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## 1. Introduction

Metrolinx is undertaking a Transit Project Assessment study under *Ontario Regulation 231/08 - Transit Projects and Metrolinx Undertakings* for electrification of the Union Pearson (UP) Express service beginning at UP Express Union Station in the City of Toronto and terminating at UP Express Pearson Station (Terminal 1, Toronto Pearson International Airport) in the City of Mississauga (see **Figure 1-1**). The project involves the electrification of approximately 25 km of track along the Union Station GO railway corridor and Kitchener GO railway corridor to Highway 427, where the route then follows the new UP Express spur line (currently under construction) into Toronto Pearson International Airport (Toronto Pearson) (see **Figure 1-2**).

The purpose of the Project is to convert the UP Express service from diesel to electric power. More specifically, Metrolinx is carrying out the preliminary design and EA study for the traction power distribution components and associated maintenance components of the project, which include the following:

- Overhead Catenary System
- Two Paralleling Stations
  - including gantries, 25 kV feeders (underground duct banks)
- Gantries and 25 kV feeders (underground duct banks) associated with new Traction Power Substation (Hydro One<sup>1</sup>)
- Electric Multiple Unit (EMU) Maintenance Facility

Electrification of UP Express requires a connection to Ontario's electrical system. It is proposed that the power be supplied from the existing 230 kV transmission line that runs between Hydro One's Claireville Transformer Station (located near Highway 407 and Highway 27 in the City of Vaughan) and Richview Transformer Station (located near Highway 401 and Highway 27 in the City of Toronto). Cables will deliver power to a new 230 kV Traction Power Substation (TPS). The TPS will convert the voltage from 230 kV to 25 kV so that it can be used to power the electric trains.

The Traction Power Substation is subject to the provincial *Environmental Assessment Act* in accordance with the *Class EA for Minor Transmission Facilities*. Therefore, the potential effects related to the new TPS are being assessed by Hydro One as part of this separate Class EA process (refer to the *Hydro One Union Pearson Express Electrification Traction Power Substation Class Environmental Assessment - Draft Environmental Study Report*). Notwithstanding this, it is noted that gantries and 25 kV feeders (via underground duct banks) are required in association with the new TPS as part of the Metrolinx power distribution components of UP Express electrification (as referred to above), therefore these components have been assessed under *O. Reg. 231/08*.

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<sup>1</sup> Refer to the *Hydro One Union Pearson Express Electrification Traction Power Substation Class Environmental Assessment - Draft Environmental Study Report*.

