New Track and Facilities Transit Project Assessment Process

Final Environmental Project Report – Chapter 1

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Prepared by:

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Authorization

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Acronyms, Abbreviations & Measurement Units

Term	Definition
AA	Archaeological Assessment
AC	Alternating Current
AG	Ecological Land Classification for Agriculture
ANSI	Areas of Natural and Scientific Interest
AODA	*Accessibility for Ontarians with Disabilities Act*
APEC	Area of Potential Environmental Concern
APTA	American Public Transportation Association
AQ	Air Quality
ARA	Archaeological Research Associates
AREMA	American Railway Engineering and Maintenance-of-Way Association. AREMA is the organization that represents the engineering function of the North American railroads.
ASI	Archaeological Services Inc.
ATRIS	Aboriginal and Treaty Rights Information System
BCI	Bat Conservation International
BHR	Built Heritage Resources
BP	Before Present
BR	Barrie Rail Corridor
BRCE	Barrie Rail Corridor Expansion
CA	Conservation Authority
Cadna/A	Noise Propagation Model
CanNor	Canadian Northern Railway
CE	Common Era
CENELEC	Comité Européen de Normalisation Électrotechnique CSA
CFIA	Canadian Food Inspection Agency
CGL	Ecological Land Classification for Green Lands
CHER	Cultural Heritage Evaluation Report
CHL	Cultural Heritage Landscapes
CHSR	Cultural Heritage Screening Report
CHVI	Cultural Heritage Value or Interest
CLOCA	Central Lake Ontario Conservation
CN	Canadian National Railway
CNR	Canadian National Railway

Term	Definition
COS	Contamination Overview Study
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CP	Canadian Pacific Railway
CPR	Canadian Pacific Railway
CRA	Commercial, Recreational or Aboriginal (used in the context of describing fisheries)
CSA	Canadian Standards Association
CSP	Corrugated Steel Pipe
CTA	Canadian Transportation Agency
CUM	Ecological Land Classification for Cultural Meadow
CUP	Ecological Land Classification for Cultural Plantation
CUT	Ecological Land Classification for Cultural Thicket
CUW	Ecological Land Classification for Cultural Woodland
CV	Ecological Land Classification for Constructed Lands
CVC	Ecological Land Classification for Shallow Marsh
CVC Authority	Credit Valley Conservation Authority
CVI	Ecological Land Classification for Transportation and Utilities
CVR	Ecological Land Classification for Residential Lands
CWR	Continuous Welded Rail
DBFOM Model	Design – Build – Finance – Operate – Maintain Model
DBH	Diameter at Breast Height
Decibel (dB)	A-weighted decibels, abbreviated dBA, or dBa, or dB (a), are an expression of the relative loudness of sounds in air as perceived by the human ear.
DFO	Department of Fisheries and Oceans. This agency has since been renamed Fisheries and Oceans Canada but continues to use DFO as an acronym.
DL	Distribution Line
DMU	Diesel Multiple Unit
DRM	Design Requirements Manual
DSF	Double Stacked Freight
EA	Environmental Assessment
EA Act	*Environmental Assessment Act*
EASR	Environmental Activity Sector Registry
ECCC	Environment and Climate Change Canada
ELC	Ecological Land Classification
ELF	Extremely Low Frequency

Term	Definition
EMC	Electromagnetic Compatibility
EMF	Electric and Magnetic Field
EMI	Electromagnetic Interference
EMMP	Environmental Mitigation and Management Plan
EMU	Electric Multiple Unit
EN	European Norms/Standards
END	Designation of "Endangered" for a Species at Risk under Ontario's *Endangered Species Act, 2007*
EPB	Electrical Protection Barriers
EPR	Environmental Project Report
EPS	Electrification Performance Specifications
ERIS	Environmental Risk Information Systems
ESA	Environmentally Significant Area
ESA, 2007	*The Ontario Endangered Species Act, 2007*
ESAs	Environmental Site Assessments
ESC	Erosion and Sediment Control
ESR	Environmental Study Report
FCC	Federal Communications Commission
FOD	The Ecological Land Classification for Deciduous Forest Community
FOM	The Ecological Land Classification for Mixed Forest
FRA	Federal Rail Administration (US Department of Transportation)
FTA	Federal Transit Administration (US Department of Transportation)
FWCA	*Fish and Wildlife Conservation Act*
GHG	Greenhouse Gas
GIS	Geographic Information System
GMP	Groundwater Management Plan
GPS	Global Positioning System
GRT	Government Review Team
GS	Grade Separation
GSC	Geological Survey of Canada
GTR	Grand Trunk Railway
GTTA	Greater Toronto Transportation Authority
HCM	Highway Capacity Manual
HDF	Headwater Drainage Feature
HIA	Heritage Impact Assessment
HONI	Hydro One Networks Incorporated

Term	Definition
HRCA	Conservation Halton (also known as Halton Region Conservation Authority).
HV	High Voltages
HWIN	Hazardous Waste Information Network
IAA	*Impact Assessment Act*
ICS	Infrastructure Configuration State
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IO	Infrastructure Ontario
IPCC	The Intergovernmental Panel on Climate Change
Km	Kilometre
KT	Kitchener Rail Corridor
kV	Abbreviation for kilovolt (equal to 1000 volts)
LEED	Leadership in Energy and Environmental Design
L_{EQ}	Equivalent Sound Level
LID	Low Impact Development
LIO	Land Information Ontario
LSE	Lakeshore East Rail Corridor
LSRCA	Lake Simcoe Region Conservation Authority
LSW	Lakeshore West Rail Corridor
LV	Low Voltages
m	Metres
MA	Ecological Land Classification for Marsh
MAM	Ecological Land Classification for Meadow Marsh
MAS	Ecological Land Classification for Shallow Marsh
MBCA	*Federal Migratory Birds Convention Act, 1994.*
MECP	The acronym for Ontario Ministry of the Environment, Conservation, and Parks, formerly referred to as the Ministry of the Environment and Climate Change (MOECC), Ministry of the Environment and Energy (MOEE) or just Ministry of the Environment (MOE).
Megavolt-Ampere (MVA)	This is a unit for measuring the apparent power in an electrical circuit equivalent of one million watts
MEM	Ecological Land Classification for Mixed Meadow
MHSTCI	Ontario Ministry of Heritage, Sport, Tourism and Culture Industries (formerly the Ontario Ministry of Tourism, Culture and Sport [MTCS]). The governing body that enforces Part IV and V of the *Ontario Heritage Act* and may determine policies, priorities and programs for the conservation, protection and preservation of Ontario's heritage
Milligauss	In electricity, a practical unit of magnetic induction equal to a thousandth of one gauss or of one c. g. s. electromagnetic unit

Term	Definition
MIRR	Ministry of Indigenous Relations and Reconciliation
MMAH	Ministry of Municipal Affairs and Housing
MNO	Metis Nation of Ontario
MNRF	Ontario Ministry of Natural Resources and Forestry
MOEE/GO Protocol	MOEE/GO Transit Draft Protocol for Noise and Vibration Assessment (1995)
MOL	Ministry of Labour
MOW	Maintenance of Way
MTO	Ontario Ministry of Transportation
MVA	Megavolt-Ampere
MVC	Minimum Vertical Clearance
NAR	Designation of Not-at-Risk species
NDA	New Directions Archaeology
NHIC	Natural Heritage Information Centre
NIEHS	National Institute of Environmental Health Sciences, a division of the United States National Institute of Health (NIH)
O.Reg	Ontario Regulation
OA	Ecological Land Classification for Open Water
OASD	Ontario Archaeological Sites Database
OBA	Ontario Butterfly Atlas
OBBA	Ontario Breeding Bird Atlas
OCS	Overhead Contact System
OGS	Ontario Geological Survey
OHA	*Ontario Heritage Act*
OHT	Ontario Heritage Trust
OP	Official Plan
OPSS	Ontario Provincial Standard Specification
ORMCP	Oak Ridges Moraine Conservation Plan
ORRA	Ontario Reptile and Amphibian Atlas
OTM	Ontario Traffic Manual
OWES	Ontario Wetland Evaluation System
OWRA	Ontario Water Resources Act, R.S.O. 1990, c. O.40.
PCA	Potentially Contaminating Activity
PM	Progressive Maintenance
PS	Paralleling Station
PSW	Provincially Significant Wetland

Term	Definition
PTE	Permission to Enter
PTTW	Permission to Take Water
RCD	Reference Concept Design
RER	Regional Express Rail
RF	Radiofrequency
RH	Richmond Hill Rail Corridor
RNFP	Ravine and Natural Feature Protection
RoC	Record of Consultation
ROM	Royal Ontario Museum.
ROW	Right-of-Way
RRFMP	Rouge River Fisheries Management Plan
RTP	Regional Transportation Plan 2041
S & G	Standards and Guidelines for Consultant Archaeologists
S1	Committee on the Status of Species at Risk in Ontario designation for Critically Imperiled — meaning a critically imperiled species in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province.
S2	Committee on the Status of Species at Risk in Ontario designation for Imperiled — meaning a imperiled species in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province.
S3	Committee on the Status of Species at Risk in Ontario designation for Vulnerable — meaning a vulnerable species in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
SAR	Species at Risk
SARA	*Species at Risk Act, 2002*
SARO	Species at Risk in Ontario
SC	Designation of “Special Concern” for a Species at Risk under Ontario’s *Endangered Species Act, 2007*
SEMMP	Soil and Excavation Materials Management Plan
SOCC	Species of Conservation Concern
ST	Stouffville Rail Corridor
STEAM	Sound from Trains Environmental Analysis Method
SUE	Subsurface Utility Engineering
SW	Ecological Land Classification for Swamp
SWD	Ecological Land Classification for Deciduous Swamp
SWH	Significant Wildlife Habitat
SWM	Stormwater Management

Term	Definition
SWS	Switching Station
SWT	Ecological Land Classification for Swamp Thicket
TAC	Technical Advisory Committee
TC	Transport Canada
TDSB	Toronto District School Board
The Project	New Track and Facilities TPAP
TIA	Traffic Impact Assessment
TMC	Turning Movement Counts
TPAP	Transit Project Assessment Process
TPF	Traction Power Facility
TPZ	Tree Protection Zone
TRCA	Toronto and Region Conservation Authority
TSS	Train Service Specification
TTS	Transportation Tomorrow Survey
UP Express	Union-Pearson Express
UPS	Uninterrupted Power Supply
USA EPA	United States Environmental Protection Agency
USRC	Union Station Rail Corridor
VASCAN	Database of Vascular Plants of Canada
VOC	Volatile Organic Compound
WHMIS	Workplace Hazardous Material Information System
WHPA	Wellhead Protection Area
WOD	Ecological Land Classification for Deciduous Woodland

Glossary of Terms

Term	Definition
2041 Regional Transportation Plan (RTP) (2018)	The 2041 RTP is the second transportation plan for the GTHA developed by Metrolinx. The 2041 RTP outlines how governments and transit agencies will work together to build an integrated transportation system that will allow people to travel quickly and seamlessly to more places.
Accessibility for Ontarians with Disabilities Act (AODA) (2005)	The *Accessibility for Ontarians with Disabilities Act*, 2005 (AODA) is a statute enacted in 2005 by the Legislative Assembly of Ontario, Canada. Its purpose is to improve accessibility standards for Ontarians with physical and mental disabilities to all public establishments by 2025.
Alternating Current (AC)	An electric current in which the flow of electric charge periodically reverses direction, whereas in direct current (DC, also dc), the flow of electric charge is only in one direction.
Alternative Financing and Procurement (AFP)	An AFP model brings together private and public sector expertise in a unique structure that transfers the risk of project cost increases and scheduling delays typically associated with traditional project delivery.
Ambient Sound Levels	Sound existing at a receptor in the absence of all noise from GO Rail Network. Includes noise from road traffic and existing industry.
Area of Natural and Scientific Interest (ANSI)	An area of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study, or education.
Area of Potential Environmental Concern (APEC)	An area within the Study Area where one or more contaminants are potentially present, as determined through the Contamination Overview Study including identification of past or present land uses of concern and/or identification of a Potentially Contaminating Activity (PCA).
Autotransformer Return Feeder	An overhead conductor supported on the same structure as the catenary conductors. The Autotransformer Return Feeder connects successive feeding points and is connected to one terminal of an autotransformer in the TPF via a circuit breaker or disconnect switch. At these facilities, the other terminal of the autotransformer is connected to a catenary section or sections via circuit breakers or disconnects.
Best Practices	Professional procedures that are accepted or prescribed as being correct or most effective.
Bonding	A low impedance path obtained by permanently joining all normally non-current carrying conductive parts to ensure electrical continuity and having the capacity to conduct safely any current likely to be imposed on it.
Borden System	Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 km east to west, and approximately 18.5 km north to south.
Bridge Modifications	Bridge modifications may be required to accommodate electrification along GO rail corridors. Types of bridge modifications include: Electrification Protection Barriers, OCS Attachments/Support Structures, Vertical Clearance, Flash Plates, and Grounding and Bounding.
Bridge Overpass	Bridge Overpass is defined as rail-under-road or pedestrian walkway.
Bridge Protection Barrier	Bridge protection barrier is to protect pedestrians and infrastructure users within the public right-of-way on overhead bridges from direct contact with adjacent live parts of the Overhead Catenary System (OCS). The barrier also protects against damage to the OCS passing under bridges by providing an obstacle to debris that may be thrown onto the railway from overhead.
Built Heritage Resources	A building, structure, monument, installation or any manufactured or constructed part or remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Indigenous community. Built heritage resources are located on property that may be

