchener Line) is a SmartTrack Station located in the City of Toronto (north of St. Clair Avenue West and east of Weston Road) located in an evolving mixed-use area. The station is designed with two platforms – an island platform between Kitchener tracks 1 and 2 with side platform west of track 4 along the edge of the corridor. Adding the island platform will require re-alignment of Kitchener tracks 1, 2, and 3, but must maintain their alignment over the St. Clair overpass so track changes do not impact the recently completed West Toronto Diamond rail grade separation.

12.2 Station Concept

Following the IBC, the station was recommended by the Metrolinx Board of Directors on June 28, 2016. In Fall 2016, the City of Toronto confirmed the location, general design concept and inclusion of the station in their Smart Track program. The Metrolinx Board committed to include the station as part of the GO Expansion RER program procurement on December 8, 2016. Through 2017, Metrolinx engaged with the City and internal stakeholders to refine the IBC station concept plan. Metrolinx worked closely with the City to develop the design based on ongoing operational needs assessment, pre-environmental assessment studies, workshops, discussion, and a technical advisory committee process. Design changes are ongoing in coordination with stakeholders.

Since the Initial Business Case concept illustration (2016), the station design has been modified to:

- Provide two platforms, rather than a single island to facilitate anticipated future operating patterns
- Incorporate road extensions and bridge widenings identified in the City's St. Clair Transportation Master Plan EA study
- Enhance pedestrian connections between the station and surrounding area
- Enhance connections to the TTC streetcar service on St. Clair Avenue

12.3 Business Case

12.3.1 Strategic Case

St. Clair-Old Weston station continues to support existing regional and municipal plans. The station area is targeted for growth and intensification and is undergoing a transformation from an industrial area to a mixed-use neighbourhood with employment uses.

In concert with local transportation improvements the station will help to provide stronger connections between modes and improve walking and cycling access to maximize potential ridership at the station. More direct connections to both the St. Clair streetcar line and the new Mount Dennis GO station, which will connect to the Eglinton Crosstown LRT, would further increase transit benefits.

Ridership forecasts suggest that a potential St. Clair-Old Weston station could attract approximately 8,900 daily riders by 2031. The total includes new and existing riders, the latter of which would divert to the new station over their previous location (e.g., Bloor or Mount Dennis stations). The model indicates that relatively few upstream riders are expected to switch to another mode.

The station is located in close proximity to the Stockyards District development and ridership is partially driven by growth and development in the vicinity of the station. Station boardings and alightings are generally concentrated along St. Clair Avenue extending along the streetcar right-of-way from the Stockyards District the west to Dufferin Street and beyond in the east. The majority of riders would access the station by walking or transit modes.

12.3.2 Financial and Economic Case

	St. Clair-Old Weston
2031 Ridership (AM Peak Period) boardings + alightings	2,300
2031 Ridership (Daily) boardings + alightings	8,900
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive but Less Than Costs**
Transportation User Benefits (60yr lifecycle)	**$89 M**
Travel Time Savings	**$94 M**
Vehicle Operating Cost Savings	**-$3 M**
Decongestion or Road Network	**-$1 M**
Safety Impacts	**$0 M**
Environmental Impacts	**$0 M**

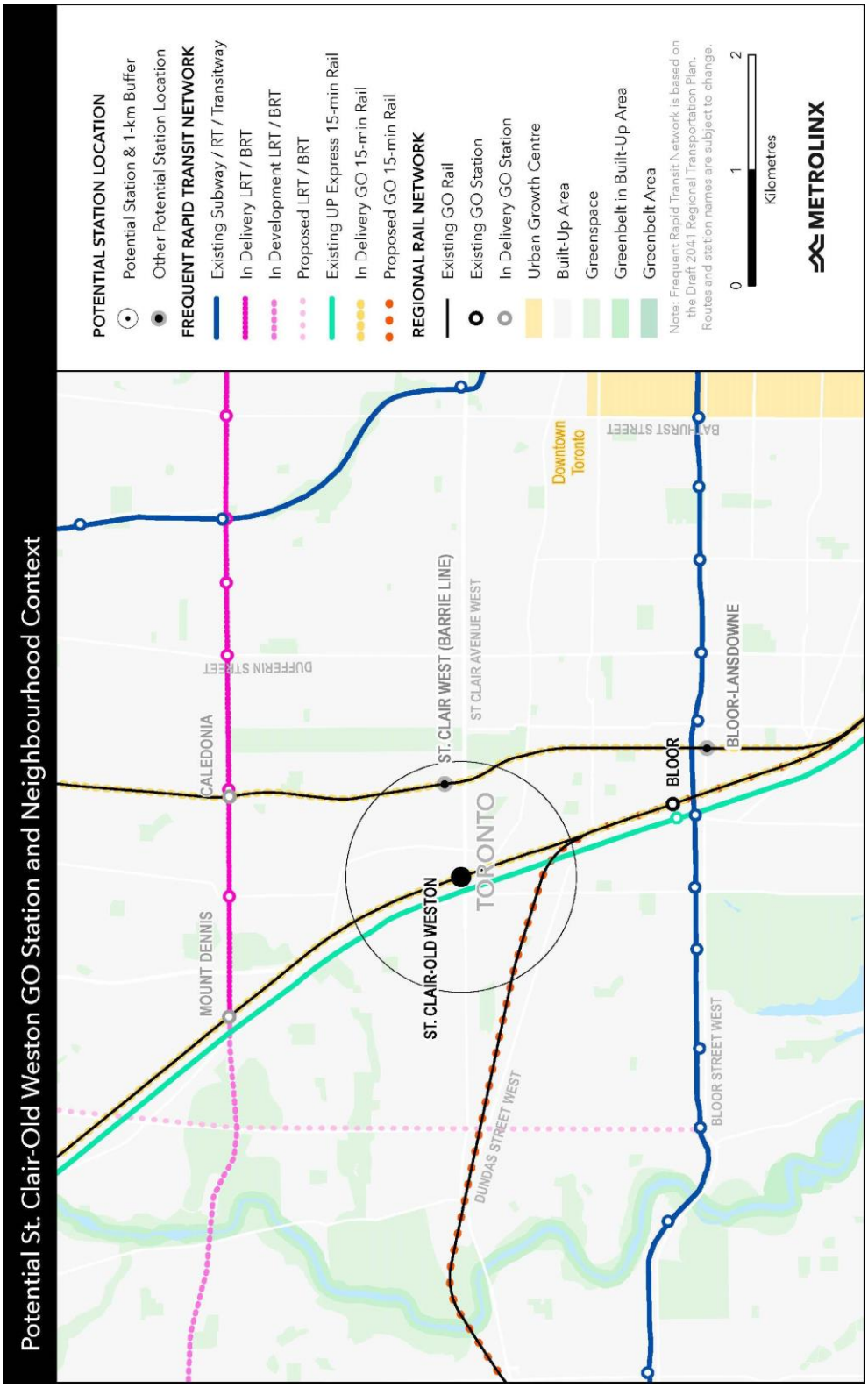
Model results show that St. Clair–Old Weston station could provide travel time savings on the order of 10-15 minutes for riders that are located in close walking distance to the station. Travel time savings are limited to a relatively small catchment area, since the station is located in relatively close proximity to the following: Bloor station on the Kitchener/Union Pearson Express Corridor, with connections to the TTC subway (2km away); Mount Dennis station on the Kitchener corridor, connecting to the Eglinton Crosstown (3km away); and Caledonia station on the Barrie corridor, connecting to the Eglinton Crosstown (4km away). North-south bus routes (e.g., Keele) also provide connections to the TTC subway and the Eglinton Crosstown. The Kitchener corridor includes express services, which serves to limit the delays experienced by upstream riders at the station. However, upstream impacts remain higher than station user benefits in all but the Fare Integration scenario.