**FIGURE 1-1 GO System Map**

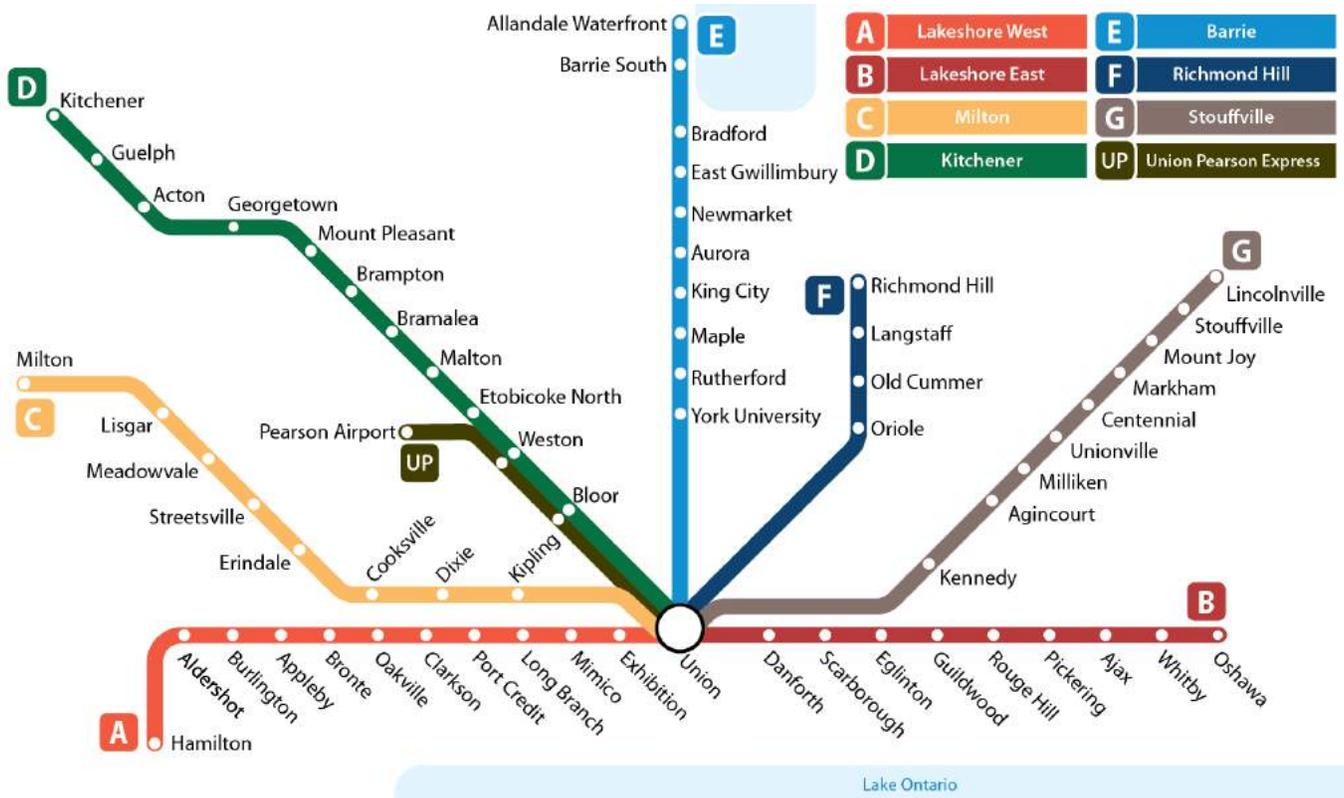
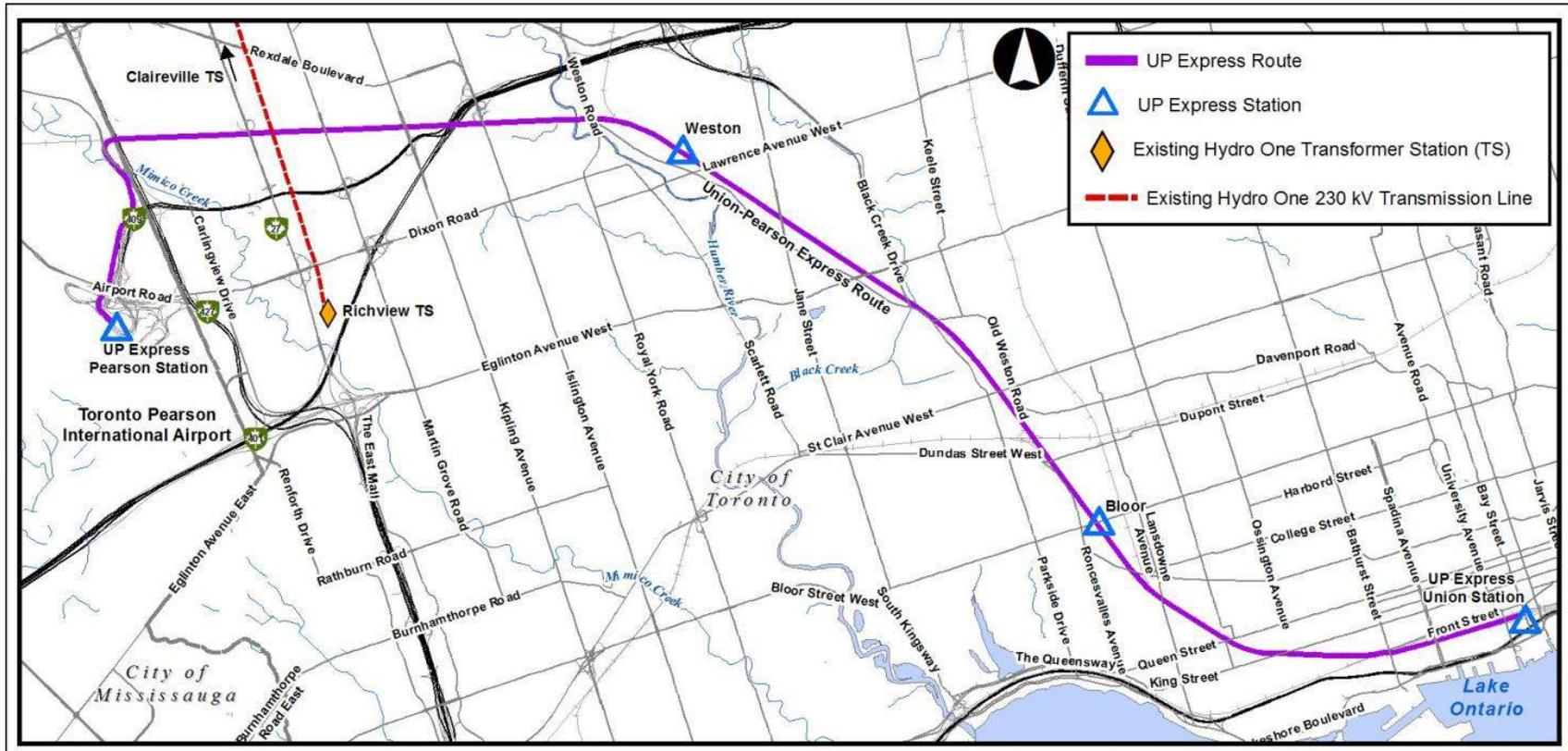