Term	Definition
	designated under Parts IV or V of the Ontario Heritage Act, or that may be included on local, provincial, federal and/or international registers.
Business Case	In the Metrolinx context, Business Cases are prepared to provide timely information on potential investments to inform decision-making and support investment optimization as the investment advances through planning, design, delivery and operation.
Canadian Standards Association Group (CSA Group)	An organization which works in Canada and around the world to develop standards in 50 different program areas, such as electronics, telecommunications, occupational health and safety, healthcare, energy efficiency, and construction products and materials. Accredited by the Standards Council of Canada, CSA Group has developed more than 3,000 standards, codes and related products for the safety, design or performance of a wide range of products and services.
Cantilever	A beam that is supported by a pole at only one end and carries the load of the electrification equipment on top of tracks. At multiple track locations where cantilever frames are not practical, portal structures should be utilized.
Catenary System	An assembly of overhead wires consisting of, as a minimum, a messenger wire, carrying vertical hangers that support a solid contact wire which is the contact interface with operating electric train pantographs, and which supplies power from a central power source to an electrically-powered vehicle, such as a train.
Ch	The contraction of Chainage, measurement in kilometres along the rail corridors, starting at the center of Union Station and radiating outwards along the corridors.
Circuit	A conductor or system of conductors which form an electrical section between two switching points.
Class Environmental Assessment	A document that sets out a standardized planning process for those classes or groups of activities for which the applicant is responsible. It is also known as a “parent” document in some class environmental assessments. A class environmental assessment is approved under the *Environmental Assessment Act* and applies to projects that are carried out routinely and have predictable environmental effects that can be readily managed. Examples of Class Environmental Assessments include the GO Transit Class Environmental Assessment document and the Class Environmental Assessment for Minor Transmission Facilities.
Class Environmental Assessment for Minor Transmission Facilities	The purpose of the Class Environmental Assessment for Minor Transmission Facilities (also referred to as "Class EA Document") is to provide information that will enable the Minister of the Environment, Conservation and Parks (Minister) to approve, following a single review, certain types of frequently occurring transmission projects specified in the Guide to Environmental Assessment Requirements for Electricity Projects (2011) and in O. Reg. 231/08. The project will be relatively small in scale, have predictable environmental effects that can be likely mitigated, and can be planned and constructed in accordance with a common process.
Combustion	The chemical process where a substance reacts with oxygen to release energy.
Combustion Emissions	The emissions released from the combustion of fossil fuels. These include carbon dioxide (CO_2), carbon monoxide (CO), oxides of nitrogen (NOx), particulate matter, and volatile organic compounds (VOCs).
Conceptual Design	The first design stage of a project. This stage includes creating ideas and considering the pros and cons of those ideas. This is done to minimize project risks and evaluate the overall potential success of the project.
Conditional Heritage Property	A property, including buildings and structures on the property, that is determined to potentially have cultural heritage value or interest and that is not owned by the Crown in right of Ontario or by a prescribed public body.
Consist	The composition of a train, including type and number of locomotives and number of cars.

Term	Definition
Constructor	The entity by which any works or operations referred to in tis Report are constructed or carried out or are to be constructed or carried out or any authority or person authorised to construct any such works or carry out any such operations.
Contact Wire	A solid grooved, bare aerial, overhead electrical conductor of an OCS that is suspended above the rail vehicles and which supplies the electrically powered vehicles with electrical energy through roof-mounted current collection equipment - pantographs - and with which the current collectors make direct electrical contact.
Control Centre	The building or room location that is used to dispatch trains and control the train and maintenance operations over a designated section of track.
Control Point	An established coordinate location for a physical feature. Control points are used as the basis for improving the spatial accuracy of all other points to which they are connected and for generating other points within an established distance or area around the control point.
Cross Bonds	The method of tying tracks together electrically to equalize traction return currents between tracks. This is done to minimize touch potential.
Cross Feeding System	Overhead feeder lines are provided between the main gantry and strain gantry across the electrified track to feed power to the OCS wires.
Cultural Heritage Evaluation Report (CHER)	A report prepared by, or with advice from a qualified heritage professional, who gathered and recorded, through research, site visits and public engagement, enough information about the property to sufficiently understand and substantiate its cultural heritage value.
Cultural Heritage Landscapes	A defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous community. The area may include features such as buildings, structures, spaces, views, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Cultural heritage landscapes may be properties that have been determined to have cultural heritage value or interest under the Ontario Heritage Act, or have been included on federal and/or international registers, and/or protected through official plan, zoning by-law, or other land use planning mechanisms.
Cultural Heritage Resource (CHR)	Includes archaeological resources, built heritage resources and cultural heritage landscapes.
Cultural Heritage Screening Report (CHSR)	A report prepared with advice by a qualified person who gathered and recorded, through research, site visits and public engagement enough information about the study area to identify those properties that have potential or known cultural heritage value.
Cultural Heritage Value or Interest	A property may be determined to have cultural heritage value or interest if it meets one or more of the criteria found in Ontario Regulation 9/06 and/or Ontario Regulation 10/06 under the *Ontario Heritage Act*.
Data Gap Analysis	An analysis conducted on previously available studies and research to see what information is missing to determine what requires further study.
Deadhead Movements	Empty train movements required to reposition a train before or after revenue service. (Revenue service entails train movements that carry fare paying passengers). Deadhead movements are also referred to as “unproductive moves” as they incur the costs of train operations but are not offset by any revenue from passengers.
Design – Build – Finance – Operate – Maintain (DBFOM) Model	The Design-Build-Finance-Operate-Maintain model integrates the work of multiple companies into one contract. These companies form a special purpose vehicle called a Project Company or a consortium to complete the project. The DBFOM model is the most comprehensive public-private partnership model and it transfers the most risks from the public sector to the private sector through a performance-based contract.

Term	Definition
Detailed Design	The detailed design phase of a project is defined as the phase of the project where design is refined past the conceptual phase, when plans, specifications, and estimates are created. This will take place after the TPAP is completed and before the construction phase.
Diesel Multiple Unit (DMU)	A train comprising single self -propelled diesel units.
Distribution Line (DL)	Electrical line conveying electricity at voltages less than 50kV.
Double Stacked Freight (DSF)	Freight trains carrying double stack containers.
Ecological Land Classification (ELC)	A term used in Ontario to describe various systems to indicate natural regions based on ecological factors.
Electric and Magnetic Field (EMF)	Electric and magnetic fields arise from natural forces and permeate our environment. In addition to natural background EMF, anthropogenic sources include electric fields which arise anywhere electricity or electrical components are used and magnetic fields which arise wherever there is a flow of electric current. Common manmade sources of EMF include electronics, power stations, transmission lines, telecommunication infrastructure, electric motors, etc. The strength of man-made EMF depends on the characteristics of the source including amongst others, voltage, current strength and frequency.
Electric Multiple Unit (EMU)	A train comprising single self-propelled electric units.
Electric Section	This is the entire section of the overhead contact system (OCS) which, during normal system operation, is powered from a traction power substation (TPS) circuit breaker. The TPS feed section is demarcated by the phase breaks of the supplying TPS and by the phase breaks at the nearest SWS or line end. An electrical section may be subdivided into smaller elementary electrical sections.
Electric Traction Power Facility	The equivalent continuous sound level in A-weighted decibels equivalent to the total sound energy measured over a stated period of time.
Electrical Potential	A measurement of the voltage (or potential difference) between two points in a system. The unit for electrical potential is expressed in volts.
Electrical Protection Barriers (EPB)	Barriers are required on overhead bridges to ensure safety of the energized equipment. Approximate barrier height is 2 meters.
Electrification Performance Specifications (EPS)	Electrification Performance Specifications (EPS) are based on the combination of available knowledge, experience, industry Best Management Practices (BMP) and worldwide standards. These EPS outline the applicable design standards to be complied with and performance requirements to be met as part of delivering a safe, efficient and reliable electrified system. Accordingly, these specifications provided the context for the subsequent preparation of the GO Transit Network Electrification conceptual design.
Electromagnetic Compatibility (EMC)	The ability of a device, equipment, or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.
Electromagnetic Interference (EMI)	A disturbance that affects an electrical circuit due to either electromagnetic induction or radiation from an external source.
Elementary Electrical Section	The smallest section of the OCS power distribution system that can be isolated from other sections or feeders of the system by means of disconnect switches and/or circuit breakers.
EMI Noise	Unwanted electrical signals that produce undesirable effects in the circuits of the control system in which they occur.

Term	Definition
Environmental Project Report (EPR)	The proponent is required to prepare an EPR to document the TPAP followed, including but not limited to: a description of the preferred transit project, a map of the project, a description of existing environmental conditions, an assessment of potential impacts, description of proposed mitigation measures, etc. The EPR is made available for public review and comment for a period of 30 calendar days. This is followed by a 35-day Minister's Decision Period.
Environmental Site Assessments (ESAs)	The study of a property to determine if contaminants are present and, if so, the location and concentration of these contaminants. This study includes a phase one environmental site assessment and where required a phase two environmental site assessment.
Environmentally Significant Area (ESA)	These are natural areas which are particularly significant or sensitive requiring additional protection to preserve their environmental qualities and significance.
Equivalent Sound Level	The equivalent continuous sound level in A-weighted decibels equivalent to the total sound energy measured over a stated period of time.
Existing Operations	Rail operations as of 2015, the Pre-project scenario.
Express Rail Service	GO train movements that do not stop at every GO Station along the Corridor.
Extremely Low Frequency (ELF)	The International Telecommunication Union (ITU) designation for electromagnetic radiation (radio waves) with frequencies from 3 to 30 Hz, and corresponding wavelengths from 100,000 to 10,000 kilometers.
Facility	Locations, structures, or facilities that have the potential to be impacted by or interact with the project.
Feeder	A current-carrying electrical connection between the overhead contact system and a traction power facility (substation, paralleling station or switching station).
Fisheries Act (1985)	The *Fisheries Act* (as amended in June 2019) is federal legislation intended to protect fish and fish habitat throughout Canada.
Flash Plate	A conductive plate installed above a bare energized wire and below reinforced concrete. The intent is to prevent 'flash over' which is where current finds its way into the reinforcing steel. Usually this is via water dripping, ice, or animals making the bridge between wire and concrete. The plate is bonded to the static wire.
Fossil Fuels	A group of combustible materials that have been formed from decayed plants and animals. These materials are often used as fuel by combusting them to release energy. Fossil fuels include oil, coal, and natural gas.
FRA Protocol	Federal Railroad Administration, U.S. Department of Transportation, High-Speed Ground Transportation Noise and Vibration Impact Assessment
Freight Switcher Trains	Freight trains with consists of 1 freight locomotive and 6 freight rail cars.
FTA Protocol	Federal Transit Administration, U.S. Department of Transportation, High-Speed Ground Transportation Noise and Vibration Impact Assessment
Full Business Case (FBC)	This Business Case aligns with the part four of Metrolinx's stage gate process (Design and Procurement Preparation). The Full Business Case advances an investment to procurement and funding by confirming its scope, benefits, costs, and delivery approach.
Future Operations	Rail operations corresponding to the TSS1+ schedule, the Post-project scenario.
Gantry	The feeder wires from the TPS will be connected to the OCS with the help of gantries. The main gantry (also referred to as the catenary feeding gantry) is the one parallel to the track and closest to the TPF. Gantries are also used for traction power distribution. The feeder wires from the facility will be connected to the OCS with the help of gantries.

