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New SmartTrack Stations

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Volume VI - King-Liberty SmartTrack Station

July 2018 Revision 0

TORONTO METROLINX 4TRANSIT PARSONS HATCH WSP

New SmartTrack Stations - EPR Volume VI - King-Liberty SmartTrack Station

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Glossary of Acronyms and Terms

Acronym / Term	Definition
AA	Archaeological Assessment
AAQC	Ambient Air Quality Criteria
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
ANSI	Areas of Natural and Scientific Interest
AQIA	Air Quality Impact Assessment
BHR	Built Heritage Resource
BMP	Best Management Practices
CAAQS	Canadian Ambient Air Quality Standards
CEAA	*Canadian Environmental Assessment Act*
CFIA	Canadian Food Inspection Agency
CHAR	Cultural Heritage Assessment Report
CHER	Cultural Heritage Evaluation Report
CHL	Cultural Heritage Landscapes
CHR	Cultural Heritage Resources
CHSR	Cultural Heritage Screening Report
CHVI	Cultural Heritage Value or Interest
CN/CNR	Canadian National Railway
COC	Contaminants of Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CP/CPR	Canadian Pacific Railway
CPTED	Crime Prevention Through Environmental Design
CSP	Corrugated Steel Pipe
CTC	Credit Valley, Toronto and Region and Central Lake Ontario
CTMP	Construction Traffic Management Plan
DBH	Diameter at Breast Height
DFO	Fisheries and Oceans Canada
DVP	Don Valley Parkway
EA	Environmental Assessment
EAA	*Environmental Assessment Act*
EAB	Emerald Ash Borer
EASR	Environmental Activity and Sector Registry
EBA	Event Based Area
ECA	Environmental Compliance Approval
ECCC	Environment and Climate Change Canada
ELC	Ecological Land Classification
EMMP	Environmental Mitigation and Monitoring Plan
EPR	Environmental Project Report
ESA	*Endangered Species Act*

Acronym / Term	Definition
ESC	Erosion and Sediment Control
ESR	Environmental Study Report
FTA	United States Federal Transit Administration
FWCA	*Fish and Wildlife Conservation Act*
GEXR	Goderich-Exeter Railway
GFA	Gross Floor Area
GHG	Greenhouse Gas
GIN	Groundwater Information Network
GTA	Greater Toronto Area
GTS	Georgetown South
HCM	Highway Capacity Manual
HIA	Heritage Impact Assessment
IBC	Initial Business Case
IPD	Initial Preferred Design
ISA	International Society of Arboriculture
LIO	Land Information Ontario
LOS	Level of Service
LRT	Light Rail Transit
masl	Metres Above Sea Level
MBCA	*Migratory Birds Convention Act*
mbgs	Metres Below Ground Surface
MNDM	Ministry of Northern Development and Mines
MNRF	Ministry of Natural Resources and Forestry
MOE	Ministry of Environment (now Ministry of the Environment and Climate Change)
MOECC	Ministry of the Environment and Climate Change
MOEE	Ministry of Environment and Energy (now Ministry of the Environment and Climate Change)
MOVES	Motor Vehicle Emission Simulator
MTCS	Ministry of Tourism, Culture and Sport
MTO	Ministry of Transportation
MUP	Multi-use Path
N/A	Not Applicable
NAPS	National Air Pollution Surveillance
NHIC	Natural Heritage Information Centre
NHS	Natural Heritage System
NPC	Noise Pollution Control
NPV	Net Present Value
NSA	Noise Sensitive Area
O. Reg.	Ontario Regulation
OBBA	Ontario Breeding Bird Atlas
OCS	Overhead Contact System

Acronym / Term	Definition
OHA	*Ontario Heritage Act*
OHT	Ontario Heritage Trust
OMB	Ontario Municipal Board
OPSS	Ontario Provincial Standard Specification
OTM	Ontario Traffic Manual
OWRA	*Ontario Water Resources Act*
PDBC	Preliminary Design Business Case
PHF	Peak Hour Factors
PHP	Provincial Heritage Properties
PPS	Provincial Policy Statement
PPUDO	Passenger Pick-up and Drop-off
PPV	Peak Particle Velocity
The Protocol	Ministry of Environment and Energy (now MOECC)/GO Transit Draft Protocol for Noise and Vibration Assessment
PSW	Provincially Significant Wetland
PTE	Permission to Enter
RCD	Reference Concept Design
RER	Regional Express Rail
RMS	Root-Mean-Square
RMSV	Root-Mean-Square Velocity
RNFP	Ravine and Natural Feature Protection
ROW	Right-of-Way
RTPC	Regional Transportation Passenger Centre
S&G	Standards and Guidelines
SAR	Species at Risk
SARA	*Species at Risk Act*
SCC	Species of Conservation Concern
SSE	Scarborough Subway Extension
SUE	Subsurface Utility Engineering
SWH	Significant Wildlife Habitat
SWHTG	Significant Wildlife Habitat Technical Guide
TAC	Technical Advisory Committee
TIP	Tree Inventory Plan
TIS	Traffic Impact Studies
TLI	Temporary Limited Interest
TMC	Turning Movement Counts
TMP	Transportation Master Plan
TPAP	Transit Project Assessment Process
TPSS	Traction Power Substation
TPZ	Tree Protection Zone
The Transit Project	New SmartTrack Stations Project

Acronym / Term	Definition
TRCA	Toronto and Region Conservation Authority
TSMP	Transportation Servicing Master Plan
TSP	Total Suspended Particles
TTC	Toronto Transit Commission
TTIS	Transportation and Traffic Impact Study
TTS	Transportation Tomorrow Survey
US EPA	United States Environmental Protection Agency
v/c ratio	Volume-to-Capacity Ratio
VKT	Vehicle Kilometres Travelled
WTRP	West Toronto Railpath
ZOI	Zone of Influence

1. Introduction

Metrolinx, an agency of the Province of Ontario, and the City of Toronto have proposed the development of a new rail station on the Kitchener rail corridor within the City of Toronto as part of the New SmartTrack Stations Project (the Transit Project). The King-Liberty SmartTrack Station (the Project) will be located on the existing Kitchener rail corridor, west of the intersection of King Street West and Sudbury Street in the City of Toronto.

The study area for the Project is discussed in Section 1.1. Further details regarding the design of the proposed Project are provided in Section 2.

Metrolinx and the City of Toronto are evaluating the potential environmental effects of the Transit Project in accordance with the Transit Project Assessment Process (TPAP). The TPAP is a streamlined environmental assessment (EA) process that recognizes and addresses the predictable environmental effects of transit projects and is approved under the *Environmental Assessment Act* (EAA) through Ontario Regulation 231/08 - Transit Projects and Metrolinx Undertakings (O. Reg. 231/08). This Environmental Project Report (EPR) documents the TPAP for the Transit Project and has been prepared in accordance with the *Guide to Ontario's Transit Project Assessment Process* (Ministry of the Environment and Climate Change, 2014a) as detailed in Volume 1 of this EPR.

Volume 9 of the EPR documents the consultation program followed for the Transit Project.

1.1 Description of Study Area

1.1.1 Kitchener Rail Corridor

Figure 1-1 shows the Kitchener rail corridor[1] with existing and proposed GO stations, and proposed SmartTrack stations. The Kitchener rail corridor is owned by Metrolinx and Canadian National Railway (CNR). Metrolinx owns the Weston and Guelph Subdivisions whereas CNR owns the Halton Subdivision. The Canadian Pacific Railway (CPR) MacTier Subdivision runs parallel and to the east of a section of the Weston Subdivision. Metrolinx operates a commuter (passenger) rail service along the Weston, Halton and Guelph Subdivisions, from Union Station in the City of Toronto to Kitchener GO Station in the City of Kitchener. The UP Express line spurs off to become the Pearson Subdivision connecting the Kitchener rail corridor to the Toronto Pearson International Airport in the City of Mississauga. VIA passenger trains travel along the Kitchener rail corridor between Toronto and London. Oriented generally in an east-west direction, the existing Kitchener rail corridor includes three Kitchener tracks and one Milton track between Strachan Avenue and West Toronto Diamond, one CP track and three Kitchener tracks between West Toronto Diamond and west of Weston GO Station, three tracks between west of Weston GO Station and Highway 427, two tracks between Highway 427 and east of Bramalea GO Station, and three tracks between east of Bramalea GO Station and west of Mt Pleasant GO Station, two tracks between west of Mt Pleasant GO Station and east of Georgetown GO Station, three tracks between east of Georgetown GO Station and west of Georgetown GO Station, and one track between west of Georgetown GO Station and Kitchener GO Station. The corridor is approximately 166 km in length and includes 11 stations (excluding Union Station). The Kitchener rail corridor runs

[1] Up until December 19, 2011, this rail corridor was known as the Georgetown rail corridor.

through the City of Toronto, the City of Mississauga and City of Brampton (both in Peel Region), Town of Halton Hills (Halton Region), City of Guelph (Wellington County), and the Township of Woolwich and City of Kitchener (both in Waterloo Region).

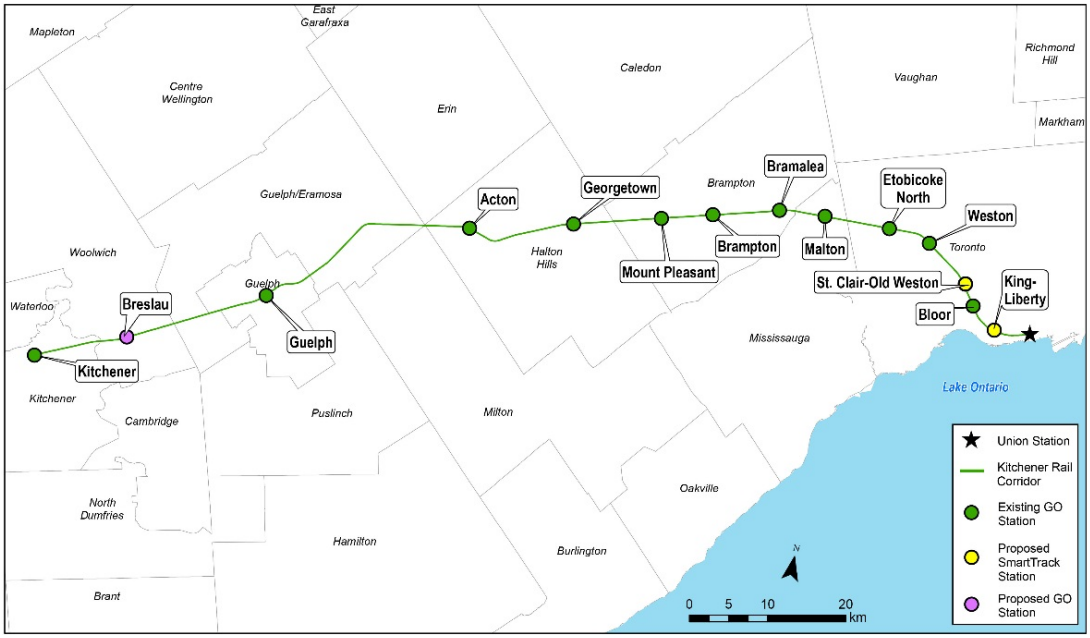

Figure 1-1: Kitchener Rail Corridor

On weekday mornings, there are ten trains on the Kitchener rail corridor travelling towards Union Station between 05:54 and 09:55. These trains stop at all stations except for one train which does not stop at stations between, and including, Malton and Bloor GO Stations. One train begins service at Bramalea GO Station, three trains at Mount Pleasant GO Station, two trains at Georgetown GO Station, and four trains at Kitchener GO Station. In the opposing direction towards Mount Pleasant GO Station, there are two trains at 08:55 and 09:48 stopping at all stations. Two-way service continues every 60 minutes during the off-peak periods between Mount Pleasant GO Station and Union Station. On weekday evenings, there are two trains from Mount Pleasant GO Station towards Union Station at 15:00 and 15:52 that do not stop between, and including, Etobicoke North and Bloor GO Stations. In the opposing direction towards Kitchener GO Station, there are seven trains between 15:35 and 18:50. These trains stop at all stations except for one train which does not stop at stations between, and including, Bloor and Malton GO Stations. Two trains terminate at Georgetown GO Station, one train at Mount Pleasant GO Station, and four trains at Kitchener GO Station. On weekends, there is no train service operated between Union Station and Kitchener GO Station.

As detailed in Section 1.2.2, works have been implemented to upgrade infrastructure along the Kitchener rail corridor to facilitate RER.

In addition to the proposed Project, the Kitchener rail corridor also includes the proposed St. Clair-Old Weston SmartTrack Station (Volume 7) and the proposed Breslau GO Station in the Township of Woolwich.

1.1.2 *Study Area*

An overall study area was identified for assessment of the potential effects of the Project (Figure 1-2). This study area includes the Project footprint and extends 1 km around the Project footprint. As shown in Table 1-1, environmental study-specific study areas were also identified for assessment of the potential effects of the Project related to each technical discipline being evaluated. These study areas define the geographic extent within which existing environmental conditions are documented and the potential environmental effects of the Project are assessed. The largest of these study areas extends 1 km from the Project footprint. Therefore, the overall study area was set at 1 km to encompass all environmental study-specific study areas. The Project footprint is the area of direct disturbance required for anticipated Project construction and operation activities and represents the anticipated property requirements associated with the Project.

Table 1-1: Study Area by Environmental Study

Study	Study Area
Natural Environment Report	Extends 120 m from the Project footprint.
Tree Inventory Plan	Extends 6 m from the Project footprint.
Cultural Heritage Screening Report	The Project footprint[2] and adjacent lands.
Stage 1 Archaeological Assessment	Extends 50 m from the Project footprint[2].
Socio-Economic and Land Use Study	Extends 500 m from the Project footprint.
Air Quality Impact Assessment	Extends 1 km from the Project footprint. Specific receptors are discussed in Section 4.
Noise and Vibration Impact Assessment	Extends 300 m from the Project footprint. Specific receptors are discussed in Section 4.
Transportation Brief	Primarily the specific intersections discussed in Section 4.

As shown in Figure 1-2, the overall study area is in the City of Toronto and is approximately bounded by west of Jameson Avenue to the west, north of Dundas Street West to the north, west of Bathurst Street to the east, and north of Lake Shore Boulevard West to the south.

[2] This technical study was initiated early, using a version of the study footprint that was not final. The differences between the station footprint used in this technical study differs marginally from that shown in Figure 2-1. As the study footprint extended beyond the probable construction boundary the area is valid, and the difference inconsequential. All background information, analysis and assessment documented is comprehensive and covers the entire area where station effects are to be found.

Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User

User Name: p007643C

Legend

- Study Area - 1000 Metres
- Proposed Project Footprint (approximate)
- Railway

DATA SOURCES:

Roads / Railways - Ontario Open Data Catelogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs

0 50 100 200 300 400 500 Metres

Project:	**New SmartTrack Stations**
Figure Title:	**King-Liberty Smart Track Station - Study Area**
Prepared By:	4TRANSIT PARSONS HATCH WSP
Date:	**May 09 2018**
Version: LV.EPR.100-1	TORONTO
Figure:	**1-2**

Document Path: H:\10000s\10568\GIS\Drawings\01-Smart Tracks EPR\10568GIS001\10568GIS001_LV.mxd

1.2 Purpose of the Project

1.2.1 Component of Regional Express Rail and SmartTrack

The Project is considered by Metrolinx and the City of Toronto to be of strategic importance to improve local access to higher order rapid transit. It will play a key role in supporting the wider RER and SmartTrack initiatives as a key transit facility in the Toronto downtown area.

1.2.2 Complement to Georgetown South Service Expansion and Union-Pearson Rail Link

Metrolinx completed the *Georgetown South Service Expansion and Union-Pearson Rail Link - Environmental Project Report* (October 2009) (Metrolinx, 2009a) in 2009. The transit infrastructure expansion delivered by the Georgetown South (GTS) Project so far has included modifying/expanding 16 bridges, building seven underpasses/overpasses and a tunnel to remove road rail crossings, and installing close to 60 km of track. Since September 2015, 14 new midday weekday GO train trips on the Kitchener rail corridor have been added between Mount Pleasant GO Station and Union Station to provide more travel options and flexibility. This more than doubles the GO service that existed prior to the start of the GTS Project in 2010.

The Kitchener (Georgetown South) rail corridor expansion works, which include installation of a fourth track in the study area for the Project, support the integrated RER and SmartTrack initiatives, including the development of the Project.

1.2.3 West Toronto Rail Path

The City of Toronto is currently in the detailed design phase for the West Toronto Rail Path (WTRP) Extension. The study followed a Municipal Class EA Schedule 'C' process and was approved in 2016. This study will extend the WTRP from Sterling Avenue (at Dundas Street West), along the Kitchener GO Rail corridor to just south of Queen Street West (at Abell Street).

The WTRP is planned to extend into the study area for the Project; the Project is being designed to integrate with this extension.

1.2.4 King-Liberty Pedestrian Cycle Bridge

The City of Toronto is planning construction of a new pedestrian/cycling bridge over the Kitchener GO Rail corridor in the vicinity of the Project. The bridge will span from Douro Street to Western Battery Road and will provide a new route from Liberty Village to King Street West between Atlantic Avenue and Strachan Avenue.

The construction and operation of the new bridge has been considered in the planning of the Project.

1.2.5 King High Line

The King High Line is a proposed multi-use path along the south side of the Kitchener GO Rail corridor that includes a bridge connection across the rail corridor to the planned extension of the WTRP (see Section 1.2.3). The Project is being designed to integrate with the proposed King High Line.

1.3 Project Background and Initial Business Case

In July 2016, Metrolinx issued the Initial Business Case (IBC) for the King-Liberty SmartTrack Station (previously referred to as Liberty Village), titled *RER New Stations Initial Business Case - Downtown West - Liberty Village, Queen-Dufferin, Lansdowne Cluster Screening - Kitchener/Barrie Corridors* (Urban Strategies Inc., 2016).

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

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

- Address operational needs to introduce Kitchener service on tracks 1 and 4, rather than tracks 1 and 2, requiring a revised platform configuration to accommodate track geometry.
- Provide access via an overhead connection multi-use trail.

1.4 Preliminary Design Business Case

In March 2018, Metrolinx issued the Preliminary Design Business Case (PDBC) for the Project within Appendix I of the New Stations Initial Business Cases Technical Report (Metrolinx, 2018). The financial and economic summary is provided in Table 1-2.The PDBC takes the IBC results and refines them with more detailed costing and analysis of benefits. The PDBC analysis captures evolved design concepts, revised modelling methodology, changes in municipal and provincial plans, and updated operating patterns and service plans since 2016.

The King-Liberty station generally aligns with current provincial, local, transportation and land use policy. It was found to offer strategic benefits including increased ridership and new pedestrian connections across the rail corridor, and regional significance in supporting the concept of a Waterloo-Toronto Technology Corridor. It facilitates broader transit integration by providing good connections to the King and Queen streetcars, local bus service, and the Exhibition GO station on the Lakeshore West corridor to the south. The station could also help to alleviate congestion on existing Toronto Transit Commission (TTC) routes. The Garrison Commons Secondary Plan, which includes the King-Liberty station, is currently under review, presenting an opportunity to enhance the public realm and pedestrian and cycling connections within the station area.

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

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

Table 1-2: Financial and Economic Summary

	King Liberty
2031 Ridership (AM Peak Period) boardings + alightings	5,100
2031 Ridership (Daily) boardings + alightings	19,600
Change in Cost from IBC	**Increase**
Change in Benefits from IBC	**Increase**
Benefits Compared to Cost	**Benefits are Positive and Exceed Costs**
Transportation User Benefits (60yr lifecycle)	**$426 M**
Travel Time Savings	**$412 M**
Vehicle Operating Cost Savings	**$11 M**
Decongestion on Road Network	**$2 M**
Safety Impacts	**$1 M**
Environmental Impacts[3]	**$0 M**

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1.5 Full Business Case

As part of Metrolinx's business case analysis approach, Metrolinx staff are currently developing full business cases for all the SmartTrack station sites that underwent a PDBC in March 2018.

2. Project Description

2.1 Initial Preferred Design

Metrolinx and the City of Toronto have sought to refine and update the station concept presented in the IBC. The result of this is the Initial Preferred Design (IPD, October 2017), which is shown in Appendix A. The IPD was used as the basis for evaluation of the Project in the EPR and will be the basis for future work to develop a Reference Concept Design[4] (RCD).

The Project is conceived as a single island platform with four station access locations, including a station building and a bridge connection across the rail corridor with access to the

[3] Environmental impacts refer to the broad cost of transport on local surroundings and the Earth's atmosphere. Environmental impacts capture the effect the potential station has on greenhouse gas emissions through reductions in vehicle kilometres travelled
[4] Reference Concept Designs, or functional designs, are used in the Alternative Financing and Procurement (AFP) model as inputs to the development of the Request for Proposal (RFP) to design and construct the Project. The functional design is intended to identify the location of entrances, exits and ancillary station equipment. Functional designs are not intended to provide architectural details. The AFP partner will be developing detailed designs for the Project and these will be subject to public input.

platform at Joe Shuster Way and the future Multi-use Paths (MUPs) north and south of the rail corridor. Platform access will be provided via a tunnel below the platform. A designated para-transit lay-by and bicycle parking will be provided. This station will not include formal Passenger Pick Up/Drop Off (PPUDO), parking facilities, or a bus loop. Specific station features are described in more detail in Section 2.3.

2.1.1 Design Refinements Subsequent to the Initial Preferred Design

As with any project in the planning phase, refinements may occur as design proceeds. Discipline-specific studies conducted for this EPR will be reviewed and refined as necessary during detailed design based upon further design refinements. As appropriate, design refinements will be subject to the EPR Addendum process prescribed in O. Reg. 231/08 (see Volume 1).

2.2 Key Design Criteria

The following assumptions guided the development of the IPD:

- An eastward extension to the WTRP is desired;
- The future King High Line bridge will provide vertical access directly onto the station platform (pending coordination with developers and technical feasibility);
- GO Rail Station Access Plan assumptions were as follows:
  - The target modal split by 2031 is 58-60% walking; 18-20% local transit; 6-8% cycling; 18-20% pick-up/drop-off [5].
- CP's retains freight operating rights on the Metrolinx-owned Lower Galt Subdivision. Station platforms and other features must respect full freight dimensional clearances.

2.3 Key Station Components

The following Project components comprise the IPD upon which this EPR is based. Refinements to the design may be made prior to construction as previously noted. These project components are as described in the King-Liberty Station New Station Concept Summary Memorandum (Urban Strategies and WSP, 2017) and shown in the IPD provided in Appendix A.

2.3.1 Platform

The station platform will be a single island platform located just west of the rail overpass over King Street West. The western part of the platform will be curved given spatial constraints in the corridor.

2.3.2 Station Entrances

The main station entrance is anticipated to be provided near the intersection of Sudbury Street and Dovercourt Road, northeast of the rail corridor. The primary entrance will include secure bicycle parking, will be adjacent to the para-transit designated lay-by, and is planned to connect to the WTRP extension. The entrance area will facilitate site circulation, and passenger transfer between streetcar stops and other modes.

[5] The PPUDO numbers from the GO Access Plan are unreasonably high given there will be no formal "PPUDO facilities. It is likely that there will be greater walking, transit and cycling access than originally forecast. Any PPUDO will be handled on street.

A secondary entrance will be provided from the WTRP via a King High Line bridge to the platform.

A tertiary entrance will be located on the north side of King Street West, on the west side of the rail corridor. This entrance may be integrated into the bridge abutment west of the King Street underpass immediately adjacent to the 1100 King Street West property, with high quality transfer to and from the streetcar and bus stops.

Additional platform access may be provided directly from the King High Line, a developer-proposed multi-use path, via the King High Line bridge. The King High Line will serve pedestrians and cyclists coming from the north, south and west of the station and is anticipated to connect with Joe Shuster Way.

2.3.3 *Station Circulation*

Staircases and elevators will provide access between station levels. Staircases will be covered or enclosed. Elevators will facilitate movement of wheelchairs, walkers, and other mobility devices between station levels.

Entrances on the north and south sides of the rail corridor will be connected via the platform, enhancing neighborhood connectivity across the rail corridor.

2.3.4 *Bicycle Facilities*

As outlined in the GO Rail Station Access Plan (Metrolinx, 2016b), bicycle parking spaces will be provided, including secured spaces (within a limited-access room or structure) and covered spaces (protected from weather). Secured spaces will be located in or near the main station entrance.

Additional bicycle parking and bicycle sharing facilities should be explored adjacent to all secondary station entrances.

2.3.5 *Landscaping and Streetscaping*

The main station entrance may include seating, trees, landscaping and other amenities. At the main and the south secondary access points, associated landscaping and signage will provide a visible and public presence along Sudbury Street and respectively along King Street West. Specific landscaping and streetscaping features will be confirmed during detailed design.

2.3.6 *Transit Access*

TTC Route 504 streetcar stops are currently located on King Street West at Atlantic Avenue, and Route 63 bus stops are located on Atlantic Avenue at King Street West that operates between the Eglinton West Subway Station and the Liberty Village via Ossington Avenue and Oakwood Avenue. A temporary streetcar stop is currently located on the west side of the King Street and Atlantic Avenue intersection due to construction. Discussion with the TTC is ongoing to confirm future stop locations. Secondary station access points on both sides of King Street West will allow for streamlined transfers for passengers between streetcars, buses and the Project. The TTC Route 501 streetcar stop located at Queen Street West and Dovercourt Avenue will be accessible through the main station entrance. No bus loop will be provided.

2.3.7 *Active Transportation Access*

Pedestrian access to the station entrance will be provided via existing sidewalks on the street network on both sides of the rail corridor.

The King High Line proposed by a private developer outside the scope of this project, is an elevated multi-use path structure that begins at Sudbury Street and Abell Street west of the station, moves over and along the west side of the rail corridor, and finishes on the south side of King Street West at the foot of Hanna Avenue. The station design is anticipated to be coordinated with the proposed King High Line to better integrate the communities on both sides of the rail corridor and facilitate a convenient access point for passengers to the west and north of the Project via a multi-use (pedestrian and cycling) bridge across the rail corridor. Vertical circulation is planned from the King High Line directly to the station platform and to Joe Shuster Way.

The planned WTRP extension will provide a new active transportation connection to the station site from the west. Construction of a new proposed multi-use bridge over the rail corridor connecting Douro Street and Western Battery Road, is anticipated to begin in Summer 2018.

2.3.8 *Vehicular Access*

The primary point for vehicles to access the Project will be from Sudbury Street which runs largely parallel to the rail corridor between King Street West and Queen Street West (east of the rail corridor). No designated PPUDO or vehicular parking spaces will be provided.

2.3.9 *Accessible Loading and Unloading*

A para-transit lay-by is planned in front of 99 Sudbury Street in proximity to the station. This area will be prominently marked through signage and pavement treatment.

2.3.10 *Emergency and Service Vehicle Corridor Access*

Corridor access for emergency and service vehicles will be provided in coordination with current and planned street and block patterns. The existing corridor access at Sudbury Street and Abell Street will be maintained.

2.3.11 *Property Acquisition*

Property is anticipated to be required to facilitate Project construction and operation. Refinement of property requirements including laydown and staging areas will occur through detailed design.

The acquisition of non-Metrolinx owned property is required to implement the Project, as defined in the IPD (see Appendix A). Property requirements are anticipated to comprise of the following:

- Full property takings - none.
- Partial property takings:
  - Private - 0.1 ha.
  - Public - 0.02 ha.
- Temporary full property takings - none.

- Temporary partial property takings:
  - Private - 0.7 ha.
  - Public - 1.0 ha.
- Other real estate considerations:
  - Private - 3.3 ha.

Other real estate considerations are anticipated to include lands for bike trails, station adjacent infrastructure, and other City initiatives.

2.3.12 *Utilities*

The owners of utility infrastructure located in the study area have been identified and are presented in Table 2-1.

Table 2-1: Utilities within the Study Area

Utility Type	Utility Owners
Power, Cables, Conduits and Lighting	• Toronto Hydro
Gas and Oil	• Enbridge Gas Distribution
Communications	• Bell Canada; • Rogers Cable Communications; and • Group Telecom.
Private Railway	• CN Signals
Municipal Utilities	• City of Toronto - Water, Sanitary, Stormsewer and wastewater

2.3.13 *Electrification*

Electrification is planned for this section of the Kitchener rail corridor by 2025, consistent with the GO Rail Network Electrification TPAP (Metrolinx, 2017b). Electrification is anticipated to consist of a 25 kV system delivering power to electric trains using an Overhead Contact System (OCS). The OCS is an aerial supply system that delivers traction power from Traction Power Substations (TPSS) to the electric trains via contact wires and associated supports and structures, including poles and other overhead line hardware and fittings. TPSSs are traction power facilities that transform the utility supply voltage for distribution to the electric trains via the OCS (Metrolinx, 2017b).

2.3.14 *Construction*

A description of anticipated construction activities is provided in Table 2-2. These typical activities serve as the basis for the assessment of construction-related potential environmental effects. These activities may be expanded, further refined, or found to be unnecessary as the Project progresses through detailed design and construction.

Table 2-2: Anticipated Construction Activities

Activity	Description	Associated Equipment
Site Preparation	• Mobilization of equipment and temporary facilities to the site. • Clearing and grubbing of vegetation. • Erection of temporary and permanent fences. • Installation of environmental management features (e.g., erosion and sediment controls).	• Site compaction equipment and grading equipment. • Vegetation removal equipment. • Excavation equipment. • Haulage/dump trucks.
Site Servicing	• Relocation and/or extension of services and utilities on the site; which may include both underground and aerial services and utilities (e.g. sewers, water, electrical, communications, gas). This may also involve installation of utilities within the site.	• Excavation equipment including backhoe, dump trucks, spoil removal equipment, jackhammers.
Excavation and Grading	• Excavation and grading activities may involve earth-moving activities and stockpiling, as applicable. Excavated material will be accommodated on-site on the degree practicable, however, where necessary, surplus material will be disposed of off-site. • Any off-site disposal shall be done in compliance with applicable law, including as it relates to contaminated material that may be encountered. • Any groundwater encountered will be managed and disposed of in accordance with applicable law.	• Site compaction equipment and general grading equipment, dump trucks, spoil removal equipment. • Groundwater pumping equipment. • Excavation equipment including backhoe, dump trucks, spoil removal equipment, jack hammers.
Construction of Buildings and Structures	• All buildings and structures will be constructed using standard civil construction techniques.	• Foundation placement equipment. • Augured piles or rammed aggregate piers. • Drill rigs. • Mobile cranes and hoists. • Concrete trucks, pumps and vibrators.
Construction of Ancillary Facilities	• Ancillary facilities may include electrical transformer/supply equipment, parking areas, exterior yard facilities including lighting, electrification enabling facilities.	• Flatbed trucks, cranes, concrete trucks. • Backhoe, pavement excavation equipment. • Mobile cranes and hoists. • Concrete trucks, pumps and vibrators.
Installation of Trackwork	• Assembly of track, ties and fastenings near the station.	• Thermal welding. • Tie placement (cranes, lifting equipment). • Ballast placement equipment. • Concrete pouring equipment.

Activity	Description	Associated Equipment
Temporary Track Diversion	• Grading. • Temporary drainage. • Relocation/ Installation of tracks. • Temporary relocation of signals, if any. • Clear delineation and protection between active rail service and construction work zones.	• Site compaction equipment and general grading equipment, dump trucks, spoil removal equipment. • Thermal welding equipment. • Tie placement (cranes, lifting equipment). • Ballast placement equipment. • Temporary concrete barriers.
Temporary Road Closure	• All road closures will follow standard traffic control management guidelines.	• Temporary traffic control devices such as signs, signals, barriers, traffic barrels.
Management of Stormwater	• All precipitation falling within the site will be managed as stormwater within a designed system of collection, conveyance, retention and discharge features. The system will be designed and operated in compliance with applicable standards and regulatory requirements. Surface flows within the site will be managed within the site to ensure discharge to off-site receivers (i.e., municipal storm sewers) is appropriate in terms of water quantity and quality.	• Site compaction equipment and general grading equipment. • Groundwater pumping equipment.

2.4 Operations

A description of anticipated operation activities is provided in Table 2-3. These activities represent those with the potential for operations-based environmental effects and serve as the basis for assessment of potential environmental effects. These activities may be expanded, further refined, or found to be unnecessary as the Project progresses through detailed design and during operation.

Table 2-3: Anticipated Operation Activities

Activity	Description
General Operations	• New SmartTrack service on the Kitchener rail corridor with access provided at the Project. • TTC streetcar service with access provided to the Project from King Street. • TTC bus service with access provided to the Project from King Street and Dufferin Street. • Private vehicles and para-transit vehicles accessing the Project via Sudbury Street. • Pedestrian and cyclist movements to/from the Project and surrounding areas from King Street and Sudbury Street, and the King High Line.

3. Existing Conditions

This section of the EPR Volume documents existing environmental conditions within each of the discipline-specific study areas (refer to Table 1-1). The purpose of characterizing existing environmental conditions is to establish baseline conditions against which potential effects are assessed, as detailed in Section 4.

Further details on existing environmental conditions within each of the discipline-specific study areas and the methodologies used to obtain this information are provided in Appendices B through I of this Volume.

3.1 Natural Environment

This section provides an overview of existing natural environment conditions within the natural environment study area. Further details are provided in Appendix B of this Volume.

3.1.1 Methodology

The study area for the Natural Environment Report extends 120 m from the Project footprint.

Available background information was collected and reviewed from several sources, including but not limited to Fisheries and Oceans Canada (DFO), the Ministry of Natural Resources and Forestry (MNRF), the City of Toronto and the Toronto and Region Conservation Authority (TRCA).

There are no aquatic features (i.e., watercourses, waterbodies, hydrological features, or wetlands) within the study area based on review of available background resources (MNRF LIO Database, NHIC and aerial imagery) and confirmation through agency consultation. As such, no further discussion of aquatic resources (i.e., aquatic environment, watercourses and hydrological features) is provided.

Vegetation communities were mapped and classified using the Ecological Land Classification (ELC) for Southern Ontario system (Lee, et al., 1998) with 2008 and 2013 catalogue code updates (Lee, 2008 and 2013).

A vascular plant species list was completed for the study area.