Figure 1-2 UP Express Route



Further detail on the scope of these project components is provided in Chapter 3.

## **1.1 Environmental Assessment Process**

### **1.1.1 Ontario Regulation 231/08 – Transit Project Assessment Process**

The proposed conversion of the UP Express service from diesel to electric power falls under Schedule 1, Subsection 2 (1) 7 of *Ontario Regulation 231/08 (O. Reg. 231/08) - Transit Projects and Metrolinx Undertakings* which applies to transit projects including: “*Electrification of rail equipment propulsion on existing commuter rail corridor and associated power distribution system.*”

By following the Transit Project Assessment Process (TPAP) for the UP Express Electrification undertaking (power distribution and maintenance components), the Transit Projects Regulation exempts Metrolinx from the requirements under Part II of the *Environmental Assessment Act (EA Act)*. The TPAP entails a defined timeline of 120 days for the proponent to complete the assessment of environmental effects, prepare the Environmental Project Report (EPR), and carry out consultation activities.

#### Pre-Planning Phase

Due to the accelerated six month timeline associated with the TPAP, proponents are encouraged to carry out background studies and preliminary consultation activities prior to issuing a Notice of Commencement (which officially starts the 120-day TPAP Phase). With this in mind, the following activities (which incorporated both power supply and power distribution/maintenance components of the UP Express Electrification project) were carried out during the Pre-Planning Phase:

- Collection and documentation of baseline environmental conditions information
- Preparation of UP Express Electrification Conceptual Design
- Stakeholder Working Session
- Public Update Meeting
- Identification of alternative facility locations, including development of proposed assessment criteria and identification of recommended facility locations
- Meetings with stakeholders (e.g., Ministry of the Environment, City of Toronto, Canadian National Railway, Greater Toronto Airports Authority)
- Preparation of UP Express Electrification Preliminary Design
- Initial contact with Aboriginal Communities
- Public Open House #1

### TPAP Phase

Following completion of the Pre-Planning phase, a Notice of Commencement was issued to commence the TPAP Phase, which involved the following activities:

- Impact assessment and develop mitigation measures
- Additional consultation with the Public, Review Agencies, and Aboriginal Communities
- Follow-up meetings with Stakeholders
- Preparation of the Environmental Project Report (EPR)
- Issuance of a Notice of Completion (within 120 days of Notice of Commencement)

Upon issuing the Notice of Completion, the EPR was made available for 30 days for review by the Public (including property owners), Aboriginal Communities, Stakeholders, and Review Agencies. During this review period, if there are concerns pertaining to the potential for a negative impact on a matter of Provincial importance that relates to the natural environment or has cultural value or interest, or on a constitutionally protected Aboriginal or treaty right, an objection may be submitted to the Minister of the Environment (Minister). Following the 30 day review period, the Minister has 35 days within which to issue one of three notices:

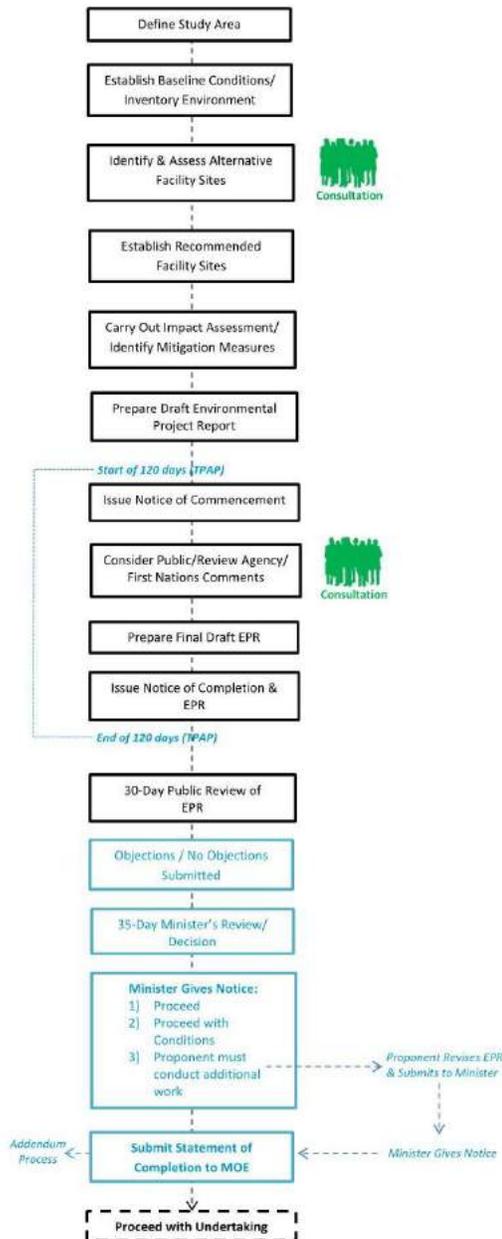
- Proceed with the Project in accordance with the EPR; or
- Proceed with the Project in accordance with the EPR subject to conditions; or
- Require the proponent to conduct further work and submit a revised EPR.

**Figure 1-3** illustrates the TPAP steps.

#### **1.1.2 Joint Metrolinx/Hydro One Consultation Process**

In the interest of presenting both key elements of the project (i.e., power supply and power distribution components) together and to avoid confusion amongst the public, the consultation processes associated with the TPAP and Class EA were carried out jointly by Metrolinx and Hydro One. This included combined public/property owner/review agency/Aboriginal communities notices and advertisements as well as a joint public open house session.

Figure 1-3 Transit Project Assessment Process



## 1.2 Overview of Environmental Project Report

To help guide the reader, **Table 1-1** summarizes the key EPR documentation requirements associated with the TPAP, as well as the corresponding section of this EPR document where the requirement has been addressed.

**TABLE 1-1. SUMMARY OF EPR REQUIREMENTS**

EPR Requirement	Section of EPR where requirement is addressed
<b>EPR Requirements (TPAP)</b>	
Statement of purpose for the transit project and summary of background information	Chapter 1
Map showing the site of the transit project	Chapter 2
Description of all studies carried out, including summary of data collected or reviewed and summary of results/conclusions	Chapter 1, Chapter 4, Chapter 6
Description of local environmental conditions within the study area	Chapter 4
Final description of transit project including preferred design, and description of other design methods considered	Chapter 5, Chapter 3
Assessment of impacts on the environment associated with the preferred design (and other methods), and criteria applied for assessment of impacts	Chapter 6
Description of proposed measures for mitigating potential negative impacts on the environment	Chapter 6
If mitigation measures are proposed, a description of the proposed monitoring activities for verifying effectiveness of mitigation, description of commitments to be fulfilled (as applicable)	Chapter 6, Chapter 7
Description of any municipal, provincial, federal or other approvals or permits anticipated to be required	Chapter 9
Consultation record	Chapter 8

As part of documenting the TPAP, this EPR has been structured into nine chapters with along with supporting technical reports (included as appendices), to address the requirements set out in *O. Reg. 231/08 – Transit Project Assessment Process*. The EPR document primarily summarizes the EA planning process followed and conclusions reached, with additional detail provided within the respective technical reports (appendices).

The following provides a brief overview of the contents found within each EPR section and technical report for reference purposes.