Term	Definition
Geographic Information System (GIS)	Systems that are designed to capture, store, visualize, manipulate, analyze, manage, and present spatial or geographical data.
GO Expansion Program	GO Expansion is an investment program that will transform GO Rail into a Rapid Rail System that provides the expanded mobility the GTHA needs to accommodate growth and maintain a high quality of life and prosperous economy. GO Expansion is one of Canada's largest infrastructure and transport projects. It will cost $16.8 billion beyond the $38.9 GO Rail would need to spend over 60 years to continue to operate and maintain the system.
GO Station Platform	A GO Station platform is an area alongside a railway track providing convenient access to trains. All GO stations have some form of platform, with larger stations having multiple platforms.
Greater Toronto and Hamilton Area (GTHA)	The metropolitan region encompassing the City of Toronto, the four surrounding Regional Municipalities (Durham, Halton, Peel and York) and the City of Hamilton.
Greenhouse Gases	Gases that absorb infrared radiation emitted from the Earth thus containing the energy within the atmosphere. Total greenhouse gases are typically expressed as carbon dioxide equivalent (CO2e), which is the total mass of CO2 that would have the same impact on climate change as a mixture of greenhouse gases.
Grounding	Connecting to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to limit the build-up of voltages to levels below that which may result in undue hazard to persons or to connected equipment.
Grounding and Bonding – Bridges	Grounding and Bonding is required to prevent damage from flashovers to the bridge structures and to prevent step and touch potential from exceeding permissible limits as defined in the applicable standards.
Grounding Grid	A system of horizontal ground electrodes that consists of a number of interconnected, bare conductors buried in the earth, providing a common ground for electrical devices or metallic structures, usually in one specific location.
Growth Plan for the Greater Golden Horseshoe (2017)	Growth Plan for the Greater Golden Horseshoe (2017) is a framework for implementing the Government of Ontario's initiative to plan for growth that supports economic prosperity, protects the environment, and helps communities achieve a high quality of life (Ministry of Municipal Affairs and Housing, 2017). It was 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.
High Voltage (HV)	Refers to electrical energy at voltages high enough to cause injury and harm to human beings and living species. OESC describes high voltage for voltages over 750 V.
Hydro One	The utility that delivers electricity across the province of Ontario. Hydro One has four subsidiaries, the largest being Hydro One Networks. They operate 97% of the high voltage transmission grid throughout Ontario.
Immunity	The ability of equipment to perform as intended without degradation in the presence of an electromagnetic disturbance.
Impedance Bonds	An electrical device located between the rails consisting of a coil with a centre tap used to bridge insulated rail joints to prevent track circuit energy from bridging the insulated joint, while allowing the traction return current to bypass the insulated joint. The centre tap can also be used to provide a connection from the rails to the static wire and/or traction power facilities for the traction return current.
Initial Business Case (IBC)	The first Business Case prepared for a project in line with part two of Metrolinx's stage gate process (Feasibility and Options Analysis). This Business Case compares potential investments to identify if there is merit in further design and development.

Term	Definition
Lines of Country	An atlas of railway and waterway history in Canada.
Local Rail Service	GO train movements that stop at every GO Station along the Corridor.
Low Voltage (LV)	According to the OESC LV is voltages between 30 V and 750 V.
Main Gantry	These 25 kV feeders from the TPF will be connected to the OCS with the help of main and strain gantries, as well as a cross feeder arrangement.
Maintenance Facility	A mechanical facility for the maintenance, repair, and inspection of engines and railcars.
Megavolt-Ampere (MVA)	This is a unit for measuring the apparent power in an electrical circuit equivalent of one million watts.
Messenger Wire	In catenary construction, the OCS Messenger Wire is a longitudinal bare stranded conductor that physically supports the contact wire or wires either directly or indirectly by means of hangers or hanger clips and is electrically common with the contact wire(s).
Metrolinx Interim Cultural Heritage Management Process (2013)	The Metrolinx Interim Cultural Heritage Management Process (2013) involves four steps: Step 1: Cultural Heritage Screening Step 2: Heritage Evaluation Step 3: Interim Cultural Heritage Management Step 4: Review and Approval for Metrolinx Heritage Properties of Provincial Significance.
Mid-span	Area between two OCS registration points.
Migratory Bird Convention Act (MBCA) (1994)	The federal *Migratory Bird Convention Act, 1994* (MBCA) protects most migratory birds and their nests in Canada. Bird families not protect under the Act include grouse, quail, pheasants, ptarmigan, hawks, owls, eagles, falcons, cormorants, pelicans, crows, jays, kingfishers, and some species of blackbirds; however, these bird families have some level of protection under the *Fish and Wildlife Conservation Act, 1997* (FWCA).
Minimum Vertical Clearance (MVC)	A clearance plate defines the maximum height and width for railway vehicles to ensure safe passage through bridges, tunnels and other structures. Standard plates are used throughout North America so that train operators know what size equipment will safely pass on a given line.
Mitigation Measure	An action taken to lessen or reduce the severity of potential adverse environmental effects or enhance positive environmental effects. These measures could include construction techniques, compensation or community enhancement.
Modelling	The process of using collected data and information to generate rational predictions regarding the future implementation of project components.
Non-Revenue Trains	GO and VIA train movements that do not carry passengers. These movements typically occur between layovers or maintenance facilities and GO Stations.
Notice of Commencement	Notice prepared by the proponent of the TPAP, which includes information as outlined *in O.Reg. 231/08, s. 7(2)*, and is distributed as described in *s.7(3) of O.Reg. 231/08.* The first day on which the Notice of Commencement of the TPAP is published in a newspaper marks the project commencement date. The proponent has 120 days following the Notice of Commencement to prepare and distribute the Environmental Project Report and issue the Notice of Completion.
Notice of Completion	Refers to the Notice of Completion as outlined in *O.Reg. 231/08, s.11.* After conducting consultation in accordance with *O.Reg. 231/08, s.8* and preparing the Environmental Project Report, the proponent shall prepare a Notice of Completion of the Environmental Project Report. The preparation and distribution of the notice shall be in accordance with *O.Reg. 231/08, s. 11.* The Notice of Completion shall be issued within 120 days of the issuance of the Notice of Commencement (i.e., project commencement date), unless a Notice of Issue (i.e., suspension of 120-day period) is issued. The date on which the Notice of Completion is issued marks the start of a 30-day public review period of the Environmental Project Report.

Term	Definition
NPC-300: Environmental Noise Guideline - Stationary and Transportation Noise Sources - Approval and Planning	A guideline on the proper control of sources of noise emissions to the environment. The Ministry of the Environment Conservation and Parks (MECP) ensures sources of emissions to the environment are adequately controlled to prevent potential negative effects. Published by the Ministry of Environment and Energy: August 2013
O. Reg. 231/08: Transit Projects and Metrolinx Undertakings	O.Reg 231/08 is provincial legislation that sets out the ground rules for transit project in Ontario. It describes exceptions for Metrolinx projects.
OCS Attachments/Support Structure	To run OCS wires under overhead bridges without attachments, there must be enough clearance between the messenger wire/catenary and the lowest part of the bridge structure. Where enough clearance does not exist, attachments (e.g., tunnel arms) on the structure are required to support the OCS. In addition, for rail overpass structures, OCS support structures (i.e., portals/cantilevers) may need to be installed on the structure to support the OCS system.
Official Plan	An Official Plan is a policy document that guides the short-term and long-term development in a community. It applies to all lands within the municipal boundary and the policies within it provide direction for the size and location of land uses, provision of municipal services and facilities, and preparation of regulatory bylaws to control the development and use of land.
Ontario Heritage Act (OHA) (1990)	Legislation giving municipalities and the provincial government powers to preserve the heritage of Ontario by protecting heritage properties and archaeological sites.
Ontario Planning Act (1990)	The *Planning Act* (the Act) is provincial legislation that sets out the ground rules for land use planning in Ontario. It describes how land uses may be controlled, and who may control them.
Ontario Provincial Policy Statement (2014)	The Provincial Policy Statement, 2014 is issued under section 3 of the *Planning Act*. It is effective April 30, 2014 and applies to planning decisions made on or after that date. It replaces the Provincial Policy Statement, 2005.
Open Route	An area of tracks where there are no vertical conflicts to the OCS.
Orthoimagery	An orthoimage is a raster image that has been geometrically corrected (orthorectified) to remove distortion caused by differences in elevation, sensor tilt and, optionally, by sensor optics.
Overhead Contact System (OCS)	A system that is comprised of: The aerial supply system that delivers 2x25 kV traction power from traction power substations to the pantographs of Metrolinx electric trains, comprising the catenary system messenger and contact wires, hangers, associated supports and structures including poles, portals, head spans and their foundations), manual and/or motor operated disconnect switches, insulators, phase breaks, section insulators, conductor termination and tensioning devices, downguys, and other overhead line hardware and fittings. Portions of the traction power return system consisting of the return feeder and aerial static wires, and their associated connections and cabling.
Overhead Contact System (OCS) Impact Zone	The defined zone within which Overhead Contact System (OCS) infrastructure will be built (e.g., OCS foundations, portal/cantilever poles, etc.).
Overhead Structure	A structure that allows a road to cross over a railway underneath.
Overpass	A structure that allows a railway to cross over a road or watercourse underneath.
Pantograph	Device on the top of a train that slides along the contact wire to transmit electric power from the catenary to the train.

Term	Definition
Paralleling Station (PS)	This type of traction power facility contains an autotransformer which helps support the OCS voltage in the electrified system.
Performance Standards	General specifications and criteria that define the parameters and requirements of a particular system.
Phase Break	An arrangement of insulators and grounded or non-energized wires or insulated overlaps, forming a neutral section, which is located between two sections of OCS that are fed from different phases or at different frequencies or voltages, under which a pantograph may pass without shorting or bridging the phases, frequencies, or voltages.
Pipeline	A line that is used or to be used for the transmission of oil, gas or any other commodity and that connects a province with any other province or provinces or extends beyond the limits of a province or the offshore area and includes all branches, extensions, tanks, reservoirs, storage facilities, pumps, racks, compressors, loading facilities, interstation systems of communication by telephone, telegraph or radio and real and personal property, or immovable and movable, and works connected to them, but does not include a sewer or water pipeline that is used or proposed to be used solely for municipal purposes.
Places to Grow Act (2005)	The purposes of the Act are: • to enable decisions about growth to be made in ways that sustain a robust economy, build strong communities and promote a healthy environment and a culture of conservation; • to promote a rational and balanced approach to decisions about growth that builds on community priorities, strengths and opportunities and makes efficient use of infrastructure; • to enable planning for growth in a manner that reflects a broad geographical perspective and is integrated across natural and municipal boundaries; and • to ensure that a long-term vision and long-term goals guide decision-making about growth and provide for the co-ordination of growth policies among all levels of government. 2005, c. 13, s. 1.
PM Bay	A progressive maintenance bay and wash station is proposed to perform routine maintenance.
Portal	An OCS structure that spans over the tracks between two OCS support poles located on the sides of the tracks in order to support the electrification equipment. The portal structure is used at multiple track locations where cantilever frames are not practical.
Portal Boom	Top steel section or truss/lattice at the top of the portal structure, supported by two columns placed either side of the railway. It provides support points for the OCS conductors.
Positive Train Control	A signaling system using on board and wayside equipment to automatically reduce the speed, or stop a train depending on the conditions on the track ahead.
Potential Effect	A potential impact (effect) that a proposed undertaking has or could potentially have on the environment, either positive or negative, direct or indirect, short- or long-term.
Potentially Contaminating Activity (PCA)	Use or activity at the site that has the potential to result in soil and/or groundwater. Examples are set out in Table 2, Schedule D of *O.Reg. 153/04*.
Preliminary Design	The design of a proposed project (including a detailed cost estimate) to a level that demonstrates that the project is buildable within the given parameters of the design scope.
Primary Voltage	Typically, between 750V and 50kV.
Progressive Maintenance (PM)	The light maintenance of rail stock (i.e., window cleaning, check oil levels and sand levels, clean engine cab, refill potable water, and empty washroom holding tanks).
Proponent	A person, agency, group, or organization that carries out or proposes to carry out an undertaking, or is the owner or person having charge, management or control of an undertaking.