Prior to site investigations, a desktop screening was completed to identify potential Species at Risk (SAR) habitat and other potential wildlife habitat associated with approximated vegetation communities and watercourses. During the site investigations, all direct wildlife observations and wildlife signs (including browse, tracks/trails, animal scat, bird nesting activity, tree cavities, burrows, excavated holes and vocalizations) were recorded. Incidental wildlife species observations were noted.

Significant Wildlife Habitat (SWH) was evaluated based on site-specific attributes within the study area compared to the Significant Wildlife Habitat Ecoregion Criteria Schedules for Ecoregion 7E (MNRF, January 2015).

A SAR Screening Table was developed to indicate the potential of a given SAR to occur based on habitat and known species distribution and the corresponding potential and severity of effects to the species associated with the proposed works.

3.1.2 Description of Existing Conditions

3.1.2.1 Terrestrial Environment

The study area consists predominantly of rail corridor lands and urban land uses characterized by an abundance of impervious surfaces.

A total of 47 vascular plant taxa were observed within the study area and identified to species. Of these, 18 (38%) were native and 29 (62%) were non-native.

No provincially or federally rare species were observed. This includes species designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), species designated by Committee on the Status of Species at Risk in Ontario (COSSARO), species listed on the ESA or the SARA, as well as S1 to S3 (critically imperiled, imperiled, or vulnerable) ranked species. All the native species were ranked as S5 (common and widespread within the province) or S4 (apparently secure - uncommon but not rare).

Two species observed are listed as locally/regionally rare by both the TRCA (2003)[6] and the City of Toronto (Varga, et al., 2000)[7], as shown in Table 3-1.

Table 3-1: Locally and Regionally Significant Plant Species

Common Name	Accepted Name	TRCA Rank	City of Toronto Rank
Canada Bluejoint	*Calamagrostis canadensis*	L4	U
Peachleaf Willow	*Salix amygdaloides*	L4	U

None of the flora SAR identified through background sources were observed within the study area during field studies.

[6] Codes are defined as follows: L4: Of concern in urban matrix; generally secure in rural matrix; able to withstand some disturbance.
[7] Codes are defined as follows: U: Uncommon native species.

A search for trees containing cavities was also conducted during the botanical inventory to identify potential bat habitat. No cavity trees were observed within the study area.

No definable vegetation communities were identified within the study area due to the highly urbanized conditions.

3.1.2.2 Wildlife and Wildlife Habitat

Urban/suburban-tolerant wildlife species were recorded during the site investigations.

No observations or signs of any mammal species were recorded in the study area during the site investigations; however, the general area likely supports a range of mammals often found in urban environments, including: Raccoon (*Procyon lotor*), Grey Squirrel (*Sciurus carolinensis*), Striped Skunk (*Mephitis mephitis*), and a number of small mammals that often go undetected (e.g., shrews, voles, mice) (Dobbyn, 1994).

Four common and widespread bird species were recorded during field investigations: Rock Pigeon (*Columbo liva*), Mourning Dove (*Zenaida macroura*), House Sparrow (*Passer domesticus*) and Northern Mockingbird (*Mimus polyglottos*). Background information from the Ontario Breeding Bird Atlas (OBBA) indicates that 17 bird species have been observed in proximity of the study area in a similar urban environment (eBird, 2017).

No avian nests were observed during the site investigations, though suitable nesting habitat is present in the study area. Formal nest or bird surveys were not completed during the site visit due to access limitations.

No herpetofauna were observed during the site investigations and there is no suitable habitat for amphibians in the study area. No specialized habitat features (e.g., amphibian breeding or reptile overwintering habitat) were observed or are likely to occur in the study area.

3.1.2.3 Significant Wildlife Habitat

Field investigations for wildlife habitat did not identify any candidate SWH according to the SWH Technical Guide and Ecoregion 7E Criteria Schedule (MNRF, 2015).

Through correspondence with the MNRF, records of confirmed SWH were not identified within the study area.

3.1.2.4 Species at Risk or Species of Conservation Concern

A total of 22 SAR was identified within the general vicinity of the Project through background research and Agency consultation, of which 14 were determined to have no potential to occur in the study area, six have low to minimal potential to occur, and two were determined to have moderate potential to occur. Only SAR identified to have a moderate or high potential to occur or those confirmed present within the study area are shown in Table 3-2 and discussed further.

Table 3-2: Species at Risk

Common Name	Accepted Name	S-Rank[1]	ESA Status[2]	SARA Status[3]
Chimney Swift	*Chaetura pelagica*	S4B, S4N	Threatened	Threatened
Peregrine Falcon	*Falco peregrinus anatum*	S3B	Special Concern	Special Concern

Status Sources:

[1]**S-Rank** (MNRF, 2017a)

S1: Critically Imperiled - Critically imperiled in the nation or state/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 state/province.

S2: Imperiled - Imperiled in the nation or state/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 nation or state/province.

S3: Vulnerable - Vulnerable in the nation or state/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.

S4: Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5: Secure - Common, widespread, and abundant in the nation or state/province.

S#S#: Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SR or ? - Recorded within a nation or subnation, but local status not available or not yet determined. When combined with a global rank of G1 to G3, local status is 'Indeterminate,' but the entity is nevertheless presumed vulnerable, if still extant.

N - rank for non-breeding populations in the province.

B - rank for breeding populations in the province.

[2]**ESA** (Endangered Species Act) Status (MNRF, 2018b)

[3]**SARA** (Species at Risk Act) Status (federal status - listed) (Government of Canada, 2018)

Extinct - A species that no longer exists anywhere.

Extirpated (EXT) - Lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario.

Endangered (END) - Lives in the wild in Ontario but is facing imminent extinction or extirpation.

Threatened (THR) - Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.

Special concern (SC) - Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.

Not at Risk (NAR) - A species that has been evaluated and found to be not at risk.

Data Deficient (DD) - A species for which there is insufficient information for a provincial status recommendation.

There is moderate potential for Chimney Swift to nest in the study area as suitable chimneys and other structures have been identified. Additionally, Chimney Swift could be a foraging visitant throughout the study area. Nesting habitat for this species is protected under the ESA.

There is moderate potential for Peregrine Falcon to occur as a foraging visitant throughout the study area. Suitable nesting habitat for this species is present in the study area on tall buildings. Peregrine Falcon is protected under the *Fish and Wildlife Conservation Act, 1997*.

No individual Chimney Swift and Peregrine Falcon or their nests were identified during a site investigation.

Neither Red Mulberry nor any other flora SAR were recorded during site investigations.

3.1.2.5 Significant Natural Heritage Features

Significant Natural Heritage Features include any features designated by the MNRF, Conservation Authority or municipality governing the area in which the project is based.

No mapped significant natural heritage features occur within the study area, based on a review of City of Toronto and TRCA mapping, as well as the following MNRF resources: LIO,

NHIC; and Natural Heritage Areas mapping (e.g., ANSIs, Provincially Significant Wetlands [PSWs], Environmentally Significant Areas).

3.2 Geology and Groundwater

This section provides an overview of existing geology and groundwater conditions within the study area. Refer to Section 4.3 for geology and groundwater effects assessment, mitigation and monitoring.

3.2.1 Methodology

Topographic, surficial geology and bedrock geology mapping available through Natural Resources Canada and the Ontario Geological Survey, as well as other relevant background documentation, was reviewed. Water well records were obtained from the Ministry of the Environment and Climate Change (MOECC).

3.2.2 Description of Existing Conditions

3.2.2.1 Landforms and Physiography

The study area is located in the St. Lawrence Lowland physiographic region of Canada. This landform region is the smallest in Canada and comprises the peninsula of southern Ontario bounded by the Canadian Shield and Lakes Huron, Erie, and Ontario. It extends along the St. Lawrence River to the Atlantic Ocean. Within Southern Ontario, the study area is within the Iroquois Plain which lies adjacent to the South Slope Physiographic Region and Lake Ontario (Chapman & Putnam, 1984).

3.2.2.2 Soils and Bedrock Geology

Surficial geology within the study area consists of both glacial till and coarse textured glaciomarine deposits. The glacial till has been characterized as undifferentiated older tills that may contain stratified deposits. The glaciomarine deposits identified are coarse and generally contain sand, gravel, minor silt and clay (MNDM, 2010).

Bedrock within the study area consists of shale, limestone, dolostone and siltstone. Provincial mapping indicates the bedrock elevation is generally high with little surficial overburden (MNDM, 2011). Water well and borehole Information retrieved from the Groundwater Information Network (GIN) indicates that depth to bedrock in some areas can exceed 20 m (GIN, 2017).

3.2.2.3 Groundwater Resources

The approved Source Protection mapping was reviewed for the Credit Valley, Toronto and Region and Central Lake Ontario (CTC) Source Protection Region (2015). The study area is located within the Highly Vulnerable Aquifer (HVA) but outside (greater than 20 km) all mapped wellhead protection areas.

Hydrogeological and geo-environmental studies will be completed in support of detailed design to further characterize existing conditions.

No evidence of groundwater seepage was observed within the study area during field investigations.

3.3 Tree Inventory

This section provides an overview of existing trees within the study area. Further details are provided in Appendix C of this Volume.

Refer to Section 4.4 for effects assessment, mitigation and monitoring with respect to trees.

3.3.1 Methodology

The study area for the Tree Inventory Plan (TIP) extends 6 m beyond the Project footprint (as required by City of Toronto's Private Tree By-law and Parks By-law).

A desktop review was undertaken using online mapping, including the City of Toronto's interactive mapping tool. Relevant guidelines and documents were also reviewed and followed to guide fieldwork and inform the assessment, including relevant City of Toronto By-laws, the ESA and Canadian Food Inspection Agency (CFIA) directive (D-03-08) (Canada Food and Inspection Agency, 2014).

Trees were identified based on categories as follows:

1. Trees with diameters of 30 cm or more situated on private property within the Project footprint.
2. Trees with diameters of 30 cm or more situated on private property, within 6 m of the Project footprint.
3. Trees of all diameters situated on City owned parkland within 6 m of the Project footprint.
4. Trees of all diameters situated within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine Protection.
5. Trees of all diameters situated within the City road allowance adjacent to the Project footprint.

Categories 1 and 2 relate to the City of Toronto Private Tree By-law (City of Toronto, 2015b), Category 3 relates to the City of Toronto Parks By-law (City of Toronto, 2017b), Category 4 relates to the City of Toronto Ravine and Natural Feature Protection By-law (City of Toronto, 2016b) and Category 5 relates to the City of Toronto Trees on City Streets By-law (City of Toronto, 2015b).

Site visits were undertaken within the study area limits. Individual trees greater than 10 cm Diameter and Breast Height (DBH) within the Kitchener rail corridor were identified and tagged. Trees on private property where no Permission to Enter (PTE) had been obtained were identified from the rail corridor or public property, where possible. Trees and shrubs less than 10 cm DBH were identified but not tagged in the field. Where the canopy of trees overlapped, trees were assessed as a grouping and labelled accordingly.

Parameters were derived from International Society of Arboriculture (ISA) Best Management Practices (International Society of Arboriculture, 2008). These criteria were applied during the fieldwork to provide a holistic assessment of trees within the study area.

A TIP was prepared identifying tree locations within the study area (see Appendix C of this Volume).

3.3.2 Description of Existing Conditions

The site is characterized by urban and industrial land uses with vegetation being limited to landscaped areas and narrow strips along the edge of the rail corridor. The Kitchener rail corridor runs in a generally northwest-southeast direction. Residential and commercial land

uses surround the study area on all sides. There are no watercourses in the study area; however, there are isolated swales within the rail corridor. The terrain is generally flat except for a berm separating the rail corridor from Sudbury Street.

Trees and shrubs observed throughout the study area consist of a high percentage of non-native species that have either been planted or occurred naturally and range in size from less than 10 cm to approximately 76 cm DBH.

Eleven trees greater than 10 cm DBH were assessed within the Kitchener rail corridor. A total of 341 trees less than 10 cm DBH were assessed within the rail corridor. A total of 45 trees greater than 10 cm DBH were assessed outside the rail corridor within the study area.

Sixty-seven potentially affected trees have been identified due to a potential solution for part of the West Toronto Railpath (WTRP) extension. Of these 67 trees, 25 are Category 1 trees, six are category 5 trees, and 36 are trees with a DBH less than (<) 30 cm that occur on private property.

Most of the trees within the rail corridor are located in groupings along the northern edge of the corridor. Trees less than 10 cm DBH within the corridor consist of (in order of abundance): Manitoba Maple (*Acer negundo*), Eastern Cottonwood (*Populus deltoides*), European Ash (*Fraxinus excelsior*), Tree-of-Heaven (*Ailanthus altissima*), Slippery Elm (*Ulmus rubra*), Siberian Elm (*Ulmus pumila*), Green Ash (*Fraxinus pennsylvanica*), Norway Maple (*Acer platanoides*), Sandbar Willow (*Salix interior*), Sycamore Maple (*Acer pseudoplatanus*), Staghorn Sumac (*Rhus typhina*), Black Locust (*Robinia pseudoacacia*), Red Maple (*Acer rubrum*), White Mulberry (*Morus alba*), Apple (*Malus* sp.), Crack Willow (*Salix euxina*), Peachleaf Willow (*S. amygdaloides*), and Wooly-headed Willow (*S. eriocephala*).

Trees greater than 10 cm DBH outside the rail corridor but within the study area are mostly located along Sudbury Street or on private property just beyond the rail corridor boundary. These consist of (in order of abundance): European Ash, Norway Maple, Freeman Maple (*Acer* x *freemanii*), Sugar Maple (*A. saccharum*), Silver Maple (*A. saccharinum*), Little-leaf Linden (*Tilia cordata*), Austrian Pine (*Pinus nigra*), Ginkgo (*Ginkgo biloba*), Manitoba Maple, Norway Spruce (*Picea abies*), Red Pine (*Pinus resinosa*), Red Oak (*Quercus rubra*), Siberian Elm, Tree-of-Heaven, Green Ash, London Plane Tree (*Platanus* x *acerifolia*), Peachleaf Willow, Slippery Elm, White Ash (*Fraxinus americana*), and White Mulberry.

A majority of trees are in good condition. However, some trees show signs and symptoms of abiotic and biotic defects leading to decline.

No woody vegetative SAR (e.g., Butternut) were observed within the study area.

Figure 3-1 to Figure 3-4 identify the locations of trees that are greater than 10 cm DBH within the study area. Trees less than 10 cm DBH were accounted for but not noted as tree groups.

Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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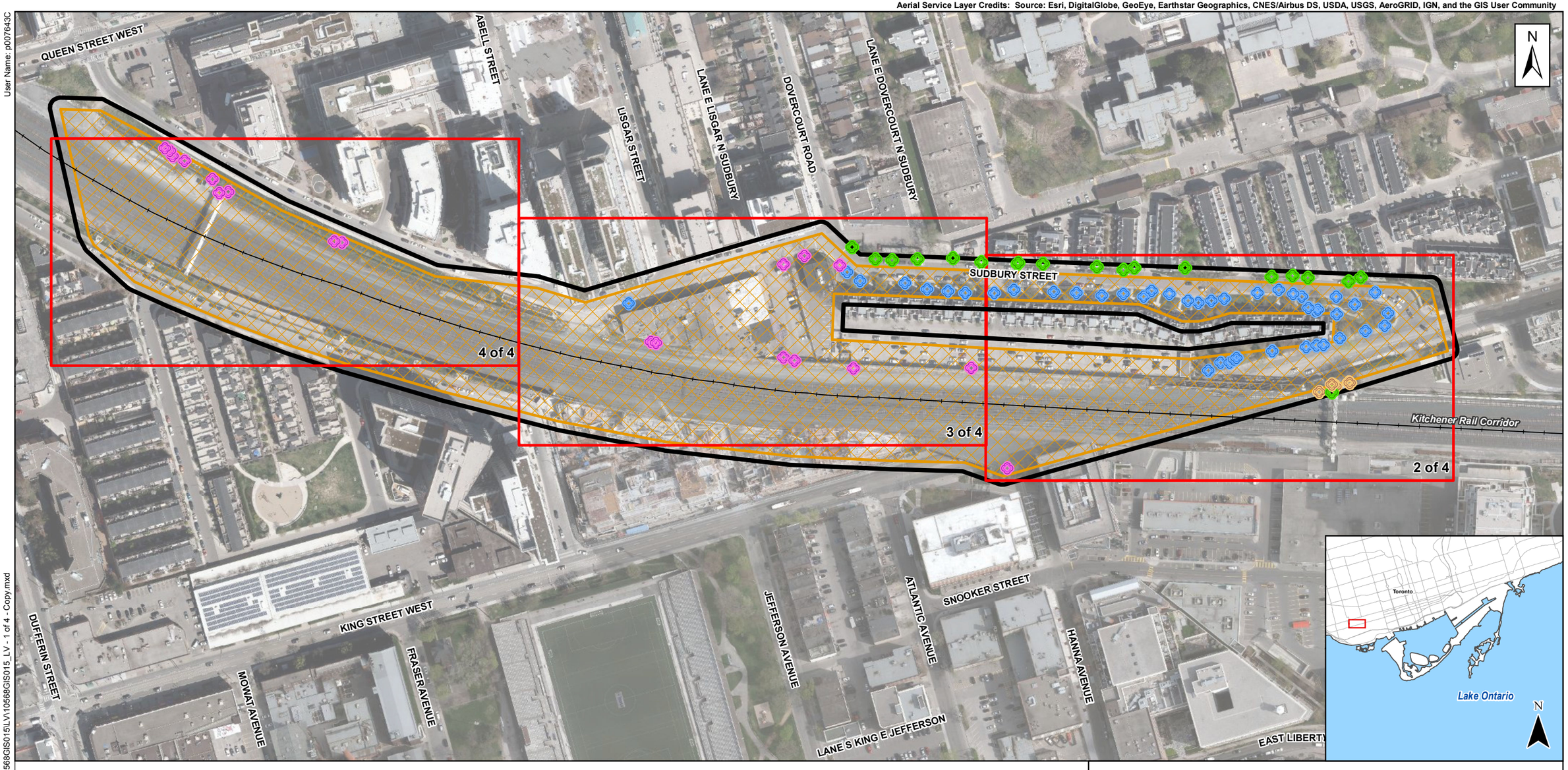

Legend

- Study Area - 6 metres
- Project Footprint (approximate)
- Railway

Existing Individual Tree (Not OLS Surveyed)

- To Be Preserved
- To Be Injured
- To Be Removed
- Potentially Affected

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs
Individual Trees - Parsons

0 25 50 100 150 Metres

Project:	**New SmartTrack Station**		
Figure Title:	**King-Liberty SmartTrack Station Tree Inventory - Overall**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date: July 04 2018**	
Version: LV.EPR.100-1	**Review:**	**Figure: 3-1**	

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Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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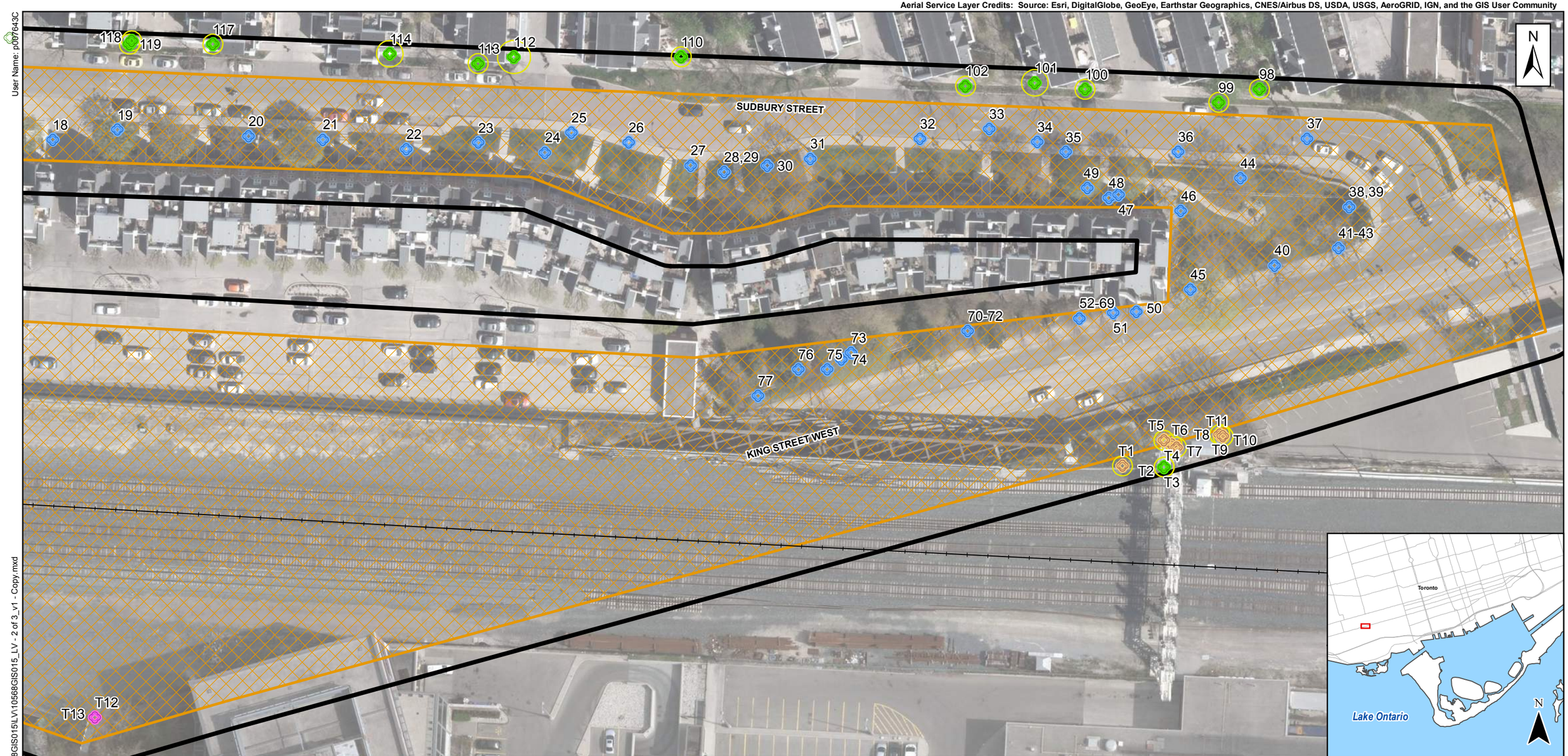

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Legend

- Study Area - 6 metres
- Project Footprint (approximate)
- Railway
- Tree Protection Zone (TPZ)

Existing Individual Tree (Not OLS Surveyed)

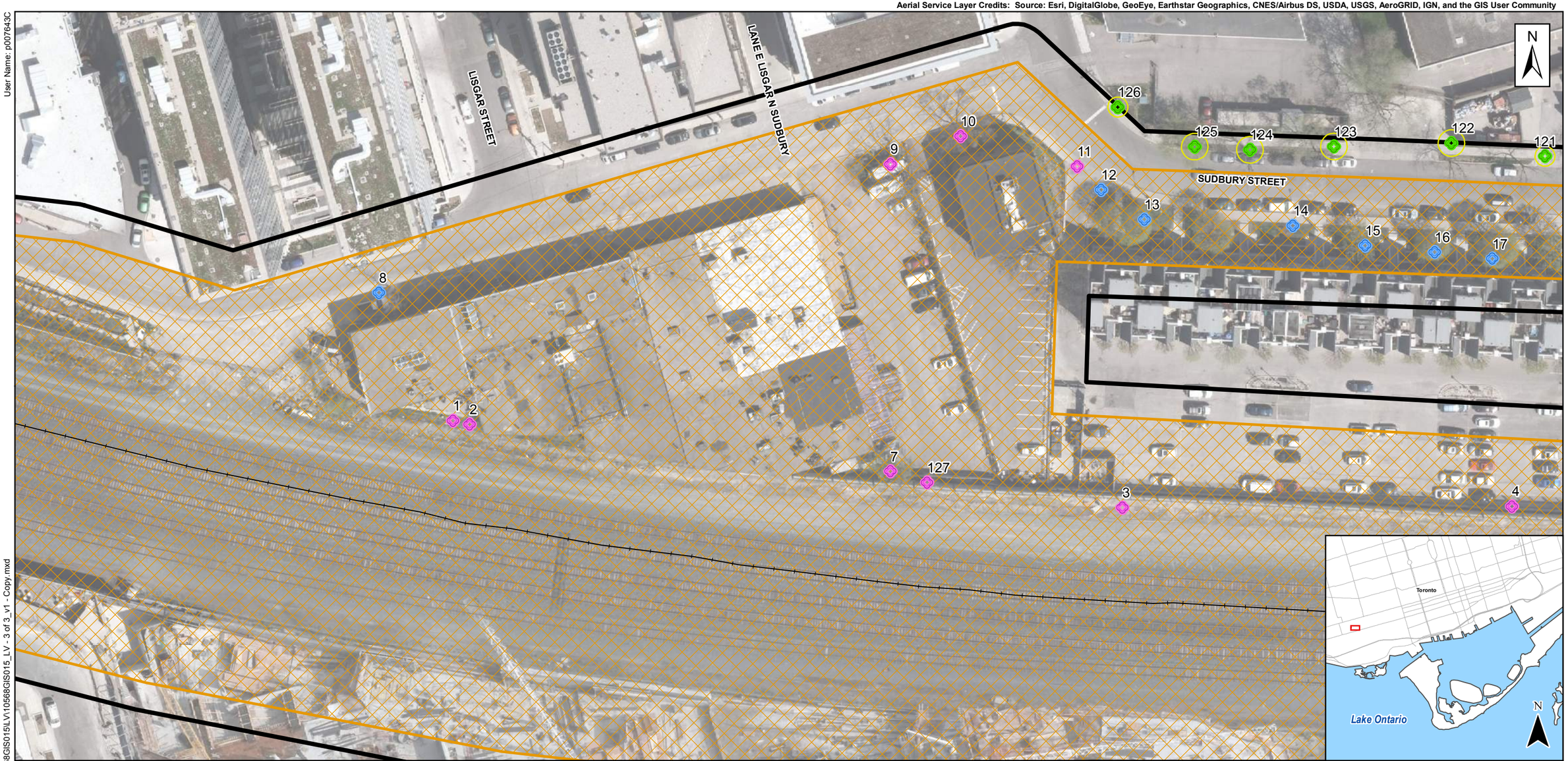
- To Be Preserved
- To Be Injured
- To Be Removed
- Potentially Affected

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs
Individual Trees - Parsons

0 5 10 20 30 40 50 Metres

Project:	**New SmartTrack Stations**		
Figure Title:	**King-Liberty SmartTrack Station - Tree Inventory - East**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11 2018**
Version: LV.EPR.100-1	**Review:**	**Figure:** 3-2	



Legend

- Study Area - 6 metres
- Project Footprint (approximate)
- Railway
- Tree Protection Zone (TPZ)

Existing Individual Tree (Not OLS Surveyed)

- To Be Preserved
- To Be Injured
- To Be Removed
- Potentially Affected

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs
Individual Trees - Parsons

0 5 10 20 30 40 50 Metres

Project:	**New SmartTrack Stations**		
Figure Title:	**King-Liberty SmartTrack Station - Tree Inventory - Central**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11 2018**
Version: LV.EPR.100-1	**Review:**	**Figure:** 3-3	

Legend

- Study Area - 6 metres
- Project Footprint (approximate)
- Railway
- Tree Protection Zone (TPZ)

Existing Individual Tree (Not OLS Surveyed)

- To Be Preserved
- To Be Injured
- To Be Removed
- Potentially Affected

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs
Individual Trees - Parsons

0 5 10 20 30 40 50 Metres

Project:	**King-Liberty SmartTrack Station**		
Figure Title:	**King-Liberty SmartTrack Station Tree Inventory - West**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date: July 04 2018**	
Version: LV.EPR.100-1	**Review:**	**Figure:** 3-4	

3.4 Cultural Environment

This section provides an overview of existing cultural environment conditions within the study area, including Built Heritage Resources (BHRs) and Cultural Heritage Landscapes (CHLs), and archaeological resources. Further details are provided in Appendices D and E of this Volume of the EPR, respectively.

Refer to Section 4.5 for cultural environment effects assessment, mitigation and monitoring.

3.4.1 Built Heritage Resources and Cultural Heritage Resources

3.4.1.1 Methodology

The study area for the Cultural Heritage Screening Report (CHSR) is defined by the Project footprint and immediately adjacent lands, encompassing the broadest area in which cultural heritage resources might be affected.

The CHSR was conducted in accordance with the Metrolinx Interim Cultural Heritage Management Process (Metrolinx, 2013) and the Standards and Guidelines for Conservation of Provincial Heritage Properties (MTCS, 2010) issued under the *Ontario Heritage Act* (OHA).

The following tasks were undertaken in the preparation of the CHSR:

- Reviewed primary and secondary (e.g., historical maps, images, aerial photographs, tax assessment rolls) source material to provide information about property history and current properties that have known or potential Cultural Heritage Value or Interest (CHVI);
- Conducted an overview of the historic background of the area to address the uses of the land and the development of the area;
- Conducted a property visit to confirm and identify properties with known or potential CHVI;
- Conducted a screening for previously identified cultural heritage resources (CHRs) and potential CHRs;
- Conducted a review of previous CHSRs, Cultural Heritage Evaluation Reports (CHERs), Cultural Heritage Assessment Reports (CHARs) and Heritage Impact Assessments (HIAs) previously prepared by/for Metrolinx; and
- Provided recommendations for further evaluation of potential Provincial Heritage Properties (PHPs), conditional heritage properties or adjacent lands.

The municipal heritage inventory was reviewed to identify whether properties and structures have been previously identified and/or have been designated under the OHA. Consultation with the City of Toronto was conducted to confirm those properties that are listed on the City's Heritage Register or Designated under Parts IV or V of the OHA. The Ontario Heritage Trust (OHT) provided information for properties on the *Ontario Heritage Act* register of municipally-designated properties and OHT easements. The Heritage Bridge List was provided by the Ministry of Transportation (MTO).

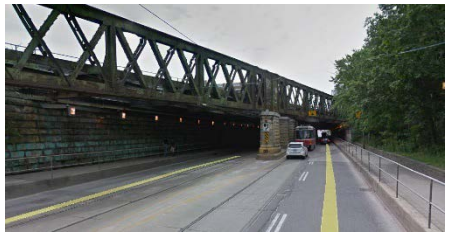
In June 2018 a CHAR was prepared to build on the findings of the CHSR and to identify potential adverse impacts to identified cultural heritage resources and to recommend mitigation measures to lessen or avoid any identified impacts. The results of this CHAR are included in this Volume of the EPR.

3.4.1.2 Description of Existing Conditions

One property in the study area, the King Street West Subway, is a PHP. The Statement of CHVI for the property can be found in Appendix D.

Through the screening process, additional properties in the study area have been identified as having potential CHVI. Table 3-3 lists these properties, which are also shown on Figure 3-5.

Table 3-3: Properties with Potential or Identified Cultural Heritage Value or Interest

Cultural Heritage Resource #	Municipal Address	Previous Heritage Recognition	Description	Image
KL-1	55 Sudbury Street	Listed	The CHVI of 55 Sudbury Street is outlined in its SCHV. The physical features of the property at 55 Sudbury Street which embody the cultural heritage value or interest of the property are: • The two-and-a-half-storey late Victorian office building in its current location on the south side of Sudbury Street as it terminates at the junction with Dovercourt Road and adjacent to the former Dominion Glass Company factory building at 99 Sudbury Street and rail corridor; • The setback and orientation of the building, including its chamfered corners at the northeast and northwest corners; • The scale, form, massing, and symmetry of the building, including its rectangular plan with raised basement and flat roof; • The fabric of the building, including brick and stone; • The arrangement of the openings on the north (front) façade with central door, flanked by paired windows and chamfered corners; • The arrangement and alignment of openings on the east and west facades; and • Decorative brick and stone details of the building including: the arches surrounding the main entrance, curved headed windows with brick voussoirs, the projecting brick voussoirs, rusticated stone sills and lintels, brick dentil courses.	
KL-2	King Street West Subway	Provincial Heritage Property	The CHVI of the King Street West Subway is outlined in its SCHV. Key elements that define the subject property's heritage character include: • The stone substructure including abutments and piers, demonstrating masonry techniques of the late-19th century. • The carved stone pilasters at the end piers which indicate the subway's provenance: "Erected 1880, _ Mayor, _City Engineer,_Hamilton Brg Co., _Actors.", (underscore indicates illegible lettering). • The steel Howe truss system and light openings at the subway's east span, demonstrating engineering techniques of the early twentieth century.	 (Source: Google Streetview, 2018)

Cultural Heritage Resource #	Municipal Address	Previous Heritage Recognition	Description	Image
			• The steel girder system at the subway's west span, demonstrating the bridge's evolution since the late-19th century. • The rivet connections, demonstrating steel construction techniques of the late-19th century.	
KL-3	109 Atlantic Avenue	Listed	The CHVI of the property lies in its design as an early 20th-century Edwardian era warehouse with load-bearing brick envelope and timber interior structure. The property is associated with the Gowans, Kent and Company warehouse. It is an important component of the industrial character of its surroundings. Potential heritage attributes include elements of the three-storey brick and timber structure and its physical elements.	
KL-4	61 Hanna Avenue	Listed	The CHVI of the property lies in the c.1910 to 1912 structure's association with the Hinde and Dauch Paper Company. Potential heritage attributes include elements of the one-storey brick structure and its physical elements.	

Cultural Heritage Resource #	Municipal Address	Previous Heritage Recognition	Description	Image
KL-5	107 Atlantic Avenue	Listed	The CHVI of the property lies in the c.1905 structure's association with Bradshaw and Company and the National Fibre Company and its association with it's designers, Toronto architects Henry Simpson and Robert Young. It is an important component of the industrial character of its surroundings. Potential heritage attributes include elements of the three-storey brick structure and its physical elements.	