12.3.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- Integrating the TMP road extensions into the station development will add cost and require additional property. Careful coordination is required to minimize conflict and maximize construction efficiency.
- In order to accommodate service patterns, the realignment of 800m of existing CP tracks is required. Negotiation with CP and mitigation of the grade difference between the CP and Weston subs will be required.
- Freight restrictions or alternative routing should be considered to address operation concerns and physical constraints through the corridor.
- A signal bridge is required approximately 30m north of St. Clair Avenue.

12.4 Proposed GO Station and Neighbourhood Context Area



Appendix II: Updated Initial Business Cases

1. Ellesmere

1.1 Description

The Ellesmere station site is located along the Stouffville Line in the City of Toronto. The station occupies the site of the existing Scarborough Line 3 station, which is planned for removal following the opening of the Scarborough Subway Extension (SSE). Ellesmere station is located in a generally industrial neighbourhood that has been subject to some mixed use redevelopment.

The station was conceived as a single island platform, accessible from both sides of the rail corridor through pedestrian tunnels. Access from the Ellesmere Road overpass would be provided by stairs and elevators. The station design has not progressed beyond the IBC concept plan and it has not been subject of further discussion with stakeholders. No changes were identified in order to accommodate the emerging GO RER operating pattern. Station costs and ridership assumptions have been re-evaluated to reflect revised methodology.

1.2 Business Case

1.2.1 Strategic Case

Municipal policy targets the station area for growth (particularly in the nearby Scarborough Centre Urban Growth Centre) in employment densities, population densities, and real estate market demand in the immediate area. However forecasts remain low. Surrounding communities were identified as low income, including an adjacent Neighbourhood Improvement Area.
The station could help to replace transit service lost with the removal of Scarborough Line 3. Ridership forecasts indicate that the potential Ellesmere station would attract approximately 4,600 daily riders by 2031. This includes new GO riders and those that would have previously used another GO station such as Kennedy and Agincourt stations. The majority of the users of Ellesmere station are forecasted to be boarding riders that are destined to locations in downtown Toronto in the AM peak period. The station is expected to primarily attract riders that live or work along the Ellesmere Road corridor between Warden Avenue and McCowan Road. Most of these riders would arrive at the station using walking or transit access modes.

1.2.2 Financial Case and Economic Case

	Ellesmere
2031 Ridership (AM Peak Period) boardings + alightings	1,200
2031 Ridership (Daily) boardings + alightings	4,600
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Negative due to Network Impacts**
Transportation User Benefits (60yr lifecycle)	**-$113 M**
Travel Time Savings	**-$109 M**
Vehicle Operating Cost Savings	**-$3 M**
Decongestion or Road Network	**-$1 M**
Safety Impacts	**$0 M**
Environmental Impacts	**$0 M**

Ellesmere station is located 3km away from Agincourt station and 4km away from Kennedy GO/TTC subway stations, is close to the terminus of the proposed Scarborough Subway Extension at Scarborough Centre, and is approximately 3km away from the proposed Lawrence-Kennedy station. These alternate access opportunities tend to limit the ridership and travel time savings associated with the station.

With the exception of riders that start or end in the immediate vicinity of the station, riders generally realize travel time savings of 10 minutes or less, over existing Agincourt and Kennedy GO stations. Most users of Ellesmere station are destined to downtown Toronto, but a number of riders use the station to connect to Markham. The model indicates that the travel time impacts to upstream users would be higher than the travel time savings realized by Ellesmere station users.