### EPR Chapters

- **Chapter 1** – provides an overview of the project, describes the *EA Act* requirements and summarizes the EA process followed, describes the report purpose, provides a brief project background and associated planning context
- **Chapter 2** – summarizes the process followed for generating and assessing alternative facility locations leading to the recommended electrification facility locations
- **Chapter 3** – describes the scope of the project, provides a detailed description of the Study Area (including map)
- **Chapter 4** – provides a detailed description of the baseline environmental conditions (environment potentially affected) within the Study Area
- **Chapter 5** – provides a detailed description of the UP Express Electrification project components, including power distribution and maintenance requirements associated with the electrification infrastructure and equipment
- **Chapter 6** – describes the potential environmental effects, recommended mitigation measures, net environmental effects, and monitoring activities associated with the project, including potential effects related to construction and operational/maintenance phases of the project
- **Chapter 7** – describes the proposed commitments and future work to be carried out as required during future project phases
- **Chapter 8** – describes the consultation process, elements and activities that were undertaken as part of the UP Express Electrification EA in the context of the key consultation milestones, including consultation with Review Agencies, Aboriginal Communities, and the Public. This chapter provides an overview of the input/comments/feedback received from various stakeholders and how they were addressed by Metrolinx e during the EA
- **Chapter 9** – outlines the additional anticipated approvals and permits required for implementing the project beyond *EA Act* approval

### Technical Reports

- **Natural Environment Assessment Report:** is composed of two parts including *Part A - Natural Environment Baseline Conditions Report*, and *Part B - Natural Environment Impact Assessment Report*.
- **Land Use Assessment Report:** is composed of two parts including *Part A – Land Use Baseline Conditions Report*, and *Part B – Land Use Impact Assessment Report*.

- **Cultural Heritage Assessment Report:** is composed of two parts including *Part A – Cultural Heritage Baseline Conditions Report*, and *Part B – Cultural Heritage Environment Impact Assessment Report*.
- **Stage 1 Archaeological Assessment Report:** documents the results of the Stage 1 Archaeological Assessment carried out as part of the UP Express Electrification EA.
- **Air Quality Assessment Report:** is composed of two parts including *Part A – Air Quality Baseline Conditions Report*, and *Part B – Air Quality Impact Assessment Report*.
- **Noise and Vibration Assessment Report:** is composed of two parts including *Part A – Noise and Vibration Baseline Conditions Report*, and *Part B – Noise and Vibration Impact Assessment Report*.
- **Visual Impact Assessment Report:** summarizes the visual impact assessment that was carried out for the UP Express Electrification project.
- **Electromagnetic Compatibility (EMC) Report:** summarizes the electromagnetic fields (EMF) and electromagnetic interference (EMI) assessment undertaken.
- **Traffic Report:** summarizes the results of the traffic study carried out with respect to the proposed maintenance facility at Resources Rd.
- **Consultation Record:** summarizes the consultation activities carried out by Metrolinx as part of the UP Express Electrification EA including the various consultation events held, feedback/comments received from review agencies, First Nations, and other stakeholders including members of the public, and how those comments were considered as part of the EA process.
- **Maintenance Facility Conceptual Design Report:** describes the conceptual level design for the proposed EMU Maintenance Facility at Resources Rd., including facility components, conceptual site layout, maintenance activities, etc.
- **Utilities Report:** summarizes the inventory carried out and assessment of potentially affected utilities within the study area undertaken.

### 1.3 Purpose of the Project

The purpose of the UP Express Electrification project is to convert the UP Express service from diesel powered trains (Diesel Multiple Units, DMUs) to electric powered trains (Electric Multiple Units, EMUs).

Power supply will be provided by Hydro One via cables that will deliver power to a new 230 kV Traction Power Substation (TPS). The TPS will convert the voltage from 230 kV, to 25 kV so that it can be used to power the electric trains (refer to *Hydro One Union Pearson Express Electrification Traction Power Substation Class Environmental Assessment - Draft Environmental Study Report*) for additional detail).

The preferred traction power distribution system for UP Express is an Overhead Contact System (OCS) that is comprised of a wiring system which provides efficient transfer of traction power to the pantograph mounted on the roof of the EMU (see Chapter 3, Figure 3-2), then to the EMU electric drive

motors. The wiring system is suspended from a number of catenary structures (i.e., portals, cantilevers) placed along the track. The traction power distribution system will include two paralleling stations containing autotransformers to boost the voltage along the UP Express route. In addition, a new electrified maintenance facility will be required in order to carry out maintenance on the new EMUs.