Cultural Heritage Resource #	Municipal Address	Previous Heritage Recognition	Description	Image
KL-6	40 Hanna Avenue	Designated under Part IV of the OHA (By-law 1293-2015)	The CHVI of the property lies in the c.1913 structure's association with the Brunswick-Blake-Collender Company and its association with it's designer, Toronto architect Henry Simpson and Robert Young. It is an important landmark component of the industrial character of its surroundings. The heritage attributes of the property at 40 Hanna Avenue are the building complex known historically as the Brunswick-Balke-Collender Factory and Boiler House with: • The placement, setback and orientation of the factory, which was designed in three stages along the west side of Hanna Avenue between present-day Snooker Street (north) and Liberty Street (south), with the detached boiler house and brick smokestack at the south end of the site. • The scale, form and massing of the four-storey factory complex and the detached boiler house with the smokestack • The materials, with buff brick cladding and brick, stone and wood detailing. • Along the flat rooflines of the factories, the corner chimneys on the 1905 building, and the parapets on the north and south ends of the 1913 addition where an extension on the east side was originally the base for a water tower (later removed). • On the factory complex, the entries and the symmetrically-placed flat-headed openings (mostly industrial-scale) with sills and minimal detailing, as well as the segmental-arched openings with the brick arches on part of the east elevation of the 1913 (south) building (some of the door and window openings have been altered). • The restored painted signage reading "Brunswick-Balke-Collender Company of Canada Limited" on the south wall of the 1913 section, and the remaining original painted company signage on the factory buildings. • The detached boiler house with the segmental-arched openings and the extended brick smokestack with corbelled detailing. • The views of the landmark chimney along Liberty Street, including the view looking northwest from the corner of Hanna and Liberty that encompasses the boiler house and factory complex in situ on Hanna Avenue.	

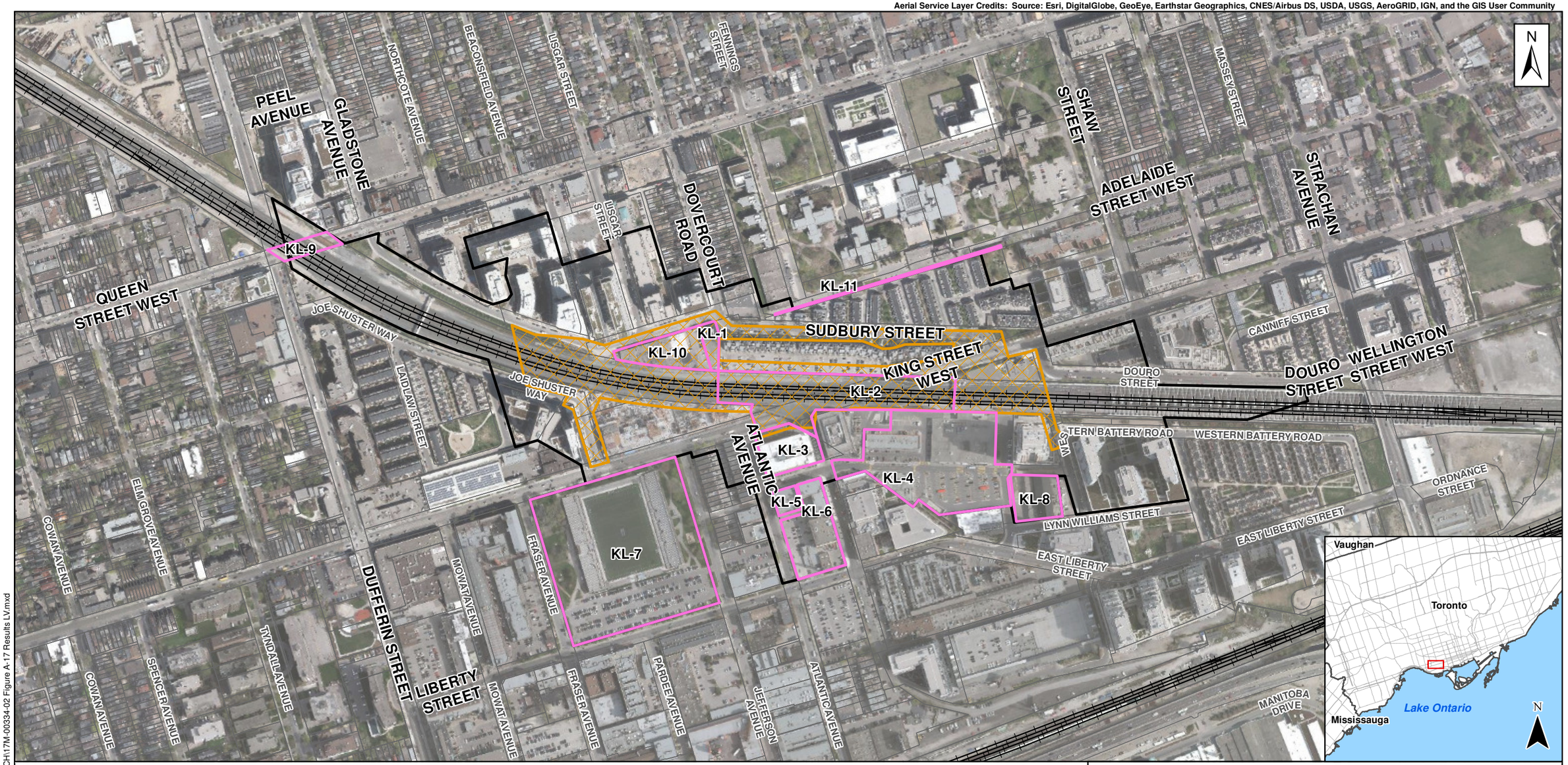
Cultural Heritage Resource #	Municipal Address	Previous Heritage Recognition	Description	Image
KL-7	1177 King Street West	Listed	The CHVI of the property lies in the c.1894 Queen Anne Revival residential structure and its use as the warden's house for the Andrew Mercer Ontario Reformatory for Females (of which it is the only remnant). The building was designed by Province of Ontario architect, Kivas Tully, and constructed by inmates from the nearby Central Prison for Men. Potential heritage attributes include elements of the two-and-a-half-storey brick structure and its physical elements.	
KL-8	80 Lynn Williams Street/130 East Liberty Street	Listed	The CHVI of the property lies in the c.1929 structure's association with the Central Prison for Men and the A.R. Williams Machinery Company. Portions of the structure associated with the prison were designed by Kivas Tully. Potential heritage attributes include elements of the brick structure and its physical elements.	

Cultural Heritage Resource #	Municipal Address	Previous Heritage Recognition	Description	Image
KL-9	Queen Street West Railway underpass	Listed	The CHVI of the property lies in the 1897 structure's design, construction, and materials, including its ashlar masonry and Longford limestone. Potential heritage attributes include elements of the structure and its physical elements.	
KL-10	99 Sudbury Street	None Potential CHVI (identified during screening)	The CHVI of the property is outlined in its SCHV. The physical features of the property at 99 Sudbury Street which embody the cultural heritage value or interest of the property are: • The late Victorian industrial building. • The location, setback and orientation of the building. • The form, scale, massing, and low-rise nature of the building. • The fabric of the building, including its stretcher bond brickwork. • The remaining segmental arched windows and brick voussoirs. • The scale and arrangement of remnant bay door ways. • The buildings physical location which creates a contextual connection to the railway at the south end of the property and office building at 55 Sudbury Street.	

Cultural Heritage Resource #	Municipal Address	Previous Heritage Recognition	Description	Image
KL-11	Remnant building of Lunatic Asylum and Wall[8]	Designated under Part IV of the OHA	This property is designated under Part IV of the OHA (by-law 1997-0085). The CHVI of the property lies in the remnant brick wall and its association with the Provincial Lunatic Asylum, of which this is the only remnant. The wall was designed by the Toronto architectural firm of Cumberland and Ridout in 1851. Heritage attributes include the remnant portions of the red brick wall, with parged rubble stone base with a brick base course and stone coping and its brick piers on stone bases with a brick base course and stone coping, placed at approximately 3 m intervals along the exterior of the east and west wall and both sides of the south wall. The structures and portion of the wall located within the study area, are not contemporary with the 1851 portions of the wall and are not described in the designation by-law.	

[8] The wall is located on the property at 1001 Queen Street West and is situated at 17T 627470.72 E 4833294.09 N.

Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Document Path: T:\17M-00334-02\Arch\MXD\Liberty\CH\17M-00334-02 Figure A-17 Results LV.mxd

Legend

- Study Area
- Proposed Project Footprint (approximate)
- Railway
- Property Parcels
- Potential Cultural Heritage Resources

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs

0 50 100 200 300 Metres

Project:	**New SmartTrack Station**		
Figure Title:	**King-Liberty SmartTrack Station - Cultural Heritage Screening Report Results**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 10 2018**
Version: LV.EPR.100-1	**Review:**	**Figure:** 3-5	

3.4.2 Archaeology

3.4.2.1 Methodology

The study area for the Stage 1 Archaeological Assessment (AA) extends approximately 50 m from the Project footprint.

Archaeological activities were carried out in accordance with the Standards and Guidelines (S&G) for Consultant Archaeologists (MTCS, 2011).

The Stage 1 AA (see Appendix E) involved a review of documents including historic maps, aerial photographs and local histories. Inspections were conducted of the rail corridor and properties visible from the corridor.

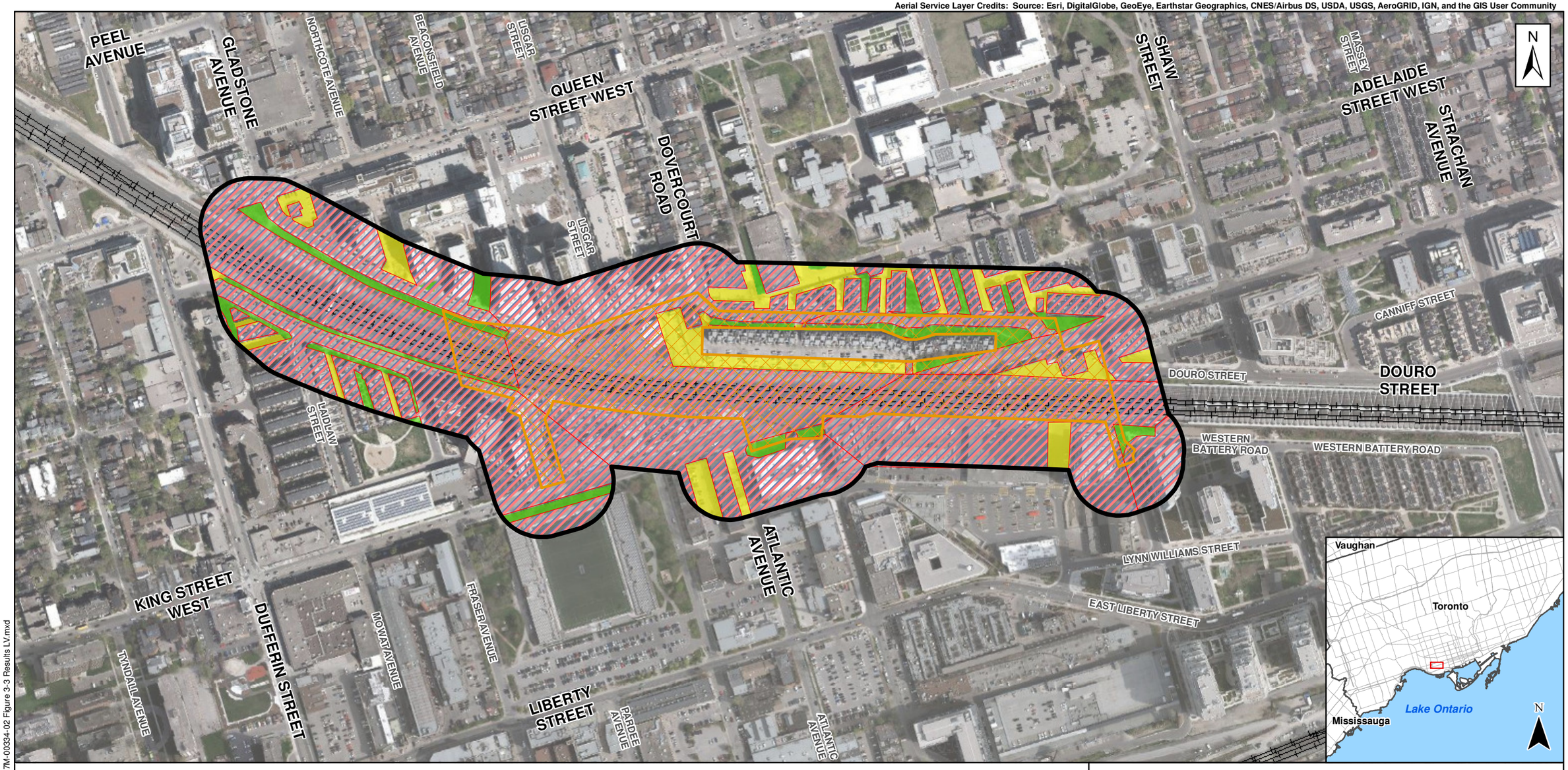
Archaeological recommendations were made based on background historical research, locations of known or registered archaeological sites, previously completed AAs, and indicators of archaeological potential as outlined in the 2011 S&G.

3.4.2.2 *Description of Existing Conditions*

The Stage 1 AA found that the presence of primary water sources (within 1 km of Lake Ontario) and historic transportation routes (Toronto, Grey and Bruce Railway, King Street West, Sudbury Street) in the vicinity of the Project indicates that there is potential for the recovery of both pre-contact and post-contact period archaeological resources. While the development of the surrounding lands and the rail corridor resulted in disturbances of lands within the study area, a Stage 2 AA is required to determine the extent of that disturbance where deeply buried archaeological resources may be present, as well as in the areas that have been found to be undisturbed.

Figure 3-6 presents the results of the Stage 1 AA showing areas of archaeological potential requiring Stage 2 AA.

Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Document Path: T:\17M-00334-02\Arch\MXD\Vol 3\17M-00334-02 Figure 3-3 Results LV.mxd

Legend

- Study Area
- Proposed Project Footprint (approximate)
- Railway
- Stage 2 Required: Deeply Buried Potential
- Stage 2 Required: Test Pit Survey
- Disturbed

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs

0 40 80 160 240 Metres

Project:	**New SmartTrack Stations**		
Figure Title:	**King-Liberty SmartTrack Station - Areas of Archaeological Potential**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 10 2018**
Version: LV.EPR.100-1	**Review:**	**Figure:** 3-6	

3.5 Socio-Economic and Land Use

This section provides an overview of existing socio economic and land use conditions within the study area. Further details are provided in Appendix F of this Volume.

Refer to Section 4.6 for socio-economic and land use effects assessment, mitigation and monitoring.

3.5.1 Methodology

The study area for the Socio-Economic and Land Use Study extends 500 m from the Project footprint.

A desktop review and site visit to determine existing conditions was undertaken for the study area. The desktop review included relevant policy and planning documents at the provincial and municipal levels, and data provided by the City of Toronto, Statistics Canada and TTC.

Photographs from the site visit are provided in Appendix F of this Volume.

3.5.2 Description of Existing Conditions

3.5.2.1 Planning Policy Context

The following provincial and municipal policies were considered in the context of project planning:

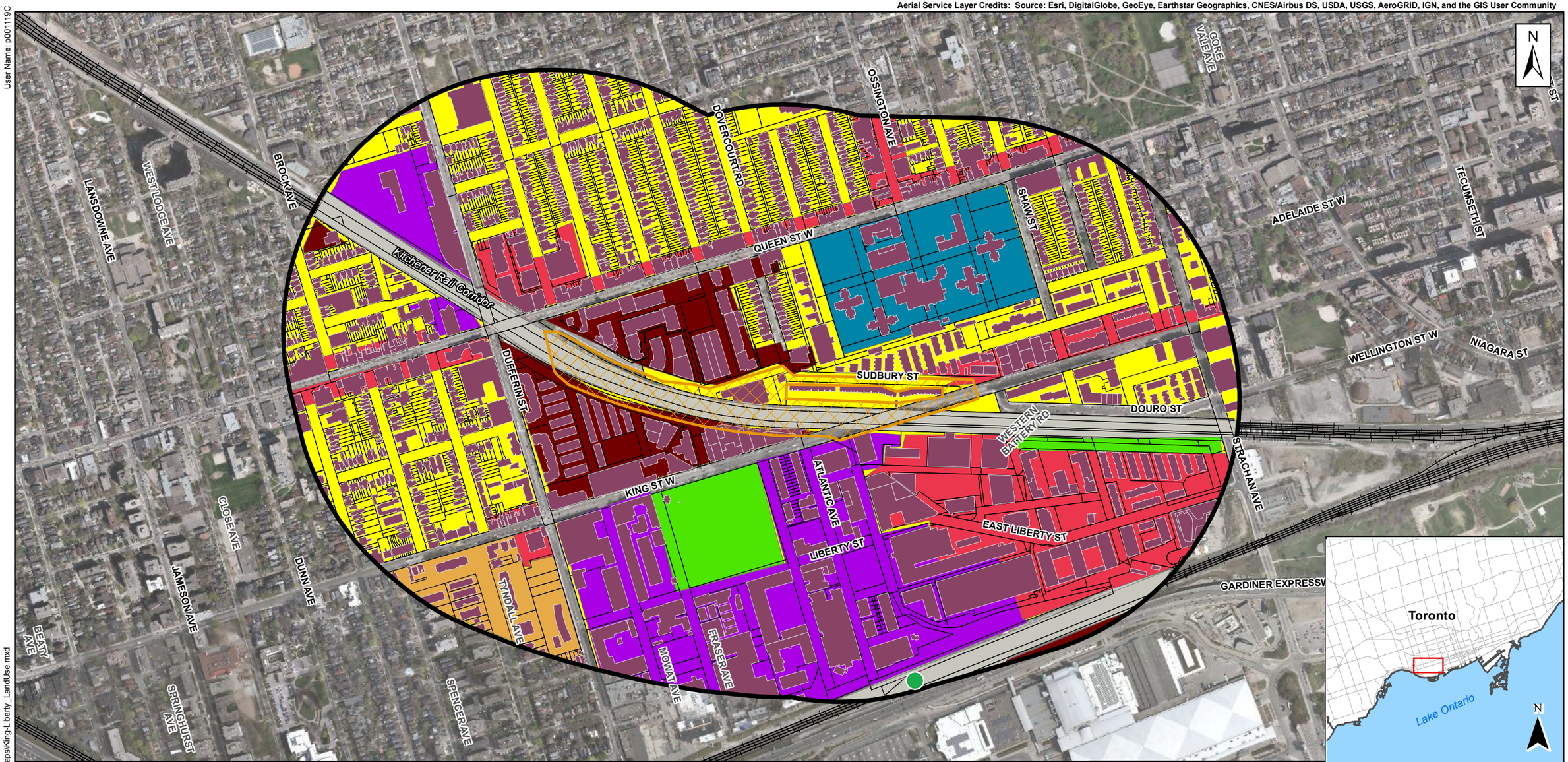
- Provincial Policy Statement (PPS) (Ministry of Municipal Affairs and Housing, 2014);
- Growth Plan for the Greater Golden Horseshoe (Ministry of Municipal Affairs, 2017);
- Metrolinx Regional Transportation Plan (Metrolinx, 2012);
- TRCA Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (O. Reg. 166/06) (Toronto and Region Conservation Authority, 1990);
- City of Toronto Official Plan (City of Toronto, 2015a);
- City of Toronto Secondary Plans and Precinct Plans; and
- The City of Toronto Zoning By-Law No. 438-86 and 569-2013.

Land use designations in the study area are shown on Figure 3-7. The City of Toronto Official Plan designates lands within the study area as Employment Areas, Mixed Use Areas, Neighbourhoods, Apartment Neighbourhoods, Parks, Institutional Areas and Regeneration Areas. The Project footprint is primarily covered by the Utility Corridors designation, recognizing the presence of the existing Kitchener GO Rail Corridor.

Lands within the Project footprint are split zoned. The Project footprint is zoned in the City of Toronto Zoning By-law 569-2013 as: Employment Industrial - EI; Commercial Residential Zone - CR; and Utility Transportation - UT. These zones permit transportation uses under the condition that the transportation uses must comply with all requirements for a building on the subject lot.

User Name: p001119C

Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- Study Area - 500 Metres
- Proposed Project Footprint (approximate)
- Railway
- Exhibition GO Station

Land Use Designations

- Neighbourhoods
- Regeneration
- Mixed Use Areas
- Parks
- Employment Areas
- Institutional Areas
- Apartment Neighbourhoods
- Utility Corridors

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs
Land Use Designations - Toronto Official Plan 2015
Parcel Fabric, Building Footprints, All Points of Interest - Toronto Open Data

0 100 200 400 600 Metres

Project:	**New SmartTrack Station**
Figure Title:	**King-Liberty SmartTrack Station - Land Use Designations**
Prepared By:	4TRANSIT PARSONS HATCH WSP
Date:	**June 19, 2018**
Version: LV.EPR.100-1	**Review:**
Figure:	3-7

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3.5.2.2 *Neighbourhood Characteristics*

The Project is located within the South Parkdale, Niagara, and Little Portugal neighbourhoods[9], within the City of Toronto. These neighbourhoods are located within the Old City of Toronto, which now comprises the centre of the amalgamated City of Toronto.

The South Parkdale neighbourhood is an urban neighbourhood with a variety of development, most notably high density residential and mixed-use areas. There is a large amount of commercial development along Queen Street West and King Street West, and adjoining streets. The Niagara neighbourhood is similar and is home to ongoing urban development of both employment uses, residential and commercial destinations. Both neighbourhoods have older, lower density residential development interspersed throughout.

Table 3-4 summarizes some of the key features of the physical neighbourhood within the study area by category. These are also mapped on Figure 3-8.

Table 3-4: Features of Interest within the Study Area

Key Feature ID	Feature Type	Feature Name
1	Place of Worship (Institutional Use)	Slavic Evangelical Baptist Church
2	Place of Worship (Institutional Use)	Parkdale Neighbourhood Church
3	Place of Worship (Institutional Use)	Hamza Mosque
4	Place of Worship (Institutional Use)	Church of the Epiphany
5	School (Institutional Use)	Alexander Muir Gladstone Avenue Junior and Senior Public School.
6	School (Institutional Use)	Senhor Santo Cristo Catholic Elementary School (relocated)
7	School (Institutional Use)	Givins Shaw Junior Public School
8	Recreational Uses	Allan Lamport Stadium Park
9	Community Groups and Resources	Parkdale Library
10	Licensed Child Care Centre	Bonaventure Child Care Centre
11	Licensed Child Care Centre	Downtown Kids Academy, Inc.
12	Licensed Child Care Centre	Queen Street Child Care Centre
13	Ambulance Facility	Station 37
14	Recreational Uses	Rita Cox Park
15	Human Services	King West Village Chiropractic Clinic
16	Human Services	Platinum Health & Wellness
17	Human Services	King Liberty Health Centre
18	Hospital	Centre for Addiction and Mental Health - Queen Street Site
19	Human Services	Parkdale Project Read - Adult Literacy and Learning
20	Human Services	Sporometrics Inc.
21	Human Services	Village Family Health Team
22	Human Services	King-Dufferin Family Medical Clinic
23	Human Services	Parkdale Queen West Community Health Centre

[9] The neighbourhoods in the study area are also known as West Queen West Triangle (Sudbury north to Queen Street) and Liberty Village (south of King Street West, from Dufferin Street to Strachan Avenue).

Key Feature ID	Feature Type	Feature Name
24	Human Services	Appletree Medical Group
25	Human Services	OISE University of Toronto TEFL Certification - Teach Away
26	Human Services	Kababayan Multicultural Centre
27	Human Services	Ossington Men's Withdrawal Management Centre
28	Community Centre	Masaryk-Cowan Community Centre

User Name: p001119C

Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Study Area - 500 Metres
- Proposed Project Footprint (approximate)
- Railway
- Exhibition GO Station
- Community Centre
- Licensed Child Care
- Human Services
- Hospital
- Ambulance Facility
- Community Groups and Resources
- Recreational Uses, Parks and Open Space
- Place of Worship
- School

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs

0 100 200 400 600 Metres

Project:	**New SmartTrack Station**
Figure Title:	**King-Liberty SmartTrack Station- Key Features**
Prepared By:	4TRANSIT PARSONS HATCH WSP
Date:	**May 22, 2018**
Version: LV.EPR.100-1	**Review:**
Figure:	3-8

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3.5.2.3 *Aesthetics/Visual Character*

The study area has the following characteristics in terms of built form:

i. Mixed-use high-rise buildings with massing and step backs to reduce their dominance. The façade of these buildings is articulated to clearly define the ground-oriented commercial uses along the street;

ii. Buildings are oriented toward the street (often with ground floor retail or office space);

iii. Town/row homes with parking away from the street;

iv. Buildings are set back from the street; and,

v. Where landscaped areas exist, they are provided along the street frontage.

vi. Along the Railway and west along Sudbury Street, industrial sites are arranged with large surface parking lots and some older buildings have simple utilitarian designs with few windows, minimal architectural detailing, and blank walls facing the street.

The area north of the Project footprint contains commercial and industrial uses. The commercial and industrial uses extend north towards Dundas Street West.

The area east of the Project footprint contains high-density residential developments, as well as some townhomes. Further east beyond the study area is Trinity Bellwoods Park and some moderate to low density residential development.

The area south of the Project footprint contains high density residential developments and commercial/retail areas. There are also some intermittent industrial uses in this area, and some sites proposed for development.

The area west of the Project footprint contains some high-density residential buildings and substantial townhome and moderate density residential development. There are also some retail commercial uses.

The study area in between Queen Street West and King Street West consists predominantly of residential uses. There are multiple high-rise residential towers situated to the east and the west of the rail corridor both north and south of King Street West. There are townhouses located to the east of the rail corridor along Sudbury Street.

3.5.2.4 *Utilities*

The owners of utility infrastructure located in the study area have been identified and are listed in Table 2-1 in Section 2.3.12.

3.5.2.5 *Current Development Applications*

Table 3-5 provides a description of active development proposals and applications in the study area at the time this EPR was written.

Table 3-5: Active Development Applications

Address File # Map ID	Application Summary	Application Status	Non-Residential Area (sq. m)
440 Dufferin Street *Official Plan Amendment* *Zoning By-law Application* *11 320041 STE 18 OZ* MAP ID 1	Employment Lands Conversion. Application for 2 new mixed-use buildings with common underground parking garage. All buildings have ground and second floor commercial/industrial uses and remaining floors are residential. - 402 residential units - buildings range between 9 and 11 storeys - 393 parking spaces - 2 levels below grade parking.	Under Review	Unknown
1181 Queen Street West *Site Plan Approval* *16 270617 STE 18 SA* MAP ID 2	Site Plan Approval to construct a 16-storey mixed use building with retail at the ground floor and 146 dwelling units (11,066.8 sq. m. Residential Gross Floor Area with 3 levels of underground parking.	Under Review Zoning By-Law Application under OMB appeal.	709
1150 Queen Street West *Site Plan Approval* *11 131706 STE 18 SA* MAP ID 3	To alter the existing three-storey hotel by constructing a five-storey east side addition in order to increase the number of hotel suites from the existing 19 suites by adding an additional 32 suites within the building.	Under Review	Unknown
1093 Queen Street West *Condominium Approval* *16 204785 STE 18 CD* MAP ID 4	Application for a 9-storey mixed use building with retail at grade and residential above - 134 residential units - 4 levels below grade parking - 168 parking spaces - 64 spaces for visitor and commercial - remainder for residential - 137 bicycle parking spaces	Under Review	Unknown
99 Sudbury Street Zoning By-law Application 14 135661 STE 18 OZ MAP ID 5	Proposal for a rezoning application for the redevelopment of the site for a 26-storey mixed-use building containing a hotel, event space, ancillary retail, and residential uses at 99 Sudbury Street. The first 6 storeys of the building will contain the hotel and commercial uses (including 101 hotel suites), and the 20-storeys above will contain 190 residential units. A total of 183 parking spaces will be provided below grade.	Appeal Received	Unknown
57 Brock Avenue *Official Plan Amendment* *Zoning By-law Amendment* *16 183287 STE 14 OZ* MAP ID 6	Proposal to construct a seven-storey residential building, with two levels of above-grade parking. The site is currently designated Employment Lands.	Under Review	Unknown
6 Noble Street *Zoning By-law Amendment* *16 218808 STE 14 OZ*	Zoning By-law Amendment application to construct a 14-storey, mixed use building containing commercial use at grade, 174 residential units, and 76 below-grade parking	Under Review	Unknown

Address File # Map ID	Application Summary	Application Status	Non-Residential Area (sq. m)
MAP ID 7	spaces. A Site Plan Control application has not yet been submitted in conjunction with this application.		
1266 Queen Street West *Site Plan Approval* *17 215859 STE 14 SA* MAP ID 8	Proposal to construct a third and fourth addition to the existing two-storey building. The existing and proposed use is office.	Under Review	Unknown
1267 Queen Street West *Site Plan Approval* *13 243413 STE 14 SA* MAP ID 9	To alter the existing three-storey mixed use building by constructing a rear three-storey addition with a mezzanine level on the top floor and to increase the number of dwelling units from 7 to 13. The building has a commercial unit on the ground floor.	Under Review	Unknown
155 Cowan Avenue *Site Plan Approval* *Zoning By-law Amendment* *13 221736 STE 14 SA* *13 221740 STE 14 OZ* MAP ID 10	Proposal for Site Plan Approval for a 4 storey rental residential building containing 2 dwelling rooms and 22 units (3 bachelor units and 19 one bedroom units). A total of four open surface parking spaces are also being proposed for residential use.	Under Review	Unknown
1182 King Street West *Zoning By-law Amendment* *15 193651 STE 14 OZ* MAP ID 11	Proposal for rezoning application for two condominium towers, with a commercial ground floor, with 3 levels of underground parking, a total of 749 residential units.	Under Review	Unknown
1100 King Street West *Condominium Approval* *17 235989 STE 14 CD* *17 235752 STE 14 CD* *17 236125 STE 14 CD* MAP ID 12	Draft Plan of Condominium for newly-constructed building: 299 dwelling units.	Under Review	Unknown
60 Atlantic Avenue *Site Plan Approval* *15 209692 STE 14 SA* MAP ID 13	Site Plan approval to construct a new 5 storey heavy timber office/retail building/The building will contain 78 parking stalls in 2 levels of underground parking.	OMB Appeal	7,906
58 Atlantic Avenue *Official Plan Amendment* *Zoning By-law Amendment* *15 236743 STE 14 OZ* MAP ID 14	Proposal for a rezoning application related to a 10-storey office building with 4 levels of below ground parking.	Under Review	Unknown
45 Dovercourt Road *Site Plan Approval* *15 177238 STE 19 SA* MAP ID 15	Proposal for the construction of a 6 storey 25-unit condominium building with 24 parking spaces.	Under Review	Unknown
41 Dovercourt Road *Site Plan Approval* *17 207331 STE 19 SA* MAP ID 16	Site Plan Approval application to permit a 10-storey mixed-use building: 74 dwelling units, 83 parking spaces, including 19 non-residential spaces.	Under Review	2,150

Address File # Map ID	Application Summary	Application Status	Non-Residential Area (sq. m)
1071 King Street West *Zoning By-law Amendment* *11 251394 STE 19 OZ* MAP ID 17	Proposal to construct a 14 storey mixed use building with 3 levels of underground parking, 1 floor (approximately the height of two storeys) of retail/commercial space and 205 residential units in the project.	Under Review	Unknown
99 Atlantic Avenue *Site Plan Approval* *17 243666 STE 19 SA* MAP ID 18	Proposal to amend Site Plan Approval (OMB approved) 14 130831 STE 19 SA. The revisions include changes to building and parking entrances, additional vehicular and bicycle parking spaces, loading arrangements, air-intake shaft locations, garbage compactors, additional upper-ground floor space and landscaping.	Under Review	Unknown
171 East Liberty Street *Site Plan Approval* *14 266871 STE 19 SA* MAP ID 19	Proposal for site plan approval for a 28 storey mixed use building with 283 residential units and 4 levels of underground parking.	Under Review	Unknown
80 Lynn Williams Street *Site Plan Approval* *15 232150 STE 19 SA* MAP ID 20	Proposed 16 storey (52 m) on the northern portion of the block containing 159 live-work units with 280 vehicle parking spaces, in a four level underground parking garage; 96 resident bicycle parking spaces, along with 24 visitor bicycle parking spaces.	Under Review	27,045
51 East Liberty Street *Site Plan Approval* *12 116875 STE 19 SA* MAP ID 21	Proposal for draft plan of condo for a mixed-use building consisting of 386 residential units and 3 commercial units.	Under Review	Unknown

3.6 Air Quality

This section provides an overview of existing air quality conditions within the study area. Further details are provided in Appendix G of this Volume.

Refer to Section 4.7 for air quality effects assessment, mitigation and monitoring.

3.6.1 Methodology

The study area for the Air Quality Impact Assessment (AQIA) extends 1 km from the Project footprint in either direction along the Kitchener rail corridor and 300 m perpendicular to the rail corridor in either direction. Sensitive receptors within the study area are shown in Figure 3-9.

User Name: p0076643C

Legend

- Study Area
- Proposed Project Footprint (approximate)
- Railway

Receptors

- 20 Most Sensitive
- Sensitive

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs

0 100 200 400 600 Metres

Project:	**New SmartTrack Station**
Figure Title:	**King-Liberty SmartTrack Station - Air Quality Sensitive Receptors**
Prepared By:	4TRANSIT PARSONS HATCH WSP
Date:	**May 04 2018**
Version: LV.EPR.100-1	**Review:**
Figure:	**3-9**

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Local air quality effects were assessed by estimating contaminant concentrations resulting from the transit operations in three scenarios:

1. Current Scenario: conditions currently on the rail corridor (2017);
2. No-Build Scenario: 2028 horizon (future scenario) including electrification and Kitchener rail corridor expansion, but with no Project; and
3. Full Build Scenario: 2028 horizon (future scenario) including electrification, Kitchener rail corridor expansion and the Project.

For the three scenarios, the effects of the Project on sensitive receptors within the study area were determined.

The effects were compared to the Ontario Ambient Air Quality Criteria (AAQC) and the Canadian Ambient Air Quality Standards (CAAQS). The air quality thresholds represent desirable levels of contaminants in ambient air and are not enforceable within any of the jurisdictions.