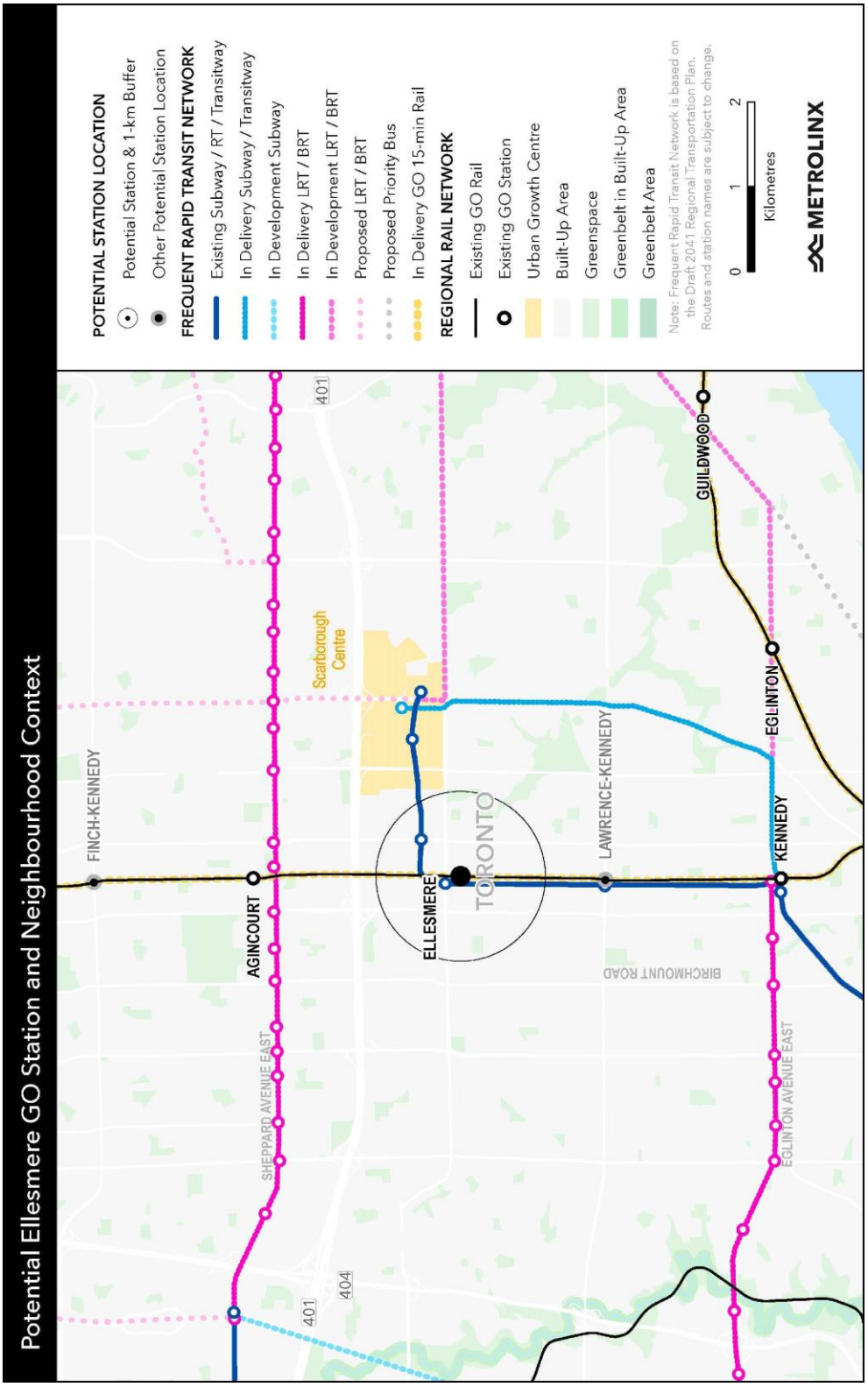
1.2.3 Deliverability and Operations

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- The initial station concept assumed the removal of the Line 3 station and infrastructure, however, the City has since required that Line 3 must remain in operation until the completion of the Scarborough Subway Extension, increasing the difficulty of construction and ongoing operation.
- An Environmental Assessment has not been initiated for this site and would be required.
- Existing plans for track work along the Stouffville corridor would need to be modified to accommodate a station at Ellesmere. Track construction has already begun in many locations along the corridor, leading to increased cost and complexity.
- Snow and ice control services on Ellesmere Road will create snow windrows adjacent to bridge level entrances which could impact functionality of the site. An interface agreement between the City, service provider, and Metrolinx may be required.
- There is a risk that Ellesmere Road will be used for ad hoc drop-offs in and around the station. Mitigation measures and further dialog with the City should take place to ensure pedestrian and vehicular impacts are minimized.

- Ongoing development of operating patterns and freight accommodation may affect station design and track alignment.
- There is a reverse curve through the station site and a turnout to an industrial spur is approximately 100m north of Ellesmere Avenue.

1.3 Proposed GO Station and Neighbourhood Context Area



2. Highway 7-Concord

2.1 Description

The Highway 7-Concord station site is located along the Barrie Line in the City of Vaughan in York Region. The station location for Highway 7-Concord is near the intersection of Highway 7 and Baldwin Avenue. The site is located in a low-density residential, commercial and industrial area, adjacent to a forested ravine containing a branch of the Don River. The site is designated for a future GO station in the York Region Official Plan. The area surrounding the site is planned for intensification and forms part of a Concord GO Mobility Hub as designated by the City of Vaughan.

The 2016 station design concept includes two side platforms, station buildings, a large passenger pick-up and drop-off facility, two parking facilities (structured and surface) and bicycle parking. The station contextual design was envisioned on mostly vacant land and would avoid negative impacts on adjacent natural features. It would also integrate with a larger multi-modal transit hub, providing direct connections to the planned vivaNext and 407 Transitway BRT services, including GO Bus.

The station design has not progressed beyond the IBC concept plan and it has not been subject of further discussion with stakeholders. No changes were identified in order to accommodate the emerging GO RER operating pattern. The concept plan was prepared before completion of the 2016 GO Rail Station Access Plan, which prioritizes parking implementation via surface parking; parking structures are to be considered in specific circumstances, which have not yet been confirmed at this site. Therefore, the Updated IBC's Economic and Financial Cases used a cost equivalent for the same number of surface spaces. Further site analysis would be required to verify a preferred parking solution. Station costs and ridership assumptions have been re-evaluated to reflect revised methodology and include costs for surface parking.

2.2 Business Case

2.2.1 Strategic Case

The station at Highway 7-Concord continues to support provincial, regional and local land use and transportation policies and plans. Growth is expected in the area around the station with density to exceed provincial targets in the 2017 Growth Plan for Major Transit Station Areas. Since 2016, four new developments have been proposed in the station area.

In August 2017, the City of Vaughan initiated the Concord GO Mobility Hub Study. The Study was identified as an important element of the Concord GO Centre Secondary Plan, as a tool to accommodate the station and a transit supportive land use regime around it. In addition to the Concord GO Mobility Hub Study, the City will be undertaking a comprehensive transportation study for the Concord GO Centre Secondary Plan, to advance transportation planning and engineering in the area to support the Mobility Hub. Improvements have been made to the surrounding transit networks and services to create an integrated, higher order transit network and enhanced mobility in Vaughan, including the completion/construction of segments of the Viva BRT along Highway 7/Centre Street and the opening of the TTC subway service to the Vaughan Metropolitan Centre in December 2017.