The UP Express service is to commence in 2015, operating with DMUs. At this time, the service is anticipated to run approximately 20 hours per day, 7 days a week, with trains operating every 15 minutes in each direction.

### 1.3.1 Report Purpose

The purpose of this EPR document is:

- To document the Transit Project Assessment planning process undertaken by Metrolinx in accordance with the requirements of *O. Reg. 231/08* (TPAP) for the power distribution/maintenance components of the UP Express Electrification undertaking, including but not limited to: net environmental effects of the proposed design, associated mitigation measures, consultation process and activities, and future commitments.

### 1.4 Project Team

The following multi-disciplinary team was retained to carry out the UP Express Electrification project:

- **Parsons Brinckerhoff** – responsible for overall project management and leading the engineering design (power distribution components).
- **Morrison Hershfield** – responsible for leading the EA process, managing the Consultation process for the UP Express Electrification EA, as well as carrying out the Natural Environmental study.
- **ARCADIS** – (formerly SENES Consultants Ltd.) responsible for leading the Land Use, Air Quality, and Noise and Vibration studies.
- **Archaeological Services Inc.** – responsible for leading the Cultural Heritage Resource Assessment study.
- **A.M. Archaeological Associates** – responsible for leading the Archaeological investigative study.
- **Todhunter Associates Inc.** – responsible for preparation of artistic renderings, Visual Impact Assessment).
- **Swerhun Inc.** - responsible for carrying out the public/stakeholder engagement and communications program, and facilitation support during the UP Express Electrification EA process.

## 1.5 Background

### 1.5.1 Georgetown South Service Expansion and Union-Pearson Rail Link EA (2009)

In July 2009, Metrolinx completed an EA study for the Georgetown South Service Expansion and Union-Pearson Rail Link (GSSE-UPRL). The scope of the GSSE-UPRL project included a number of infrastructure improvements along the Kitchener (previously known as Georgetown) corridor, including construction of additional trackage along the Kitchener corridor to accommodate forecast growth in GO ridership demand over the next 25 years, and construction of a new 3.3 km spur line (from Highway 427 to Terminal 1 at Pearson Airport) to allow for operation of the UP Express service between Union Station and Pearson International Airport which is to commence operation in 2015. Most of the new works detailed in the GSSE-UPRL EA are currently under construction.

### 1.5.2 GO Transit Electrification Study (2010)

Following the 2009 GSSE-UPRL EA, Metrolinx completed the GO Transit Electrification Study in December 2010, which examined electrification of the entire GO Transit rail system as a future alternative to diesel trains currently in service. This was a unique study, as it examined the entire GO system and included a comprehensive approach to assess the impact of different technologies. It also involved a comprehensive stakeholder engagement and communications program to consult with stakeholders throughout the study process. The purpose of the GO Transit Electrification Study was to provide Metrolinx's Board of Directors with the information needed to decide how the GO Transit trains will be powered in the future – using electricity, enhanced diesel technology or other technologies.

The study was based on the following considerations and approach:

- Development of the operating plan for the Reference Case<sup>2</sup>;
- A comprehensive rolling stock technology assessment, which examined the technologies – electric, diesel and alternative fuel sources – that could be used to provide future GO Transit and UP Express (formerly Airport Rail Link or 'ARL') service;
- Consideration of power supply and distribution options – overhead wires, third-rail, and others – to deliver electricity to a potential future electrified rail service;
- Identification and evaluation of network options for electrifying part or all of the GO Transit rail network and UP Express;
- Detailed assessment of a "short list" of network options; and
- Development of findings and conclusions.

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<sup>2</sup> The Electrification Study used an expanded and enhanced GO Transit rail network from the network of today as a basis of comparison. This Reference Case network was intended as one potential medium term scenario for GO Transit rather than a firm expansion plan, and assumed extensive additional investment in infrastructure to have been made.