The assessment was conducted using an emission rate calculation model. The local impacts of all emissions were predicted using an air dispersion model. The United States Environmental Protection Agency's (US EPA) Motor Vehicle Emission Simulator (MOVES) model was used to determine vehicle emission rates for passenger cars in parking lots and PPUDO areas, and transit buses in lay-by areas. The American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was used to determine the dispersion of the emissions associated with the three scenarios.

The potential for an adverse effect is considered to exist when the modelled concentration and the ambient background concentration summed for a contaminant exceeds the air quality threshold at a sensitive receptor. If the ambient background concentration of a contaminant already exceeds the threshold, then the potential for an adverse effect already exists, without considering the Project.

Concentrations of the Contaminants of Concern (COCs) resulting from background sources were estimated by analysing historical monitoring data from Environment and Climate Change Canada (ECCC) National Air Pollution Surveillance (NAPS) stations as well as MOECC air monitoring stations in the vicinity of the Kitchener rail corridor.

The 90th percentile background concentration for each COC was determined from the stations listed in Table 3-6. The 90th percentile over the five-year data set is considered to be representative of ambient background conditions for averaging periods of 30 minutes, one hour, eight hours, and 24 hours. For COCs with an annual averaging period, the highest recorded annual mean over the five years of data from the designated ambient stations was used.

A credible worst-case analysis has been undertaken for this assessment. The contribution from the Project and the ambient background concentrations can vary from day to day, depending on meteorological conditions and operational characteristics. If the credible worst-case analysis indicates that a significant number of sensitive receptors may be subject to air quality that does not meet the air quality thresholds, then a more detailed analysis will be

conducted for that specific receptor/community (mitigation); otherwise, no further local air quality impact assessment is required.

Table 3-6: Air Monitoring Stations for Contaminants of Concern

Contaminant of Concern	Station ID	Station Name (Location)	Availability of Data
Particulate Matter ($PM_{2.5}$)	MOECC - 31103	Toronto Downtown	2012-2016
Nitrogen Dioxide (NO_2)	MOECC - 31103	Toronto Downtown	2012-2016
Ozone	MOECC - 31103	Toronto Downtown	2012-2016
Carbon Monoxide (CO)	MOECC - 35125	Toronto West (Resources Road)	2012-2016
Acrolein	NAPS - 60418	Perth/Ruskin (Junction Triangle)	2002-2006
Benzene, 1,3-Butadiene	NAPS - 60427	Toronto (223 College Street)	2008-2012
Acetaldehyde, Formaldehyde	NAPS - 64401	Egbert CARE	2006-2010
Benzo(a)pyrene	NAPS - 60427	Toronto (223 College Street)	2006-2010

3.6.2 Description of Existing Conditions

Table 3-7 summarizes ambient background concentrations within the study area.

24-hour benzo(a)pyrene and annual NO_2, benzene and benzo(a)pyrene ambient background concentrations exceed the applicable air quality threshold. The elevated ambient background levels of these contaminants are a widespread occurrence across urban Ontario, and levels are desired to be decreased by the MOECC.

Table 3-7: Summary of Ambient Background Concentrations within the Study Area

Contaminant	Period	Unit	Background Value 90% Percentile	Criterion	% of criterion
$PM_{2.5}$	24 hour	$\mu g/m^3$	14	27	52%
$PM_{2.5}$	Annual	$\mu g/m^3$	8.7	8.8	99%
NO_2	one hour	$\mu g/m^3$	49.1	83	12%
NO_2	24 hour	$\mu g/m^3$	40.9	200	21%
NO_2	Annual	$\mu g/m^3$	27.7	24	115%
CO	one hour	$\mu g/m^3$	441	36,200	1%
CO	8 hour	$\mu g/m^3$	424	15,700	3%
O_3	one hour	$\mu g/m^3$	84.7	N/A	N/A
O_3	24 hour	$\mu g/m^3$	75.1	N/A	N/A
O_3	Annual	$\mu g/m^3$	52.6	N/A	N/A
Acrolein	one hour	$\mu g/m^3$	-	4.5	-
Acrolein	24 hour	$\mu g/m^3$	0.2	0.4	59%
Benzene	24 hour	$\mu g/m^3$	0.8	2.3	45%
Benzene	Annual	$\mu g/m^3$	1	0.45	178%
1,3 Butadiene	24 hour	$\mu g/m^3$	0.099	10	1%
1,3 Butadiene	Annual	$\mu g/m^3$	0.053	2	4%
Acetaldehyde	30 minutes	$\mu g/m^3$	-	500	-
Acetaldehyde	24 hour	$\mu g/m^3$	1.4	500	0.30%
Formaldehyde	24 hour	$\mu g/m^3$	4.2	65	6%
B(a)P	24 hour	$\mu g/m^3$	0.000182	0.00005	364%
B(a)P	Annual	$\mu g/m^3$	0.000132	0.00001	1320%

Notes:
Ozone (O_3) concentrations were used to calculate the NO to NO_2 conversion using the Ozone Limiting Method (See Section 2.5 in Appendix G of this EPR).
'-' : Insufficient data to estimate these values.

3.7 Noise and Vibration

This section provides an overview of existing noise and vibration conditions within the study area. Further details are provided in Appendix H of this Volume.

Refer to Section 4.8 for noise and vibration effects assessment, mitigation and monitoring.

3.7.1 Methodology

The study area for the Noise and Vibration Impact Assessment extends 300 m from the Project footprint. Sensitive receptors within identified Noise Sensitive Areas (NSAs) were selected based on the geographical and land use context and as per the Ministry of Environment and Energy (now MOECC)/GO Transit Draft Protocol for Noise and Vibration Assessment (MOEE/GO Transit, 1995) (the Protocol). Existing and predicted noise and vibration levels were assessed at sensitive receptor locations to characterize the effects of the Project and identify where mitigation is required. Further information on sensitive receptors is provided in Section 4.8.

A site visit was undertaken on August 11, 2017 to confirm the NSAs and receptor locations.

Noise monitoring was conducted at four representative locations to determine the existing ambient noise levels in the proximity of the subject site and to confirm the accuracy of the noise model. Noise Sensitive Areas are shown in Figure 3-10. Two locations were located along the north side of the rail corridor, and two were located along the south side of the rail corridor as shown in Figure 3-11.

Aerial Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

User Name: p0022247D

Legend

- Study Area - 300 Metres
- Proposed Project Footprint (approximate)
- Railway
- Existing Noise Sensitive Area
- Proposed Development Noise Sensitive Area

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs

0 50 100 200 300 Metres

Project:	**New SmartTrack Station**		
Figure Title:	**King-Liberty SmartTrack Station - Noise Sensitive Areas**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 02 2018**
Version: LV.EPR.100-1	**Review:**	**Figure:** 3-10	

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User Name: p0022247D

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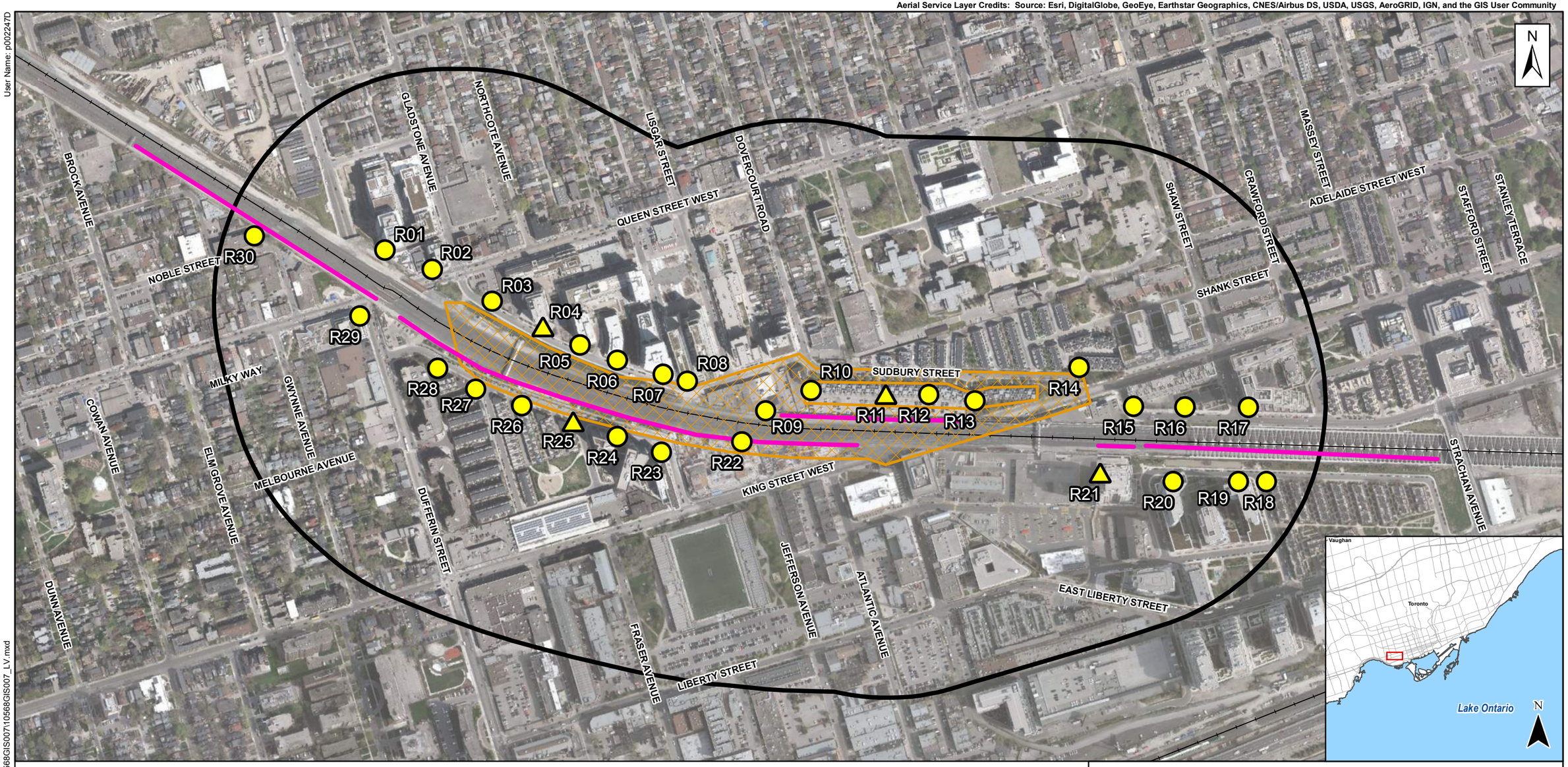

Legend

- Study Area - 300 Metres
- Proposed Project Footprint (approximate)
- Railway
- Existing Noise Barriers
- Monitors
- Receptors

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs
Receptor Data - Parsons

0 50 100 200 300 Metres

Project:	**New SmartTrack Station**		
Figure Title:	**King-Liberty SmartTrack Station - Noise and Vibration Sensitive Receptor Locations**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 23 2018**
Version: LV.EPR.100-1	**Review:**	**Figure:** 3-11	

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The following scenarios formed part of the assessment:

- Scenario 1, existing conditions;
- Scenario 2, future conditions without Project (no-build condition), which consists of year 2028 future diesel and electric train volumes, but without the station; and
- Scenario 3, future conditions with Project (future build condition), which consists of year 2028 future diesel and electric train volumes, plus the proposed station.

The review of construction noise is based on the *Noise Pollution Control Publication 115* (NPC-115) and NPC-118 (part of the *MOE Model Municipal Noise Control By-law* (Ministry of the Environment, 1978)), the United States Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration, 2006) and the City of Toronto *Municipal Code Chapter 591 - Noise* (City of Toronto, 2009).

NPC-115 stipulates specific sound emission standards for various pieces of construction equipment. This publication does not set receptor-based sound level limits due to construction activities but rather sets limits for noise generated by each individual piece of equipment. Table 3-8 lists maximum noise emission levels for typical construction equipment.

Table 3-8: NPC-115 Maximum Noise Emission Levels for Typical Construction Equipment

Type of Equipment	Quiet Zone Maximum Sound Level (dBA)	Residential Area Maximum Sound Level (dBA)	Distance (m) [3]	Power Rating (kW)
Excavation Equipment [1] (January 1, 1981 and later)	83	83	15	< 75
	85	85	15	75 ≤
Pneumatic Equipment [2]	85	85	7	-
Portable Compressors (January 1, 1981 and later)	70	76	7	-

(1) Excavation equipment includes bulldozers, backhoes, front end loaders, graders, excavators, steam rollers and other equipment capable of being used for similar applications.
(2) Includes pavement breakers.
(3) Distances based on NPC-103 Procedures (Section 6, 7 and 9).

NPC-118 sets sound emission standards for motorized conveyances of various types. This publication does not set receptor-based sound level limits due to heavy vehicle operation but sets limits for noise generated by each individual piece of equipment. Table 3-9 lists maximum noise emission levels for standard diesel heavy vehicles.

Table 3-9: NPC-118 Maximum Noise Emission Levels for Standard Diesel Heavy Vehicles

Date of Manufacture	Maximum Sound Level (dBA)	Distance (m)
Prior to January 1, 1979	100	15
January 1, 1979 and after	95	15

Key elements of the City of Toronto Noise By-law *(Municipal Code - Chapter 591: Noise)* (City of Toronto, 2009) related to construction activities include By-law No. 1400-2007 (Construction Noise) (City of Toronto, 2009) and place limits on the timing of construction activity during nighttime and on Sundays and statutory holidays. The FTA *Transit Noise and Vibration Impact Assessment* guide (Federal Transit Administration, 2006) includes receptor-

based 90 dBA one-hour L_{eq} day-time and 80 dBA one-hour L_{eq} night-time construction noise criteria for residential land uses. It should be noted that these noise levels cannot be enforced in Canada; however, the FTA criteria can be used to help gauge whether construction noise levels at the receptor level are acceptable or not.

There are no federal or provincial construction vibration limits. Vibration levels due to construction are governed municipally, on the basis of the City of Toronto By-law No. 514-2008 (Construction Vibration) (City of Toronto, 2008). As per the By-law, if any structures fall within the Zone of Influence (ZOI), construction vibration monitoring will be undertaken to ensure that the vibration levels are never exceeded. The ZIO is defined as the area of land adjacent to or within the construction site, delineated at a Point of Reception where the Peak Particle Velocity (PPV) is measured to be greater or equal to 5 mm/s. Table 3-10 lists the City of Toronto prohibited vibration limits.

Table 3-10: City of Toronto Prohibited Vibration Limits

Frequency of Vibration (Hz)	Vibration Peak Particle Velocity (mm/s)
Less than 4	8
4 to 10	15
More than 10	25

The operations noise assessment is based on the Protocol. An objective of the Protocol is that the daytime (i.e., 07:00 to 23:00 hours) Equivalent Continuous Sound Level, L_{eq} (16 hrs), produced by future rail service operation of the GO Transit project under assessment, does not exceed the higher of:

a. The ambient sound level (combined with the sound level from existing rail service); or

b. 55 dBA.

The Protocol also has an objective that the night-time (i.e. 23:00 to 07:00 hours) L_{eq} (8 hrs) produced by the future rail service operation of the GO Transit project does not exceed the higher of:

a. The ambient sound level (combined with the sound level from existing rail service); or

b. 50 dBA.

To assess the impact at a Point of Reception, the Adjusted Noise Impact level is used. The Adjusted Noise Impact level is the difference in sound level between pre-project and post-project noise. In accordance with the Protocol, if the difference in sound level is 5 dB or higher, the potential to mitigate will be evaluated based on administrative, operational, economic, and technical feasibility.

Table 3-11 summarizes the adjusted noise impact rating and mitigation requirements.

Table 3-11: Summary of Impact Rating and Action of Mitigation

Change in Noise Level	Impact Rating	Mitigation Effort Required
0 to 2.99 dB	Insignificant	None
3 to 4.99 dB	Noticeable	None
5 to 9.99 dB	Significant	• Investigate the potential of noise control measures to mitigate based on administrative, operational, economic and technical feasibility. • If deemed feasible, the mitigation measures shall ensure that the predicted sound level from the GO transit rail project is as close to, or lower than, the rail service objective.
10+ dB	Very Significant	

The review of stationary noise is based on the Noise Pollution Control Publication 300 (NPC-300). The effects of stationary noise sources related to the Project, such as the public-address system and ancillary equipment, shall meet the requirements outlined in NPC-300. NPC-300 presents sound level limits based on type of land use and type of stationary sound. The relevant criteria based on the project setting and type of stationary noise produced by the Project are summarized in Table 3-12.

Table 3-12: NPC-300 Stationary Noise Assessment Criteria

Time of Day	Exclusion Limit Values of One-Hour Equivalent Sound Level (L_{eq}, dBA)[1]	
	Outdoor	Plane of Window
07:00 - 19:00	50	50
19:00 - 23:00	45	50
23:00 - 07:00	--	45

1 - The sound level limit at a point of reception is the higher of the applicable exclusion limit value given, or the background sound level.

The vibration assessment is also based on the Protocol. Under the Protocol, the desirable objective is that the Root-Mean-Square Velocity (RMSV) produced by the Project does not exceed 0.14 mm/s. However, if the existing vibration levels are above 0.14 mm/s, the future vibration velocity objective is to be no greater than existing vibration levels.

When the vibration velocity at the Point of Reception exceeds the objective by 25 percent, vibration control measures should be investigated within the constraints of administrative, aesthetic, economic and technical feasibility.

3.7.2 Description of Existing Conditions

Table 3-13 summarizes the noise monitoring locations and corresponding results.

Table 3-13: Summary of Noise Monitoring Results

Receptor	Address	Day-time L_{eq},16 (dBA)	Night-time L_{eq},8 (dBA)
R4	1171 Queen Street West	58	56
R11	31 Sudbury Street	58	55
R25	110 - 20 Machells Avenue	53	51
R21	125 Western Battery Road	57	54

The measured sound levels were above the 55 dBA daytime (with the exception of R25) and 50 dBA nighttime limits outlined in the Protocol.

Table 3-14 summarizes the vibration monitoring locations and corresponding results.

Table 3-14: Summary of Vibration Monitoring Results

Receptor	Address	RMS Vibration Velocity (mm/s)
R4	1171 Queen Street West	0.06
R11	31 Sudbury Street	0.06
R21	125 Western Battery Road	0.05

As illustrated in Table 3-14, the measured vibration levels are below 0.14 mm/s.

There are multiple existing noise barriers which provide shielding to the residential row houses throughout the study area, including a three-metre-high masonry block wall along Joe Shuster Way from Dufferin Street to King Street West, a seven-metre-high masonry block and plexiglass wall along Sudbury Street from King Street West to Dovercourt Road, and a four-metre-high wood wall along Western Battery Road. The location of the barriers was confirmed during a site visit. No additional noise barriers were proposed by the GO Rail Electrification project within the Project vicinity. Therefore, there are no barriers associated with the GO Rail Electrification included in the future noise modelling. All the modelled scenarios include the specified existing noise barriers, as well as building features which provide shielding at the representative receptor locations.

3.8 Traffic and Transportation

This section provides an overview of existing traffic and transportation conditions within the study area and the methodology used to obtain this information. Further details are provided in Appendix I of this Volume.

Refer to Section 4.9 for traffic and transportation effects assessment, mitigation and monitoring.

3.8.1 Methodology

This document was developed based on the following methodology:

- Reviewing relevant background reports to gather information about the existing and future planned conditions within the study area and the surrounding roadway networks, the standards and guidelines from relevant municipalities, and the traffic data that can be used for this study;
- Conducting a site visit to gain a “hands on” perspective of the existing transportation and traffic conditions; and
- Following the principles of transportation/traffic analysis theories, best practices and professional engineering judgement to identify issues and evaluate solutions.

The following is a list of relevant background information that has been reviewed as part of this study. The understanding of the existing and future conditions within the study area and the surrounding roadway network is further described in Appendix I of this Volume.

- The City of Toronto's Zoning By-law (By-law 569-2013) (2016);
- The City of Toronto Official Plan & Secondary Plans (2015; 2009);
- King-Liberty Urban Design Guidelines (2005);
- The City of Toronto's 10 Year Cycling Network Plan (2016);
- RER New Stations Business Case - Downtown West (2016);
- GO Regional Express Rail 10-Year Program: New Stations Analysis (2016);
- West Toronto Railpath Extension Environmental Assessment (2017);
- King-Liberty Pedestrian Cyclist Link EA (Environmental Assessment) Study (2011); and
- Liberty Village Gateway Project (2012).

Based on the City's directions and relevant guidelines, this Transportation Brief was developed to focus on identifying the number of multi-modal trips and critical movements at the adjacent intersections generated by the station.

The GO stations proposed within the core of the City of Toronto, including the Project, are all within highly urbanized areas. As no parking is to be provided, most people will walk or cycle to/from the station. The station will be located on the Kitchener rail corridor, west of the intersection of King Street West and Sudbury Street in the City of Toronto with easy transfer access from local transit services on King Street, Queen Street and Dufferin Street. Good pedestrian/cycling access is available to local development and to the emerging King Street West development area.

Given the high density local development and the availability of easy walking/cycling and transit access, there is likely to be limited PPUDO access to or from the station. In addition, many PPUDO trips are likely to be pass-by in nature and are existing trips with the added feature of dropping or picking up someone at the station.

The 2031 forecast ridership figures for the Project during the A.M. and P.M. peak hours were provided by City Planning, as shown in Table 3-15.

Table 3-15: King-Liberty SmartTrack Station Boarding and Alighting Data (from City of Toronto)

Peak Hour	Total Boardings	Transfer Boardings	Total Alightings	Transfer Alightings
A.M.	220	30 (13.6%)	2,180	270 (12.4%)
P.M.	1790	70 (3.9%)	340	0 (0%)

The mode split and trip distribution information were obtained from Metrolinx's GO Rail Station Access Plan (Metrolinx, 2016b). The PPUDO mode split for the A.M peak alighting and P.M. peak boarding periods have been reduced to zero for this analysis, to reflect the idea that PPUDO activities will not occur during these periods. The trips forecast to be generated by this mode have been proportionally reallocated to the walking, local transit, and cycling modes during these periods. Additionally, it is assumed that the 2031 forecast targets are identical to the 2028 future year targets (the opening of the station), to be conservative.

In addition, the Metrolinx's GO Rail Passenger Survey Report (GO Transit, 2016), and data extracted from the 2011 Transportation Tomorrow Survey (TTS) were reviewed.

3.8.2 Description of Existing Conditions

3.8.2.1 Road Network

The study area contains the following key roadways; all which are all under the jurisdiction of the City of Toronto:

- Arterials - King Street West, Queen Street West, Dufferin Street;
- Collector - Dovercourt Road; and
- Locals - Sudbury Street, Joe Shuster Way, Atlantic Avenue

Functional details of these roadways are provided in the Appendix I of this Volume.

The key intersections examined for this study include:

- Sudbury Street and Dovercourt Road: a three-way stop-controlled intersection;
- Atlantic Avenue and King Street West: a signalized T-intersection;
- King Street West and Sudbury Street: a signalized four-leg intersection;
- Queen Street West and Dovercourt Road: a signalized four-leg intersection; and
- Queen Street West and Gladstone Avenue/Sudbury Street: a signalized four-leg intersection.

Turning Movement Counts (TMC) were collected for the study's key intersections; however, this data was out of date (2013 or older) and therefore, they were only used as a reference in the study process.

3.8.2.2 Transit Network

The Project will be situated on the Kitchener rail corridor mid-way between Union Station (3.4 km to the east) and Bloor Station (3.2 km to the northwest).

The Exhibition GO Station on the Lakeshore West GO rail corridor is roughly 500 m south of the proposed station.

The TTC serves the study area and the broader Liberty Village and South Parkdale neighborhoods. As the station site is located in an intensifying area with both high-density residential and employment uses, connectivity from local transit services is of great significance. King Street West and Queen Street West operate as key transit routes in the study area. Service details of the local routes are included in Appendix I of this Volume. Figure 3-12 shows existing TTC routes in the study area.

User Name: p007463B

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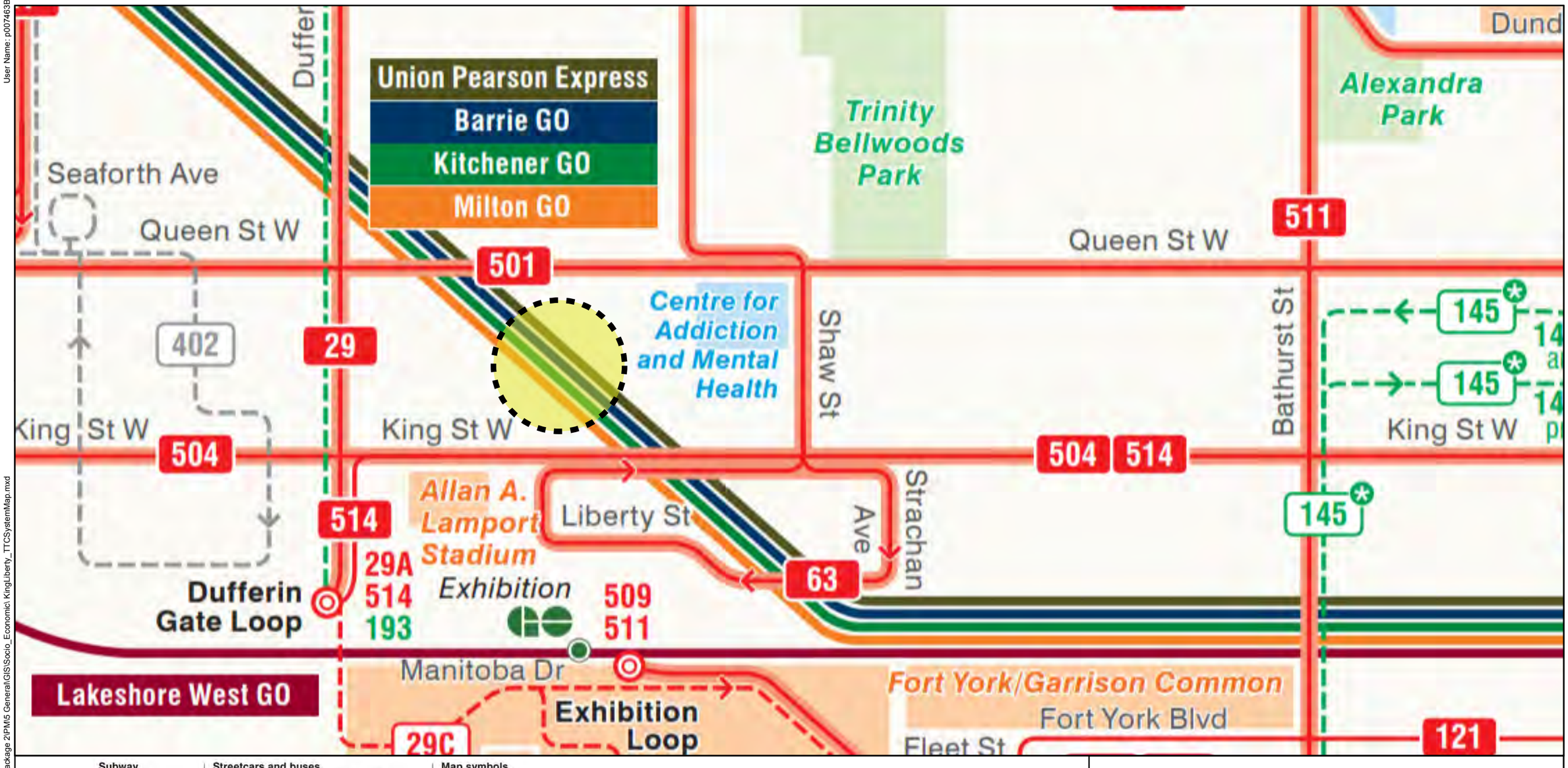

Legend

Subway

1. Yonge-University Line
2. Bloor-Danforth Line
3. Scarborough Line
4. Sheppard Line

Regular station / Interchange station

Intermodal station (Connects with other transit agencies) / Accessible station

Streetcars and buses

Direction of travel
Routing details
Route number
Multiple branches (All letters denotes all branches)
Additional fare required
Termination point

Local service (Streetcar and bus service)
Express service (Express bus service, serving fewer stops)

Ten-Minute Network
10-minute or better service from 6 a.m. to 1 a.m. Monday to Saturday; 8 a.m. to 1 a.m. on Sundays.

Regular service
Operates all day, every day, until 1 a.m.

Limited service
Operates at limited times of day. Some service does not operate during off-peak periods (holidays, evenings and weekends).

Community Bus
Neighbourhood midday service, Monday to Friday, connecting various residences with local points of interest. Flag down anywhere along route.

Map symbols

- Streetcar terminal loop
- Commuter rail station
- Airport
- Hospital
- Point of interest
- Transportation/government
- Post-secondary school
- Park
- Additional fare required (For more information on TTC fares, visit ttc.ca/fares)

Approximate Study Area Boundary

DATA SOURCES:

TTC System Map - TTC
Sudy Area Boundary (approximate) - Initial Preferred Designs

Project:	**New SmartTrack Stations**		
Figure Title:	**King-Liberty SmartTrack Station - TTC Routes**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date: May 10, 2018**	
Version: LV.EPR.100-1	**Review:**	**Figure: 3-12**	

3.8.2.3 Cycling, Pedestrian and Trail Network

Based on observations gathered from the study's site visit, a review of the City's 10-Year Cycling Plan, and desktop analysis of the boundary road network, there is no substantial existing cycling infrastructure in the study area. Although cycling infrastructure is extremely limited, existing cycling facilities near the study area were used as reference for this study.

Sidewalks provide pedestrians with enhanced connectivity throughout the study area. The existing pedestrian network is well connected, providing sidewalks on both sides of the street and other informal pedestrian pathways for the majority of roadways in the study area. Details on the locations with intermittent conditions or no sidewalks are provided in Appendix I of this Volume.

4. Effects Assessment, Mitigation and Monitoring

4.1 Methodology

The methods used to conduct the effects assessment were designed to meet the requirements of the TPAP. During the process the following was considered:

- The key activities associated with the construction and operation of the Project as defined in the IPD and detailed in Section 2 of this Volume;
- Existing environmental conditions of the study area as detailed in Section 3 of this Volume; and
- Issues raised by the public, stakeholders and Indigenous communities during consultation and engagement activities conducted to date and detailed in Volume 8.

Potential environmental effects resulting from the construction and operation of the Project were identified, analyzed, and described. Mitigation measures were then identified to minimize or avoid potential effects. Monitoring activities were also identified where warranted to evaluate effectiveness of proposed mitigation measures and provide feedback for adaptive management.

Where applicable, relevant methodologies undertaken are discussed in this section.

Volume 8 of this EPR includes a specific discussion on climate change as it pertains to the Transit project.

4.2 Natural Environment

4.2.1 Overview

The Project has the potential to result in temporary (e.g., effects to wildlife due to anticipated vegetation removals) and permanent (e.g., long term colonization and spread of invasive species) effects to the natural environment. Potential effects associated with this Project may result from direct loss of habitat as well as indirect and accidental effects resulting from construction, and operations/maintenance activities.

It is anticipated that effects can be mitigated through implementation of well-established and site-specific mitigation measures. The Vegetation Compensation Protocol for Metrolinx RER Projects will be implemented for the Project.

4.2.2 Potential Effects, Mitigation and Monitoring Measures

Potential effects, corresponding mitigation measures and monitoring activities relating to the natural environment are described in Table 4-1.

Further details on potential effects, mitigation and monitoring are provided in Appendix B of this Volume.

Table 4-1: Natural Environment - Potential Effects, Mitigation and Monitoring

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
Construction			

Terrestrial Environment	• No vegetation communities have been identified within the study area. No direct or indirect effects to vegetation communities are anticipated from the construction of the Project.
	• Both direct and indirect effects to vascular flora and vegetation are anticipated from construction of the Project.
	• There is potential for indirect effects to adjacent retained vegetation features during the construction phase, including the following:
	  • Vegetation clearing/damage beyond the construction area (e.g., due to air emissions and dust deposition);
	  • Colonization and spread of invasive species; and
	  • Spills of fuel and/or application of other hazardous materials (e.g. de-icing substances during winter months). Spills have the potential to affect retained vegetation.
		Since no effects are anticipated, no mitigation measures specific to vegetation communities are required for the construction of the Project.
		Potential effects to vascular flora from construction of the Project can be managed through implementation of the following mitigation measures:
		• Retain existing vegetation within the study area to the extent practicable. Vegetation removal will be kept to a minimum, limited to within the construction disturbance area and should be scheduled to occur outside of the overall bird nesting season of April 1 to August 31, following the mitigation measures described for migratory birds.
		• Areas for vegetation removal will be refined during detailed design, if required (e.g., change in construction disturbance area, final staging areas).
		• ESC fencing will be installed (as noted above) prior to vegetation clearing, and maintained throughout construction.
		• Construction fencing and/or ESC fencing, where appropriate, will be installed and maintained to clearly define the construction disturbance area and prevent accidental damage to vegetation, or intrusion to adjacent vegetated areas. Fencing will be monitored and repaired as necessary throughout the construction period and will be removed and disposed of accordingly, post-construction.
		• Re-stabilize all disturbed areas, incorporating re-vegetation using plantings and native seed mix appropriate to the site conditions. Exposed soils will be revegetated as soon as possible to reduce erosion.
		• Carry out clearing, grubbing, site preparation and tree protection activities with consideration for relevant Ontario Provincial Standard Specification (OPSS)
			• On-site inspection and maintenance by an Environmental Inspector will be undertaken on a regular basis (e.g., monthly) or as required (e.g., following storm events) over the course of construction to ensure the effectiveness of ESC and other mitigation measures.
			• On-site inspection will be undertaken as required during construction to ensure that only specified trees are removed, fencing is intact and there is no damage caused to the remaining trees and adjacent vegetation. Construction and/or ESC fencing will be repaired if it is damaged. Any damaged trees will be pruned through the implementation of proper arboricultural techniques, under supervision of an Arborist or Forester.
			• Regular inspections of dust emissions, (frequency to be defined prior to project construction) will be undertaken to confirm dust control watering frequency and rates are adequate.
			• Post-planting monitoring of restoration areas for one year after installation. One site visit will be conducted during the subsequent growing season to confirm survival of plantings and/or seed mix. Should the plantings and/or seed mix not

Feature	Potential Effects	Mitigation Measures	Monitoring Activities

		(e.g., OPSS 201, (Ministry of Transportation, 2011) OPSS 801.PROV (Ministry of Transportation, 2018)). When practicable, prune or top the vegetation instead of grubbing/uprooting, if required, implement dust control practices (e.g., wetting with water) in dust-sensitive areas.
		• Any damaged trees will be pruned or removed through the implementation of proper arboricultural techniques, under supervision of an Arborist.
		• Mitigation measures specific to trees will be adhered to, including municipal by-law permitting requirements where applicable, that are summarized in the Tree Inventory Plan (Appendix C of this Volume), which will be further detailed in an Arborist Report, to be completed during detailed design.
		• The Arborist Report will contain at a minimum the following information in addition to details of tree location, size, species, conditions and category:
		  • Recommendations for tree/vegetation protection and preservation measures for all trees/vegetation that are to be retained;
		  • Details of tree pruning;
		  • Details of all trees / vegetation recommended for removal, including removal measures;
		  • Mitigation and monitoring measures to ensure success of preservation and removal measures;
		  • Should vegetation compensation be required, it will be in accordance with the Metrolinx Vegetation Compensation Protocol; and
		  • Mapping.
		• Remove and dispose of all construction-related debris following construction in appropriately designated areas which will be determined during detailed design.
		• Metrolinx is establishing a Vegetation Compensation Protocol for Metrolinx RER projects and vegetation that is removed will be compensated for in accordance with
			survive, additional seeding and/or plantings will be undertaken one year thereafter with one additional monitoring visit in the following growing season.
			• Restoration/compensation monitoring will be confirmed through regulatory agency consultation during detailed design.
			• Additional restoration/compensation monitoring may be required based on the results of additional surveys and consultations with regulatory agencies.