In December 2017, the 2018 10-Year Roads and Transit Capital Construction Program was approved by York Regional Council, with road widenings beginning in 2019 to beyond 2026. Along Keele Street from Steeles

Avenue to Highway 407, construction on a dedicated cycling facility could connect to the station. Additionally, the Vaughan Super Trail concept is being developed. It is envisioned to be a city-wide pedestrian loop trail connecting south of the Concord GO station and to the associated mobility hub area.

Ridership forecasts indicate that a potential Highway 7-Concord station would attract approximately 5,500 daily riders by 2031. The total includes those that would otherwise use another GO station (e.g., Rutherford or Langstaff stations). Almost three quarters of the ridership at Highway 7-Concord station in the AM peak period is forecast to be boarding riders, with the majority using drive-and-park to access the station. The station provides a new drive-and-park access opportunity that is closer to riders in southern Vaughan and Richmond Hill. The Barrie corridor provides more frequent service than the Richmond Hill corridor, which means that the station also attracts riders that would otherwise be closer to Langstaff and Old Cummer stations on the Richmond Hill corridor.

The station location would benefit from its location along the Hwy 7 Viva BRT, providing connections to riders that are destined for areas as far west as Brampton and east to Richmond Hill and Markham. The Viva BRT connection and planned intensification near this station location are key drivers of ridership accessing by walking and transit. The station is in relatively close proximity (approx. 4km away) to the Vaughan Metropolitan Centre and Highway 407 subway stations on the recently opened Toronto York Spadina Subway Extension (TYSSE).

2.2.2 Financial and Economic Case

	Highway 7-Concord
2031 Ridership (AM Peak Period) boardings + alightings	1,900
2031 Ridership (Daily) boardings + alightings	5,500
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Negative due to Network Impacts**
Transportation User Benefits (60yr lifecycle)	**-$93 M**
Travel Time Savings	**-$102 M**
Vehicle Operating Cost Savings	**$7 M**
Decongestion or Road Network	**$1 M**
Safety Impacts	**$1 M**
Environmental Impacts	**$0 M**

The model indicates that users walking or using transit to board or alight at the station experience the highest travel time savings, ranging between 10 to 20 minutes or more. Travel time savings benefits are highest for alighting riders that are destined to areas along the Highway 7 corridor in Vaughan.

Drive-and-park users would save relatively little time because the auto travel time between Highway 7-Concord and alternate upstream and downstream stations is small. The new stations along the TYSSE also provide an attractive alternate option for riders that have destinations in downtown Toronto or other areas that are accessible via the TTC subway network.

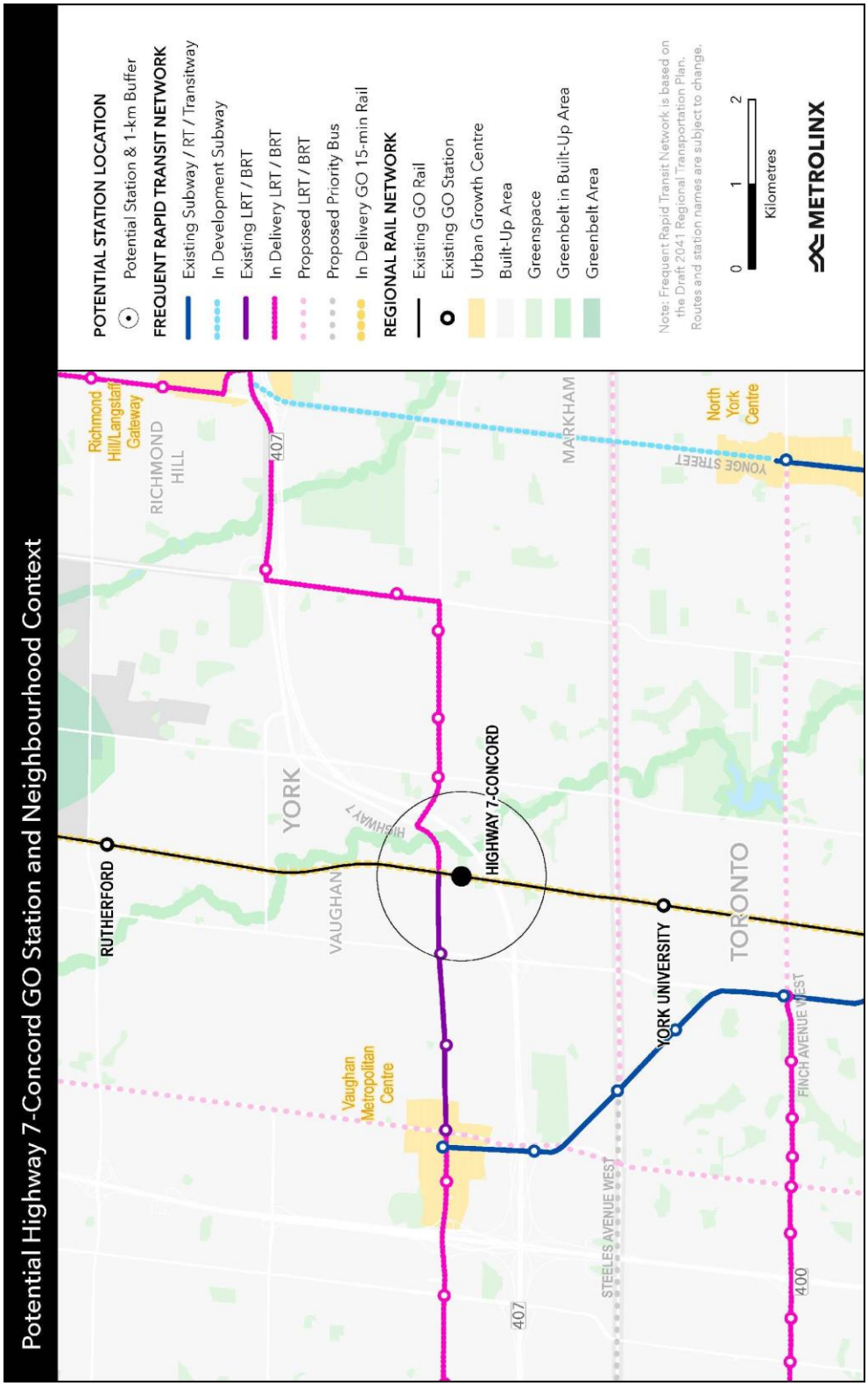
The station is directly downstream of King City, Maple, and Rutherford stations, which currently attract a significant number of boarding riders and are expected to continue to do so in the future. Although Express service plays a significant role in reducing delay impacts to these upstream riders that originate from Aurora station and points north, the station would continue to delay the riders that board at these northern stations. Refinements to the express service concept for the Barrie corridor could limit upstream impacts at Highway 7–Concord.