Some of the noteworthy findings of the study were:

- Greatest benefits of electrification are associated with three different scenarios: one electrifying only the Lakeshore corridor; one electrifying a combination of the Kitchener and Lakeshore corridors; and one electrifying a combination of the Kitchener, Lakeshore and Milton corridors;
- More journey time savings can be achieved with electric locomotives compared to diesel locomotives;
- Pursuing electrification of both the Kitchener and Lakeshore corridors results in capital cost savings; and
- Electrification would offer annual operating and maintenance cost savings compared to a comparable diesel network, while the cost of electricity is expected to increase at a slower rate compared to diesel.
- Electrification would not significantly reduce regional greenhouse gas emissions and offer only marginal public health benefits

In addition, one of the key recommendations outlined in the 2010 Electrification Study was for Metrolinx to proceed with electrification of the GO Kitchener (formerly Georgetown) and GO Lakeshore corridors in phases, beginning with the UP Express service. Based on these findings, the Metrolinx Board of Directors made a decision in January 2011 to initiate *Phase 1: Electrification of the UP Express service from Union Station to Pearson International Airport*, including completion of the engineering design and EA study.

## **1.6 Planning Context**

### **1.6.1 Growth Plan for the Greater Golden Horseshoe**

The Growth Plan for the Greater Golden Horseshoe (2006) is a framework for implementing the Government of Ontario's vision for building stronger, prosperous communities by better managing growth in the region to 2031 (Ministry of Infrastructure, 2006). It has been prepared under the *Places to Grow Act (2005)* and is intended to guide decisions on a variety of issues, including the planning and management of transportation. Metrolinx's planning work is coordinated with the Growth Plan for the Greater Golden Horseshoe to tackle congestion and create an integrated, user-friendly transit system in the Greater Toronto and Hamilton Area (GTHA).

### **1.6.2 Regional Transportation Plan: *The Big Move***

In November, 2008, Metrolinx adopted the GTHA's first ever Regional Transportation Plan (RTP), *The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area*. The RTP provides direction and sets priorities for decision-making on transportation in the GTHA so as to deliver a high quality of life; a thriving, sustainable and protected environment; and a strong, prosperous and competitive economy.

*The Big Move* provides the blueprint for transforming the regional transportation system over the next 25 years. Its proposed future regional transportation network (**Figure 1-3**) includes “regional rail” and “express rail” services. *The Big Move* notes that regional rail service can be delivered by either diesel-electric or electric trains, with the latter demonstrating certain performance benefits, while express rail systems such as the Paris region’s Réseau Express Regional (RER) are “typically electric”. Eventual implementation of express rail service on the Kitchener GO corridor is identified between Union Station and the City of Brampton.

Of the 92 Priority Actions and Supporting Policies in *The Big Move*, nine are highlighted as ‘Big Moves’. These priority actions are intended to have the largest and most transformational impacts on the GTHA’s transportation system. Priority Action 1.2, highlighted as ‘Big Move #2’ is “establish high-order transit connectivity to the Pearson Airport district from all directions” through a variety of measures including the UP Express service. In Chapter 5, the rail link between Union Station and Pearson Airport is included in the RTP’s list of Top Priority Projects.

In February 2013, the Metrolinx Board of Directors approved a series of amendments to *The Big Move*. This technical update was done to keep the plan relevant, incorporating decisions taken since 2008 including the 2010 Electrification Study. *The Big Move* now specifies that the electrification of UP Express is a Top Priority project. This amendment reflects the findings of the Electrification Study that for various logistical reasons it would be preferable to undertake UP Express electrification as a precursor project to electrification of the GO Lakeshore line, which had already been identified in *The Big Move* as a Top Priority.

Figure 1-4 25 Year Plan for the Regional Rapid Transit and Highway Network from *The Big Move*



### **1.6.3 Metrolinx Investment Strategy: *Investing in Our Region; Investing in Our Future***

In fulfillment of section 32.1 of the *Metrolinx Act*, on May 27 2013 the Metrolinx Board of Directors adopted the Investment Strategy and relayed it to the Minister and the heads of councils of the municipalities of the GTHA as the corporation's formal advice.

The Investment Strategy proposes a series of 24 recommendations to Government as part of a four-part plan to integrate transportation, growth and land use planning in the GTHA, maximize the value of public infrastructure investment, optimize system and network efficiencies, and dedicate new revenue sources for transit and transportation.

The Investment Strategy identifies a 'Next Wave' of Big Move projects—a transformative slate of infrastructure projects and new programs that will continue Metrolinx's transformation of the GTHA's transportation system by expanding the regional transit network and providing resources for local transit, roads, walking and cycling, and more. It proposes that the Next Wave be fully funded by a Transportation Trust Fund that collects and administers new revenues generated by dedicated investment tools. UP Express electrification is included in the Next Wave of projects, in addition to electrification of Lakeshore and Kitchener line GO services and additional investment in GO infrastructure to introduce comprehensive two-way, all-day service to the five lines that presently lack it.