Term	Definition
Provincial Heritage Property (PHP)	A property, including buildings and structures on the property, that has cultural heritage value or interest and that is owned by the Crown in right of Ontario or by a prescribed public body; or that is occupied by a ministry or a prescribed public body if the terms of the occupancy agreement are such that the ministry or public body is entitled to make the alterations to the property that may be required under these heritage standards and guidelines.
Provincial Heritage Property of Provincial Significance (PHPPS)	A provincial heritage property that has been evaluated using the criteria found in *Ontario Heritage Act O. Reg. 10/06* and has been found to have cultural heritage value or interest of provincial significance.
Provincially Significant Wetland (PSW)	Wetlands that have been evaluated using the Ontario Wetland Evaluation System by a certified wetland evaluator and that have satisfied the Ontario Wetland Evaluation System criteria for significance.
Raceway	A group of conduits designed to protect electrical cabling, often consolidated in a buried or encased structure. The purpose of the Raceway and associated conduit is to protect and provide defined routing of electrical cables and wiring. It also provides physical separation and isolation for the various types of cables.
Rail Overpass	Rail overpass is defined as rail over road or water.
Rail Right-of-Way	Land that is reserved, usually through legal designation, for transportation purposes, such as for railway line. A right-of-way is often reserved for the maintenance or expansion of existing services.
Rail Track	A track with a designated location at the station to board and disembark trains is called station track or house track regardless of whether it is a main line or loop line. If such track is served by a platform, the track may be called platform track.
Rail Underpass	Rail underpass is defined as rail tunnel that runs underneath a road or railroad.
Reference Concept Design (RCD)	The Reference Concept Design illustrates how an investment be delivered. This reference concept design is used to: • Demonstrate that a working approach to deliver GO Expansion is possible. • Determine a budget and construction schedule to be approved by Treasury Board.
Regional Transportation Plan: The Big Move (2008)	The Big Move is the GTHA's first ever Regional Transportation Plan (RTP), The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area. The *Big Move* provides the blueprint for transforming the regional transportation system over the next 25 years. Its proposed future regional transportation network includes "regional rail" and "express rail" services. 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.
Regulatory Agency	Government ministries, agencies, authorities, or departments (federal; provincial, including local conservation authorities; and, municipal, including local boards of health) who may have an interest, participate and contribute to the review of documentation prepared by the proponent for a transit project by providing comments based on their mandate.
Resilient Arm	A combined registration and support assembly with vertical resilience, used for support of catenary conductors in situations with restricted clearance such as tunnels and overhead bridges.
Retaining Wall	A retaining wall is any wall designed to resist lateral earth and/or fluid pressures, including any surcharge, in accordance with accepted engineering practice. The following types of retaining walls may be considered for implementation and will be subject to confirmation as part of the detailed design phase: • Lock block wall – concrete blocks that are stacked to create retaining walls; • Precast Concrete Lagging with Cantilevered Soldier Pile;

Term	Definition
	• Precast Concrete Lagging with Solider Pile and Tieback; • Sheet Pile.
Revenue Trains	GO or VIA train movements that carry passengers between Stations. These trains do not stop at layovers or maintenance facilities.
Right-of-Way (ROW)	Land that is reserved, usually through legal designation, for transportation and/or utility purposes, such as for a hydro corridor, rail line, street or highway. A right-of-way is often reserved for the maintenance or expansion of existing services. A permit or legal permission is generally required for any work or encroachment on a right-of-way. For the purposes of this report, ROW refers to rail ROW unless otherwise specified.
Rouge River Fisheries Management Plan (RRFMP)	The Rouge River Fisheries Management Plan (TRCA, 2010).
Running Rails	Rails that act as a running surface for the flanged wheels of a car or locomotive.
SAR Screening	The suitability of an area to support habitat preferred by SAR species is based on a combination of factors; including, but not limited to: a species' requirements for critical life stages and adaptability, seasonal temperatures, precipitation, soils, vegetation, aquatic conditions, existing disturbances and land form.
Screening	The process of applying criteria to a set of alternatives in order to eliminate those that do not meet minimum conditions or requirements.
Secondary Plan	A secondary plan is a land use plan for a particular area of a municipality that is prepared as an amendment to an official plan. Typically, a secondary plan will provide more detailed policies for the area it covers, such as public spaces, parks and urban design.
Secondary Voltage	Typically, less than 750V.
Shield	As normally applied to instrumentation cables, refers to a conductive sheath (usually metallic) applied, over the insulation of a conductor or conductors, for providing means to reduce coupling between the conductors so shielded and other conductors that may be susceptible to, or which may be generating, unwanted electrostatic or electromagnetic fields (noise).
Shielding	The use of the conducting and/or ferromagnetic barrier between a potentially disturbing noise source and sensitive circuitry. Shields are used to protect cables (data and power) and electronic circuits. They may be in the form of metal barriers, enclosures, or wrappings around source circuits and receiving circuits. Additionally, shielding is used to protect overhead transmission lines or OCS from incidents of lightning, in regions of high isoceraunic activity. Shield wire is located above the exposed current carrying wires to provide a 45-degree angle of protection. In sensitive applications, the angle is reduced to 30 degrees for more conservative design.
Signal Bridges	A structure for mounting signals that spans one or more tracks. Signal bridges may be footed on both ends, or they may be 'cantilever signal bridges', footed only on one end.
Signal System	A combination of wayside and on-board equipment and/or software to provide for the routing and safe spacing of trains or rail vehicles.
Significant Wildlife Habitat (SWH)	SWH is categorized as potential to occur "candidate" or "confirmed" within the Project study area. While some "edge" of SWH features (i.e. adjacent wetlands, forests) may occur associated with proposed track and layover facilities, these edges generally occur within the existing modified footprint of the Project study area and are considered to exhibit pre-disturbed conditions.
Species at Risk (SAR)	A species, subspecies, variety or genetically or geographically distinct population of animal, plant or other organism, other than a bacterium or virus, that is native to Ontario. Species at Risk in Ontario

Term	Definition
	are all the species that are classified by the Committee on the Status of Species at Risk in Ontario (COSSARO) as either extirpated, endangered, threatened, or special concern.
Species at Risk Act (SARA) (2002)	SARA is the official list of wildlife species at risk in Canada and includes species listed as Extirpated, Endangered, Threatened and of Special Concern.
Spur	A railroad track that diverges from the main track to service a specific location or industry.
Statement of Completion	As per *O.Reg. 231/08, s. 14*., the statement of completion is completed by a proponent and submitted to the Director of the MECP Environmental Approvals Branch and the Regional Director to formalize the completion of the Transit Project Assessment Process.
Static Wire (Aerial Ground Wire)	A wire usually installed aerially adjacent to or above the catenary conductors and return feeders, that connects OCS supports collectively to ground or to the grounded running rails to protect people and installations in case of an electrical fault.
Strain Gantry	These 25 kV feeders from the TPF will be connected to the OCS with the help of main and strain gantries and a cross feeder arrangement. The strain gantry is located within the ROW parallel to and on the opposite side of the track from the TPF, with footprints exactly equal to that of the main gantry.
Study Area	The study area is defined as the limits of the geographic area being examined as part of the TPAP.
Switches	The function of a switch is to enable a train to be guided from one track to another at a railway junction. Switches allow trains to easily move across the network, providing increased service.
Switching Station (SWS)	SWS is an installation where the supplies from two adjacent traction power substations are electrically separated and where electrical energy can be supplied to an adjacent but normally separated electrical section during contingency power supply conditions. It also acts as a paralleling station.
Traction Power Substation	Electric Traction Power Facility that transforms the utility supply voltage of 230 kV to 50 kV and 25 kV for distribution to the trains via catenary and autotransformer return feeders.
Train Layover Facility	A train layover facility is needed to store, service (including fueling – until electrification), inspect and maintain trains when they are not in service; carry out minor repairs or replacement for items such as lights, interior car lights, brake shoes, air hoses, and electrical and communications; and co-ordinate trains during off-peak periods, thereby keeping unused trains off active tracks to minimize congestion at stations.
Train Service Specification (TSS)	The Train Service Specification (TSS) is the output of transportation modelling studies performed by Metrolinx and is one of the tools used to better understand the requirements that will support Metrolinx's GO Expansion Program.
Train Storage Yard	A train storage yard is used to store trains during the day as well as overnight to reduce congestion on the rail corridor and minimize non-revenue travel by being near major GO stations.
Transit Project Assessment Process (TPAP)	This process is defined in sections 6 through 17 in *O. Reg 231/08*. It consists of various steps and requirements. It is a focused impact assessment process that includes consultation, an assessment of potential positive and negative impacts, an assessment of measures to mitigate negative impacts, and documentation.
Transmission Line (TL)	Electrical line conveying electricity at voltages more than 50kV.
Transmission Station (TS)	This station may refer to a transformer station, switching station, compensation station, regulating station, terminal or tap station, high voltage direct current station or another type of substation used in the transmission and/or transformation of electrical power. In Ontario, transmission stations include those whose nominal operating voltage is equal to or greater than 115 kV or equal to or less than 500 kV. Where a station has more than one voltage level, the highest level is used in defining the station's nominal operating voltage.

Term	Definition
Tree Protection Zone (TPZ)	Tree Protection Zones are the minimum required distances where tree protection is to be put in place so that no construction activity of any kind will take place inside the Tree Protection Zone.
Underground Feeder Connection	An underground conduit carrying electrical connection between the overhead contact system and a traction power facility (i.e., traction power substation, paralleling station or switching station).
Utility	An entity that generates, transmits and/or distributes electricity, water and/or gas from facilities that it owns and/or operates, including electrical transmission and distribution companies, communication companies, community antenna distribution systems and regional / municipal authorities.
Vegetation Clearing Zone	A Vegetation Clearing Zone is required in order to provide safe electrical clearances to any existing vegetation along the rail corridors. The Vegetation Clearing Zone entails vegetation removals within the area encompassed by the overhead contact system/2 X 25 kV feeders plus an additional 2 metre (m) offset area on either side of the OCS components or 2 X 25 kV feeders.
VIA Trains	Passenger trains that travel through portions of the Metrolinx Corridors.
Viewshed	The area of visual influence of the project components.
Zoning Bylaw	Zoning bylaws put the official plan into effect and provide for its day-to-day administration. They contain specific requirements that are legally enforceable. Construction or new development that doesn't comply with a zoning bylaw is not allowed, and the municipality will refuse to issue a building permit.

1 Introduction

For over fifty years, GO Rail has provided high-quality, fast, and reliable commuter rail service. GO Rail began as a one-line pilot in 1967 and has now grown into one of North America's largest and most successful commuter rail systems, exemplified by:

- Daily ridership of over 200,000 passengers and over 70 million annual passengers.
- Consistent ridership growth for the last 20 years.
- Passenger rail service on seven lines covering over 400 km of railway corridors and 66 stations (see Figure 1-1).
- Integrated service with municipal bus networks and rapid transit systems, with new connections added alongside the development of new rapid transit.

FIGURE 1-1 GO TRANSIT NETWORK

Today, the GO Rail Service Area serves a population of over 8.8 million people living in the Greater Toronto Hamilton Area (GTHA), Kitchener-Waterloo, Barrie, and Niagara. Since its inception, GO Rail has evolved into a core service for these communities and each day nearly 40% of commuters headed to Downtown Toronto make use of GO Rail services.

While GO Rail has played a crucial role in shaping regional growth and economic development in the GTHA, it is only realizing a portion of its overall potential and requires new investment to meet the evolving needs of the region. Metrolinx is committed to improving the GO Transit system to bring 15-minute, two-way electrified service to core parts of the rail network through the Regional Express Rail (RER) program, also known as GO Expansion. As a component of the regional transportation plan, *The Big Move,* the GO Expansion program supports Metrolinx's goal of transforming the GO system into a comprehensive regional rapid transit network.