2.2.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- The station's relatively unconstrained context offers good potential for facility expansion and express train operation.
- Private property acquisitions will be necessary and possible impacts to environmental features may need to be mitigated.
- Simultaneous integration of both 407 Transitway and Viva BRT services at opposite ends of the site would require careful design. Construction timing for the 407 Transitway is unknown so design must consider any compromise between existing and future services.

2.3 Proposed GO Station and Neighbourhood Context Area



3. Park Lawn

3.1 Description

The Park Lawn station site is located on the Lakeshore West GO corridor in the City of Toronto. South of the rail corridor is the Humber Bay Shores neighbourhood that consists of medium- to high-density residential buildings and has experienced population growth in recent years. The lands north of the rail corridor are a mix of commercial properties, the Ontario Food Terminal and a low-rise residential neighbourhood north of the Queensway.

The station design was reviewed in the context of the emerging GO RER service operating pattern, which resulted in platform shifts. The updated station concept includes a shift west, centered over Park Lawn Road, with two side platforms. The station plan has not progressed beyond a concept level, and is still to be the subject of further discussion with stakeholders. The updated analysis investigated the potential to serve both a Park Lawn and Mimico stations, but with reduced service at each site. An indicative pattern was tested, with more service planning work still required.

3.2 Business Case

3.2.1 Strategic Case

The lands immediately surrounding the station are designated as Employment Area by the City of Toronto Official Plan (OP) and as 'Core Employment Area' by OP amendment 231 (adopted by Toronto City Council in 2013). The 2013 OP amendment is under appeal by the owners of the Mr. Christie site who are seeking to re-designate their lands as 'Regeneration Area' to permit a mix of uses, including residential.

The surrounding Park Lawn station neighbourhoods exhibit a congested and discontinuous multi-modal transportation network, which does not meet the needs of the surrounding community. Additional transit options could help alleviate the vehicle congestion experienced and serve the sustainability of a densely populated residential and employment area.

The updated IBC analysis has considered a potential GO service concept where both Mimico and Park Lawn are served by Lakeshore West trains. When serving both stations, there is a balance between minimizing impacts to upstream users and maintaining service levels at Mimico and Park Lawn stations. The updated IBC analysis has considered a conceptual split service where every other non-express Lakeshore West train would stop at Mimico or Park Lawn; this split service would provide a 30-minute service frequency at each station and not result in delays to upstream riders. GO service concepts would be further considered and evaluated as part of future PDBC analysis for Park Lawn station.

Ridership at Park Lawn station is forecast to be approximately 10,000 per day in 2031. The model shows that residential development in the Humber Bay Shores area and the proposed redevelopment of the Mr. Christie's site would be served by the Park Lawn station.

3.2.2 Financial and Economic Case

	Park Lawn
2031 Ridership (AM Peak Period) boardings + alightings	2,600
2031 Ridership (Daily) boardings + alightings	10,000
Change in Cost from IBC	**Decrease**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive and Exceed Costs**
Transportation User Benefits (60yr lifecycle)	**$156 M**
Travel Time Savings	**$157 M**
Vehicle Operating Cost Savings	**-$0.1 M**
Decongestion or Road Network	**$0 M**
Safety Impacts	**$0 M**
Environmental Impacts	**$0 M**

3.2.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- The identified station location is less than the 1.5km from existing Mimico station. Further analysis is required to determine if Mimico station should be retained, and it 15 minute service should be split between both stations.
- The Park Lawn station side platform design is consistent with Mimico and Exhibition stations and will enable service by all inner services. Island platform design, previously considered, would provide greater flexibility, though at a higher cost. There is no expectation that express trains would serve the station so there is no case for building platforms on the "fast" lines.
- Alternating stop pattern will pose customer service challenges with disparate "all-stop" schedules.
- Alternating 30-minute service to these stations would not meet the GO Expansion RER to 15-minute service, reducing prospective ridership.
- Modifications to Mimico Creek rail bridge would involve environmental impact.
- Structural capacity of the Mimico Creek rail bridge to support platforms has not been evaluated.

3.3 Proposed GO Station and Neighbourhood Context Area

4. St. Clair West (Barrie Corridor)

4.1 Description

The St. Clair West station site is on the Barrie corridor in the City of Toronto. The site is west of Caledonia Road, with primary station facilities located along St. Clair Avenue, in a predominantly residential area characterized by detached and semi-detached homes, as well as civic and institutional uses such as parks, schools and cemeteries.

The station concept plan elements include two side platforms, a small passenger pick-up and drop-off facility (PPUDO) and bicycle parking. Due to the urban nature of the surrounding area, no parking facilities are included in the station concept, as it is assumed that the majority of station users will arrive by active transportation (walking/cycling) or by transfers from other public transit routes.

The station design has not progressed beyond the IBC concept plan and it has not been subject of further discussion with stakeholders. No changes were identified in order to accommodate the emerging GO RER operating pattern. Station costs and ridership assumptions have been re-evaluated to reflect revised methodology.

4.2 Business Case

4.2.1 Strategic Case

While City of Toronto policy targets the station area for growth and intensification (as St. Clair West is designated as an *Avenue*), densities are expected to remain low with moderate potential for future real estate market demand. Due to the area's stability and limited potential for change or intensification, the City did not identify a station at St. Clair West (BA) as a priority.