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
		the provisions of this protocol: • **For Municipal/Private Trees**: Metrolinx will work with each municipality to develop a municipality-wide streamlined tree permitting/compensation approach for municipal and private trees. The goal is to reduce the administrative permitting burden for trees along long stretches of rail corridor. • For Trees within Metrolinx Property: Metrolinx is developing a methodology to compensate for trees located within Metrolinx's property. This will involve categorizing trees community types/ecological value and establishing the appropriate level of compensation. Metrolinx will be looking to partner with Conservation Authorities and municipalities to develop the final compensation plan. • Conservation Authorities: For vegetation removals within Conservation Authority lands where required, applicable removal and restoration requirements will be followed. • Federal Lands: For vegetation removals within Federally-owned lands where required, applicable removal and restoration requirements will be followed. • **Tree End Use**: Metrolinx will develop options for the end use of trees removed from Metrolinx property (e.g., reuse/recycling options). • Machinery is to arrive on site in a clean condition in accordance with the Clean Equipment Protocol for Industry. • Soil stockpiles will be managed in accordance with the Soil Management Plan as per above. Re-stabilize disturbed areas, incorporating re-vegetation using plantings and/or native seed mix appropriate to the site conditions. Ash trees, leaves, logs, or wood chips will not be removed out of the Regulated Area, as identified on the Canadian Food Inspection Agency (CFIA) website (CFIA, 2015). This is necessary to prevent the spread of the Emerald Ash Borer (EAB) to un-infested areas in Ontario. The Contractor must dispose of all	

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
		wood at a registered Waste Facility. • Control all activity to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances, in addition to sediment as outlined above, to the watercourses. Conduct storage, refueling or maintenance of equipment at least 30 m away from the watercourse. An Emergency Preparedness and Response Plan will govern spill response. • The Terrestrial Natural Heritage Target System Strategy and habitat implementation plans will be considered in the design, along with the City's Ravine and Natural Feature Protection Bylaw requirements. The Metrolinx Vegetation Compensation Protocol is under development in consultation with TRCA to create opportunities to enhance natural heritage and the ecological contributions. • Restoration/compensation will be confirmed through regulatory agency consultation during detailed design. • Engagement with the TRCA on natural heritage enhancement opportunities will continue through detailed design. • Additional restoration/compensation measures may be required based on the results of additional surveys and consultations with regulatory agencies. • Efforts should be made to coordinate with Toronto Hydro, Toronto Water and other utility companies that may be affected by utility relocations to help minimize the overall impacts of the Project on the natural heritage system. • Infrastructure and utility works will either be completed by Metrolinx as part of this Project, or by utility companies. Metrolinx and its Contractors will follow TRCA regulatory requirements.	
Wildlife	• Effects to wildlife are expected to be minimal given the urban nature of the study area, and that no critical habitats have	The mitigation measures outlined above to protect the terrestrial environment will also protect associated wildlife habitat functions. It is also necessary to ensure the protection of breeding birds and other animals that may nest	• On-site inspection will be undertaken as required during construction to ensure that only specified trees are removed,

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
	been identified. The majority of the species utilizing the study area are generally common, disturbance-tolerant urban wildlife species. • Wildlife may be directly affected due to anticipated vegetation removals as a result of construction. This vegetation could provide habitat for common urban wildlife and can be expected to provide nesting habitat for birds. • There is potential for other wildlife (e.g., snakes, small mammals, etc.) to enter the proposed work areas. The majority of the wildlife species with potential to occur in the study area are common, tolerant species, and to which effects can be managed through the implementation of the mitigation measures. • Dust and noise created by the construction activities may also temporarily disturb and displace wildlife present within the study area. These wildlife species are likely accustomed to noise given the urban nature of the study area.	or otherwise be encountered incidentally where construction is proposed. For the protection of wildlife in general, the following measures are recommended: • Any wildlife incidentally encountered during construction will not be knowingly harmed and will be allowed to move away from the construction area on its own if at all possible. • In the event that an animal encountered during construction does not move from the construction zone, or is injured, the Environmental Inspector will be notified. • Implement dust control practices (e.g., wetting with water) in dust-sensitive areas.	fencing is intact and there is no damage caused to the remaining trees and adjacent vegetation. Construction and/or ESC fencing will be repaired if it is damaged. Any damaged trees will be pruned through the implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. • Regular inspections of dust emissions, (frequency to be defined prior to project construction) will be undertaken to confirm dust control watering frequency and rates are adequate.
Migratory Birds	• Clearing of trees, shrubs, ground vegetation and structures has the potential to disturb or destroy nests of migratory birds. Migratory birds may nest within these areas, most of which are protected by	• To reduce the possibility of contravention of the MBCA, vegetation removal should be scheduled to occur outside of the overall bird nesting season of April 1 to August 31. Some birds may nest before and after this peak bird nesting season due to annual seasonal fluctuations. Therefore, if a nest of a migratory bird is found within the construction area outside of this	• Regular monitoring, to be defined prior to pre-construction land clearing, will be undertaken to confirm that activities do not encroach into nesting areas or disturb active nesting sites.

Feature	Potential Effects	Mitigation Measures	Monitoring Activities

	the MBCA. Potential effects include disturbance to nesting activity or possible loss of any nests present in the year of construction, depending on timing. Any migratory birds that are found nesting are protected under the MBCA.	nesting period it still receives protection.
		• If vegetation must be removed during the overall bird nesting season:
		  • Nest and nesting activity searches will be conducted in areas defined as simple habitat[10] by a qualified Biologist no more than 24 hours prior to vegetation removal. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (Cadman et. al., 2007).
		  • If an active nest or confirmed nesting activity of a migratory bird is observed in simple habitat, regardless of the timing window recommended, a species-specific buffer area following ECCC guidelines will be applied to the nest or confirmed nesting activity wherein no vegetation removal will be permitted until the young have fledged from the nest. The radius of the buffer will depend on species, level of disturbance and landscape context (ECCC, 2014), which will be confirmed by a qualified Biologist, but will protect a minimum of 10 m around the nest or nesting activity.
		  • The results of all nest searches will be documented at the end of each survey day in a Technical Memorandum, including information on the searcher, date, time conducted, weather conditions, habitat type, vegetation community type, observations of breeding activity, observations of confirmed nests including co-ordinates, and, if required, the buffer applied to identified breeding/nesting sites.
		  • If vegetation removal must occur in complex habitats within the above-listed timing windows and absolutely cannot be avoided, the same best	

10. Simple habitats refer to habitats that contain few nesting spots or few species of migratory birds, where identification of active nests or confirmed nesting activity can be completed with confidence. According to ECCC (2014), examples of simple habitat include the following:
    - Urban parks consisting mostly of lawn with a few isolated trees;
    - Vacant lot with few possible nest sites;
    - Previously cleared area where there is a lag between clearing and construction activities (and where ground nesters may have been attracted to nest in cleared areas or in stockpiles of soil); or
    - Structure such as a bridge, beacon, tower or building (often chosen as a nesting spot by robins, swallows, phoebes, nighthawks, gulls and others).

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
		management practices (BMPs) such as nest and nesting activity searches described above will be undertaken. • Suitable human-made structures within the study area should be inspected for evidence of active bird nests during the breeding bird season prior to the onset of construction activities in order to determine appropriate nesting preventative measures (e.g., netting).	
Significant Wildlife Habitat	• No SWH has been identified within the study area. No direct or indirect effects to SWH are anticipated from the construction of the Project.	• Since no effects are anticipated, no mitigation measures specific to SWH are required for the construction of the Project.	• No monitoring activities are anticipated to be required at this time.
SAR	• Two SAR have moderate potential to occur within the study area. A presence/absence field survey confirmed that neither Chimney Swift nor Peregrine Falcon are presently nesting in the study area. However, there is potential for these species to move through the study area during construction, and therefore be encountered and disturbed or possibly harmed incidentally by construction activities and/or they may nest in the area between the finalization of this report and commencement of construction. Therefore, there is some risk of harm to these. Potential construction-related effects to these species are as follows: • Chimney Swift -There is limited suitable foraging habitat for this species,	To protect SAR, the following mitigation measures will be implemented: • In the event that a SAR, or potential SAR, is found within the construction area, work that could potentially harm the species will cease. • It is recommended that construction occur outside of the breeding season to ensure no effects to the breeding SAR birds, where possible, and where not possible that additional mitigation such as nest surveys be completed, as described above. • If a nesting migratory bird (or SAR protected under the ESA) is identified within or adjacent to the construction site, the measures outlined above will be followed. • Chimney Swift: Effects can be mitigated by conducting roosting surveys in appropriate chimneys before demolition activities and timing any building demolition to coincide with proper vegetation clearing timing windows and standard awareness mitigation. • Peregrine Falcon: Implementation of vegetation clearing timing windows and standard awareness mitigation.	• No monitoring activities are required over and above the regular on-site inspection and maintenance by an Environmental Inspector, as outlined above.

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
	which is not protected under the ESA, and moderate potential for nesting habitat in nearby buildings. • Peregrine Falcon -There is suitable foraging habitat throughout the study area, and very limited suitable nesting habitat on buildings within the Project area.		
Significant Natural Heritage Features	• No effects to Significant Natural Heritage Features are anticipated to occur from the construction of the Project.	• Since no effects are anticipated, no mitigation measures are required for the construction of the Project.	• No monitoring activities are anticipated to be required at this time.
Operation and Maintenance			
Aquatic Environment	• An increase in impervious surface area, which may result in increased stormwater runoff.	• A Stormwater Management Report will be developed during detail design, which will provide more details as to how to accommodate differences in flow volumes.	• No monitoring activities are required at this time.
Terrestrial Environment	• Work undertaken to keep the rail ROW clear and free of vegetation has the potential to harm healthy trees and allow disease or rot to expand. Any use of chemical pesticides also has the potential to affect the terrestrial environment if not applied correctly. • Spills of fuel and/or application of other hazardous materials (e.g. de-icing substances during winter months) have the potential to affect retained vegetation.	• Carry out clearing, grubbing, site preparation and tree protection activities with consideration for relevant OPSS (e.g., OPSS 201 (Ministry of Transportation, 2011), OPSS 801.PROV (Ministry of Transportation, 2018)). When practicable, prune or top the vegetation instead of grubbing/uprooting, if required. • Any damaged trees will be pruned or removed through the implementation of proper arboricultural techniques, under supervision of an Arborist. • Mitigation measures specific to trees will be adhered to, including municipal by-law permitting requirements where applicable, that are summarized in the Project Tree Inventory Plan (Appendix C of this Volume), which will be further detailed in an Arborist Report, to be completed during detailed design. • Arborist Report will contain at a minimum the following information in addition to details of tree location, size, species, conditions and category:	• No monitoring activities are anticipated to be required at this time.

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
		• Recommendations for tree/vegetation protection and preservation measures for all trees/vegetation that are to be retained; • Details of tree pruning; • Details of all trees/vegetation recommended for removal, including removal measures; • Mitigation and monitoring measures to ensure success of preservation and removal measures; • Should vegetation compensation be required, it will be in accordance with the Metrolinx Vegetation Compensation Protocol; and • Mapping.	
Wildlife	• During operations, train traffic associated with the Project (e.g. stopping and starting) will result in noise, which may affect and possibly displace wildlife. The addition of the station on the existing rail corridor is not anticipated to have an effect on overall habitat connectivity.	• Wildlife present within the study area are likely somewhat adapted to these effects given the urban nature of the study area and the existing train traffic on the rail corridor. These effects are anticipated to be minor and wildlife fencing is not warranted given the existing level of habitat fragmentation in the study area.	• No monitoring activities are anticipated to be required at this time.
Migratory Birds	• Clearing of trees, shrubs and ground vegetation for maintenance has the potential to disturb or destroy nests of migratory birds.	• To reduce the possibility of contravention of the MBCA, vegetation removal should be scheduled to occur outside of the overall bird nesting season of April 1 to August 31. Some birds may nest before and after this peak bird nesting season due to annual seasonal fluctuations. Therefore, if a nest of a migratory bird is found within the construction area outside of this nesting period it still receives protection. • If vegetation must be removed during the overall bird	• No monitoring activities are anticipated to be required at this time.

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
		nesting season: • Nest and nesting activity searches will be conducted in areas defined as simple habitat[11] by a qualified Biologist no more than 24 hours prior to vegetation removal. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (Cadman et. al., 2007). • If an active nest or confirmed nesting activity of a migratory bird is observed in simple habitat, regardless of the timing window recommended, a species-specific buffer area following ECCC guidelines will be applied to the nest or confirmed nesting activity wherein no vegetation removal will be permitted until the young have fledged from the nest. The radius of the buffer will depend on species, level of disturbance and landscape context (ECCC, 2014), which will be confirmed by a qualified Biologist, but will protect a minimum of 10 m around the nest or nesting activity. • The results of all nest searches will be documented at the end of each survey day in a Technical Memorandum, including information on the searcher, date, time conducted, weather conditions, habitat type, vegetation community type, observations of breeding activity, observations of confirmed nests including co-ordinates, and, if required, the buffer applied to identified breeding/nesting sites. • If vegetation removal must occur in complex habitats within the above-listed timing windows and absolutely cannot be avoided, the same best management practices (BMPs) such as nest and nesting activity searches described above will be undertaken.	

[11] Simple habitats refer to habitats that contain few nesting spots or few species of migratory birds, where identification of active nests or confirmed nesting activity can be completed with confidence. According to (ECCC, 2014), examples of simple habitat include the following:
- Urban parks consisting mostly of lawn with a few isolated trees;
- Vacant lot with few possible nest sites;
- Previously cleared area where there is a lag between clearing and construction activities (and where ground nesters may have been attracted to nest in cleared areas or in stockpiles of soil); or
- Structure such as a bridge, beacon, tower or building (often chosen as a nesting spot by robins, swallows, phoebes, nighthawks, gulls and others).

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
Significant Wildlife Habitat	• No SWH has been identified within the study area. No direct or indirect effects to SWH are anticipated from the operation of the Project.	• Since no effects are anticipated, no mitigation measures specific to SWH are required for the operation of the Project.	• No monitoring activities are anticipated to be required at this time.
SAR	• During operations, train traffic associated with the Project will result in noise (e.g. stopping and starting), which may affect and possibly displace SAR.	• SAR present within the study area are likely somewhat adapted to these effects given the urban nature of the site and the existing train traffic on the rail corridor. These effects are anticipated to be minor and wildlife fencing is not warranted given the existing level of fragmentation in the study area.	• No monitoring activities are anticipated to be required at this time.
Significant Natural Heritage Features	• No effects to Significant Natural Heritage Features are anticipated to occur from the operation of the Project.	• Since no effects are anticipated, no mitigation measures specific to Significant Natural Heritage Features are required for the operation of the Project.	• No monitoring activities are anticipated to be required at this time.

4.3 Geology and Groundwater

4.3.1 Overview

No direct or indirect effects to underlying landforms and Iroquois Plain physiography, bedrock geology or groundwater are anticipated during construction or operations. However, hydrogeological and geo-environmental studies will be completed during detailed design to assess potential effects to groundwater during construction dewatering. It is possible that dewatering may result in temporary lowering of the groundwater table and groundwater flow direction. Effects to groundwater users and the natural environment, as a result of dewatering, will be assessed in the hydrogeological study.

4.3.2 Potential Effects, Mitigation and Monitoring Measures

Potential effects, corresponding mitigation measures and monitoring activities relating to geology and groundwater are described in Table 4-2.

Table 4-2: Geology and Groundwater - Potential Effects, Mitigation and Monitoring

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
Construction			
Landforms and Physiography	• No effects to the underlying landforms or Iroquois Plain physiographic region are anticipated from construction.	• Since no effects are anticipated, no mitigation measures for the underlying landforms or Iroquois Plain physiographic region are required for the construction of the Project.	• No monitoring activities are anticipated to be required at this time.
Soils and Bedrock Geology	• No direct or indirect effects to the bedrock geology are anticipated. Clearing of vegetation and excavation of soil associated with the construction of the Project may result in potential for direct and indirect effects to soils during and the construction phase, including: • Sedimentation and erosion of soils due to removal of vegetation, or changes in drainage patterns. • Soil contamination from chemical/fuel spills. • Mixing of topsoil and subsoil layers.	• Since no effects are anticipated, no mitigation measures for the bedrock geology are required for the construction of the Project. Potential effects from construction of the Project to soils can be managed through implementation of the following mitigation measures: • Soil and bedrock conditions, as well as bedrock elevations, will be confirmed through future geotechnical investigations to be undertaken in support of detailed design. • The TRCA's Geotechnical Engineering Design and Submission Plan Guidelines will be referenced during the detailed design phase. • Retain existing vegetation within the study area to the extent practicable. Vegetation removal will be kept to a minimum, limited to within the construction disturbance area and should be scheduled to occur outside of the overall bird nesting season of April 1 to August 31, following the mitigation measures described for migratory birds. • Areas for vegetation removal will be refined during detailed design, if required (e.g., change in construction disturbance area, final staging areas). • Develop an Erosion and Sediment Control (ESC) Plan prior to construction for implementation throughout construction. The ESC Plan will include consideration of the Greater Golden Horseshoe Area Conservation Authorities' Erosion and Sediment Control Guideline for Urban Construction (Greater Golden Horseshoe Area Conservation Authorities, 2006) and OPSS 805 (Erosion and Sediment Control Measures) (Ministry of Transportation, 2015). This plan will encompass all areas of soils disturbance, particularly in the vicinity of the Southwest Branch of Highland Creek. • Construction fencing and/or ESC fencing, where appropriate, will be installed and maintained to clearly define the construction disturbance	• On-site inspection and maintenance by an Environmental Inspector will be undertaken on a regular basis (e.g., monthly) or as required (e.g., following storm events) over the course of construction to ensure the effectiveness of erosion and sediment control measures and other mitigation measures. • The success of compensation vegetation will be monitored in accordance with the Vegetation Compensation Protocol for Metrolinx RER Projects. • Post-planting monitoring of restoration areas will occur for one year after installation. One site visit will be conducted during the subsequent growing season to confirm survival of plantings and/or seed mix. Should the plantings and/or seed mix not survive, additional

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
		area and prevent accidental damage to vegetation, or intrusion to adjacent vegetated areas. Fencing will be monitored and repaired as necessary throughout the construction period and will be removed and disposed of accordingly, post-construction. • Re-stabilize disturbed areas, incorporating re-vegetation using plantings and/or native seed mix appropriate to the site conditions. Exposed soils will be stabilized and re-vegetated as soon as possible to reduce erosion. • A Soil Management Plan will be developed by a Qualified Professional as defined in O. Reg. 153/04 for managing soil materials on-site (includes excavation, location of stockpiles, reuse and off-site disposal). • Soils needing to be stored temporarily will be stored in such a way as to not interfere with Project activities. • Topsoil and subsoil will not be mixed or contaminated with any other material. • The transportation, storage and handling of fuel shall be in accordance with the *Technical Standards and Safety Act*, 2000. • Machinery and equipment shall be inspected for leaks routinely throughout the duration of construction. • Vehicle maintenance and fuelling will be conducted at the designated and properly contained maintenance areas. • To mitigate accidental contamination from equipment leaks or spills, an Emergency Preparedness and Response Plan will govern spill response. • Restoration/compensation will be confirmed through regulatory agency consultation during detailed design. • Additional restoration/compensation measures may be required based on the results of additional surveys and consultations with regulatory agencies. • During detailed design and prior to construction, a Stormwater Management Report will be completed to determine potential effects and mitigation measures. The report will be completed in consultation with TRCA and the MOECC. Stormwater management design will consider guidance provided by the MOECC Stormwater Management Planning and Design Manual (2003), MTO Drainage Management Manual (2008), TRCA Storm Water Management Criteria (2012), and	seeding and/or plantings will be undertaken one year thereafter with one additional monitoring visit in the following growing season. • Restoration/compensation monitoring will be confirmed through regulatory agency consultation during detailed design. • Additional restoration/compensation monitoring may be required based on the results of additional surveys and consultations with regulatory agencies.

Feature	Potential Effects	Mitigation Measures	Monitoring Activities
		the Low Impact Development Stormwater Management Planning and Design Guide (TRCA/Credit Valley Conservation, 2010).	
Groundwater	• As hydrogeological and geo-environmental studies will be completed at the next stage of design, groundwater impacts (both direct and indirect) will be assessed in the hydrogeological study. Direct and indirect impacts to groundwater will be confirmed based on field investigations.	• At this time, no effects are anticipated, as such no mitigation measures specific to groundwater are required for the construction of the Project. However, this will be updated based on the findings from the hydrogeological and geo-environmental studies to be completed at the next stage of design. • Conduct staging, storage, refueling and maintenance of equipment at least 30 metres away from the watercourse and outside of floodplain areas. A Flood Contingency Plan will be developed during detailed design and prior to construction.	• No monitoring activities are anticipated to be required at this time. However, further field studies will be undertaken as part of the hydrogeological and geo-environmental studies and monitoring requirements will be determined at that time.
Operation and Maintenance			
Landforms and Physiology	• No effects to the underlying landforms or Iroquois Plain physiographic region are anticipated from the operation of the Project.	• Since no effects are anticipated, no mitigation measures for the underlying landforms or Iroquois Plain physiographic region are required for the operation of the Project.	• No monitoring activities are anticipated to be required at this time.
Soils and Bedrock Geology	• No effects exceeding current operation effects to the soils and bedrock geology are anticipated from the operation of the Project.	• Since no effects are anticipated, no mitigation measures for the soils and bedrock geology are required for the operation of the Project.	• No monitoring activities are anticipated to be required at this time.
Groundwater	• No effects to groundwater are anticipated from the operation of the Project.	• Since no effects are anticipated, no mitigation measures specific to groundwater are required for the operation of the Project.	• No monitoring activities are anticipated to be required at this time.

4.4 Tree Inventory

Tree removals are required to accommodate the Project. An Arborist Report will be completed during detailed design to identify all trees that may be affected by the Project, including trees to be preserved, removed or injured. Mitigation measures are necessary prior to and during Project implementation to reduce the potential effects to trees associated with the Project. Additionally, recommended monitoring activities help to confirm that mitigation measures are working effectively and provide feedback for adaptive management.

The specific trees that are greater than 10 cm DBH identified in Table 4-3 for removal are shown in Figure 3-1 to Figure 3-4. Trees less than 10 cm DBH were accounted for but not noted as tree groups.

4.4.1 Potential Effects, Mitigation and Monitoring Measures

Potential effects, corresponding mitigation measures and monitoring activities relating to trees are described in Table 4-3.

Further details on potential effects, mitigation and monitoring are provided in Appendix C of this Volume.

Table 4-3: Tree Inventory - Potential Effects, Mitigation and Monitoring

Effect Type	Potential Effects	Mitigation Measures	Monitoring Activity
Construction			
Tree Removal	Trees on Metrolinx property and/or lands immediately adjacent to accommodate the Project require removal. Approximate removals based on field investigations are as follows: • City of Toronto Categories 1 to 5 **= 13 trees** [tree #'s: 9, 10, T12, T13, and 128-136] • Metrolinx ROW **= 341 trees** [341 trees <10 cm DBH] • TRCA Regulated Area **= 0 trees** • Trees less than 30 cm DBH on Private Property **= 7 trees** [tree #'s: 1-4, 7, 11, and 127] • Total **= 361 trees**	Metrolinx is establishing a Vegetation Compensation Protocol for Metrolinx RER projects and vegetation that is removed will be compensated for in accordance with the provisions of this protocol: • **For Municipal/Private Trees**: Metrolinx will work with each municipality to develop a municipality-wide streamlined tree permitting/compensation approach for municipal and private trees. The goal is to reduce the administrative permitting burden for trees along long stretches of rail corridor. • **For Trees within Metrolinx Property**: Metrolinx is developing a methodology to compensate for trees located within Metrolinx's property. This will involve categorizing trees community types/ecological value and establishing the appropriate level of compensation. Metrolinx will be looking to partner with Conservation Authorities and municipalities to develop the final compensation plan. • **Conservation Authorities**: For vegetation removals within Conservation Authority lands where required, applicable removal and restoration requirements will be followed. • **Federal Lands**: For vegetation removals within Federally-owned lands where required, applicable removal and restoration requirements will be followed. • **Tree End Use**: Metrolinx will develop options for the end use of trees removed from Metrolinx property (e.g., reuse/recycling options). The opportunity to salvage existing vegetation, particularly sensitive species, for transplanting from within the Project boundaries will be explored. An Arborist Report will be prepared as the design progresses to detail proposed works, impacts and removals on private, conservation authority and /or municipal property. The Arborist Report will include: • The identification of all trees on private, conservation authority, and/or municipal property that will be impacted by the Project, including trees to be preserved, removed or injured. • Details of proposed work and impacts. • Recommendations for protection and preservation measures for all trees/vegetation that are to be retained.	The success of compensation vegetation will be monitored in accordance with the Vegetation Compensation Protocol for Metrolinx RER Projects. Post-planting monitoring of restoration areas will occur for one year after installation. One site visit will be conducted during the subsequent growing season to confirm survival of plantings and/or seed mix. Should the plantings and/or seed mix not survive, additional seeding and/or plantings will be undertaken one year thereafter with one additional monitoring visit in the following growing season. Restoration/compensation monitoring will be confirmed through regulatory agency consultation during detailed design. Additional restoration/compensation monitoring may be required based on the results of additional surveys and consultations with regulatory agencies. On-site inspection will be undertaken as required

Effect Type	Potential Effects	Mitigation Measures	Monitoring Activity
		• Details of tree pruning. • Details of all trees/vegetation recommended for removal, including removal measures. • Appraised values of trees/vegetation to be removed. • Mitigation and monitoring measures recommended to ensure success of preservation and removal measures. • Identification of suitable restoration/compensation to accommodate site-specific impacts, mitigation and replacement measures to offset vegetation losses. Where required, property specific landscaping and/or restoration plans for tree removals permitting and approvals.	during construction to ensure that only specified trees are removed, fencing is intact and there is no damage caused to the remaining trees and adjacent vegetation communities. Construction and/or silt fencing will be repaired if it is damaged. Any damaged trees will be pruned through the implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. Regular monitoring, to be defined prior to pre-construction land clearing, will be undertaken to confirm that activities do not encroach into nesting areas or disturb active nesting sites.
Tree Injury	Encroachment into the Tree Protection Zone of trees within the Study Area. The following **10 trees** will be 'injured': T1- T2, and T4 - T11. Impacts to trees adjacent to the work zone may result in unintended root damage or tree felling: 10 trees Protected trees that are close to the Project footprint, with a canopy that overhangs the work area, may require pruning of branches to facilitate works.	An Arborist Report will be prepared as the design progresses to detail proposed works, impacts and removals on private, conservation authority and /or municipal property, as discussed above. All removals should be felled into the work area to ensure that damage does not occur to the trees within the TPZ. Upon completion of the tree removals, all felled trees are to be removed from the site, and all brush chipped. All brush, roots and wood debris should be shredded into pieces that are smaller than 25 mm in size to ensure that any insect pests that could be present within the wood are destroyed.	On-site inspection will be undertaken as required during construction to ensure no unauthorized encroachment into vegetated areas and TPZs, as well as monitoring and administering repair of tree protection barriers to ensure proper installation and functionality.
Tree	Trees within the study area will require tree protection barriers.	Install barriers for trees to be preserved. Barriers to consist of following types:	Inspections to ensure barriers have been installed as

Effect Type	Potential Effects	Mitigation Measures	Monitoring Activity
Preservation	Trees to be preserved are #s 98 to 102, 110, 112 to 114, 117 to 119, 121 to 126 and T3. Refer Appendix C of this Volume for minimum TPZ distances.	• Private Property: 2.4 m height plywood barriers (3/4" thick). • City Property: 1.2 m height orange plastic web snow fence on a 38x89 mm (2"x4") wood frame. Barriers to be installed per details in the Appendix C of this Volume. The following activities are prohibited within a TPZ: • Demolition, construction, replacement or alteration of permanent or temporary buildings, structures or pathways of any kind; • Installation of large stones or boulders; • Altering grade by adding or removing soil or fill, excavating, trenching, topsoil or fill scraping, compacting soil or fill, dumping or disturbance of any kind; • Storage of construction materials, equipment, wood, branches, leaves, soil or fill, construction waste or debris of any sort; • Application, discharge or disposal of any substance or chemical that may adversely affect the health of a tree; • Causing or allowing water or discharge, to flow over slopes or through natural areas; • Access, parking or movement of vehicles, equipment or pedestrians; • Cutting, breaking, tearing, crushing, exposing or stripping tree's roots, trunk and branches; • Nailing or stapling into a tree, including attachment of fences, electrical wires or signs; • Stringing of cables or installing lights on trees; • Soil remediation, removal of contaminated fill; • Excavating for directional or micro-tunnelling and boring entering shafts. • Tree protection barriers shall be clearly staked in the field prior to construction to ensure correct positioning of fencing and avoid unnecessary disturbance. • To avoid root zone impacts on trees to be retained, excavated material shall not be stored against the tree protection barrier.	specified and monitoring during construction to ensure barriers are functioning as specified and to administer any necessary repairs.
Nests of Migratory	Clearing of trees has the potential to disturb or destroy	• To reduce the possibility of contravention of the MBCA, vegetation removal should be scheduled to occur outside of the overall bird nesting	Regular monitoring, to be defined prior to pre-

Effect Type	Potential Effects	Mitigation Measures	Monitoring Activity

Birds	migratory birds or the nests of migratory birds.	season of April 1 to August 31. Some birds may nest before and after this peak bird nesting season due to annual seasonal fluctuations. If a nest of a migratory bird is found within the construction area outside of this nesting period it still receives protection.
		• If vegetation must be removed during the overall bird nesting season:
		  • Nest and nesting activity searches will be conducted in areas defined as simple habitat[12] (i.e., the CUM1-1 community) by a qualified Biologist no more than 24 hours prior to vegetation removal. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001).
		  • If an active nest or confirmed nesting activity of a migratory bird is observed in simple habitat, regardless of the timing window recommended, a species-specific buffer area following ECCC guidelines will be applied to the nest or confirmed nesting activity wherein no vegetation removal will be permitted until the young have fledged from the nest. The radius of the buffer will depend on species, level of disturbance and landscape context (ECCC, 2014), which will be confirmed by a qualified Biologist, but will protect a minimum of 10 m around the nest or nesting activity.
		  • The results of all nest searches will be documented at the end of each survey day in a Technical Memorandum, including information on the searcher, date, time conducted, weather conditions, habitat type, vegetation community type, observations of breeding activity, observations of confirmed nests including co-ordinates, and, if required, the buffer applied to identified breeding/nesting sites.
		If vegetation removal must occur in complex habitats within the above-listed timing windows and absolutely cannot be avoided, the same best management practices (BMPs) such as nest and nesting activity searches described above will be undertaken.
			construction land clearing, will be undertaken to confirm that activities do not encroach into nesting areas or disturb active nesting sites.

12. Simple habitats refer to habitats that contain few nesting spots or few species of migratory birds, where identification of active nests or confirmed nesting activity can be completed with confidence. According to ECCC (2014), examples of simple habitat include the following:
    - Urban parks consisting mostly of lawn with a few isolated trees;
    - Vacant lot with few possible nest sites;
    - Previously cleared area where there is a lag between clearing and construction activities (and where ground nesters may have been attracted to nest in cleared areas or in stockpiles of soil); or
    - Structure such as a bridge, beacon, tower or building (often chosen as a nesting spot by robins, swallows, phoebes, nighthawks, gulls and others).

Effect Type	Potential Effects	Mitigation Measures	Monitoring Activity
Operations			
Tree Injury	Deterioration in tree vitality or a decline in tree vigour of trees that within the study area adjacent to the Project that could occur over time due to new growing conditions (e.g. sunscald, compaction, root damage, broken branches and TPZ damage).	Maintenance and seasonal pruning or tree removal to prevent woody material from falling onto the rail corridor, by a Certified Arborist or under the supervision of one.	Routine inspections to identify dead trees or limbs adjacent to the Project that require removal or maintenance for safety. Certified Arborist to inspect and assess trees on adjacent lands annually (at a minimum) from the Metrolinx property.