FIGURE 1-2

FIGURE 1-2 KEY ASPECTS OF GO EXPANSION (GO EXPANSION FULL BUSINESS CASE, 2018)

presents the key aspects of GO Expansion that formed the basis for Metrolinx's 2018 GO Expansion Full Business Case.

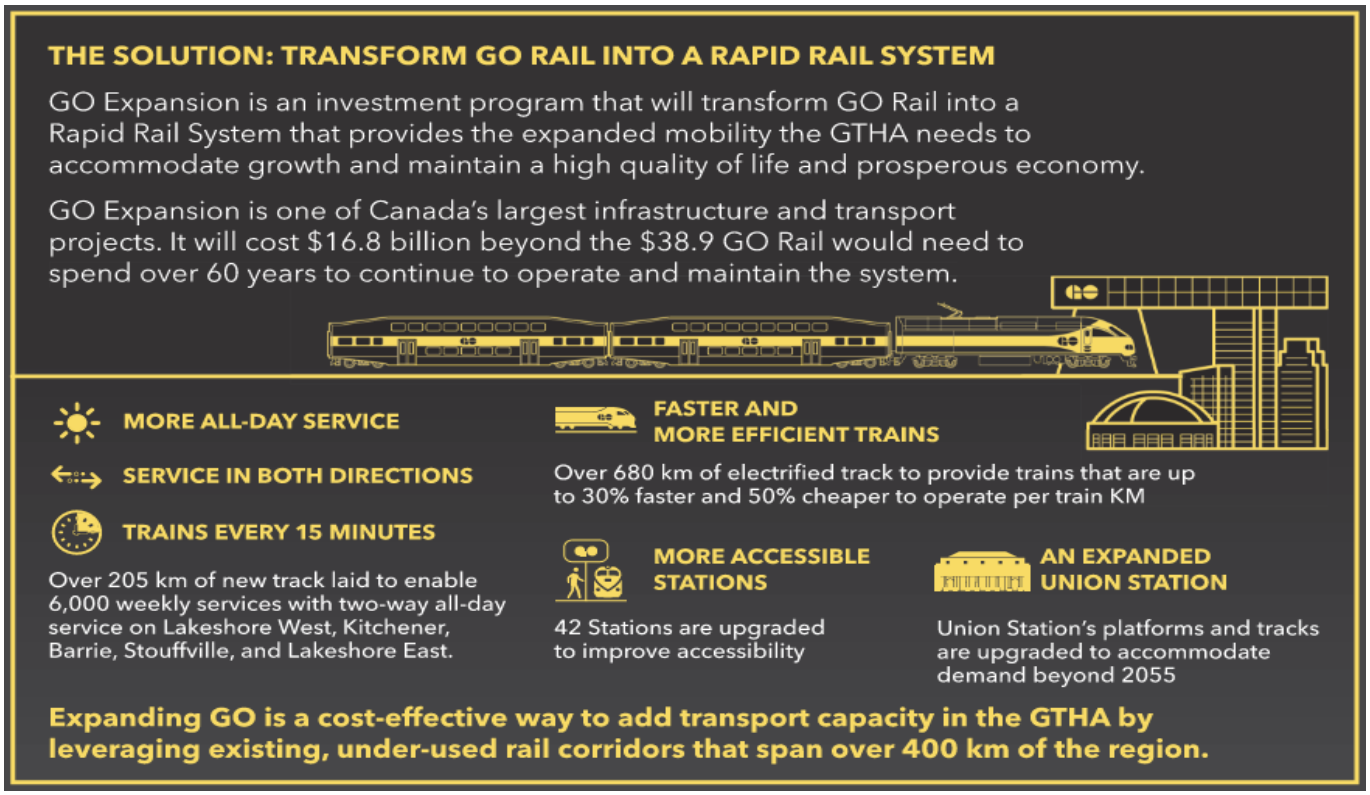

FIGURE 1-2 KEY ASPECTS OF GO EXPANSION (GO EXPANSION FULL BUSINESS CASE, 2018)

Much of GO Transit's rail network is already congested – meaning demand for travel currently exceeds capacity. The transportation network requires new travel choices for trips within cities, between cities, and across the region. Without investment, GO's network will become a bottleneck to further growth, quality of life improvements and economic prosperity. A congested transportation network will not support regional plans and polices for urban development because:

- Congestion can increase travel times for drivers by as much as 120% compared to uncongested conditions with today's travel demand.
- Congestion is estimated to cost the region's economy up to $15 billion annually in lost productivity by 2031.

In order to accommodate growth, the network will need to:

- Enable travel between emerging Urban Growth Centres and major employment, education, and recreation centres.
- Provide reliable and high capacity transportation options to downtown Toronto, which will remain the heart of the region's economy.
- Support broader development goals for quality of life, economic development, and a protected environment.

GO Expansion differs from other commuter rail services by providing two-way all-day service with high frequencies (typically a train every fifteen minutes or better) using higher speed trains (typically electrified

with faster breaking/acceleration and maximum speeds of 120 km/h). Rapid rail systems have successfully been deployed to manage demand and support economic prosperity in over 60 cities around the world.

1.1 Purpose

GO Expansion will offer more service with faster trains, more stations and seamless connections to a regional rapid transit network. As part of the GO Expansion program, Metrolinx has identified various infrastructure requirements to achieve the established service level targets across the network. The New Tracks & Facilities TPAP (the Project) is one component of the broader Metrolinx GO Expansion Program.

1.1.1 Project Purpose & Project Description

Specifically, the purpose of the New Track & Facilities Project is to build new infrastructure as follows along various rail corridors, that will enable Metrolinx to deliver targeted service levels: new tracks within existing Metrolinx rail rights-of-way (ROW), modifications or upgrades to existing tracks within existing Metrolinx rail ROW, three (3) new layover/storage facilities, new GO station platforms, bridge expansion/modification, and electrification of a portion of the Richmond Hill rail corridor.

1.2 Project Proponent

Metrolinx is the Proponent of this Project for the purpose of the Transit Project Assessment Process, meaning they are the entity proposing to carry out, have charge, and take ownership/control of the undertaking. Metrolinx is an agency of the Government of Ontario under the *Metrolinx Act, 2006,* and was created to improve the condition and integration of all modes of transportation in the Greater Toronto and Hamilton Area.

1.3 Environmental Assessment Process

1.3.1 Ontario Regulation 231/08: Transit Project Assessment Process

The scope of the New Track and Facilities TPAP falls under *Schedule 1, 2.1 Subsection 2 (1) of O*. *Reg. 231/08* (July 1, 2015). This Regulation applies to a transit project that is carried out by Metrolinx or any of its successors, or applies if the transit project includes any one or more of the following:

A. Construction of a new or extended Commuter Rail Line. Involves construction of a new rail corridor.

B. Establishment of a new Commuter Rail Route or rail Route Extension on an existing rail corridor. May involve construction of trackwork, including mainline sidings and switches.

C. Construction of a new commuter Rail Station, Bus Terminal, and/or ancillary Commuter Service Facilities. Terminal may include major Transfer Station or Intermodal Station. In the case of a Rail Station, may include modifications or additions to track within the Station area.

D. Construction or modification of tracks required to increase the commuter rail service (including a change to All-Day Service) on an existing rail corridor, including such activities as,

   I. Construction of additional mainline tracks or passing track,

   II. Modification of existing mainline tracks,

   III. Construction along short sections of one or more tracks to maintain continuity of existing corridor or for capacity requirements,

   IV. Construction, reconstruction or widening of structures,

   V. Construction and/or relocation of storage yard facilities, and

VI. Construction of additional switches.

E. Construction of a new Maintenance Yard and facilities for commuter rail or bus service.

By following the Transit Project Assessment Process (TPAP) for the New Track & Facilities Project, 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. Figure 1-3 illustrates the TPAP steps.

Pre-Planning Phase

Due to the accelerated 120-day 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 were carried out during the Pre-Planning Phase.

- Collection and documentation of baseline environmental conditions information;
- Preparation of the Conceptual Design, including:
  - Identification of track and switch locations;
  - Identification of retaining wall locations;
  - Identification of layover and storage facility locations;
  - Identification of platform locations at existing GO Stations;
  - Identification of the area of disturbance for the Thickson Road Bridge Expansion; and
  - Identification of Electrification impact zone along the Richmond Hill corridor up to Mile 4.4, associated ancillary components (e.g., grounding and bonding) and identification of bridge modifications required for electrification.
- Initial communications and follow up consultation efforts with Indigenous Communities and Nations;
- Meetings with stakeholders (e.g., Review Agencies, Municipalities, Indigenous communities, Utility companies);
- Public Meeting Round #1;
- Virtual Public Meeting Round #2;
- Pre-submission Circulation of Draft EPR;
- Consideration of stakeholder comments received and follow-up efforts;
- Impact assessment studies and development of mitigation measures; and
- Preparation of Draft Environmental Project Report (EPR).

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:

- Issue Notice of Commencement;
- Public Consultation;

- Meetings with stakeholders (e.g., Review Agencies, Municipalities, Indigenous communities, Utility companies);
- Virtual Public Meeting Round #3;
- Finalization of the EPR; and
- Issue Notice of Completion (within 120-days of Notice of Commencement).

Upon issuing the Notice of Completion, the EPR will be made available for 30-days for review by the Public (including property owners), Indigenous Communities, review agencies, and other stakeholders. 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 and Climate Change (Minister). Following the 30-day review period, the Minister has 35 days to issue one of three notices:

- Proceed with the Project in accordance with the EPR;
- 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.

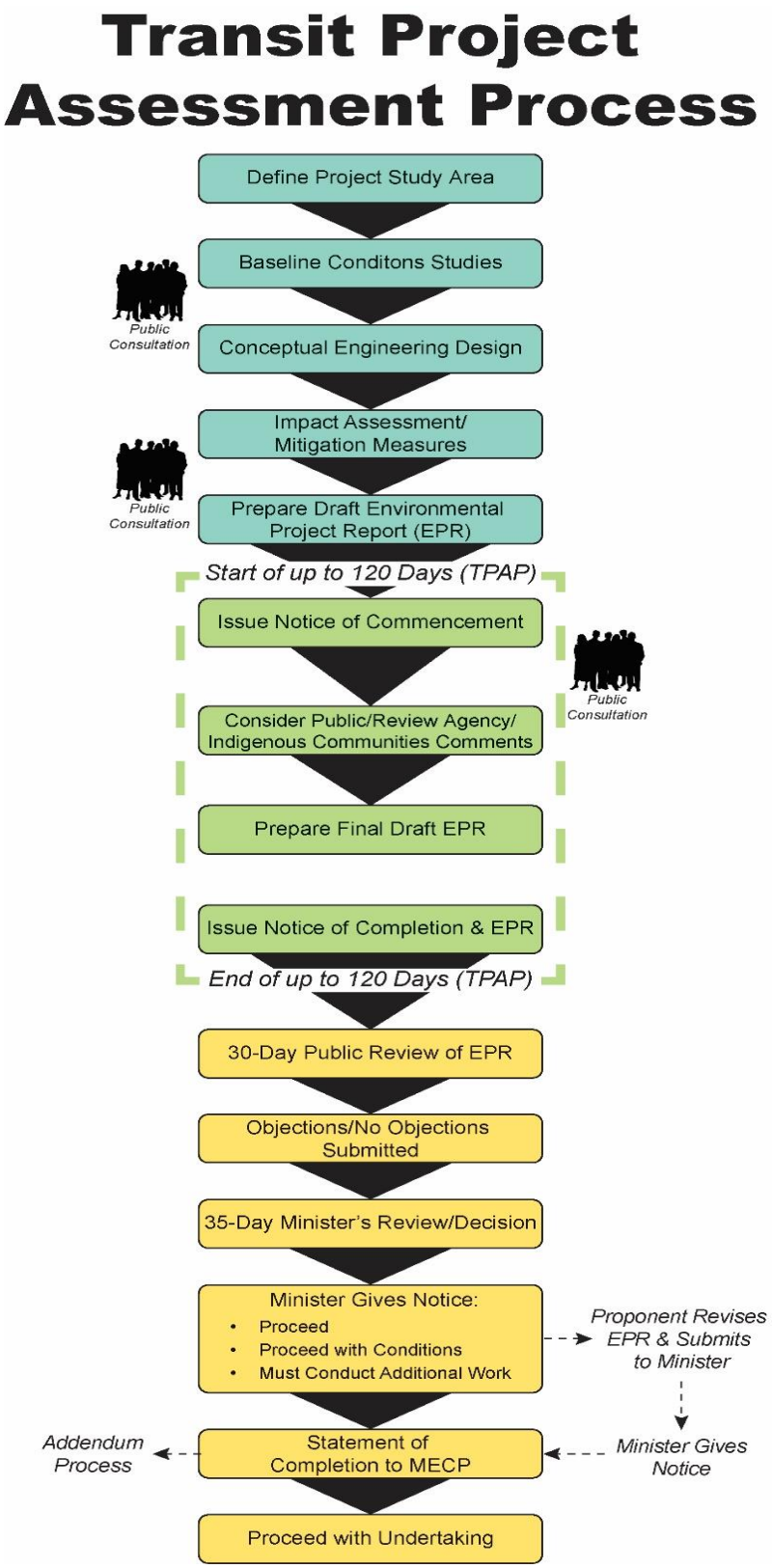

FIGURE 1-3 TRANSIT PROJECT ASSESSMENT PROCESS

1.4 Report Organization

Table 1-1 summarizes the key documentation requirements as outlined in *O. Reg. 231/08* - Transit *Project Assessment Process*, and the corresponding section of this EPR document where the requirement has been addressed.