The station has the potential to serve low-income and disadvantaged residents in the Weston Pelham Park *Neighbourhood Improvement Area*, located immediately adjacent to the station site.

Accessibility to the station remains high, as it is located at the intersection of several parks and cycling/pedestrian routes and could serve as a transfer node between the St. Clair streetcar and the GO network. The service and catchment area may overlap with the planned Caledonia GO/LRT station (under construction), the St. Clair-Old Weston SmartTrack station, and the 512 St Clair streetcar.

Ridership forecasts indicate that St. Clair West station would attract approximately 6,200 daily users in 2031. The total includes new and existing riders, who would now use this station rather than another such as Bloor or Caledonia stations. The majority of the station's projected boardings are forecast to be new GO riders who are within walking distance of the station. The majority of riders would be expected to arrive at the station by walking or transit.

St. Clair West station on the Barrie corridor is located less than 1km west of the St. Clair-Old Weston station site. Both stations are served by the St. Clair streetcar. St. Clair-Old Weston station generally has more existing and higher future density trip generators than St. Clair West station on the Barrie corridor, which is in proximity to lower density stable residential neighbourhoods and greenspace (e.g. Prospect Cemetery and Earlscourt Park).

4.2.2 Financial and Economic Case

	St. Clair West (Barrie Corridor)
2031 Ridership (AM Peak Period) boardings + alightings	1,600
2031 Ridership (Daily) boardings + alightings	6,200
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Negative due to Network Impacts**
Transportation User Benefits (60yr lifecycle)	**-$58 M**
Travel Time Savings	**-$31 M**
Vehicle Operating Cost Savings	**-$20 M**
Decongestion or Road Network	**-$4 M**
Safety Impacts	**-$2 M**
Environmental Impacts	**$0 M**

The model shows that St. Clair West station would provide travel time savings on the order of 10-15 minutes for riders that are within walking distance of the station. Travel time savings are limited to a relatively small catchment area since the station is located in proximity to the existing Bloor station on the Kitchener /Union Pearson Express Corridor and the TTC subway, and the approved Caledonia station on the Barrie corridor, which connects to the Eglinton Crosstown LRT.

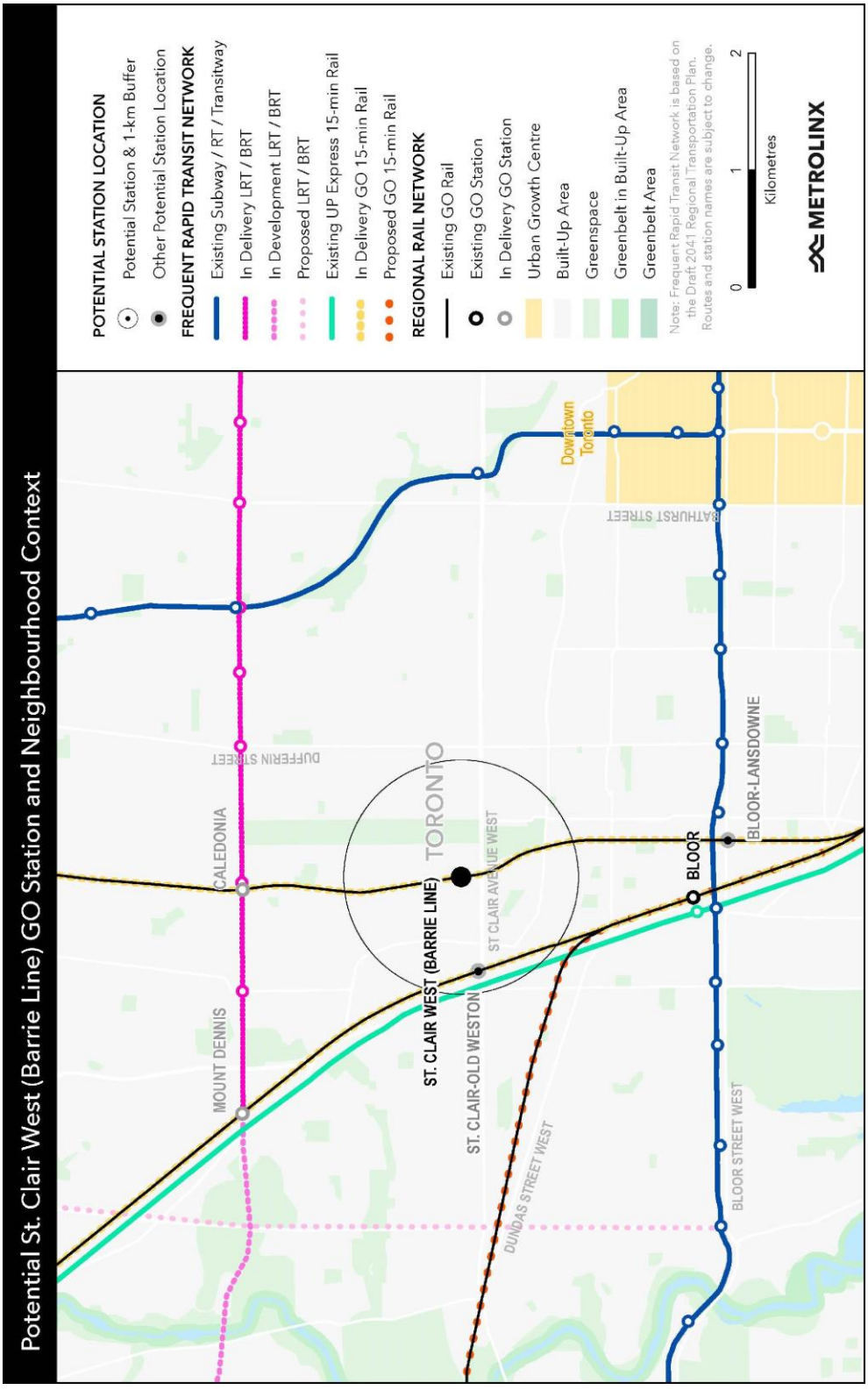
The introduction of express service to the Barrie corridor will have a significant role in reducing the number of upstream users that are impacted by St. Clair West station. The express services attract upstream users since they provide a faster travel time to downtown Toronto. The introduction of express services also results in a reduction in ridership at St. Clair West station but the reduction in the number of impacted upstream riders is more significant.