## **1.7 Other Metrolinx Projects**

The following provides a brief overview of other Metrolinx projects that are currently ongoing along the corridor.

### **1.7.1 Georgetown South Project Construction**

The Georgetown South (GTS) Project will provide infrastructure improvements to meet existing GO Transit ridership demand as well as future growth, including future two-way, all-day service. This project is one of the key elements of The Big Move. Through track sharing, the Project also facilitates the introduction of UP Express service. Various components of this project are currently under construction along the corridor, including the Strachan Ave. Grade Separation, West Toronto Diamond Grade Separation, Weston Tunnel, various bridge widenings, and track and signal installation.

#### **1.7.1.1 Bloor and Weston GO Stations**

As part of the GTS project, Metrolinx is currently undertaking renovation work to modernize and improve Bloor and Weston GO Stations. Weston GO Station improvements include: a new station building with a pedestrian plaza and added parking. Pedestrian tunnels will include elevators, ramps and stairs, and an accessible platform will be located at the station's east end. Similarly, Bloor GO Station is undergoing renovation to enhance the existing pedestrian access from Bloor Street, construct new

passenger facilities, and make adjustments to platform heights to accommodate both GO Trains and UP Express.

Both stations will also include a stop for the new UP Express, which will connect passengers between Toronto Pearson International Airport and Union Station.

### **1.7.2 Eglinton Crosstown Light Rail Transit Project**

The Eglinton Crosstown Light Rail Transit Project is a 19 km electrically-powered Light Rail Transit (LRT) line extending from Mt. Dennis to Kennedy Station in the City of Toronto. This \$5.3 billion investment is currently under construction with service anticipated to begin in 2020.

The Eglinton Crosstown LRT was the subject of an EPR completed in March 2010 and undertaken by the City of Toronto and the TTC as co-proponents. In May 2010, the Minister of the Environment issued a Notice to Proceed. Subsequently, in 2012, Metrolinx assumed management responsibility for the Project and has become the sole proponent. In addition, changes to the original design upon which the original 2010 EPR was based, were identified. As a result, Metrolinx proceeded to carry out an EPR Addendum to address the potential effects of these specific changes, including a proposed Maintenance and Storage Facility (MSF) at 3500 Eglinton Avenue West, where light rail vehicles would be maintained and stored.

Following completion of the EPR Addendum process, the *Minister's Notice to allow a Change to a Transit Project in accordance with an Addendum* for the Eglinton Crosstown LRT Project was issued to Metrolinx in December 2013. As a result, Metrolinx can proceed with the changes to the project as described in the Addendum.

## 1.8 Studies and Technical Documents Prepared/Reviewed as part of UP Express Electrification EA

The following studies and technical reports were prepared in support of the Transit Project Assessment Process, and are included as Appendices to this EPR. The content of these documents has been summarized within this EPR and referenced as applicable; they have also been made available for review on the project website<sup>3</sup>.

- *Appendix A - Natural Environment Assessment Report*
- *Appendix B - Land Use Assessment Report*
- *Appendix C - Cultural Heritage Assessment Report*
- *Appendix D - Stage 1 Archaeological Assessment Report*
- *Appendix E - Air Quality Assessment Report*
- *Appendix F - Noise and Vibration Assessment Report*
- *Appendix G - Visual Impact Assessment Report*
- *Appendix H - Electromagnetic Compatibility Report*
- *Appendix I – Traffic Report*
- *Appendix J – Consultation Record*
- *Appendix K - Maintenance Facility Conceptual Design Report*
- *Appendix L - Utilities Report*

In addition, reference documents reviewed during background data collection include but were not limited to the following:

- *Georgetown South Service Expansion and Union-Pearson Rail Link Environmental Assessment (2009) (Metrolinx)*
- *GO Electrification Study (2010) (Delcan + Arup Joint Venture)*
- *Traction Power System Simulations Report (2012) (LTK Engineering Services)*
- *Airport Rail Link Spur Provisions for Future Electrification (2012) (AirLinx/AECOM)*
- *Traction Power and Overhead Contact System Design Specification: Future Electrification of the Toronto Airport Rail Link (2012) (AECOM)*

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<sup>3</sup> <http://www.gotransit.com/electrification/>