TABLE 1-1 SUMMARY OF TPAP DOCUMENTATION REQUIREMENTS

EPR Requirements	Chapter of EPR Where Requirement is Addressed
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	Chapters 4, 5, 6 and 7
Description of local environmental conditions within the study area	Chapter 4
Final description of transit project including preferred design, and description of other methods considered	Chapter 3
Assessment of impacts on the environment associated with the preferred design (and other methods), and criteria applied to assess the impacts	Chapters 5, 6, 7 and 9
Description of proposed measures to mitigate potential negative impacts on the environment	Chapters 5, 6, 7 and 9
If mitigation measures are proposed, a description of the proposed monitoring activities to verify the effectiveness of mitigation, and a description of commitments to be fulfilled (as applicable)	Chapter 9
Description of any municipal, provincial, federal or other approvals or permits anticipated to be required	Chapter 9
Summary of public and stakeholder consultation	Chapter 8

As part of documenting the TPAP, this EPR has been structured into nine (9) chapters along with supporting technical reports (included as Appendices), to address the requirements set out in *O. Reg. 231/08*. The EPR document primarily summarizes the 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 Chapter:

EPR Chapters

- **Chapter 1** – describes the *EA Act* requirements and process followed, provides a brief project background and associated planning context.
- **Chapter 2** – describes the scope of the project and illustrates the Study Area (including map).
- **Chapter 3** – provides a detailed description of the Project components, including track infrastructure, switches, layover/storage yard facility requirements, bridge modifications, property requirements and electrification components.
- **Chapter 4** – describes the baseline environmental conditions within the Study Area.

- **Chapter 5** – describes the potential environmental effects, recommended mitigation measures, net environmental effects, and monitoring activities associated with implementation of the project.
- **Chapter 6** – describes the ongoing operations effects and maintenance activities associated with the implementation of the Project.
- **Chapter 7** – describes the installation and construction effects, construction management plans, traffic management plans, net environmental effects, and mitigation measures.
- **Chapter 8** – describes the consultation process and activities that were undertaken as part of the Project, including key consultation milestones. This chapter provides an overview of the input/comments/feedback received from various stakeholders (i.e., review agencies, Indigenous Communities and Nations, residents, property owners, etc.) and how they were addressed by Metrolinx.
- **Chapter 9** – describes the proposed commitments and work to be carried out during future project phases (e.g., detailed design, construction), and outlines the anticipated approvals and permits required to implement the Project beyond EA Act requirements.

List of EPR Appendices

- **Appendix A1 -** Conceptual Corridor Plans
- **Appendix A2 -** Conceptual Layover Facility & Storage Yard Plans
- **Appendix A3 -** Proposed Switch Locations
- **Appendix B1 -** Natural Environment Baseline Conditions Report
- **Appendix B2 -** Natural Environment Impact Assessment Report
- **Appendix C1 -** Hydrogeology Baseline Conditions Report
- **Appendix C2 -** Hydrogeology Impact Assessment Report
- **Appendix D1 -** Land Use and Socio-Economic Baseline Conditions Report
- **Appendix D2 -** Land Use and Socio-Economic Impact Assessment Report
- **Appendix E1 -** Visual Baseline Conditions Report
- **Appendix E2 -** Visual Impact Assessment Report
- **Appendix F1 -** Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment- Volume 1: Baseline Conditions
- **Appendix F2 -** Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment - Volume 2: Impact Assessment
- **Appendix F3 -** Cultural Heritage Evaluation Report – Richmond Hill Rail Corridor Bridges, City of Toronto
- **Appendix G1 -** Archeological Baseline Conditions Report
- **Appendix G2 -** Stage 1 Archaeological Assessment Report
- **Appendix H -** Preliminary Stormwater Management Assessment Reports
- **Appendix I -** Traffic Impact Assessment Reports
- **Appendix J -** Third-Party Utilities Impact Assessment Report

- **Appendix K -** Noise and Vibration Facilities Construction Impact Assessment Report
- **Appendix L -** Air Quality Facilities Construction Impact Assessment Report
- **Appendix M1** - Richmond Hill Corridor Operational Noise & Vibration Assessment
- **Appendix M2** - Richmond Hill Corridor Operational Air Quality Assessment
- **Appendix N -** Electromagnetic Interference/Electromagnetic Fields (EMI/EMF) Impact Assessment Report
- **Appendix O** - Environmental Site Assessment Summary
- **Appendix P** - Consultation Record

1.4.1 Report Purpose

The purpose of this EPR is to document the Transit Project Assessment Process undertaken by Metrolinx in accordance with the requirements of *O. Reg. 231/08* for the New Track & Facilities TPAP undertaking.

1.5 Project Team

The following multi-disciplinary team was retained by Metrolinx to carry out the New Track & Facilities TPAP project:

- **Gannett Fleming Canada ULC**– responsible for engineering conceptual design, the environmental assessment planning process, and consultation/stakeholder engagement; also responsible for carrying out the Land Use and Socio-Economic Assessment, Visual Assessment, Traffic, Climate Change, Stormwater Management, and Utilities studies.
- **Archaeological Services Inc.** – responsible for Cultural Heritage Assessment studies, and Archaeological Assessment studies.
- **SLR Consulting Ltd.** – responsible for the Natural Environment and Hydrogeology Assessment studies.
- **TUV Rheinland** – responsible for the EMI/EMF Impact Assessment Study.
- **Swerhun Inc.** – coordinated and implemented the public/stakeholder engagement process.

1.6 Background & Planning Context

1.6.1 GO Expansion Program

The GO service area, including the Greater Toronto and Hamilton Area (GTHA) together with Niagara, Kitchener, and Barrie, is one of the fastest growing city-regions in North America. By 2041 the communities across this region will be home to over 12 million people. With this growth, daily travel will grow by more than 50%. As the region grows, the mobility needs of its people will continue to increase and evolve, which will put ever increasing demands on the existing GO Transit system. Developing a transportation network that can serve future demands is essential to manage growth, enable a high quality of life and continue economic prosperity.

The GO Expansion program will transform the existing GO Rail network into a world class rail system and is set to become one of the biggest transit infrastructure builds in Canada. It is part of ongoing provincial investments in public transit that includes Light Rail Transit (LRT), subway, and bus projects across the GTHA. Upon delivery, the GO Expansion program will transform GO Rail from a commuter focused rail system to the backbone of the GTHA's Rapid Transit Network. These improvements will

expand the GO Rail network to new markets which will enable seamless travel across the region. The GO Expansion program will provide a range of improvements across the GTHA, as described in Figure 1-4 below.

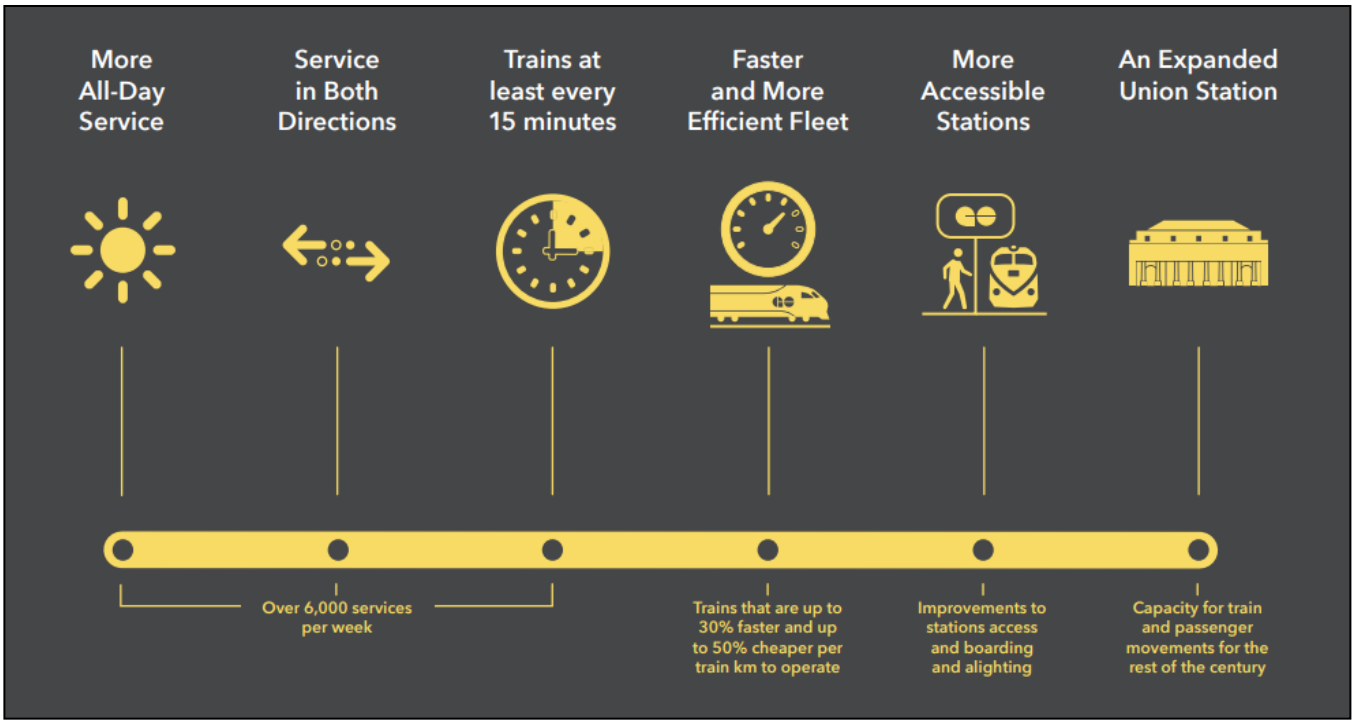

FIGURE 1-4 GO EXPANSION PROGRAM INITIATIVES (GO EXPANSION FULL BUSINESS CASE, 2018)

The program is intended to support the planning, design and construction of new infrastructure within existing GO rail corridors and includes consideration of the need for new structures or facilities (such as grade separations and layover sites), track work and electrification systems. As part of the program, corridor-wide studies have been initiated for air quality, noise and vibration and vegetation removal and compensation.

Metrolinx has developed a Reference Concept Design (RCD) that illustrates how the GO Expansion Program can be delivered and the scope of benefits the region could realize as a proof of concept. This RCD was used to:

- Demonstrate that a working approach to deliver GO Expansion is possible; and
- Determine a budget and construction schedule to be approved by Ontario's Treasury Board.

The RCD was developed based on engineering, economic, and modelling analysis to present a realistic and deliverable concept for GO Expansion. It represents one potential infrastructure and service investment program that could be utilized to achieve Metrolinx's service objectives.