4.2.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- The platforms would be on an 'S' curve, which may create uneven gaps between the train and platform, reduce end-to-end visibility, and require mitigation to improve safety.
- The site is located in a constrained corridor and primarily residential area.
- Similar to the issues identified at St. Clair-Old Weston station, direct access to the St. Clair streetcar may not be feasible.

4.3 Proposed GO Station and Neighbourhood Context Area



5. Whites Road

5.1 Description

The Whites Road station site is located at Whites Road, just south of Highway 401, on the Lakeshore East Line in Pickering. The station is within a stable, low-density area known as West Shore that contains a mix of industrial, single family housing and retail/commercial uses.

The station was conceived as having both a side and island platform, a main station building, a passenger pick-up and drop-off (PPUDO) and two parking structures. The station site is made up of two parcels of land connected by a pedestrian bridge. Multi-use paths off Whites Road would provide pedestrian and cyclist connections.

The station design has not progressed beyond the IBC concept plan and it has not been subject of further discussion with stakeholders. No changes were identified in order to accommodate the emerging GO RER service operating pattern. The concept plan was prepared before completion of the 2016 GO Rail Station Access Plan, which prioritizes parking implementation via surface parking; parking structures are to be considered in specific circumstances, which have not yet been confirmed at this site. Therefore, the Updated IBC's Economic and Financial Cases used a cost equivalent for the same number of surface spaces. Further site analysis would be required to verify a preferred parking solution. Station costs and ridership assumptions have been re-evaluated to reflect revised methodology and include costs for surface parking.

5.2 Business Case

5.2.1 Strategic Case

The station at Whites Road continues to conform to provincial, regional and municipal transportation and land use policy objectives, but does not necessarily align with the City of Pickering's vision for where growth and higher density should be located at this time. The station is not a priority for the City of Pickering.

Development interest in the area is moderate and anticipated densities are expected to remain below the minimum density targets identified in the Growth Plan (2017) and by Metrolinx's Mobility Hub Guidelines. Connectivity and accessibility of the station has also not changed significantly.

Ridership forecasts suggest that a Whites Road station would attract approximately 3,500 daily riders by 2031. The total includes new and existing riders, the latter of which who would divert to the new station from their previous station. The majority of trips forecasted to use Whites Road station in the AM peak period are comprised of boarding riders. The majority of the passengers at the station would be drive-and-park passengers.

The Whites Road station is located directly downstream from Pickering station, which has more frequent inbound train service; Whites Road is served by four trains per hour while Pickering is served by nine trains per hour. The model shows that, with more frequent and express services at Pickering station, riders would tend to favour Pickering over Whites Road stations.

5.2.2 Financial and Economic Case

	Whites Road
2031 Ridership (AM Peak Period) boardings + alightings	1,200
2031 Ridership (Daily) boardings + alightings	3,500
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive but Less Than Costs**
Transportation User Benefits (60yr lifecycle)	**$73 M**
Travel Time Savings	**$21 M**
Vehicle Operating Cost Savings	**$39 M**
Decongestion or Road Network	**$8 M**
Safety Impacts	**$4 M**
Environmental Impacts	**$0 M**

Model results show that existing GO riders who divert to the station save automobile access time relative to their previous access station choice at Pickering or Rouge Hill stations. Travel time savings per user are relatively low due to the close proximity of Pickering station, which has higher train frequencies and expresses services.

Whites Road station's location immediately downstream of Pickering station also service to limit the upstream impacts and delays associated with the station. Lakeshore East express services are not expected to stop at the station and the local trains that would stop at Whites Road station only include riders that board at Pickering station. This reduces the number of upstream riders that would be impacted at this station.

5.2.3 Deliverability and Operations Case

The evaluation of the constructability of a potential station and its impacts on GO operations found:

- It is recommended that additional vertical access points be included from platform to main pedestrian bridge to assist with the movement of commuters.
- There is a horizontal curve in the tracks through the station site.

5.3 Proposed GO Station and Neighbourhood Context Area

Appendix III: Peer Review

steer davies gleave

Toronto
1502-80 Richmond St W
Toronto, ON M5H 2A4
Canada
canadainfo@sdgworld.net
t: +1 (647) 260 4860

Client Ref. 200346-1
SDG Ref. 23241901

23 February 2018

Nick Day
Manager, Modelling & Geomatics, Planning and Policy
Metrolinx
97 Front St W
Toronto, ON
M5J 1E6

GO Rail New Station Business Case methodology review

Dear Nick,

Over the period November 2017 – February 2018, Steer Davies Gleave reviewed the demand forecasting and evaluation approach to proposed new stations on the GO network. This encompassed reviewing documentation and draft results provided by the Metrolinx team, and a series of associated meetings and discussions.

We have concluded that the approach uses a robust combination of available information and demand forecasting tools, alongside a detailed review process to ensure credible and robust results. A series of refinements to the process have been identified that could be employed when time and resource allows.

Overall, the review found that the approach and broad assumptions employed are fit for purpose and appropriate for this stage of project development.

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Introduction

Steer Davies Gleave was commissioned on 17 November 2017 by Metrolinx to undertake a peer review of the methodology being developed and applied to evaluate new stations being considered as part of the plan to enhance the regional transit network. The review comprises three broad tasks:

- Review the methodology, including proposed economic benefits/impacts and assessing its fit for evaluating new GO Rail stations
- Assess the demand modelling methodology and its fit for the evaluation process
- Develop a letter (this document) outlining the outcome of the peer review including any feedback or suggested modifications to the analytical process

Peer review process

To facilitate the review, Metrolinx provided documentation and analysis of the methodology, and several meetings took place to discuss these and clarify any queries arising.

In addition, we familiarised ourselves with the work undertaken to date through the material available on the Metrolinx website (at http://www.metrolinx.com/en/regionalplanning/newstations/default.aspx).