Nests of Migratory Birds	Clearing of trees has the potential to disturb or destroy nests of migratory birds.	• To reduce the possibility of contravention of the MBCA, vegetation removal should be scheduled to occur outside of the overall bird nesting season of April 1 to August 31. Some birds may nest before and after this peak bird nesting season due to annual seasonal fluctuations. If a nest of a migratory bird is found within the construction area outside of this nesting period it still receives protection.
		• If vegetation must be removed during the overall bird nesting season:
		  • Nest and nesting activity searches will be conducted in areas defined as simple habitat[13] (i.e., the CUM1-1 community) by a qualified Biologist no more than 24 hours prior to vegetation removal. Nesting activity will be documented when it consists of confirmed breeding evidence, as defined by OBBA criteria (OBBA, 2001).
		  • If an active nest or confirmed nesting activity of a migratory bird is observed in simple habitat, regardless of the timing window recommended, a species-specific buffer area following ECCC guidelines will be applied to the nest or confirmed nesting activity wherein no vegetation removal will be permitted until the young have fledged from the nest. The radius of the buffer will depend on species, level of disturbance and landscape context (ECCC, 2014), which will be confirmed by a qualified Biologist, but will protect a
			Regular monitoring (frequency to be defined prior to vegetation removal) will be undertaken to confirm that activities do not encroach into nesting areas or disturb active nesting sites.

13. Simple habitats refer to habitats that contain few nesting spots or few species of migratory birds, where identification of active nests or confirmed nesting activity can be completed with confidence. According to ECCC (2014), examples of simple habitat include the following:
- Urban parks consisting mostly of lawn with a few isolated trees;
- Vacant lot with few possible nest sites;
- Previously cleared area where there is a lag between clearing and construction activities (and where ground nesters may have been attracted to nest in cleared areas or in stockpiles of soil); or
- Structure such as a bridge, beacon, tower or building (often chosen as a nesting spot by robins, swallows, phoebes, nighthawks, gulls and others).

Effect Type	Potential Effects	Mitigation Measures	Monitoring Activity
		minimum of 10 m around the nest or nesting activity. • The results of all nest searches will be documented at the end of each survey day in a Technical Memorandum, including information on the searcher, date, time conducted, weather conditions, habitat type, vegetation community type, observations of breeding activity, observations of confirmed nests including co-ordinates, and, if required, the buffer applied to identified breeding/nesting sites. • If vegetation removal must occur in complex habitats within the above-listed timing windows and absolutely cannot be avoided, the same best management practices (BMPs) such as nest and nesting activity searches described above will be undertaken.	

4.5 Cultural Environment

4.5.1 Overview

Eleven properties in the study area have been identified to hold either potential or known CHVI. The King Street West Subway was previously identified as a PHP and is anticipated to be directly impacted by the Project. Specifically, alterations to the subway are anticipated to be required to accommodate platforms and other station infrastructure. This property will undergo an HIA during detailed design to identify effects on heritage attributes and mitigation measures to avoid or reduce these effects. Two additional properties, 55 and 99 Sudbury Street, are anticipated to be directly impacted by the Project. Specifically, alterations to the properties, and possible partial or complete demolition of 99 Sudbury, are anticipated to be required to accommodate station access. These properties have undergone CHERs as part of the TPAP and have been identified as PHPs, as discussed in Section 4.5.2. An HIA will be undertaken for these properties as soon as possible and prior to completion of detailed design.

Additional properties identified as having potential CHVI are summarized in Table 4-4. In June 2018 a CHAR was prepared to build on the findings of the CHSR and to identify potential adverse impacts to identified cultural heritage resources and to recommend mitigation measures to lessen or avoid any identified impacts. The results of this CHAR are provided in Table 4-4.

Table 4-4 provides an overview of potential impacts on properties of known or potential CHVI identified in the CHSR. Potential effects, mitigation measures, and monitoring are included in Section 4.5.2 of this EPR volume.

Table 4-4: Summary Table of Screening Recommendations

Cultural Heritage Resource #	Municipal Address	Heritage Recognition	Description of Anticipated Impact	Analysis of Potential/Anticipated Impact	Next Steps
KL-1	55 Sudbury Street	Provincial Heritage Property	Directly Affected Property - anticipated alteration to accommodate station entrance.	• Anticipated alteration to accommodate station entrance.	HIA required
KL-2	King Street West Subway (1888)	Provincial Heritage Property	Directly Affected Property - anticipated alteration to accommodate new platforms.	• Anticipated alteration to accommodate new platforms.	HIA required
KL-3	109 Atlantic Ave (Gowans, Kent and Company warehouse)	Listed	Indirectly Affected Property - no direct impacts anticipated at this time. This property may experience indirect impacts as a result of construction activities.	• Immediately adjacent to Project footprint. Within Vibration ZOI. • A small strip of the property (part of the manicured lawn along the north end of the property) is located within the Project footprint and will be acquired for station infrastructure. The potential loss of the lawn will not result in any adverse impacts to the CHVI or heritage attributes of the property.	CHER required, during detailed design
KL-4	61 Hanna Ave (Hinde and Dauch Paper Company Factory)	Listed	Indirectly Affected Property - no direct impacts anticipated at this time. This property may experience indirect impacts as a result of construction activities.	• Not within Vibration ZOI (structure is >25 m from Project footprint). • No indirect adverse impacts identified.	No further work required
KL-5	107 Atlantic Ave (Bradshaw and Company Factory)	Listed	Indirectly Affected Property - no direct impacts anticipated at this time. This property may experience indirect impacts as a result of construction activities.	• Not within Vibration ZOI (structure is >60 m from Project footprint). • No indirect adverse impacts identified.	No further work required
KL-6	40 Hanna Ave	Property is	Indirectly Affected Property - no direct	• Not within Vibration ZOI (structure is	No further work

Cultural Heritage Resource #	Municipal Address	Heritage Recognition	Description of Anticipated Impact	Analysis of Potential/Anticipated Impact	Next Steps
	(Brunswick-Balke-Collender Factory)	designated under Part IV of the OHA (By-law 1293-2015)	impacts anticipated at this time. This property may experience indirect impacts as a result of construction activities.	>60 m from Project footprint). • No indirect adverse impacts identified.	required
KL-7	1177 King St W (Warden's House, Mercer Reformatory)	Listed	Indirectly Affected Property - no direct impacts anticipated at this time. This property may experience indirect impacts as a result of construction activities.	• Not within Vibration ZOI (structure is >75 m from Project footprint). • No indirect adverse impacts identified.	No further work required
KL-8	80 Lynn Williams St/130 East Liberty St (Liberty Storage Warehouse)	Listed	Indirectly Affected Property - no direct impacts anticipated at this time. This property may experience indirect impacts as a result of construction activities.	• Not within Vibration ZOI (structure is >15 m from Project footprint). • No indirect adverse impacts identified.	No further work required
KL-9	Queen Street West Railway underpass	Listed	Indirectly Affected Property - no direct impacts anticipated at this time. This property may experience indirect impacts as a result of construction activities.	• Not within Vibration ZOI (>300 m from Project footprint). • No indirect adverse impacts identified.	No further work required
KL-10	99 Sudbury Street	Provincial Heritage Property	Directly Affected Property - anticipated alteration, including partial or full demolition, to accommodate station entrance.	• Anticipated alteration, including partial or full demolition, to accommodate station entrance.	HIA required
KL-11	17T 627470.72 E 4833294.09 N[14] (remnant building of Lunatic asylum and Wall)	Property is designated under Part IV of the OHA (By-law 1997-0085)	Indirectly Affected Property - no direct impacts anticipated at this time. This property may experience indirect impacts as a result of construction activities.	• Not within Vibration ZOI (structures are >8 m from Project footprint). • No indirect adverse impacts identified.	No further work required

[14] Located at 1001 Queen Street West

4.5.2 Cultural Heritage Evaluation

Two CHERs have been completed as part of this TPAP for the properties at 55 Sudbury Street and 99 Sudbury Street, in accordance with the MTCS *Standards and Guidelines for Conservation of Provincial Heritage Properties* (2010) and the *Ontario Heritage Act*. These CHERs were also undertaken according to the guidelines presented in the Metrolinx *Interim Cultural Heritage Management Process* (Interim Heritage Process, 2013), *Draft Terms of Reference for Consultants: Cultural Heritage Evaluation Report and Cultural Heritage Evaluation Recommendations Report* (2016).

4.5.2.1 55 Sudbury Street

The property is located within part of Lot 29, Concession 1, in the historic York Township, former County of York, now the City of Toronto, in the Province of Ontario.

The recommended outcome of the Cultural Heritage Evaluation of the property at 55 Sudbury Street in the City of Toronto is that it meets the criteria set out under O. Reg 9/06 of the *Ontario Heritage Act* but does not meet the criteria set out under O. Reg 10/06 of the *Ontario Heritage Act*.

4.5.2.2 99 Sudbury Street

The property is located within part of Lot 29, Concession 1, in the historic York Township, former County of York, now the City of Toronto, in the Province of Ontario.

The recommended outcome of the Cultural Heritage Evaluation of the property at 99 Sudbury Street in the City of Toronto is that it meets the criteria set out under O. Reg. 9/06 of the *Ontario Heritage Act* but does not meet the criteria set out under O. Reg 10/06 of the *Ontario Heritage Act*.

4.5.3 Archaeology

Archaeological recommendations are based on a Stage 1 AA undertaken for this Project. The Stage 1 AA found that the presence of primary water sources in the vicinity of the Project (within 1 km of Lake Ontario) and historic transportation routes (Toronto, Grey and Bruce Railway, King Street West, Sudbury Street) indicates that the property holds potential for the recovery of both pre-contact and contact period archaeological resources. A Stage 2 AA is required in the areas that have been found to be undisturbed. While the development of the surrounding lands resulted in disturbances of lands within the study area, a Stage 2 AA is required to determine the extent of that disturbance in these areas as well as to address areas that have been found to be undisturbed.

Figure 3-6 shows areas of archaeological potential requiring Stage 2 AA.

The areas recommended for Stage 2 AA are shown on Figure 3-6.

4.5.4 Potential Effects, Mitigation and Monitoring Measures

Potential effects, corresponding mitigation measures and monitoring activities relating to the cultural environment are described in Table 4-4.

Further details on potential effects, mitigation and monitoring are provided in Appendices D and E of this Volume of the EPR.

Table 4-4: Cultural Environment - Potential Effects, Mitigation and Monitoring

Feature	Description of Potential Effects	Mitigation Measures	Monitoring Activities
Construction			

Built and Cultural Heritage	• Directly Affected Property - anticipated alteration to accommodate new platforms.	• An HIA will be completed as soon as possible, and prior to completion of detailed design for the following directly affected properties:
		  • KL-1 - 55 Sudbury Street
		  • KL-2 - King Street West Subway
		  • KL-10 - 99 Sudbury Street
		• The HIA will identify mitigation measures to avoid or reduce potential effects on heritage attributes. These mitigation measures will be implemented.
			• The HIA may identify monitoring recommendations. These monitoring recommendations will be implemented.

	• Indirectly Affected Properties - no direct impacts anticipated at this time. This property may experience indirect impacts as a result of construction activities.	• Potential construction vibration impacts were identified for the following property:
		  • KL-3 - 109 Atlantic Ave (Gowans, Kent and Company warehouse)
		Mitigation measures to avoid or reduce potential effects on heritage attributes to reduce or avoid construction vibration impacts have been identified as follows:
		  • Pre-construction consultations between the applicant and owners/occupants;
		  • Pre-construction measurements of background vibration levels;
		  • Pre-condition survey by means of a photographic record of potentially affected structure façades and all surfaces, including visible sections of building foundations, building cladding, doors, windows, interior wall finishes, surface pavement, sidewalks, signs and trees. Each of the elements should be rated on their general condition (new, good, fair, poor, severe), and visible defects will be photographed
		• Any additional measures outlined in the Noise and Vibration Control Plan should be implemented for the properties of known and potential CHVI that fall
			• Work that may exceed the vibration limits outlined in the City of Toronto By-law No. 514-2008 or that may cause structural damage should be monitored.

Feature	Description of Potential Effects	Mitigation Measures	Monitoring Activities
		within the ZOI. These mitigation measures will be implemented. • A CHER and, if required, HIA will be prepared during Detailed Design, to assess additional impacts related to the design of the station, for the following property within which the Project footprint is located: • KL-3 - 109 Atlantic Avenue • These studies will be conducted.	

	• No potential direct or indirect impacts have been identified for the following properties located outside of the vibration ZOI:
	  • KL-4 - 61 Hanna Ave (Hinde and Dauch Paper Company Factory)
	  • KL-5 - 107 Atlantic Ave (Bradshaw and Company Factory)
	  • KL-6 - 40 Hanna Ave (Brunswick-Balke-Collender Factory)
	  • KL-7 - 1177 King St W (Warden's House, Mercer Reformatory)
	  • KL-8 - 80 Lynn Williams St/130 East Liberty St (Liberty Storage Warehouse)
	  • KL-9 - Queen Street West Railway underpass
	  • KL-11 - Remnant building of Lunatic Asylum and Wall
		• Not applicable (N/A)	• N/A

Archaeology	• Potential for the recovery of both pre-contact and contact period archaeological	• Areas determined to be undisturbed will be subjected to a Stage 2 AA in accordance with section 2.1.2 of the 2011 S&G prior to construction	• Further AA may identify the need for monitoring during

Feature	Description of Potential Effects	Mitigation Measures	Monitoring Activities
	resources.	activities to ensure no cultural heritage resources will be impacted; • Areas determined to be disturbed do not require further assessment; • Should deeply buried archaeological materials be encountered during construction, all work will cease and a professionally licenced archaeologist will be consulted to assess the cultural heritage value and significance of the archaeological deposits; • Areas identified to contain deeply buried archaeological potential must be subjected to a Stage 2 AA in accordance with Section 2.1.7, Standard 3 or 4 and Guideline 2 of the 2011 S&G, prior to construction activities; • If final limits of the Project are altered and fall outside the current study area, an additional Stage 1 AA is required to assess the new footprint; and • If human remains are encountered during project work, all activities must cease immediately and the local police as well as the Cemeteries Regulation Unit of the Ministry of Government and Consumer Services must be contacted. In situations where human remains are associated with archaeological resources, MTCS should also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act.	construction.
Operation and Maintenance			
Built and Cultural Heritage	• None.	• N/A	• N/A
Archaeology	• None.	• N/A	• N/A

4.6 Socio-Economic and Land Use Characteristics

4.6.1 Overview

The Project has the potential to result in temporary and permanent socio-economic and land use effects, including construction-related nuisance effects (e.g., increased noise, vibration, and dust), and visual and aesthetic effects. It is anticipated that potential effects can be mitigated through thoughtful Project design, coupled with effective implementation of mitigation measures.

The Project will bring benefits to existing communities along the Kitchener rail corridor by providing improved access to the GO rail network. The Project will facilitate improved movement across the rail corridor by providing connections that span the north and south sides of the rail corridor. The Project is also expected to create public benefit by improving public transportation options. The social and economic benefit of public transit is expected to outweigh any negative residual effects. The Project is anticipated to reduce traffic congestion, and promote economic spin offs and redevelopment near the Project. The Project will also provide greater mobility for those without access to, or ability to drive a car, and better connectivity for active transportation users between growth areas and transit stations. The new station will also support the City of Toronto's direction to accommodate future growth in a sustainable manner while also providing infrastructure to promote active transportation (City of Toronto, 2015a).

4.6.2 Potential Effects, Mitigation and Monitoring Measures

Potential effects, corresponding mitigation measures and monitoring activities relating to the socio-economic and land use environment are described in Table 4-5.

Further details on potential effects, mitigation and monitoring are provided in Appendix F of this Volume.

Table 4-5: Socio-Economic and Land Use Environment - Potential Effects, Mitigation and Monitoring

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
Neighbourhood Characteristics			
Demographics	**During Operations:** Additional employment opportunities and additional revenue opportunities for local businesses.	**During Operations:** None anticipated at this time.	**During Operations:** None anticipated at this time.
Physical Neighbourhood Composition	**During Construction:** Nearby residential and commercial land uses may experience nuisance effects resulting from noise and vibration and emissions due to construction equipment and other construction related activities. Should these nuisances be sustained for a prolonged period of time, the physical neighbourhood composition could be slowly altered as a result of individual building related changes, as well as a result of the changes in the behaviour of pedestrians moving through the neighbourhood. Construction may result in the need for temporary road or lane closures causing access restrictions to nearby residences or businesses. Additional details are provided in Appendix I of this Volume. The final design of the Project may also introduce opportunities for inconsistent design elements such as reducing visibility and creating spaces without character. Enhanced transit service to the nearby residential neighbourhoods may attract development interest and investment in the community. Enhanced transit service to nearby residential neighbourhoods may also provide further opportunities to engage in active transportation modes.	**During Construction:** A Noise and Vibration Control Plan will be developed prior to construction. The plan will include a complaint response protocol and will indicate that surrounding property owners and tenants will be informed of anticipated upcoming construction works, including any work at night. Mitigation is documented in Appendix H of this Volume. An Air Quality Management Plan will be developed for implementation during construction to address construction equipment and vehicle exhaust, potential traffic disruption and congestion, fugitive dust and odour. Mitigation is documented in Appendix G of this Volume. Access to residential and commercial areas will be maintained at all times. Potentially affected residents, tenants and business owners will be notified of initial construction schedules, as well as any future modifications to these schedules as they occur. At a minimum, safety fencing will be used where necessary to separate work areas from pedestrians and/or cyclists. Metrolinx is establishing a Vegetation Compensation Protocol for RER projects. Vegetation that is removed will be compensated for in accordance with this Protocol as documented in Appendix C of this Volume.	**During Construction:** On-site inspection and maintenance by an Environmental Inspector will be undertaken on a regular basis (e.g., monthly) or as required (e.g., following storm events) over the course of construction to ensure the effectiveness of ESC and other mitigation measures. Regular inspections of dust emissions (frequency to be defined prior to project construction) will be undertaken to confirm dust control watering frequency and rates are adequate. Site supervisors should monitor the site for wind direction and weather conditions to ensure that high-impact activities be reduced when the wind is blowing consistently towards nearby sensitive receptors. The site supervisor should also monitor for visible fugitive dust and take action to determine the root-cause in order to counteract this. Specific details regarding monitoring should be included in the Air Quality Management Plan.

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
	During Operations: Enhanced transit service to the nearby residential neighbourhoods may attract development interest and investment in the community.	**During Operations:** CPTED principles will be used to ensure areas with reduced visibility as a result of the construction of the station will be minimized.	**During Operations:** None anticipated at this time.
Community Groups and Resources	**During Construction:** No direct physical effects to community groups or resources are anticipated during the construction of the Project.	**During Construction:** A Noise and Vibration Control Plan will be developed prior to construction. The plan will include a complaint response protocol and will indicate that surrounding property owners and tenants will be informed of anticipated upcoming construction works, including any work Appendix H of this Volume. An Air Quality Management Plan will be developed for implementation during construction to address construction equipment and vehicle exhaust, potential traffic disruption and congestion, fugitive dust and odour. Mitigation is documented in Appendix G of this Volume.	**During Construction:** Regular inspections of dust emissions (frequency to be defined prior to project construction) will be undertaken to confirm dust control watering frequency and rates are adequate. Site supervisors should monitor the site for wind direction and weather conditions to ensure that high-impact activities be reduced when the wind is blowing consistently towards nearby sensitive receptors. The site supervisor should also monitor for visible fugitive dust and take action to determine the root-cause in order to counteract this. Specific details regarding monitoring should be included in the Air Quality Management Plan.
	During Operations: Enhanced transit service to the community will provide local community groups with additional travel options to the area, providing further opportunities to participate in group events and activities.	**During Operations:** None anticipated at this time.	**During Operations:** None anticipated at this time.
Institutional Uses and Places of Worship	**During Construction:** Nearby institutional uses or places of worship may experience nuisance effects resulting from noise and vibration and emissions due to construction equipment and other construction related activities. Construction may result in the need for	**During Construction:** A Noise and Vibration Control Plan will be developed prior to construction. The plan will include a complaint response protocol and will indicate that surrounding property owners and tenants will be informed of anticipated upcoming construction works, including any work at night. Mitigation is documented in Appendix H of this	**During Construction:** Regular inspections of dust emissions (frequency to be defined prior to project construction) will be undertaken to confirm dust control watering frequency and rates are adequate. Site supervisors should monitor the site

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
	temporary road or lane closures causing access restrictions to nearby local institutional uses. Additional details are provided in Appendix J of this Volume.	Volume. An Air Quality Management Plan will be developed for implementation during construction to address construction equipment and vehicle exhaust, potential traffic disruption and congestion, fugitive dust and odour. Mitigation is documented in Appendix G of this Volume. Access to institutional uses or places of worship will be maintained at all times. Potentially affected individuals will be notified of initial construction schedules, as well as any future modifications to these schedules as they occur.	for wind direction and weather conditions to ensure that high-impact activities be reduced when the wind is blowing consistently towards nearby sensitive receptors. The site supervisor should also monitor for visible fugitive dust and take action to determine the root-cause in order to counteract this. Specific details regarding monitoring should be included in the Air Quality Management Plan.
	During Operations: Enhanced transit service to the nearby institutional uses or places of worship may benefit users of these resources. Nearby institutional uses or places of worship may experience nuisance effects resulting from noise and vibration and emissions due to regular operations and maintenance.	**During Operations:** Operations will be carried out in accordance with applicable regulations and standards, including MOEE/GO Transit Noise and Vibration Protocol (MOEE/GO Transit, 1995) and the Environmental Noise Guideline, Stationary and Transportation Sources - Approval and Planning Publication NPC 300 (MOECC, 2013). Mitigation is documented in Appendix H of this Volume, and Appendix G of this Volume.	**During Operations:** Regular inspections of dust emissions (frequency to be defined prior to project construction) will be undertaken to confirm dust control watering frequency and rates are adequate. Site supervisors should monitor the site for wind direction and weather conditions to ensure that high-impact activities be reduced when the wind is blowing consistently towards nearby sensitive receptors. The site supervisor should also monitor for visible fugitive dust and take action to determine the root-cause in order to counteract this. Specific details regarding monitoring should be included in the Air Quality Management Plan.
Recreational Uses Parks and Open Spaces	**During Construction:** There may be temporary disruptions to the public access and enjoyment of Rita Cox Park, and the Allan A. Lamport Stadium Park during construction. Tree removal may affect the overall recreational and aesthetic experience of	**During Construction:** Potential effects to users seeking to access nearby recreational areas and the trail during construction will be mitigated through the installation of appropriate way-finding, regulatory, and warning signs, as per the Construction Traffic Control and Management Plan. Special directional signage may be considered as a	**During Construction:** Regular inspections of dust emissions (frequency to be defined prior to project construction) will be undertaken to confirm dust control watering frequency and rates are adequate. Site supervisors should monitor the site for wind direction and weather

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
	existing and future park users.	means to help pedestrians and cyclists avoid any potential construction activities. At a minimum, safety fencing will be used where necessary to separate work areas from pedestrians and/or cyclists. All stockpiled materials will be fenced and the construction footprint area will be minimized to prevent the construction zone from extending beyond that which is necessary. Metrolinx is establishing a Vegetation Compensation Protocol for RER projects. Vegetation that is removed will be compensated for in accordance with this Protocol as documented in Appendix C of this Volume.	conditions to ensure that high-impact activities be reduced when the wind is blowing consistently towards nearby sensitive receptors. The site supervisor should also monitor for visible fugitive dust and take action to determine the root-cause in order to counteract this. Specific details regarding monitoring should be included in the Air Quality Management Plan.
	During Operations: The project will result in increased connectivity across the railway corridor, and improve connections to adjacent recreational uses and open spaces, such as the Rita Cox Park and the Allan A. Lamport Stadium Park	**During Operations:** None anticipated at this time.	**During Operations:** None anticipated at this time.
Sensitive Land Uses	**During Construction:** Nearby sensitive land uses may experience nuisance effects resulting from noise and vibration and emissions due to construction equipment and other construction related activities.	**During Construction:** A Noise and Vibration Control Plan will be developed prior to construction. The plan will include a complaint response protocol and will indicate that surrounding property owners and tenants will be informed of anticipated upcoming construction works, including any work at night. Mitigation is documented in the Appendix I of this Volume. An Air Quality Management Plan will be developed for implementation during construction to address construction equipment and vehicle exhaust, fugitive dust and odour. Mitigation is documented Appendix G of this Volume.	**During Construction:** Site supervisors should monitor the site for wind direction and weather conditions to ensure that high-impact activities be reduced when the wind is blowing consistently towards nearby sensitive receptors. If a structure falls within the ZOI, the following will be required: • Pre-construction consultations between the applicant and owners/occupants; • Pre-construction measurements of background vibration levels; • Pre-condition survey by means of a photographic record of potentially affected structure façades and all

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
			surfaces, including visible sections of building foundations, building cladding, doors, windows, interior wall finishes, surface pavement, sidewalks, signs and trees. Each of the elements should be rated on their general condition (new, good, fair, poor, severe), and visible defects will be photographed; and • A vibration monitoring program to confirm that the Prohibited Construction Vibrations are not exceeded.
	During Operations: Nearby sensitive land uses may experience nuisance effects resulting from noise and vibration and emissions due to regular operations and maintenance.	**During Operations:** Operations will be carried out in accordance with applicable regulations and standards, including MOEE/GO Transit Noise and Vibration Protocol (MOEE/GO Transit, 1995) and the Environmental Noise Guideline, Stationary and Transportation Sources - Approval and Planning Publication NPC 300 (MOECC, 2013). Mitigation requirements are documented in Appendices H and G of this Volume.	**During Operations:** None anticipated at this time.
Transit and Transportation Network			
Public Transit	**During Construction:** Potential temporary disruptions to the existing service along the rail corridor during construction. Construction may result in the need for temporary road or lane closures causing access restrictions to local TTC streetcar and bus routes.	**During Construction:** Notification will be provided in advance of any potential service disruptions. Site-Specific Construction Traffic Control and Management Plans will be prepared and implemented prior to Project construction to maintain reasonable access through work zones, to the extent possible. Metrolinx and the City of Toronto will consult with the TTC to establish a suitable mitigation strategy to be implemented.	**During Construction:** Metrolinx will consult directly with the TTC to establish a suitable monitoring strategy to be implemented. Traffic impacts to be monitored in accordance with the Construction Traffic Control and Management Plan

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
	During Operations: Provision of new transit service to nearby residents and workers, as well as improved GO Transit and TTC connectivity. The Project is expected to create significant public benefit by providing local access to the regional rail network.	**During Operations:** None anticipated at this time.	**During Operations:** None anticipated at this time.
Cycling Infrastructure Network	**During Construction:** Cyclist movement within the study area may experience temporary effects as a result of the construction activities of the Project.	**During Construction:** Potential effects to pedestrian and cycling activities during construction will be mitigated through the installation of appropriate way-finding, regulatory, and warning signs.	**During Construction:** Metrolinx will consult with the City of Toronto to establish a suitable mitigation strategy to be implemented. Cycling network impacts to be monitored in accordance with the Construction Traffic Control and Management Plan.
	During Operations: The project will result in increased connectivity to the overall cycling network with a pedestrian overpass in the vicinity of Joe Shuster Way, as well as planned MUPs on both the north and south side of the railway. Overall multi-modal connectivity to the wider public transit network will be enhanced and will subsequently encourage cycling culture and demand in the local neighbourhood.	**During Operations:** None anticipated at this time.	**During Operations:** None anticipated at this time.
Movement	**During Construction:** Construction of the Project may result in the need for temporary road or lane closures causing access restrictions to nearby properties. Pedestrian and cyclist movement within the study area may experience temporary effects during construction of the Project, as detailed in Appendix I of this Volume. There are potential conflicts between	**During Construction:** Access to residences, businesses, and industrial areas will be maintained at all times. Potentially affected residents, tenants and business owners will be notified of initial construction schedules, as well as modifications to these schedules as they occur. Adequate construction hauling routes will be determined during detailed design. Site-specific Construction Traffic Control and	**During Construction:** Metrolinx and the City of Toronto will consult with the TTC to establish a suitable mitigation strategy to be implemented during detailed design. Traffic impacts will be monitored in accordance with the Traffic Control and Management Plan.

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
	pedestrians, cyclists, and motorists traffic associated with the operation of the station. Potential hazards include: trucks, heavy equipment, and machinery in operation on the site.	Management Plans will be prepared and implemented prior to Project construction to maintain reasonable access through work zones, to the extent possible, and include construction signage and safety fencing requirements. Potential effects to pedestrian and cycling activities during construction will be mitigated through the installation of appropriate way-finding, regulatory, and warning signs. It is recommended that the temporary construction staging be implemented according to Ontario Traffic Manual (OTM) Book 7 on Temporary Conditions. Minimize disruption to the existing trail network in the study area to the extent feasible while balancing construction schedules and expediting construction activity. Mitigation requirements are documented in Appendix I of this Volume.	
	During Operations: Potential long term increase in pedestrian and vehicular traffic as a result of the passengers the Project will serve these neighbourhoods, as detailed in Appendix I of this Volume. MUPs associated with the Project will facilitate pedestrian and cyclist movement in the study area. The Project will facilitate improved movement across the rail corridor by providing connections that span the north and south sides of the rail corridor. This will reduce the barrier effect of the rail corridor, and foster a permeable environment for pedestrian and cyclist movement.	**During Operations:** No effects to roads and traffic volumes, public transit, or pedestrian or cycling routes are anticipated during the operational phases of the Project. Traffic signals should be optimized post-construction to accommodate predicted changes in traffic patterns. Mitigation requirements are documented in Appendix I of this Volume.	**During Operations:** None anticipated at this time.
Utilities			

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
Utilities	**During Construction:** Utility relocation and/or service interruptions to nearby properties may be required. Protection of utility infrastructure may also be necessary. These effects could be either temporary or permanent. The following potential utility conflicts were identified in the Project footprint at the time of report preparation: • Toronto Hydro • Enbridge Gas Distribution • Bell Canada • Group Telecom • CN Signals • Toronto Water • City of Toronto sanitary, storm and wastewaterPotential temporary disruptions to CP Rail operations along the rail corridor during construction.	**During Construction:** Effects to utilities during construction will be confirmed during detailed design. Additional Subsurface Utility Engineering (SUE) investigations may be conducted during detailed design, as required, to confirm existing utilities. A review of existing and proposed future utilities plans, in addition to on-going consultation with utility companies and the City of Toronto, should be conducted during the detailed design stage. Any relocations, service interruptions, or utility protection projects should be identified as early as possible to allow for project coordination and construction management plans to be created with consideration of utility needs. Utility relocations will be coordinated to minimize the overall impacts on existing natural heritage systems. Metrolinx will continue to work with CP through detailed design to minimize potential effects on CP operations.	**During Construction:** None anticipated at this time.
	During Operations: Access to utilities may require temporary access permission (easements) for maintenance activities.	**During Operations:** Potential access requirements as a result of maintenance activities to be determined in consultation with the relevant utility owners during detailed design. Any utility conflicts will have been identified and resolved during the construction stage of the Project. Subsequently, no further mitigation strategies related to utilities are anticipated to be required during the operational stage.	**During Operations:** None anticipated at this time.
Property			
Property	**During Construction:** The Project includes new platforms, tunnels and other associated structures.	**During Construction:** Specific property requirements will be determined during detailed design. Ongoing consultation with	**During Construction:** None anticipated at this time.

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
	Approximately 0.12 ha of property is anticipated to be required permanently from parcels in need of full acquisition. Approximately 3.3 ha of property is anticipated to be required from parcels not in need of full acquisition. Approximately 1.7 Ha of property is anticipated to be temporarily required for construction of the Project. Property requirements are being confirmed as part of the detailed design process. Temporary use of adjacent lands may be required for construction purposes (e.g., access, establishment of equipment storage/staging/laydown areas, stockpiling of materials). Temporary access may be required to adjacent properties for maintenance activities.	affected property owners will help identify appropriate site-specific mitigation measures. Access to residences, businesses, and industrial areas will be maintained at all times. Potentially affected residents, tenants and business owners will be notified of initial construction schedules, as well as modifications to these schedules as they occur. The effects to properties will be mitigated by providing fair market value compensation in accordance with applicable laws and through negotiations with affected property owners. At this time, the final design of the station is not available and these requirements will be addressed at future stages of the project. Appropriate agreements will be executed. Temporary use of adjacent lands will be managed through the use of construction easements or temporary limited interests (TLIs). Consultation and agreements with adjacent property owners will be obtained where temporary access is needed for maintenance activities.	
	During Operations: There is potential for an increase in property values for properties located in close proximity to a transit station due to an increase in transit service.	**During Operations:** None anticipated at this time.	**During Operations:** None anticipated at this time.
Visual Characteristics			
Site and Surroundings	**During Construction:** Temporary visual and aesthetic effects may also be experienced as a result of temporary storage sites for equipment, staging/laydown areas, stockpiling of materials and other construction activities. Tree and vegetation removal may pose undesirable aesthetic effects to the	**During Construction:** Construction schedule delays will be avoided to the extent possible in order to minimize the duration of construction and corresponding visual impacts. Metrolinx is establishing a Vegetation Compensation Protocol for RER projects. Vegetation that is removed will be compensated for in accordance with this Protocol as	**During Construction:** None anticipated at this time.

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation

	surrounding land uses.	documented in Appendix C and Appendix B of this Volume.
		Additional potential mitigation measures:
		• Provide a screened enclosure for the development site, with particular attention to the waste disposal and material storage areas
		• Consider improving the aesthetic quality of the enclosure with graphics and/or artistic images that create visual interest for those viewing from the public realm and neighbouring lands
		• The design considerations for buffers and screening of nuisances or unwanted effects should:
		  • Be appropriately located to obscure the view and access to the nuisances or unwanted impact; and
		  • Be designed to be relative to the magnitude of the nuisance or unwanted impact.
		• Provide temporary landscaping along the borders of the construction site between site fencing/enclosure and walkways, where space allows.	

	During Operations: The Project may have a visual impact upon existing and proposed development.	**During Operations:** An aesthetically pleasing design for public-facing infrastructure will be developed in consultation with adjacent landowners and through engaging the Metrolinx Design Review Panel.	**During Operations:** None anticipated at this time.
Built Form	**During Construction:** None anticipated.	**During Construction:** None anticipated at this time.	**During Construction:** None anticipated at this time.
	During Operations: The visual/aesthetic effects of the completed site will depend upon a variety of characteristics including: form of the development (massing, height, relationship to	**During Operations:** A lighting plan should be developed where the quality of light produced, and type of light sources used on the exterior of buildings, signs, parking areas, pedestrian walkways, and other areas of	**During Operations:** None anticipated at this time.