Metrolinx is now undertaking a Transit Project Assessment Process (TPAP) under *Ontario Regulation 231/08 - Transit Projects and Metrolinx Undertakings* for various new infrastructure requirements (i.e., new tracks, new layover facilities, etc.) that are contained in the RCD along the Lakeshore West, Kitchener, Barrie, Stouffville, Lakeshore East, and Richmond Hill Rail Corridors. This new infrastructure, which requires Environmental Assessment (EA) approval, provides the basis for the scope of the New Track & Facilities TPAP (the Project).

1.6.2 GO Expansion Business Case

The rail improvement projects included in the GO Expansion program have been refined over ten years of planning and study – including the GO 2020 Strategic Plan, the 2008 Regional Transportation Plan (*The Big Move*), and the GO Electrification Study. Significant rail improvements were also included in the 2041 Regional Transportation Plan (RTP), which defines the policies and plans for transportation in the GTHA.

Elements of these plans were included in the 2014 Provincial Budget, which first announced the creation of a two-way all-day electrified service across the GO Rail network as a government priority. This announcement launched the development of the GO Expansion program, which was formally defined in the 2015 Initial Business Case (IBC) for RER and the 2015 Provincial Budget.

Metrolinx follows a seven-stage lifecycle (outlined in Figure 1-5) to plan and deliver transportation network investments. Throughout this lifecycle, Business Cases are completed to define the rationale and requirements for delivering an investment. The Full Business Case (FBC) is prepared as part of this lifecycle and informs decision-makers on whether and how an investment should be procured.

Since the publication of the IBC in 2015, there has been significant work undertaken in refining and developing options, and in seeking to optimize the GO Expansion program improvements. The FBC builds upon the work undertaken in the IBC, drawing upon best available evidence, updated forecasts and revised costs and designs. As a result, there is some variation between the IBC and this FBC based on program evolution.

In December 2018, the Metrolinx Board approved the GO Expansion FBC, an investment program that will transform the GO rail network into a rapid rail system by providing faster and more frequent two-way all-day service. The FBC builds upon the work undertaken during the IBC, drawing upon best available evidence, updated information and revised designs. As a result, the FBC is prepared as part the lifecycle and informs decision makers on whether and how an investment should be procured. Therefore, there are some variations between the IBC and FBC based on program evolution.

In general, the following cases in the FBC articulate a compelling argument to invest in the GO Expansion program:

1. Leveraging existing corridors: the GO rail network connects major metropolitan centers across the GTHA. GO Expansion adds faster and more service to existing corridors, allowing passengers to access more of the region with more reliable service. This time saved can generic economic benefits for the region and its people.
2. Break the bottleneck: more rail capacity and improved connectivity to Union Station will unlock economic development, allowing more people to commute to the Toronto each day.
3. Unlock development: expanded off-peak services will make urban centers across the region more attractive for people to live, work and invest. This will in turn help regional development, which is in line with regional policies.
4. Faster Commutes: GO Expansion will reduce commuter travel times by an average of 10 minutes per trip, leading to increased productivity and an easier commute to work, with over 32% of jobs in the region located within 3.5 km of a GO Rail station with two-way all-day service.

Based on performance of these cases, Metrolinx will submit the FBC to the Minister of Transportation to inform decision making on future transportation investment.

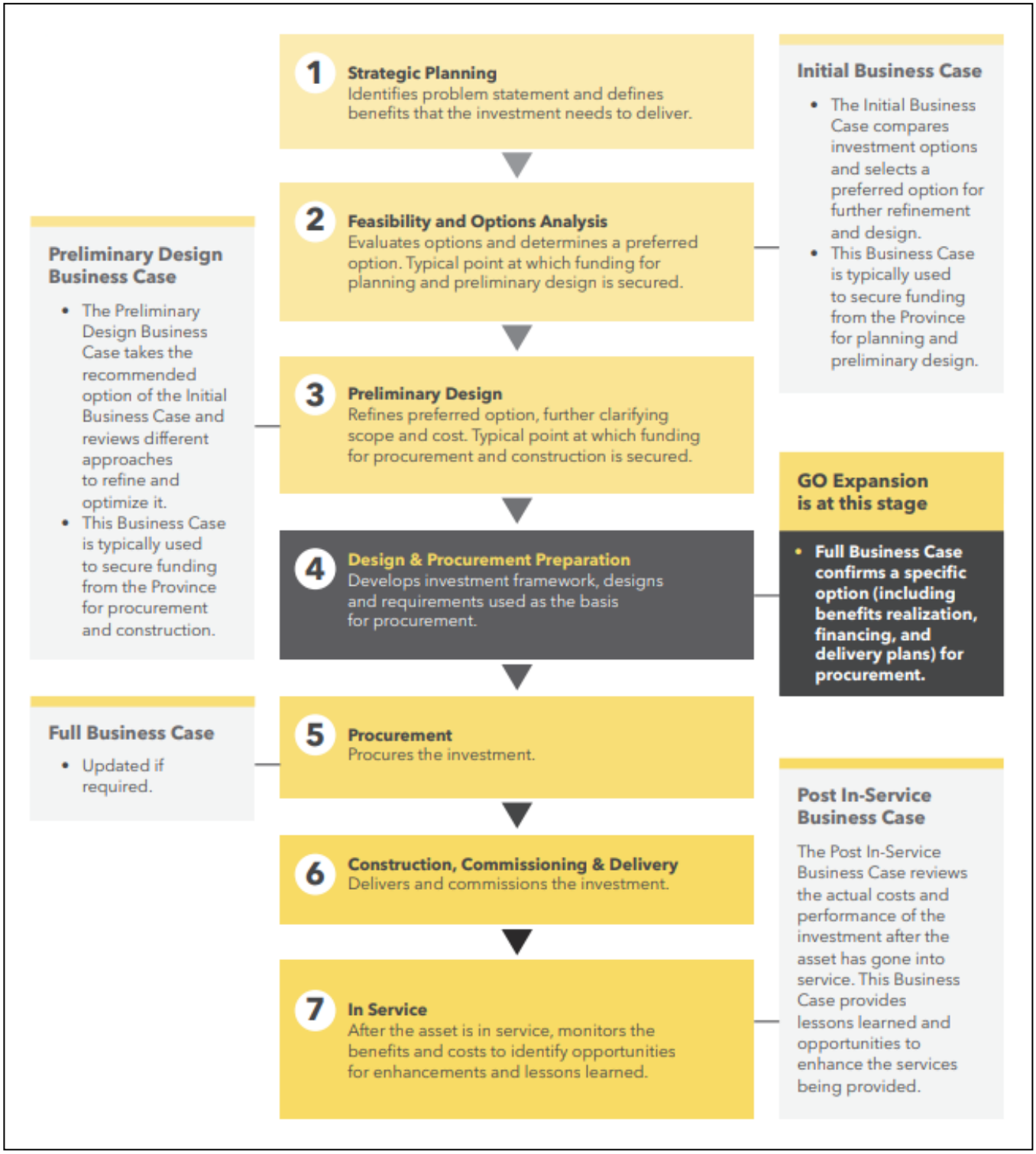

FIGURE 1-5 ILLUSTRATION OF THE BUSINESS CASE PROCESS (GO EXPANSION FULL BUSINESS CASE, 2018)

1.6.3 Growth Plan for the Greater Golden Horseshoe

The Growth Plan for the Greater Golden Horseshoe (2019) is a framework for implementing the Government of Ontario's initiative to plan for growth that supports economic prosperity, protects the environment, and helps communities achieve a high quality of life (Ministry of Municipal Affairs and Housing, 2017). It was 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 GTHA.

1.6.4 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 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 includes "regional rail" and "express rail" services. 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.

In March 2018, 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.

The 2041 RTP is the second transportation plan for the GTHA developed by Metrolinx. *The Big Move* set the stage for today's investments in rapid transit, GO Transit expansions, and bus rapid transit systems. These transit projects are vital to keep our region moving while minimizing congestions and harmful emissions from automobiles. The 2041 RTP outlines how governments and transit agencies will work together to build an integrated transportation system that will allow people to travel quickly and seamlessly to more places.

1.6.5 Provincial Policy Statement

The Planning Act (1990) sets out the foundational rules for how land use planning may occur in the Province of Ontario and the control mechanisms that are in place for identified authorities. Mandatory compliance and conformity with provincial plans is prescribed in section 5 (b) stating that,

> *"A decision of the council of a municipality, a local board, a planning board, a minister of the Crown and a ministry, board, commission or agency of the government, including the Municipal Board, in respect of the exercise of any authority that affects a planning matter, shall conform with the provincial plans that are in effect on that date, or shall not conflict with them, as the case may be."*

This Provincial Policy Statement (PPS) was issued under *Section 3* of the *Planning Act* and came into effect May 1, 2020. It replaces the Provincial Policy Statement issued April 30, 2014. The PPS states that provincial plans should be read in conjunction with the PPS and shall take precedence over other PPS policies in instances of conflict unless other relevant legislature provides otherwise.

The purpose of the PPS is to provide policy direction on matters of provincial interest related to land use planning and development. Objectives of the PPS include:

- Buildings strong communities;
- Wise use and management of resources; and

- Protecting public health and safety.

With this in mind, healthy, liveable and safe communities are sustained by “promoting the integration of land use planning, growth management, transit-supportive development, intensification and infrastructure planning to achieve cost-effective development patterns, optimization of transit investments, and standards to minimize land consumption and servicing costs” (Section 1.1.1.e). With intensification comes the increased need for public transportation. The GO Expansion Business Case supports intensification and cost-effective development that optimizes transit investments by leveraging existing corridors and increasing rail capacity to unlock economic development and regional connectivity.

The PSS indicates *that "new development proposed on adjacent lands to existing or planned corridors and transportation facilities should be compatible with, and supportive of, the long-term purposes...." (Section 1.6.8).* The infrastructure proposed is in keeping with Metrolinx’s GO Expansion Program, to provide two-way all-day service across the GO rail network, as supported by the FBC. Since all development proposed within this Project is either within the existing Metrolinx right-of-way or directly adjacent to the right-of-way, it is supportive of long-term transportation uses and is in keeping within the intent of the PPS.

Additionally, the PPS states "*as part of a multimodal transportation system, connectivity within and among transportation systems and modes should be maintained and, where possible, improved including connections which cross jurisdictional boundaries.” (Section 1.6.7.3).* The Project is proposed to support the GO Expansion Program, allowing more people access to urban centres across the region more frequently, and is thus in keeping with the intent of the PPS.

1.6.6 Other Past/Ongoing Metrolinx TPAP Studies

The following section provides a brief overview of the Environmental Assessment (EA) study work previously completed or in progress to provide context and to highlight geographic areas that may require coordination with the New Track & Facilities TPAP, and which are part of the GO Expansion Program.

1.6.6.1 Union Pearson (UP) Express Electrification TPAP (2014)

Metrolinx completed a TPAP for electrification of the UP Express service beginning at UP Express Union Station (just west of the Union Station Train Shed) to Terminal 1 Station at Toronto Pearson International Airport. The project involved the electrification of approximately 25 km of track along a portion of the USRC and Kitchener corridor to Highway 427, where the route then follows the new UP Express spur line into Pearson Airport. The Statement of Completion for the TPAP was filed in June 2014.

1.6.6.2 GO Rail Network Electrification TPAP (2017)

Metrolinx and Hydro One (as co-proponents) jointly completed the GO Rail Network Electrification to convert six GO-owned rail corridors from diesel to electric propulsion, including:

- Union Station Rail Corridor – from UP Express Union Station to the Don Yard Layover
- Lakeshore West Corridor – from just west of Bathurst Street (Mile 1.20) to Burlington GO Station
- Kitchener Corridor – from UP Express Spur1 (at Highway 427) to Bramalea GO Station
- Barrie Corridor – from Parkdale Junction (off Kitchener Corridor) to Allandale GO Station
- Stouffville Corridor – from Scarborough Junction (off Lakeshore East Corridor) to Lincolnville GO Station

[1] The portion of the Kitchener corridor from Strachan Ave. to the airport spur (at Highway 427) was previously assessed/approved as part of the Metrolinx UP Express Electrification TPAP.

- Lakeshore East Corridor – from the Don Yard Layover to Oshawa GO Station

This study examined the environmental effects of the proposed traction power supply components, power distribution components, and other ancillary aspects. The Statement of Completion for the TPAP was filed in December 2017.