Finally, we did not review the detailed analysis undertaken for the three stations provided or the wider set of stations evaluated, nor the detailed assumptions employed (such as 2031 land use by zone or network definition) and hence cannot assure the detailed analysis conducted or results therefrom. The review is focused solely on the overall methodology employed, reviewing outputs for three example stations to validate the overall approach.

Summary of approach

New stations on existing GO passenger rail lines have three broad impacts that should be captured through the evaluation process:

- The benefit to existing and new GO rail passengers that use the new station
- The potential disbenefit to passengers passing through the new station who now have additional journey time due to the additional station stop (typically 2-3 minutes, depending on the combined operating characteristics of the trainset and rail corridor)
- The changes in auto congestion and cost as trips switch between auto and GO

The approach developed employs the Greater Golden Horseshow Model, version 3 (GGHMv3), a 4-stage network model of a typical weekday AM peak period. The model is calibrated to reflect 2006 travel conditions and behaviour, and applied for a 2031 forecast year (encompassing reasonable assumptions for a 2031 transport network and land use).

The model is employed to forecast 2031 station and GO rail system demand, which is then compared to a 2031 without station scenario to understand the change in demand and associated benefits. Land use assumptions in 2031 are based on municipally provided data, supplemented by

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more focused data and updates reflecting localised development plans. Land use assumptions are held constant in the without and with new stations tests.

The demand and benefits from the GGHMv3 model are reviewed and normally used directly in the analysis. However, in some instances, the coarse nature of the zoning and network respective to the local station area as well as some variability in highway results given the congested assignment process, gives rise to anomalous results, notably for new GO users. In such cases, detailed analysis is used to modify the outputs to a more reasonable and intuitive result for the analysis, including an element of substituted values taken from the 2016 IBC work and other sources.

In practice, such modifications do not materially change the case for a new station, but this refinement is undertaken to provide a more robust analysis.

Similar analysis was used to disaggregate the new station benefit where it is tested with express service and level boarding (which reduces station dwell times). Such analysis created an alternative without new station network that included express and level boarding respectively, and compared this to a network with all the new stations added. Comparison of the demand on the network and at the respective stations between these tests and the tests set out above was undertaken to derive adjustment factors that adjust the core results to reflect express trains and level boarding. This approach 'scales' the core results, assuming the pattern and distribution of impacts remains constant.

A final sensitivity analysis was undertaken for fare integration, simply allowing all transit users to use all modes in the assignment process (thus ignoring any mode or distribution impacts). Such analysis focused on the City of Toronto, allowing Toronto transit users to access the GO system without barrier.

Key findings and recommendations

The peer review process aimed to address three key questions:

- Is the evaluation methodology appropriate for understanding new station performance?
- Is the model fit for purpose?
- Are the model outputs consistent with expectations?

The review found that across these questions the approach undertaken by Metrolinx is appropriate. Looking to the future, we have also set out potential areas for consideration on future new station business case projects.

Is the methodology appropriate?

The evaluation approach is fit for purpose as it considers a range of user and transport efficiency/external impacts that are consistent with emergent Metrolinx Business Case guidance

The evaluation's use of scenarios/sensitivity tests is encouraged as a valuable way to understand the overall resilience of each option to different futures as well as how option performance is influenced by network changes

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Recommendations for Future Analysis:

1. **Evaluate discrete changes separately** – where the impact of express service and level boarding on the case for new stations is to be considered, BAU/Base scenarios should be created to enable a direct comparison of the new station case only, clearly separating the impact of multiple changes.
2. **Land use** – the evaluation process to date has assumed a fixed land use, with the land use assumptions reflecting the presence of a new station and the intensification this could engender in both the Base and new station case. Consideration should be given to having alternative land use scenarios with the distribution (only) reflecting the presence or otherwise of a station (the overall totals remaining unchanged).

Is the model fit for purpose?

The tool (GGHMv3) is fit for purpose due to its technical rigour and widespread acceptance and use for other business case and planning studies.

Recommendations for Future Analysis:

3. **Freeze highway times** – if possible, consideration should be given to having an option within GGHM to freeze the highway travel times to reduce model variability where the transit network changes are modest and the impacts within the range of such model variability.
4. **Use of GGHMv4** – this latest version of the GGHM model has just been released, incorporating both more recent information (2011 TTS data and the latest forecast land use and network data) and functional upgrades (especially all-day modelling). Future station planning work should seek to use this model.
5. **RER service pattern** – the implementation of RER will provide enhanced opportunities for through-Union travel. The modelling structure of GGHMv3 will not fully reflect this (as all services are assumed to terminate at Union) and thus results in a conservative forecast. Specific consideration should be given to undertaking further analysis of the potential upside from such through running, notably for the downtown stations (Spadina and East Harbour).

Are the model outputs consistent with expected impacts?

The presentation of results is suitable for a Preliminary Design Business Case. While this review did not audit results, it does note that the model and evaluation outputs are within the realm of expected results for new stations in a commuter rail network.

Recommendations for Future Analysis:

6. **Benchmarking** – regional models like GGHM can be poor at replicating observed demand and/or providing robust forecasts at a station level. Benchmarking analysis should be undertaken to review the 2006 replication of observed station demand and the 2031 forecasts against existing (2017) station demand, cognisant of service levels and land use catchment. The latter should include catchment analysis within walking distance (800m) and auto/transit

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(5km). While such analysis will not be able to allow explicit adjustment of the forecasts, it will provide insight into the potential ranges that may exist.

7. **Fare integration** – integrated transit fares could have material impacts on the case for new City of Toronto stations (where to date there is no integration, although a 50% TTC co-fare is being implemented in early 2018). To date, some simple high level analysis has been undertaken to understand the broad upsides that fare integration could bring; more detailed analysis should be carried out as fare integration options crystalize.

Summary

Overall, the approach appropriately captures the range of impacts arising from new stations. The approach uses a robust combination of available information and tools, alongside a detailed review process to ensure credible and robust results. Where appropriate, modest and well-grounded modifications are made to results to reflect the nuances of the tools employed and/or the station location. To meet the requisite timelines for results, the approach and assumptions employed err to conservatism in the analysis. Overall, the approach is deemed fit for purpose.

Yours sincerely

L. T. Buckman

Les Buckman
Associate