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
	neighbouring land uses and the public realm); building façade materials; fenestration and visual permeability; landscape design; and, lighting (functional and decorative). The aesthetic quality and effects of the completed station will be the result of a combination of landscaping; compatible building massing, façade design and detailing; and, public realm design. This Project may spur an improvement in the visual environment compared to what exists today, by providing improved street lighting and public visibility. Light spillage effects may occur from lighting at the proposed station required for both the station itself, as well as ancillary infrastructure, such as the surface parking lots. Light reflected on trains at night may increase light spillage into adjacent properties.	the site, are compatible with, and appropriate to the overall design and use of the site. Mitigation measures may include: • External visors on floodlights; • Optimal light location, height and settings; • Light shields such as walls of hedges; • Various intensities and control of lighting of the station and of parking lots for different scenarios; and • Shielded fixtures with efficient light bulbs in parking lots surrounding the station. Additional potential mitigation measures: • Blank walls that are adjacent to gathering areas, outdoor amenity spaces, and pedestrian walkways should have aesthetic character improved with any combination of architectural detailing, landscape features, art, or other elements that provide visual relief and interest • Paving should be reduced to the minimum necessary to accomplish site circulation and parking needs with other areas set aside for landscaping, or pedestrian ways as needed • The landscape design should add visual interest, define pedestrian zones, and provide visual screens and buffers for incompatible uses	
Public Realm	**During Construction:** Adverse effects may arise from the presence of construction materials; equipment; modular construction trailers for housing on-site offices and facilities, which will either temporarily eliminate public realm elements or impede access to the public realm. Potential effect on ability of individuals to use and move through the study area during	**During Construction:** Provide well connected, clearly delineated, and appropriately signed walkways and cycling route options Provide temporary lighting and wayfinding signs and cues for navigation around the construction site	**During Construction:** None anticipated at this time.

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
	construction.		
	During Operations: The small public plaza at the foot of the West Elm Shops will be permanently affected as a result of the construction of the south entrance. It is expected that the Project and accompanying increases in connectivity will promote improvements to the public realm, particularly along Sudbury Street and areas still under development. Increased ability for individuals to travel to and through the public realm in the vicinity of the station.	**During Operations:** The landscape design and public realm features should add visual interest, define pedestrian zones, distinguish private and public realms, delineate different spaces and use areas on site, contribute to comfort and health of users, provide visual screens and buffers for incompatible uses. The overall site design and station architecture should provide necessary infrastructure and the careful arrangement of uses to accordingly provide for accessibility throughout.	**During Operations:** None anticipated at this time.
Crime Prevention Through Environmental Design	**During Construction:** None anticipated	**During Construction:** None anticipated at this time.	**During Construction:** None anticipated at this time.
	During Operations: The project is considered to be supportive in further activating land uses along King Street West or Sudbury Street by increasing pedestrian traffic in the area and bringing new customers in via transit.	**During Operations:** • The building façade materials and fenestration should allow for passive surveillance and be fitting with the context of the neighbouring uses • Parking lots should be configured, designed and landscaped as well-defined areas linked to a particular building/station entrance with dedicated pedestrian ways that are safe and convenient The site design should integrate uses, transportation facilities, landscape elements, public spaces and buildings in such a way that they support safe, efficient, and comfortable use.	**During Operations:** None anticipated at this time.
Policy Context - Zoning			
Provincial Policies	**During Construction:** None anticipated	**During Construction:** None anticipated at this time.	**During Construction:** None anticipated at this time.

Feature	Potential Effect	Mitigation Measures	Monitoring Recommendation
	During Operations: The Project achieves policy objectives as outlined in the *Provincial Policy Statement,* the *Growth Plan for the Greater Golden Horseshoe,* and the *Metrolinx Regional Transportation Plan.*	**During Operations:** None anticipated at this time.	**During Operations:** None anticipated at this time.
Municipal Policies	**During Construction:** None anticipated	**During Construction:** None anticipated at this time.	**During Construction:** None anticipated at this time.
	During Operations: The final design of the station may not be in conformance with some long-term municipal policy context. The project is considered to be supportive of the Official Plan and zoning objectives of the area.	**During Operations:** Metrolinx, as a Provincial Crown Agency, is not generally subject to municipal permitting and approval requirements; regardless, Metrolinx works in co-operation with local municipalities to adhere to the intent of the relevant permit/approval, to the extent possible.	**During Operations:** None anticipated at this time.
Current Development Applications			
Current Development Applications	**During Construction:** Temporary effects to 99 Sudbury are anticipated during the construction of the King-Liberty SmartTrack Station, through the use of a portion of the property as a staging and laydown area.	**During Construction:** Access to property will be maintained at all times. Potentially affected residents, tenants and business owners will be notified of initial construction schedules, as well as modifications to these schedules as they occur. Temporary use of adjacent lands will be managed through the use of construction easements or Temporary Limited Interests (TLIs). Consultation and agreements with adjacent property owners will be obtained where temporary access is needed for maintenance activities.	**During Construction:** None anticipated to be required at this time
	During Operations: Implementation of the station is likely to make the area more attractive for new growth and development.	**During Operations:** None anticipated at this time.	**During Operations:** None anticipated at this time.

4.7 Air Quality

4.7.1 Overview

The Project's air quality effects were predicted at a selection of representative sensitive receptors within the study area, as shown in Figure 3-9.

The modelling results for the selected COCs for the 20 most affected sensitive receptors are reported in Table 4-6. For most of COCs, receptor R1, located approximately 55 m north of the rail corridor, is the most affected receptor. Additional information about the most affected receptors for each COC is available in Appendix G of this Volume.

Table 4-6 shows the changes in air quality due to the development of the Project. The comparison of the modelling results between the 2028 scenarios and the 2017 Current Scenario shows the effects to local air quality due to electrification.

The Full-Build scenario results in marginally higher contaminant concentrations compared to the No-Build scenario at the most affected receptors near the Project. This is due to the increased deceleration, acceleration and total travel time through the study area of the remaining diesel trains due to the change of speed profiles from the Project. The overall increase is marginal, with a maximum single contaminant increase of 0.92% of the background concentration being attributable to the Project, and an average of all contaminant increases of 0.14% of the background concentrations as a result of the Project.

Anticipated increased ridership on the Kitchener rail corridor is expected to reduce passenger car trips, which is not assessed within this localized assessment. Details of air dispersion modelling results including maximum, median and percentile values for the 20 most affected receptors is provided in Appendix G of this Volume.

Table 4-6: Summary of COC Concentrations at the Most Affected Sensitive Receptor (Project Effects)

Contaminant	Averaging Period	Current 2017 Conditions (µg/m³)	Future 2028 No Build (µg/m³)	Future 2028 Full-Build (µg/m³)	Air Quality Threshold (µg/m³)
NO2	1 hour	1.27	0.231	0.680	83
	24 hour	0.262	0.0439	0.128	200
	Annual	0.0598	0.0111	0.0215	24
CO	1 hour	0.230	0.254	3.13	36200
	8 hour	0.192	0.120	0.742	15700
$PM_{2.5}$	24 hour	0.00737	0.00128	0.00516	27
	Annual	0.00180	0.000340	0.000710	8.8
Acetaldehyde	30 minute	0.000177	0.000194	0.00142	500
	24 hour	0.0000743	0.0000954	0.000496	500
Acrolein	1 hour	0.00155	0.0000908	0.000666	4.5
	24 hour	0.000326	0.0000223	0.000116	0.4
Benzene	24 hour	0.000786	0.0000540	0.000280	2.3
	Annual	0.000193	0.0000126	4.85E-05	0.45
1,3-Butadiene	24 hour	2.86E-06	1.96E-07	1.02E-06	10
	Annual	7.02E-07	4.56E-08	1.76E-07	2

Contaminant	Averaging Period	Current 2017 Conditions (µg/m³)	Future 2028 No Build (µg/m³)	Future 2028 Full-Build (µg/m³)	Air Quality Threshold (µg/m³)
Benzo (a)pyrene	24 hour	3.08E-08	4.77E-09	2.48E-08	5.00E-05
	Annual	7.57E-09	1.11E-09	4.29E-09	1.00E-05
Formaldehyde	24 hour	0.00427	0.000300	0.00156	65

The cumulative effects due to the proposed Project were calculated by aggregating the Project specific modelling results with the 90th percentile background ambient concentrations. The cumulative effects were compared to air quality thresholds and the percentage is presented in Table 4-7.

As shown in Table 4-7, the cumulative air quality effects of the Project are predicted to be below the air quality thresholds, with the exception of annual NO_2 and benzene and 24 hour and annual benzo(a)pyrene, which already exceed the air quality thresholds from 90th percentile ambient background concentrations. The cumulative air quality effects of the Project are predicted to marginally increase for all contaminants but not cause exceedance of any contaminants that are not already exceeding the respective thresholds. The maximum Project contribution to the concentration of contaminants already exceeding their threshold from ambient background concentrations is predicted to be 0.01% of the background concentration and considered to have a very small effect on the ambient pollutant concentrations that does not require consideration of mitigation.

Table 4-7: Summary of Maximum Predicted COC Concentrations at the Most Affected Sensitive Receptor (Cumulative Effects)

Contaminant	Averaging Period	Background Values (µg/m³)	Current Conditions 2017 Cumulative Concentrations (µg/m³)	Future 2028 No-Build Cumulative Concentrations (µg/m³)	Future 2028 Full-Build Cumulative Concentrations (µg/m³)	Air Quality Threshold (µg/m³)	Percent of Threshold 2017	Percent of Threshold 2028 No-Build	Percent of Threshold 2028 Full-Build
NO_2	1 hour	49.1	50.366	49.331	49.780	83	60.7%	59.4%	60.6%
	24 hour	40.9	41.162	40.944	41.028	200	20.6%	20.5%	20.5%
	Annual	**27.7**	**27.7598**	**27.7111**	**27.7215**	**24**	**115.7%**	**115.5%**	**115.5%**
CO	1 hour	441	441.230	441.254	444.132	36200	1.2%	1.2%	1.2%
	8 hour	424	424.192	424.120	424.742	15700	2.7%	2.7%	2.7%
$PM_{2.5}$	24 hour	14	14.00737	14.00128	14.00516	27	51.9%	51.9%	51.9%
	Annual	8.7	8.70180	8.700340	8.700710	8.8	98.9%	98.9%	98.9%
Acetaldehyde	30 min.	-	0.000177	0.000194	0.00142	500	0.00004%	0.00004%	0.0003%
	24 hour	1.4	1.4000743	1.4000954	1.400496	500	0.3%	0.3%	0.3%
Acrolein	1 hour	-	0.00155	0.0000908	0.000666	4.5	0.03%	0.002%	0.01%
	24 hour	0.2	0.200326	0.2000223	0.200116	0.4	50.1%	50.0%	50.0%
Benzene	24 hour	1	1.000786	1.0000540	1.000280	2.3	43.5%	43.5%	43.5%
	Annual	**0.8**	**0.800193**	**0.8000126**	**0.8000485**	**0.45**	**177.8%**	**177.8%**	**177.8%**
1,3-Butadiene	24 hour	0.099	0.09900286	0.099000196	0.09900102	10	1.0%	1.0%	1.0%
	Annual	0.053	0.053000702	0.0530000456	0.053000176	2	2.7%	2.7%	2.7%
Benzo (a)pyrene	**24 hour**	**0.000182**	**0.0001820308**	**0.00018200477**	**0.0001820248**	**5.00E-05**	**364.1%**	**364.0%**	**364.0%**
	Annual	**0.000132**	**0.00013200757**	**0.00013200111**	**0.00013200429**	**1.00E-05**	**1320.1%**	**1320.0%**	**1320.0%**
Formaldehyde	24 hour	4.2	4.204270	4.000300	4.0156	65	6.5%	6.5%	6.5%

4.7.2 Potential Effects, Mitigation and Monitoring Measures

Potential effects, corresponding mitigation measures and monitoring activities relating to air quality are described in Table 4-8.

Further details on potential effects, mitigation and monitoring are provided in Appendix G of this Volume.

Table 4-8: Air Quality Environment - Potential Effects, Mitigation and Monitoring

Feature	Potential Effect	Mitigation Measures	Monitoring Activity
Construction			
Air Quality	Air emissions associated with construction activities may include: 1. Total Suspended Particles (TSP), particulate matter less than 10µm (PM_{10}) and fugitive dust emissions resulting from: • Stockpiling of soils and other friable materials; • Granular material loading and unloading activities; • Transportation of soils and other friable materials via dump trucks; • Movement of heavy and light vehicles on paved and unpaved roads; • Soil excavation and filling activities required to facilitate the modified site layout for the new station; • Demolition of structures necessary to accommodate the new station; and • Cutting of existing concrete. 2. Emissions resulting from the combustion engines of construction equipment.	• An Air Quality Management Plan will be developed for implementation during construction to address construction equipment and vehicle exhaust, potential traffic disruption and congestion, fugitive dust and odour. Potential mitigation measures that may be included in the Air Quality Management Plan include: • Dust suppression measures (e.g., application of water wherever appropriate, or the use of approved non-chloride chemical dust suppressants, where the application of water is not suitable) will conform to recognized standard specifications such as the ChemInfo Services Inc. March 2005 publication "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" prepared for Environment Canada; • Use of dump trucks with retractable covers for the transport of soils and other friable materials; • Minimize the frequency of loading and unloading of soils and other friable materials; • Minimize drop heights, use enclosed chutes, and cover bins for debris associated with deconstruction of affected structures; • Washing of equipment and/ use of mud mats where practical at construction site exits to limit the migration of soil and dust off-site;	• Construction activities will be monitored by a qualified construction inspector who will frequently review the efficacy of the mitigation measures and construction best management practices to confirm they are functioning as intended. In the event that mitigation is found to be ineffective, revised mitigation measures designed to improve effectiveness will be implemented. Dust levels will be monitored daily by the Contractor and frequently by the construction inspector to assess the effectiveness of dust suppression measures, and adjust as required. Monitoring will continue throughout the construction phase until activities are complete, all exposed soils have been stabilized, and all construction waste has been removed from site; • A complaint response protocol for nuisance effects such as dust will be established; • Regular inspections of dust emissions (frequency to be defined prior to project construction) to confirm dust control watering frequency and rates are adequate; and, • Site supervisors should monitor the site for wind direction and weather conditions to ensure that high-impact activities be reduced when the wind is blowing consistently towards nearby sensitive receptors. The site supervisor should also monitor for

Feature	Potential Effect	Mitigation Measures	Monitoring Activity
		• Dust monitoring in locations where it has been determined that a particulate bound contaminant of concern exists in native soil; • Stockpiling of soil and other friable materials in locations that are less exposed to wind (e.g., protected from the wind by suitable barriers or wind fences/screens, or covered when long-term storage is required) and away from sensitive receptors to the extent possible; • Reduction of unnecessary traffic and implementation of speed limits; • Permanent stabilization of exposed soil areas with non-erodible material (e.g., stone or vegetation) as soon as practicably possible after construction in the affected area is completed; • Ensuring that all construction vehicles, machinery, and equipment are equipped with current emission controls, which are in a state of good repair; and • Dust-generating activities should be minimized during conditions of high wind; and, • Other mitigation techniques can be found in Environment Canada "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" (Environment Canada, 2013).	visible fugitive dust and take action to determine the root-cause in order to counteract this. Specific details regarding monitoring should be included in the Air Quality Management Plan.
Operations and Maintenance			
Air Quality	• During the operation of the Project, there are minimal predicted effects to air quality. The areas surrounding the station structures are naturally ventilated, so there is minimal risk to human exposure to COCs. Roadway dust, emergency	• Operations and maintenance of rail infrastructure will be carried out in accordance with applicable regulations and standards, including Environmental Activity and Sector Registry (EASR) and Environmental Compliance Approval	• Metrolinx maintains ongoing inspection schedules to monitor the effectiveness of its GO Transit operations. A complaints procedure is in place during operations to address concerns raised by neighbouring land

Feature	Potential Effect	Mitigation Measures	Monitoring Activity

	generator exhausts (GHGs and COCs), and any air handling equipment for conditioned spaces are also potential sources of operation air emission sources;
	• Air emissions from the combustion engines of emergency generators located at the Project (GHGs, COCs); and,
	• Air emissions from the combustion of natural gas in heating and ventilation equipment located at the Project (GHGs, COCs).
		(ECA) applications (O. Reg. 1/17 and 419/05).
		• To improve air quality around the station during maintenance and operation, several solutions can be implemented, such as:
		  • Signed speed limits on the rail corridor for locomotives;
		  • Improve walkways and trail connections to increase the number of passengers that are walking or cycling to access the station;
		  • Ensure fleet vehicles are properly maintained and kept in good working condition in terms of engine emission tune-ups;
		  • Testing of any standby emergency generators to occur for minimum duration and testing to be conducted one at a time, where applicable; and
		  • Adherence to MOECC Environmental Activity and Sector Registry (EASR) recommendations for exempt equipment that has minimal air quality impacts, as well as application to the EASR for equipment that qualifies (O. Reg. 1/17 and O. Reg. 419/05).
			owners, municipalities, or the public-at-large.

4.8 Noise and Vibration

4.8.1 Overview

Sensitive receptors within the identified NSAs were selected based on the geographical and land use context in the vicinity of the Project. NSAs are shown in Figure 3-10. Sensitive receptor locations are shown in Figure 3-11.

Construction noise levels were predicted as per the Roadway Construction Noise Model methodology contained in the FTA *Transit Noise and Vibration Impact Assessment* publication (Federal Transit Administration, 2006). The sound levels at the receptor location for each piece of equipment were then summed to determine the overall construction sound levels at each identified noise receptor. Table 4-9 presents the predicted construction sound levels at each receptor.

Construction sound levels during the worst-case scenario are expected to exceed the FTA criterion for R2 to R14, R22 to R27, as detailed below.

Table 4-9: Construction Noise Impact Assessment (Worst Case)

Receptor	Distance to Construction (m)	Noise Level, L_{eq} 1hr (dBA)			Exceeds Criterion?
		Day-time Criterion	Night-time Criterion	Predicted	
R1	104	90	80	67	No
R2	46	90	80	81	**Yes (night-time)**
R3	17	90	80	91	**Yes (day and night)**
R4	18	90	80	91	**Yes (day and night)**
R5	18	90	80	91	**Yes (day and night)**
R6	17	90	80	91	**Yes (day and night)**
R7	8	90	80	100	**Yes (day and night)**
R8	6	90	80	103	**Yes (day and night)**
R9	5[1]	90	80	105	**Yes (day and night)**
R10	5[1]	90	80	105	**Yes (day and night)**
R11	14	90	80	93	**Yes (day and night)**
R12	15	90	80	93	**Yes (day and night)**
R13	8	90	80	100	**Yes (day and night)**
R14	8	90	80	100	**Yes (day and night)**
R15	53	90	80	74	No
R16	119	90	80	65	No
R17	201	90	80	60	No
R18	246	90	80	62	No
R19	214	90	80	64	No
R20	146	90	80	68	No
R21	90	90	80	73	No
R22	5[1]	90	80	100	**Yes (day and night)**
R23	18	90	80	86	**Yes (night-time)**
R24	12	90	80	90	**Yes (day and night)**
R25	9	90	80	93	**Yes (day and night)**
R26	10	90	80	92	**Yes (day and night)**
R27	13	90	80	89	**Yes (night-time)**
R28	32	90	80	79	No
R29	113	90	80	66	No

Receptor	Distance to Construction (m)	Noise Level, L_{eq} 1hr (dBA)			Exceeds Criterion?
		Day-time Criterion	Night-time Criterion	Predicted	
R30	262	90	80	57	No

Note: 1 - Where receptors are located within the project footprint, for analysis purposes it is assumed a minimum distance of 5 metres from construction activities would be maintained.

Table 4-10 presents the predicted operations sound levels for all three scenarios.

Table 4-10: Operations Noise Impact Assessment

Receptor	Period	Predicted Noise Level (dBA)			Adjusted Impact Level[4]	Adjusted Impact Rating[5]
		Existing Rail[1]	Pre-Project[2]	Post-Project[3]		
R1	D	66.1	71.1	71.3	0.2	Insignificant
	N	59.7	65.8	66.1	0.3	Insignificant
R2	D	63.9	68.8	69.0	0.2	Insignificant
	N	57.5	63.5	63.6	0.1	Insignificant
R3	D	64.4	69.3	69.3	0.0	None
	N	58.2	64.1	64.0	-0.1	None
R4	D	65.8	70.7	70.6	-0.1	None
	N	59.6	65.5	65.3	-0.2	None
R5	D	64.8	69.8	69.6	-0.2	None
	N	58.6	64.6	64.3	-0.3	None
R6	D	65.8	70.9	70.6	-0.3	None
	N	59.6	65.7	65.3	-0.4	None
R7	D	66.2	71.3	71.0	-0.3	None
	N	59.9	66.0	65.6	-0.4	None
R8	D	65.5	70.6	70.3	-0.3	None
	N	59.1	65.3	64.8	-0.5	None
R9	D	70.7	76.1	76.0	-0.1	None
	N	63.6	70.6	70.3	-0.3	None
R10	D	55.6	60.7	60.1	-0.6	None
	N	49.3	55.4	54.6	-0.8	None
R11	D	57.6	62.5	61.9	-0.6	None
	N	50.9	57.0	56.0	-1.0	None
R12	D	58.9	63.8	63.1	-0.7	None
	N	52.1	58.2	57.2	-1.0	None
R13	D	59.9	64.8	64.1	-0.7	None
	N	53.0	59.3	58.1	-1.2	None
R14	D	61.5	66.0	65.4	-0.6	None
	N	54.4	60.2	59.2	-1.0	None
R15	D	64.9	69.8	69.1	-0.7	None
	N	57.7	64.0	62.9	-1.1	None
R16	D	65.4	70.4	69.6	-0.8	None
	N	58.5	64.8	63.6	-1.2	None
R17	D	61.9	67.3	66.3	-1.0	None
	N	56.2	62.5	61.1	-1.4	None
R18	D	56.7	61.8	60.9	-0.9	None
	N	50.5	56.7	55.4	-1.3	None

Receptor	Period	Predicted Noise Level (dBA)			Adjusted Impact Level[4]	Adjusted Impact Rating[5]
		Existing Rail[1]	Pre-Project[2]	Post-Project[3]		
R19	D	57.1	62.2	61.3	-0.9	None
	N	50.9	57.0	55.7	-1.3	None
R20	D	57.4	62.5	61.6	-0.9	None
	N	51.1	57.2	55.9	-1.3	None
R21	D	55.3	60.7	59.8	-0.9	None
	N	49.1	55.6	54.3	-1.3	None
R22	D	58.8	64.8	63.9	-0.9	None
	N	53.2	60.2	59.0	-1.2	None
R23	D	53.6	59.3	58.7	-0.6	None
	N	48.0	54.5	53.8	-0.7	None
R24	D	56.5	62.0	61.6	-0.4	None
	N	50.8	57.2	56.6	-0.6	None
R25	D	54.9	60.4	60.0	-0.4	None
	N	49.3	55.7	55.2	-0.5	None
R26	D	54.1	59.6	59.3	-0.3	None
	N	48.5	54.9	54.4	-0.5	None
R27	D	56.3	61.5	61.3	-0.2	None
	N	50.3	56.5	56.2	-0.3	None
R28	D	54.5	59.8	59.8	0.0	None
	N	48.8	54.9	54.9	-0.1	None
R29	D	53.2	58.8	59.1	0.3	Insignificant
	N	47.8	54.2	54.5	0.3	Insignificant
R30	D	58.2	63.7	64.3	0.6	Insignificant
	N	52.6	59.0	59.6	0.6	Insignificant

Notes:.1 - Existing and future rail noise levels calculated using CadnaA Version 2018 noise prediction software, using the operational data presented in Tables 2-1 and 4-4 in Appendix H of this Volume.
2 - Pre-project noise level is the combination of the ambient noise and future no-build rail noise.
3 - Post-project noise level is the combination of the ambient noise and future build rail noise.
4 - Adjusted Noise Impact is based on the difference between pre-project and post-project noise levels.
5 - Mitigation is only required when 'significant or greater' impact is predicted.
D - Day-time 16hr L_{eq} (07:00 - 23:00)
N - Night-time 8hr L_{eq} (23:00 - 07:00)

Vibration levels were modelled using the *General Method* presented in the FTA's *Transit Noise and Vibration Impact Assessment* guide.

Table 4-11 shows the two most impactful pieces of equipment and resulting ZOI. It is noted that pile driving is not expected to occur during construction.

Table 4-11: Construction Vibration ZOI

Equipment	Reference Peak Particle Velocity at 7.6 m (mm/s)	Zone of Influence (m)
Auger-Piling/Caisson Drilling	2.26	4.5
Vibratory Roller	5.33	8.0

Table 4-12 lists all the receptors that are less than 8 m away from the edge of proposed construction zone (i.e., ZOI) including the receptors that are within the proposed construction zone.

Table 4-12: Receptors within the Vibration ZOI

Receptor	Municipal Address	Distance to Construction Zone (m)
R7	150 Sudbury Street	8
R8	36 Lisgar Street	6
R9	99 Sudbury Street	5
R10	47 Sudbury Street	5
R14	90 Shank Street	8
R22	Joe Shuster Way - Future Development	5

Note: Where receptors are located within the project footprint, it is assumed a minimum distance of 5 metres from construction activities would be maintained.

Table 4-13 summarizes the predicted RMS vibration velocities at the representative receptor locations for each scenario. Although existing vibration levels were measured at three representative locations, the provided profile speeds were used to calculate vibration levels at all receptor locations for existing, future no-build, and future build conditions for consistency in the comparison.

Future build vibration levels at nearly all receptors are expected to be equal to or less than the future no-build vibration levels after implementation of the Project, because future express trains would generally be traveling at the same speeds as existing and future no-build conditions. However, the predicted vibration level at R30 is expected to increase above the objective vibration level by 0.06 mm/sec, which corresponds to a 14 percent increase in vibration level.

Table 4-13: Operations Vibration Impact Assessment

Receptor	Distance to Track (m)	RMS Vibration Velocity (mm/sec)		Exceeds Objective by more than 25%?
		Objective[1]	Difference	
R1	30	0.24	0.00	No
R2	41	0.18	0.00	No
R3	48	0.15	0.00	No
R4	44	0.16	0.00	No
R5	40	0.18	0.00	No
R6	34	0.22	0.00	No
R7	34	0.22	0.00	No
R8	34	0.22	0.00	No
R9	13	0.59	0.00	No
R10	42	0.17	0.00	No
R11	42	0.17	0.00	No
R12	43	0.17	0.00	No
R13	38	0.20	0.00	No
R14	82	0.14	-0.06	No
R15	38	0.20	0.00	No
R16	37	0.20	0.00	No
R17	40	0.18	0.00	No
R18	36	0.27	0.00	No

Receptor	Distance to Track (m)	RMS Vibration Velocity (mm/sec)		Exceeds Objective by more than 25%?
		Objective[1]	Difference	
R19	37	0.26	0.00	No
R20	40	0.23	0.00	No
R21	34	0.28	0.00	No
R22	12	0.72	0.00	No
R23	45	0.18	0.00	No
R24	27	0.32	0.00	No
R25	41	0.20	0.00	No
R26	43	0.19	0.00	No
R27	30	0.27	0.00	No
R28	44	0.18	0.00	No
R29	27	0.29	0.00	No
R30	20	0.40	0.05	No

Note: 1 - Highest value between the Protocol objective vibration velocity of 0.14 mm/s, or measured vibration velocity.

4.8.2 Potential Effects, Mitigation and Monitoring Measures

Potential effects, corresponding mitigation measures and monitoring activities relating to noise and vibration are described in Table 4-14.

Further details on potential effects, mitigation and monitoring are provided in Appendix H of this Volume.

Table 4-14: Noise and Vibration Environment - Potential Effects, Mitigation and Monitoring

Feature / Location of Potential Effect	Potential Effect	Mitigation Measure	Monitoring Activity
Noise - Construction			
Representative receptors shown in Figure 4-1	Temporarily Increased Sound Levels due to Construction	• A Noise and Vibration Control Plan will be developed prior to construction. The plan will include a complaint response protocol and will indicate that surrounding property owners and tenants will be informed of anticipated upcoming construction works, including any work at night. • A more detailed noise assessment of construction should be completed when the specifics of construction equipment are finalized, prior to construction start. This assessment should consider minimizing construction-related noise levels, while balancing construction schedules and expediting construction activity. • Trains passing construction zones may be required to use bells and/or whistles to warn construction personnel for safety reasons. This should be minimized as much as practical while promoting safety. • Construction equipment has safety features such as backup alarms (beeping sound). This is for the protection and safety of workers. Consideration will be given to the use of broadband rather than tonal backup beepers. • Construction should adhere to the City of Toronto noise by-laws (Noise Control By-Law, Municipal Code Chapter 591, By-law 1400-2007), summarized in Section 3.2.1.2, to the extent possible. • To the extent possible, nighttime construction activities should be avoided to reduce the potential impact of construction noise. Certain types of construction work can only be completed when trains are not in service (i.e., outside of business hours). Construction should be planned to minimize the number of nights where noisy nighttime construction activities may be required. • All construction equipment used should be in good repair and properly maintained to limit noise emissions. All construction equipment should be operated with effective muffling devices that are in good working order and idling of construction equipment kept to a minimum to reduce noise from construction activities. Unnecessary noise caused by faulty or non-operating components shall be addressed by regularly maintaining all equipment. • Noise emissions from construction equipment are to comply with the limits set out in NPC-115, NPC-118, and US Federal guidelines presented in Tables 3-1 through 3-3.	None anticipated to be required at this time Potential monitoring locations presented in Figure 4-1

Feature / Location of Potential Effect	Potential Effect	Mitigation Measure	Monitoring Activity
Noise - Operations			
Representative receptors shown in Figure 3-11	Overall decreased noise levels Increase of less than 1 dB at four receptor locations	• None	None
Noise - Stationary			
Representative receptors shown in Figure 3-11	Potential increase in noise levels	• During detailed design, the station public address system, ancillary systems, and any other stationary noise sources shall be designed so that the one-hour equivalent sound level does not exceed the higher of the applicable exclusion limit value given in NPC-300, or the background sound level.	None
Vibration - Construction			

Representative receptors presented in Figure 4-2	Temporarily Increased Vibration Levels due to Construction	• A Noise and Vibration Control Plan will be developed prior to construction. The plan will include a complaint response protocol and will indicate that surrounding property owners and tenants will be informed of anticipated upcoming construction works, including any work at night.
		• A more detailed vibration assessment of construction should be completed when the specifics of construction equipment are finalized, prior to construction start. This assessment should consider minimizing construction-related vibration levels, while balancing construction schedules and expediting construction activity.
		• It is recommended that the vibration limits in the City of Toronto by-law not be exceeded. This may entail monitoring of vibration levels during construction. Anticipated vibration levels will be confirmed during detailed design.
		• During detailed design, the predicted ZOI should be updated to confirm which structures fall within it. If a structure falls within the updated ZOI, the following is recommended:
		  • Pre-construction consultations with owners/occupants;
		  • Pre-construction measurements of background vibration levels; and
		  • Pre-construction survey by means of a photographic record of potentially affected structure façades and surfaces, including visible sections of
			• Consideration should be given to monitoring of vibration during vibration-intensive activities, to confirm that levels do not approach those required for structural damage.
			• Once a detailed construction vibration assessment has been completed, work that may exceed the vibration limits in the City of Toronto bylaw or that may cause structural damage should be monitored.