1.6.6.3 GO Rail Network Electrification Addendum Projects (Currently Underway)

The scope of this Significant Addendum to the GO Rail Network Electrification TPAP includes examining the potential environmental effects of building, operating and maintaining the additional electrification infrastructure required for new tracks and layover facilities (which are being studied as part of separate Metrolinx studies called “New Track & Facilities TPAP” and “Scarborough Junction Grade Separations TPAP”) proposed across various portions of the GO rail network that were not previously examined as part of the 2017 Environmental Project Report (EPR), including an assessment of any changes to the footprint of the 7-metre Overhead Contact System (OCS) Impact and Vegetation Clearance Zone.

The scope of the Addendum also includes an updated assessment of noise, vibration, and air quality associated with increased service levels across six Metrolinx-owned rail corridors. These updated assessments also consider a number of new GO Stations.

1.6.6.4 Barrie Rail Corridor Expansion Project TPAP (2017)

Metrolinx completed the Barrie Rail Corridor Expansion Project TPAP in August 2017 under *Ontario Regulation 231/08 – Transit Project and Metrolinx Undertakings*. The project included a second track between Lansdowne Avenue in the City of Toronto to Allandale Waterfront GO Station in the City of Barrie, upgrades to existing GO Stations and structures along the Barrie Corridor, and a new layover facility within the Town of Bradford West Gwillimbury for overnight storage of trains. The Statement of Completion for the TPAP was filed in October 2017.

1.6.6.5 Barrie Rail Corridor Expansion Project TPAP Addendum (Currently Underway)

Metrolinx will complete a significant addendum to the Barrie Rail Corridor Expansion TPAP (2017) for new road/rail grade separations located at McNaughton Road (City of Vaughan) and Wellington Street East (Town of Aurora) on the Barrie Corridor.

1.6.6.6 Lakeshore East Rail Corridor Expansion (Guildwood to Pickering) TPAP (2017)

Metrolinx completed a TPAP for the Lakeshore East Rail Corridor Expansion (Guildwood to Pickering) in January 2017. The Project involved the addition of a third railway track, associated bridge modifications and grade separations on the Lakeshore East Rail Corridor between Guildwood GO Station and Pickering GO Station. The addition of a third railway track will support future service expansions as part of the RER program. The Statement of Completion for the TPAP was filed in January 2017.

1.6.6.7 Lakeshore East Rail Corridor Expansion (Don River to Scarborough Junction) TPAP (2017)

Metrolinx completed a TPAP for the Lakeshore East Rail Corridor Expansion between the Don River and Scarborough GO Station. The Project involved the addition of a fourth railway track and associated bridge widenings and culvert modifications on the Lakeshore East Corridor. The proposed work included the addition of a fourth track; bridge widenings at Woodbine Avenue, Warden Avenue and Danforth Avenue; modifications to Danforth GO Station; retaining wall, noise and vibration mitigation measures; and, culvert modifications. The Statement of Completion for the TPAP was filed in November 2017.

1.6.6.8 Bowmanville Rail Service Extension Update (Currently Underway)

The Bowmanville extension was previously assessed through an IBC in 2015, that analyzed one alignment which trains would operate by travelling between Bowmanville and Union along Canadian Pacific Railway’s Belleville subdivision. The Province of Ontario announced that Metrolinx would extend

its Lakeshore East GO Rail services to Bowmanville in June 2016. Since the provincial announcement, new information have materialized necessitating an updated Initial Business Case to reflect development of the GO Expansion program, resulting in changes to GO rail capacity and operations on the Lakeshore East Corridor, and therefore, impacting the Bowmanville Extension.

The IBC updates for the Bowmanville Rail Service Extension have since been completed. This updated IBC reflects the new Metrolinx Business Case Guidance and GO Expansion Full Business Case (as discussed in Section 1.6 above), and evaluates additional alignment options that make use of existing infrastructure, as shown in Figure 1-6).

In February 2020, Metrolinx's Chief Planning Office recommend The Board of Directors advance Option 2 through the Business Case Development process and evaluate this alignment through a Preliminary Design Business Case. Option 2 was chosen as the preferred option as it utilizes existing rail infrastructure, thereby brining down the cost of the project, and can support a two-way all-day service pattern. Upon Board approval, Option 2 will be advanced for further analysis.

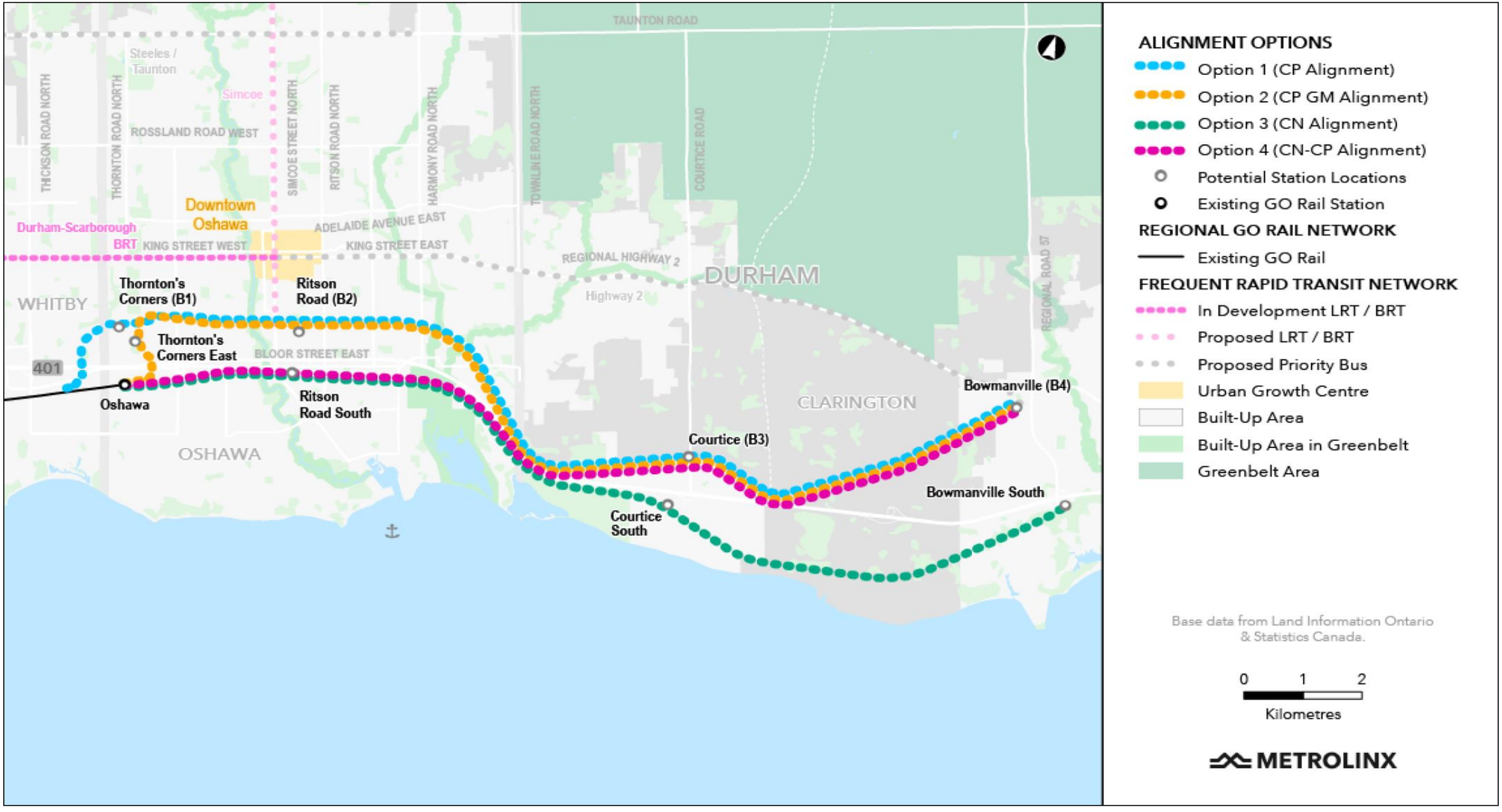

FIGURE 1-6 BOWMANVILLE RAIL EXTENSION ALIGNMENTS UNDER REVIEW

1.6.6.9 Union Station Rail Corridor East Enhancements TPAP (2018)

Metrolinx completed a TPAP for the Union Station Rail Corridor (USRC) East enhancements to provide mainline track capacity, increased train storage capacity and increased track speed capabilities. This project was to facilitate infrastructure improvements to support the planned increases in train and passenger volumes in the USRC as part of the Regional Express Rail (RER) program. The Statement of Completion for the TPAP was filed in October 2018.

1.6.6.10 Scarborough Junction Rail-to-Rail Grade Separation TPAP (Currently Underway)

In order to eliminate potential conflicts with opposing and express trains, Metrolinx is proposing to construct a grade separation between the Stouffville Corridor and Lakeshore East Corridor at the Scarborough Junction. The Scarborough Junction Grade Separation Project will include the following key components:

- Rail/rail grade separation of the new Stouffville connection under the Lakeshore East tracks at Scarborough Junction;
- Modifications to the Stouffville rail corridor:
  - Depressed rail corridor from Corvette Avenue to Danforth Road;
  - Depressed rail grade separation at Danforth Road to maintain Danforth Road at the existing grade;
  - Multi-use crossing, including the construction of an overpass bridge or tunnel option to replace the existing at-grade the pedestrian crossing at Corvette Avenue; and
  - New bridge structure over St. Clair Avenue to carry the Stouffville north track.
- Modifications to the Lakeshore East rail corridor:
  - New alignment of the Lakeshore East tracks at Scarborough Junction.
- Construction of retaining walls in areas where there is a significant change of grade;
- Construction of protective barriers in areas of electrification infrastructure;
- Construction of a layover facility (accommodating five layover tracks) between Midland Avenue and Brimley Road; and
- Modification or relocation of the Scarborough GO Station building to accommodate additional track.

1.6.6.11 Stouffville Corridor Grade Separations TPAP (Currently Underway)

The Project includes proposed modifications required to meet the service goals of the GO Expansion Program and to reduce the number of road and at-grade rail crossings along the Stouffville rail corridor. With the exception of Havendale Road, either a road over rail or a road under rail grade separation was identified as the preferred option at each location; for Havendale Road, road closure is proposed, with a grade-separated multi-use crossing to maintain pedestrian and cycle traffic.

1.6.6.12 Kitchener Corridor Expansion TPAP (Currently Underway)

Metrolinx is undertaking a TPAP under *Ontario Regulation 231/08 - Transit Projects and Metrolinx Undertakings* for various infrastructure along the Kitchener Rail Corridor.

The scope of the infrastructure proposed as part of the Guelph Subdivision TPAP comprises the following components:

- Electrification of approximately 54 kms of rail corridor

  - One Hydro One Tap location
    - Three Traction Power Facilities (TPF)
    - One Traction Power Substation (TPS)
    - One Paralleling Station (PS)
    - One Switching Station (SWS)
  - Overhead Contact System (OCS) infrastructure
  - Gantries, aerial/underground feeders
  - Grounding and bonding
  - Bridge modifications required to accommodate electrification
- Grade separations
- Bridge widenings
- Potential road closures in certain areas along/intersecting the corridor (to enhance safety measures due to the increased service levels)

1.6.6.13 Ontario Subway Line (Currently Underway)

The proposed Ontario Line will bring nearly 16 kilometres of subway service to the City of Toronto. The line will stretch across the city from the Ontario Science Centre in the northeast to Ontario Place in the southwest and includes 15 potential stations. In two segments, the Ontario Line will run adjacent to the GO Lakeshore corridors.

1.7 Alternative Technologies

Various alternative technologies for train propulsion are currently being examined by the Ontario Ministry of Transportation (MTO) as part of the GO Expansion program.

Infrastructure proposed as part of the New Track & Facilities TPAP as documented in this EPR in no way precludes future technological advances. Metrolinx will continue to monitor the developments of advances in new rail propulsion technology as they become more viable systems in the future.

1.8 Studies and Technical Documents Reviewed

The comprehensive list of studies and technical reports that were reviewed as part of the Transit Project Assessment Process is contained in Table 0-1 References and Supporting Documents.