Feature / Location of Potential Effect	Potential Effect	Mitigation Measure	Monitoring Activity
		building foundations, building cladding, doors, windows, interior wall finishes, surface pavement, sidewalks, signs and trees. Each of the elements should be rated on their general condition (new, good, fair, poor, severe), and visible defects should be photographed.	
Vibration - Operations			
Representative receptors shown in Figure 3-11	Overall decreased vibration levels Increase of less than 25% at one receptor location	• During detailed design, the effects of any discontinuities such as crossovers or switches need to be assessed at the adjacent vibration sensitive land uses.	None

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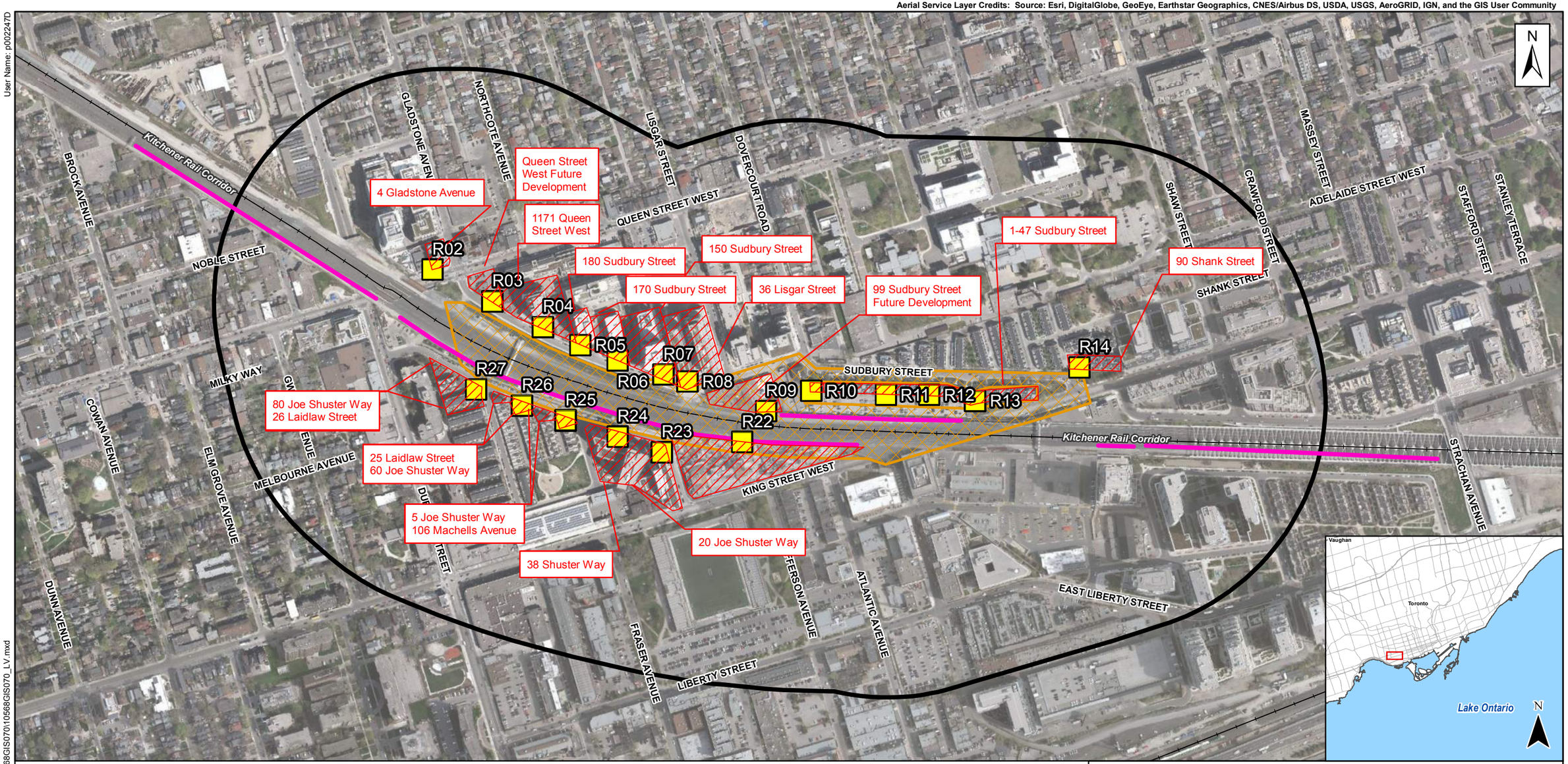

Legend

- Study Area - 300 Metres
- Proposed Project Footprint (approximate)
- Railway
- Existing Noise Barriers
- Potentially Affected Land Use (Due to Construction Noise)
- Potential Construction Noise Monitoring Location

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs
Receptor Data - Parsons

0 50 100 200 300 Metres

Project:	**New SmartTrack Station**
Figure Title:	**King-Liberty SmartTrack Station Potential Construction Noise Monitoring Locations**
Prepared By:	4TRANSIT PARSONS HATCH WSP
Date:	**July 06 2018**
Version: LV.EPR.100-1	**Review:**
Figure:	**6-1**

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User Name: p0022247D

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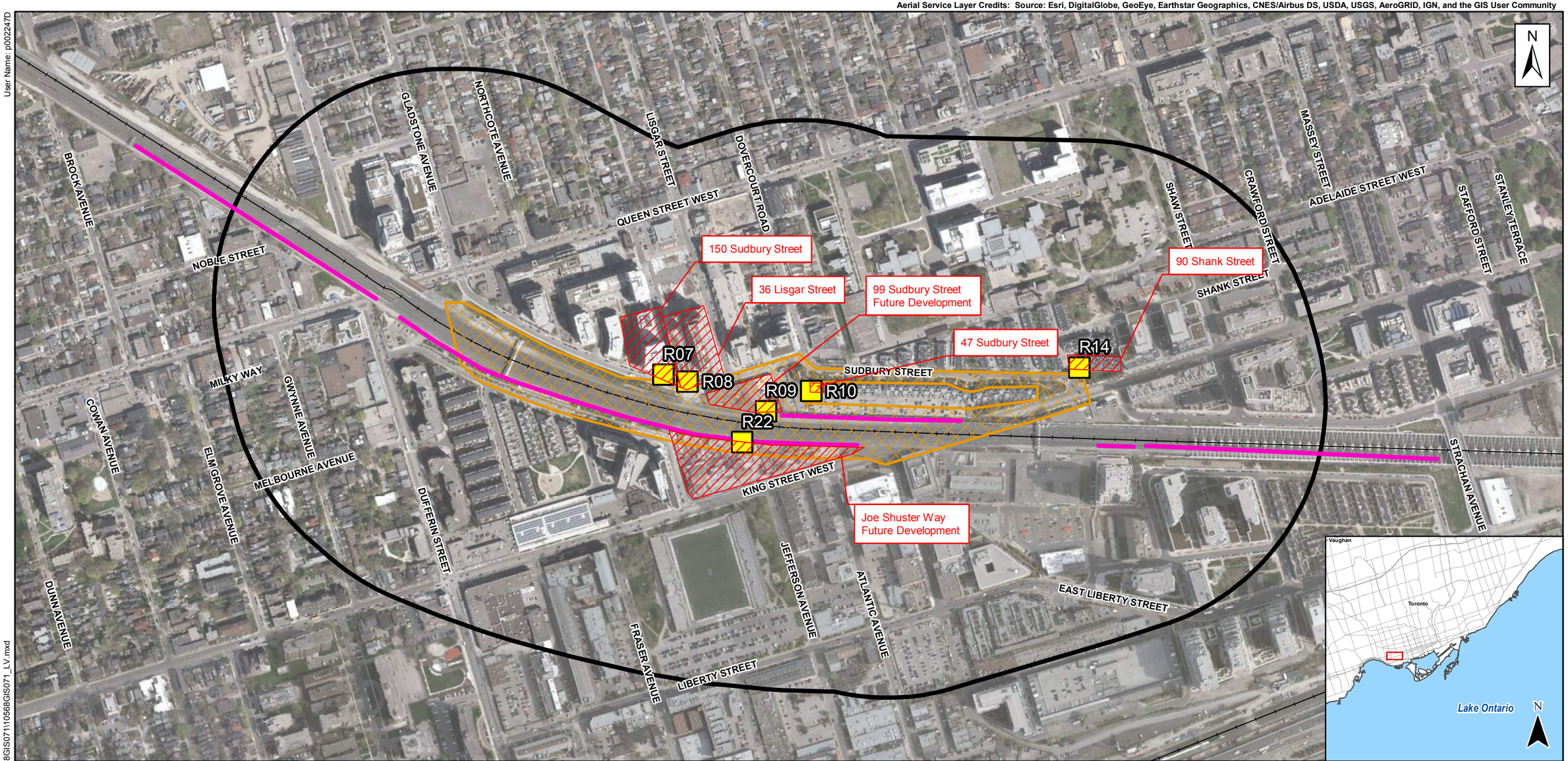

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Legend

- Study Area - 300 Metres
- Proposed Project Footprint (approximate)
- Railway
- Existing Noise Barriers
- Potentially Affected Land Use (Due to Construction Vibration)
- Potential Construction Vibration Monitoring Location

DATA SOURCES:

Roads and Railways - Ontario Open Data Catalogue
Watercourses - Land Information Ontario
Project Footprint - Initial Preferred Designs
Receptor Data - Parsons

0 50 100 200 300 Metres

Project:	**New SmartTrack Station**		
Figure Title:	**King-Liberty SmartTrack Station Potential Construction Vibration Monitoring Locations**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**July 06 2018**
Version: LV.EPR.100-1	**Review:**	**Figure:** 6-2	

4.9 Traffic and Transportation

4.9.1 Overview

The study area transportation network, namely rail, pedestrian and cycling infrastructure, will differ from existing conditions once the Project is implemented. Specifically, the City of Toronto's 10-Year Cycling Plan describes several initiatives that are planned to improve cycling infrastructure near the Project, including:

- Planned bicycle lanes/cycle tracks on Dovercourt Road;
- A Quiet Street Route along Sudbury Street; and
- An extension of the WTRP bicycle trail, along the north side of the rail corridor.
- A multi-modal bridge overpass structure, east of the station, connecting the multi-use path on the north side of the rail corridor at Douro Street to Western Battery Road.

In addition, the station is planned to incorporate features that will improve pedestrian and cycling connectivity, including:

- Connection to the King High Line, a planned MUP along the south side of the rail corridor, with access via Joe Shuster Way and the south side of King Street/Hanna Avenue and the bicycle facilities located there;
- A multi-modal bridge overpass structure, west of the station, connecting the multi-use paths on the north and south sides of the rail corridor;
- Toronto Bike Share facilities are anticipated to remain near the intersections of King Street West and Joe Shuster Way, and King Street West and Douro Street. Two new Bike Share facilities are planned to be added near the station entrances of Sudbury Street and Dovercourt Road and east of King Street West and Atlantic Avenue (north of Hanna Avenue/Snooker Street); and
- A secured bike shelter will be provided near the Sudbury Street and Dovercourt Road entrance.

As a result of these planned infrastructure improvements, in addition to development and growth in the study area, it is anticipated that there will be an increase in pedestrian and cycling activities.

For the purpose of the transportation study, the amount of vehicular traffic generated by the Project was estimated in order to determine whether a more fulsome Transportation and Traffic Impact Study (TTIS) is required. Based on the City of Toronto's guidelines, a TTIS is required if a proposed development generates at least 100 net additional peak direction vehicle trips in the peak hour or impacts critical movements at area intersections. This threshold is defined by the City's Guidelines for the Preparation of Transportation Impact Studies, and is used to determine where the site-generated traffic might result in a noticeable change in the level of service on abutting roads, generate the need for transportation infrastructure (e.g. traffic control signals) or require the implementation of mitigating measures such as the construction of separate turn lanes (City of Toronto, 2013a).

A full description of the development of the mode split forecast is included in Appendix I of this Volume. Existing local GO Transit station characteristics were used as a basis for the

forecast mode split for the Project. As there will be no commuter parking at the station, all auto trips will be attracted and/or generated by informal PPUDO.

The forecast mode splits are shown in Table 4-15.

Table 4-15: Mode Splits for King-Liberty SmartTrack Station

Mode	A.M. Peak		P.M. Peak	
	Boarding	Alighting	Boarding	Alighting
Walking	58%	71%	71%	58%
Local Transit	18%	22%	22%	18%
Cycling	6%	7%	7%	6%
Passenger Pick-Up/Drop-Off	18%	0%	0%	18%
Carpool Passengers	0%	0%	0%	0%
Drive and Park	0%	0%	0%	0%

Table 4-16 summarizes the total number of trips that are created by the Project. The number of trips generated for each mode is the number of total boarding/total alighting occurring at the station, multiplied by the mode splits in Table 4-16. As shown below, the total number of auto trips (PPUDO) generated for the station is less than 100 in all cases.

Table 4-16: King-Liberty SmartTrack Station Trip Generation Summary

Mode	A.M. Peak		P.M. Peak	
	Boarding	Alighting	Boarding	Alighting
Walking	127	1541	1266	198
Local Transit	40	479	393	61
Cycling	13	160	131	20
Passenger Pick-Up/Drop-Off	40	0	0	61
Carpool Passengers	0	0	0	0
Drive and Park	0	0	0	0

The distribution of trips to the road network was determined based on existing trip patterns and existing land use surrounding the station site. Details of the distribution for all modes are included in Appendix I of this Volume.

The assignment of trips to the road network was based on the available routes and access points to the station, as well as the critical intersections surrounding the station area. Details of the assignment for all modes are included in Appendix I of this Volume.

There is a minimal number of auto trips generated by the informal PPUDO at the five key intersections. The largest value is from 23 vehicles turning right northbound at the intersection of King Street West and Atlantic Avenue during the P.M. peak hour. As noted above, this assignment was conservative, limiting trips to only a handful of roadways adjacent to the station. It is anticipated that the trips to/from the station will be more spread out than assigned, utilizing all available roadways, resulting in an overall smaller effect on the network.

The intersection of Sudbury Street and Dovercourt Road is currently stop-controlled, at which accessibility will be improved to include pavement marking crossings for pedestrians as part of the scope for the station design.

Compared to the anticipated auto trips generated by the nearby proposed developments, which are expected to have direct and more significant effects on the intersections adjacent to the station, the informal PPUDO trips generated by the Project (estimated very conservatively) are negligible.

The pedestrian and cyclist crossing activities, specifically at the five key intersections, are expected to be significantly higher compared to the existing conditions. Pedestrian improvements at the intersection of Sudbury Street and Dovercourt Road have been considered as part of the station design; however, further mitigation measures are likely required in order to effectively accommodate the increased pedestrian volumes.

The number of pedestrian trips generated by the station at the signalized intersections of King Street West and Atlantic Avenue, King Street West and Sudbury Street, Queen Street West and Dovercourt Road, and Queen Street West and Gladstone Avenue/Sudbury Street are notable based on this conservative analysis, but the effects of these trips on traffic operations are not anticipated to be significant. Mitigation measures are presented in Section 4.9.2.

4.9.2 Potential Effects, Mitigation and Monitoring Measures

The minimal number of auto trips generated by the informal PPUDO (40 trips in the A.M. peak hour and 61 trips in the P.M. peak hour estimated conservatively) is not expected to significantly affect the existing transportation network relative to other nearby developments and is below the 100-trip threshold as per the City's TIS guidelines.

Potential effects, corresponding mitigation measures and monitoring activities relating to traffic and transportation are described in Table 4-17.

Table 4-17: Transportation Environment - Potential Effects, Mitigation and Monitoring

Feature	Potential Effect	Mitigation Measure	Monitoring
Operations			

Traffic	Increased pedestrian/ cyclist flow along sidewalk/roadways adjacent to the station and at key intersections.
	
	The minimal number of auto trips generated by the informal PPUDO (40 trips in the A.M. peak hour and 61 trips in the P.M. peak hour estimated conservatively) is not expected to significantly affect the existing transportation network relative to other nearby developments and is below the 100-trip threshold as per the City's TIS guidelines.
		• Signalization of the intersection of Dovercourt Road and Sudbury Street to accommodate the significant increase in pedestrian/cyclist volumes and ensure safety for all road users;
		• Localized sidewalk widening at critical approaches to/from the station entrances, including:
		  • East and west sidewalks along Dovercourt Road between Queen Street West and Sudbury Street; and
		  • East and west sidewalks along Atlantic Avenue between its southern limit and King Street West, to accommodate the anticipated pedestrian surges due to events at the Exhibition grounds and to facilitate access between King-Liberty Station and Exhibition GO Station.
		  • Coordination of design with the West Toronto Rail Path extension to avoid impeding pedestrian movements.
		
		Recommended improvements to minimize effects to traffic operations include:
		• Extending the WTRP, a MUP, easterly along Douro Street from the overpass to the bicycle lanes on Strachan Avenue, as this will greatly enhance the available routes and connections for cyclists traveling to/from the station from the east. The extension of the MUP along Douro Street to Strachan Avenue will also enhance pedestrian connectivity;
		• Connecting the King High-Line overpass to the station's platform level via stairs/elevators, as this will greatly enhance the available routes and connections for pedestrians arriving to the station from the west and minimize the
			Increased pedestrian/ cyclist flow along sidewalk/roadways adjacent to the station and at key intersections.

Feature	Potential Effect	Mitigation Measure	Monitoring
		distance they need to travel to access the station; • Localized sidewalk installation and improvements on the east and west sidewalks along Jefferson Avenue should be implemented between its southern limit and King Street West, to accommodate the anticipated pedestrian surges due to events at the Exhibition grounds, and to facilitate pedestrian access between King-Liberty Station and Exhibition GO Station; • Further study into improving the pedestrian and cyclist operations at the intersection of Dovercourt Road and Sudbury Street in particular should be conducted, where the pedestrian/cyclist activities are expected to be the most significant, such as crosswalk widening, modifications to pedestrian/cyclist signal timing, pedestrian/cyclist overpass/underpass; • Signal optimization initiatives along the King Street West and Queen Street West corridors near the station should be considered to improve operations for vehicles and pedestrians/cyclist; and • Improving local transit service, e.g. increasing transit frequency and capacity, particularly the routes on King Street West (504 King and 514 Cherry), to address the anticipated increase in local transit demand for trips to/from the station.	
Construction			
Construction Effects	Road closure or reduced lanes during construction will temporarily impede traffic flow in the vicinity of the station.	Develop a traffic management plan to minimize traffic delays during construction.	Monitor the effectiveness of the traffic management/control strategies and adjust as necessary during the construction period.

5. Permits, Approvals and Commitments to Future Work

5.1 Permits and Approvals

5.1.1 Federal

5.1.1.1 Canadian Environmental Assessment Act, 2012

Under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012), the Regulations Designating Physical Activities identify the types of projects that may require a Federal EA. The Project does not constitute a designated project under CEAA 2012.

5.1.1.2 Species at Risk Act

The federal *Species at Risk Act*, 2002 (SARA 2002) provides a framework to ensure the survival of wildlife species and the protection of natural heritage in Canada. Under SARA, the federal government has responsibility for wildlife on federal lands. On private lands, SARA protection applies to: aquatic species listed as endangered, threatened or extirpated in Schedule 1 of SARA; migratory birds protected under the MBCA; and species in certain cases where provincial/territorial measures do not adequately protect a species;

No federal lands, aquatic species or migratory birds protected under the MBCA are anticipated to be impacted by the Project, and as such no permits are required under SARA.

5.1.1.3 Fisheries Act

As there are no anticipated effects to the watercourse within the study area, a Federal *Fisheries Act* Authorization is not required.

5.1.2 Provincial

5.1.2.1 Conservation Authorities Act

The study area is not regulated by the TRCA under *Ontario Regulation 166/06 - Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. Therefore, no future work is required with respect to the *Conservation Authorities Act*.

5.1.2.2 Endangered Species Act, 2007

The ESA provides specific protection to Endangered and Threatened species and their habitat. Special Concern species are not afforded specific protection under the ESA. One Threatened and one Special Concern SAR were identified as potentially occurring in the study area: Chimney Swift and Peregrine Falcon, respectively.

Chimney Swift still may be encountered incidentally within the study area and/or they may nest in the area between the finalization of this report and commencement of construction. Therefore, targeted roost surveys for Chimney Swift should be completed in appropriate chimneys if buildings (with chimneys) are proposed for removal within the study area. Repair, maintenance, or demolition of Chimney Swift roost/nesting structure may constitute destruction of critical habitat and the Project must register the activity with the MNRF as part of O. Reg. 242/08 under the ESA.

For Peregrine Falcon, a permit under the ESA is not required as it is a Special Concern species and no effects to its habitat (e.g., nesting habitat) are anticipated.

5.1.2.3 *Environmental Protection Act*

Dewatering during construction may be required to facilitate creation of an isolated dry work area and may require registration on the Environmental Approval Sector Registry (EASR) system (if dewatering is over 50,000 L/day but under 400,000 L/day) or a Permit to Take Water (if dewatering exceeds 400,000 L/day).

To improve air quality around the station during operation and maintenance, MOECC EASR recommendations for exempt equipment (O. Reg. 524/98) that has minimal air quality impacts, as well as application to the EASR for equipment that qualifies (O. Reg. 1/17 and O. Reg. 419/05) will be adhered to.

5.1.2.4 *Ontario Water Resources Act*

A Permit to Take Water may be required if dewatering during construction exceeds 400,000 L/day).

Approvals for discharge of pumped water will be required, which could include one or a combination of MOECC Environmental Compliance Approval (ECA) (under the *Ontario Water Resources Act* (OWRA), Section 53), Municipal Discharge Permits, and/or Conservation Authority Approval (through the Voluntary Project Review process). The need for these permits will be determined during detailed design.

5.1.3 Municipal

Metrolinx, as a Provincial Crown Agency, is not generally subject to municipal permitting and approval requirements; regardless, Metrolinx works in co-operation with local municipalities to adhere to the intent of the relevant permit/approval requirements to the extent possible. Metrolinx is in the process of establishing a Vegetation Compensation Protocol for RER projects; vegetation that is removed for the Project will be compensated for in accordance with the provisions of this protocol.

Removal and/or damage of woody vegetation located in adjacent lands, beyond the Kitchener rail corridor, may require municipal tree removal permits. To support the permit applications, an Arborist Report will be completed during detailed design to supplement the Tree Inventory Plan. Metrolinx will work in co-operation with the City of Toronto in the spirit of meeting by-law requirements, specifically the Private Tree By-law and Trees on City Streets By-law.

Municipal Discharge Permits may also be required for the discharge of pumped water associated with construction dewatering activities.

Construction should adhere to the City of Toronto noise by-laws (Noise Control By-Law, Municipal Code Chapter 591, By-law 1400-2007), to the extent possible. It is recommended that the vibration limits in the City of Toronto bylaw not be exceeded. This may entail monitoring of vibration levels during construction. Anticipated vibration levels will be confirmed during detailed design.

5.2 Commitments to Future Work

Metrolinx is committed to implementing the mitigation measures and monitoring activities outlined in Section 4. Permits, approvals and commitments to future work to be completed during the detailed design, as well as during pre-construction and construction, are outlined in Table 5-1.

Table 5-1: Commitments to Future Work

Discipline	Commitments
Detailed Design	
General	• Mitigation measures and monitoring requirements documented in Section 4 of this Volume of the EPR related to detailed design will be implemented.
Natural Environment	• Metrolinx, as a Provincial Crown Agency, is not generally subject to municipal permitting and approval requirements; regardless, Metrolinx works in co-operation with local municipalities to adhere to the intent of the relevant permit/approval requirements to the extent possible. Metrolinx is in the process of establishing a Vegetation Compensation Protocol for RER projects; vegetation that is removed for the Project will be compensated for in accordance with the provisions of this protocol. • Efforts will be made to coordinate with Toronto Hydro, Toronto Water and other utility companies that may be affected by utility relocations to help minimize the overall impacts of the Project on the natural heritage system. • Infrastructure and utility works will either be completed by Metrolinx as part of this Project, or by utility companies. Metrolinx and its Contractors will follow TRCA regulatory requirements. • Targeted roost surveys for Chimney Swift should be completed in appropriate chimneys if buildings (with chimneys) are proposed for removal within the study area. • A Soil Management Plan will be developed by a Qualified Professional as defined in O. Reg. 153/04 for managing soil materials on-site (includes excavation, location of stockpiles, reuse and off-site disposal). • A Stormwater Management Report will be completed to determine potential effects and mitigation measures. The report will be completed in consultation with TRCA and the MOECC. Stormwater management design will consider guidance provided by the MOECC Stormwater Management Planning and Design Manual (2003), Ministry of Transportation Ontario (MTO) Drainage Management Manual (2008), TRCA Storm Water Management Criteria (2012), and the Low Impact Development Stormwater Management Planning and Design Guide (TRCA/Credit Valley Conservation, 2010). • Measures to mitigate a potential loss of green space and reduce storm runoff will be identified in detailed design. • A Flood Contingency Plan will be developed during detailed design and prior to construction.
Geology and Groundwater	• Hydrogeological and geo-environmental studies will be carried out, which may identify recommendations for groundwater mitigation measures and monitoring. These future studies will be circulated to TRCA for review. • TRCA Geotechnical Engineering Design and Submission Requirements guidelines will be referenced during the detail design phase. • Soil and bedrock conditions, as well as bedrock elevations, will be confirmed through future geotechnical investigations to be undertaken in support of detailed design. • Ongoing engagement with the CTC source protection authority will be maintained.
Trees	• An update of the tree removal count of the Project. This should be based upon a more detailed level of design, with available

Discipline	Commitments
	access permissions and more detailed survey information, to the extent possible. • An update of the tree inventory to account for detailed grading, work zones and proposed clearing, to illustrate TPZ and their protection measures (types and locations), and tree removal zones, in accordance with the completion of an Arborist Report. The Arborist Report will be completed during detailed design and will contain at a minimum the following information in addition to details of tree location, size, species, conditions and category: 1. Recommendations for tree/vegetation protection and preservation measures for all trees/vegetation that are to be retained; 2. Details of tree pruning; 3. Details of all trees/vegetation recommended for removal, including removal measures; 4. Appraised values of trees/vegetation to be removed; 5. Mitigation and monitoring measures recommended to ensure success of preservation and removal measures; 6. Should vegetation compensation be required, it will be in accordance with the Metrolinx Vegetation Compensation Protocol; and 7. Mapping. • Assessment of trees within or adjacent to the work zones, as defined by the detailed design, as part of the completion of an Arborist Report to determine if trees will be impacted. • Preparation of detailed tree removal, restoration, and compensation plans in coordination with a Certified Arborist and/or Landscape Architect (licensed to practice in the Province of Ontario) to assist with species selection, planting locations and measures to promote establishment success.
Built Heritage Resources and Cultural Heritage Landscapes	Recommendations for BHRs and CHLs are based on the CHSR, CHAR, and CHERs undertaken for this Project. The following mitigation measures will be undertaken: • Heritage Impact Assessments must be completed for KL-1 - 55 Sudbury Street, KL-10 - 99 Sudbury Street, and KL-2 - the King Street West Subway. • The following mitigation measures will be implemented for KL-3 - 109 Atlantic Avenue: • Pre-construction consultations between the applicant and owners/occupants; • Pre-construction measurements of background vibration levels; • Pre-condition survey by means of a photographic record of potentially affected structure façades and all surfaces, including visible sections of building foundations, building cladding, doors, windows, interior wall finishes, surface pavement, sidewalks, signs and trees. Each of the elements should be rated on their general condition (new, good, fair, poor, severe), and visible defects will be photographed • Any additional measures outlined in the Noise and Vibration Control Plan should be implemented for the properties of known and potential CHVI that fall within the ZOI. • A CHER and, if required, HIA will be prepared during Detailed Design, to assess additional impacts related to the design of

Discipline	Commitments
	the station, for the KL-3 - Atlantic Avenue, within which the Project footprint is located. • Complete CHERs, where recommended, as early as possible during the detailed design phase of the Project and prior to completion of detailed design. • Complete HIAs, where required, in accordance with the Standards and Guidelines for Conservation of Provincial Heritage Properties and as early as possible during the detailed design phase and prior to completion of detailed design. The HIA will discuss the alternatives considered, and that all other alternatives to removal and/or demolition have been considered and the best alternative has been adopted. The HIA will also make recommendations to minimize or mitigate adverse effects on the property. • If during detailed design the final limits of the Project are anticipated to fall outside the current Project footprint, further assessment may be necessary.
Archaeology	• Archaeological recommendations are based on a Stage 1 AA undertaken for this Project. Archaeological recommendations have been made based on the background historic research, locations of known or registered archaeological sites, previous AAs, and indicators of archaeological potential as outlined in the 2011 S&G. These recommendations are: • Areas determined to be undisturbed will be subjected to a Stage 2 AA in accordance with section 2.1.2 of the 2011 S&G prior to construction activities to ensure no cultural heritage resources will be impacted; • Areas determined to be disturbed do not require further assessment; • Areas identified to contain deeply buried archaeological potential must be subjected to a Stage 2 AA in accordance with Section 2.1.7, Standard 3 or 4 and Guideline 2 of the 2011 S&G, prior to construction activities; • If final limits of the Project are altered and fall outside the current study area, an additional Stage 1 AA is required to assess the new footprint. • Figure 3-3, in Section 3.4.2 of this EPR Volume, indicates areas of archaeological potential requiring Stage 2 AA. Complete all required AA (Stage 2 and Stage 3 if recommended by the Stage 2 AA) as early as possible, prior to the completion of detail design, and well in advance of any ground disturbance; • Undertake future work in a manner that protects archaeological sites by conserving them in their original location or through archaeological fieldwork, and endeavour to conserve significant archaeological resources in their original location through documentation, protection, and avoidance of impacts. Where activities could disturb significant archaeological resources or areas of archaeological potential, Metrolinx will take appropriate measures to mitigate impacts; and • Include provisions in procurement documents as recommended by archaeological assessment(s) (e.g. in case archaeological resources are discovered, protection of sites).
Socio-Economic and Land Use Characteristics	• Confirm effects on utilities. Additional subsurface utility engineering (SUE) investigations may be conducted, as required, to confirm existing utilities. A review of existing and proposed future utilities plans, in addition to on-going consultation with utility companies and the City of Toronto, will be conducted during the detailed design stage. • Any relocations, service interruptions, or utility protection projects will be identified as early as possible to allow for project coordination and construction management plans to be created with consideration of utility needs.

Discipline	Commitments
	• Specific property requirements will be determined during detailed design. Ongoing consultation with affected property owners will help identify appropriate site-specific mitigation measures. Where access to property is required, ongoing consultation with affected landowners will help identify appropriate site-specific mitigation measures. • A lighting plan will be developed where the quality of light produced, and type of light sources used on the exterior of buildings, signs, pedestrian walkways, and other areas of the site, are compatible with, and appropriate to the overall design and use of the site. • Ongoing consultation with utility companies will be conducted during detailed design. • Metrolinx will continue to work with CP through detailed design to minimize potential effects on CP operations.
Air Quality	• To improve air quality around the station during maintenance and operation, MOECC EASR recommendations for exempt equipment (O. Reg. 524/98) that has minimal air quality impacts, as well as application to the EASR for equipment that qualifies (O. Reg. 1/17 and O. Reg. 419/05) will be adhered to during detailed design.

Noise and Vibration	• A more detailed noise assessment of construction should be completed when the specifics of construction equipment are finalized, prior to construction start. This assessment should consider minimizing construction-related noise levels, while balancing construction schedules and expediting construction activity.
	• During detailed design, the station public address system, ancillary systems, and any other stationary noise sources shall be designed so that the one-hour equivalent sound level does not exceed the higher of the applicable exclusion limit value given in NPC-300, or the background sound level.
	• A more detailed vibration assessment of construction should be completed when the specifics of construction equipment are finalized, prior to construction start. This assessment should consider minimizing construction-related vibration levels, while balancing construction schedules and expediting construction activity.
	• A vibration monitoring plan should be completed during detailed design.
	• During detailed design, the predicted ZOI should be updated to confirm which structures fall within it. If a structure falls within the updated ZOI, the following is recommended:
	  • Pre-construction consultations with owners/occupants;
	  • Pre-construction measurements of background vibration levels; and
	  • Pre-construction survey by means of a photographic record of potentially affected structure façades and all surfaces, including visible sections of building foundations, building cladding, doors, windows, interior wall finishes, surface pavement, sidewalks, signs and trees. Each of the elements should be rated on their general condition (new, good, fair, poor, severe), and visible defects should be photographed.

Traffic and Transportation	• City of Toronto staff will be requested to include, in their 2-year review of the Ten Year Cycling Network Plan scheduled in 2018, a review of the cycling infrastructure and routes in the vicinity of the Project in order to identify possible improvements to the cycling network (both on-street and on trails) to enhance convenience and safety for cyclists accessing this station.

Discipline	Commitments
Construction[15]	
General	• Mitigation measures and monitoring requirements documented in Section 4 of this Volume of the EPR related to construction will be implemented. • An Environmental Mitigation and Monitoring Plan (EMMP) will be developed prior to construction to outline the responsibilities for carrying out monitoring and reporting activities, including timing and frequency of monitoring activities, as well as the compliance process. The EMMP will include all mitigation measures, categorized by Project phase, and will identify the party responsible for implementation. • Metrolinx will ensure that CP is notified in advance of any potential service disruptions and consult with CP Rail to establish a suitable mitigation strategy to be implemented.
Natural Environment	• Develop an ESC Plan prior to construction for implementation throughout construction. The ESC Plan will include consideration of the Greater Golden Horseshoe Area Conservation Authorities' Erosion and Sediment Control Guideline for Urban Construction and OPSS 805 (Erosion and Sediment Control Measures, Ministry of Transportation, 2015). This plan will encompass all areas of soils disturbance.
Geology and Groundwater	• Dewatering during construction may be required to facilitate creation of an isolated dry work area and may require registration on the EASR system (if dewatering is over 50,000 L/day but under 400,000 L/day). A Permit to Take Water may be required if dewatering during construction exceeds 400,000 L/day. • Approvals for discharge of pumped water will be required, which could include one or a combination of MOECC Environmental Compliance Approval (ECA) (under the *Ontario Water Resources Act* (OWRA), Section 53), Municipal Discharge Permits, and/or Conservation Authority Approval (through the Voluntary Project Review process). The need for these permits will be determined during detailed design. • Municipal Discharge Permits may also be required for the discharge of pumped water associated with construction dewatering activities.
Archaeology	• Should deeply buried archaeological materials be encountered during construction, all work will cease and a professionally licenced archaeologist will be consulted to assess the cultural heritage value and significance of the archaeological deposits; • Areas identified to contain deeply buried archaeological potential must be subjected to a Stage 2 AA in accordance with Section 2.1.7, Standard 3 or 4 and Guideline 2 of the 2011 S&G, prior to construction activities; • MTCS should be notified if archaeological resources are encountered or impacted during the course of the EA project work. All activities affecting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the Ontario Heritage Act and the Standards and Guidelines for Consultant Archaeologists. • If human remains are encountered during project work, all activities must cease immediately and the local police as well as the Cemeteries Regulation Unit of the Ministry of Government and Consumer Services must be contacted. In situations

[15] Construction phase commitments include pre-construction commitments, completed following detailed design but prior to ground disturbance.

Discipline	Commitments
	where human remains are associated with archaeological resources, MTCS should also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act. • No construction activities shall take place within the study area prior to the MTCS confirming in writing that all archaeological requirements have been met.
Socio-Economic and Land Use Characteristics	• Site-Specific Construction Traffic Control and Management Plans will be prepared and implemented prior to Project construction to maintain access through work zones, to the extent possible.
Air Quality	• An Air Quality Management Plan will be developed for implementation during construction to address construction equipment and vehicle exhaust, fugitive dust and odour.
Noise and Vibration	• Construction will adhere to the City of Toronto noise by-laws (Noise Control By-Law, Municipal Code Chapter 591, By-law 1400-2007), to the extent possible. It is recommended that the vibration limits in the City of Toronto bylaw not be exceeded. This may entail monitoring of vibration levels during construction. Anticipated vibration levels will be confirmed during detailed design. • A Noise and Vibration Control Plan will be developed prior to construction. The plan will include a complaint response protocol and will indicate that surrounding property owners and tenants will be informed of anticipated upcoming construction works, including any work at night.
Traffic and Transportation	• A Construction Traffic Management Plan (CTMP) will be developed prior to construction which will include providing pedestrian and cyclist access through work zones, alerting local transit of potential travel delays/service disruptions in advance of Project construction including road closures; identification of best detour routes for transit vehicles that minimizes travel time and service disruptions should be identified.
Operations and Maintenance	
General	• Mitigation measures and monitoring requirements documented in Section 4 of this Volume of the EPR related to operations will be implemented.

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