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4. Baseline Conditions

The following chapter provides a summary of the baseline environmental conditions within the UP Express Electrification EA study area, with further details contained in each of the respective supporting reports/studies (included as Appendices to this EPR). Generally, baseline conditions data was collected through a combination of: 1) review of background information/reports, and 2) field investigations (as required). It is noted that baseline information was collected during the pre-planning phase of the EA (as part of the conceptual design phase). Therefore at this stage, a more conservative range beyond the study area was considered in order to ensure a comprehensive understanding of baseline environmental conditions was captured.

As previously mentioned, the study area generally includes the rail corridor (from UP Express Union Station to UP Express Pearson Station along the existing Union Station and Kitchener rail corridors) plus the preferred locations for siting the associated traction power distribution facilities, EMU maintenance facility, as well as gantries and underground 25 kV feeders (installed via duct banks) required at the new traction power facility locations. Accordingly, the sections below have been organized such that a description of the baseline conditions along the rail corridor is provided first, followed by a description of the baseline conditions at each respective facility site. For ease of reference, the study area was divided into four sections, which contain the following facilities (see **Figure 4-1**):

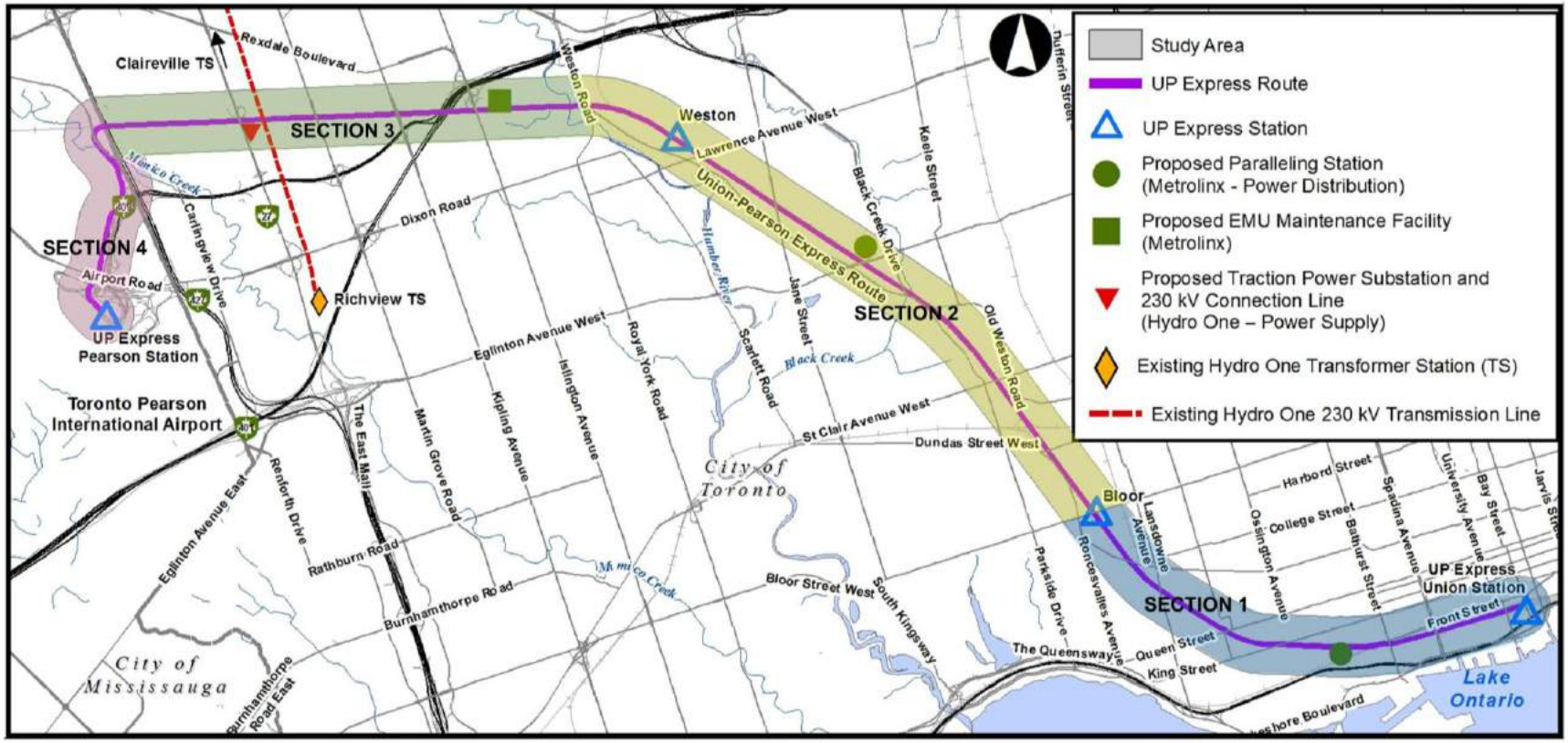
- **Section 1 – UP Express Union Station to UP Express Bloor Station**
  - Including Paralleling Station location at Ordnance Street
- **Section 2 - UP Express Bloor Station to UP Express Weston Station**
  - Including Paralleling Station location at 3500 Eglinton Avenue West
- **Section 3 - UP Express Weston Station to Highway 427**
  - Including EMU Maintenance Facility location at 50 Resources Road
  - Including traction power distribution components (gantries and underground feeders associated with Hydro One Traction Power Substation at 175 CityView Drive)
- **Section 4 - Highway 427 to UP Express Pearson Station**
  - There are no traction power facilities in this portion of the study area.

With this in mind, the following subsections document the baseline conditions according to natural, social, and cultural environmental factors:

- **Natural Environment Factor:**
  - Terrestrial Features (i.e., vegetation, wildlife/wildlife habitat, etc.)
  - Aquatic Features (i.e., surface water, fish/fish habitat)
  - Hydrogeological Features
  - Contaminated Sites
- **Cultural Environment Factor:**
  - Cultural Heritage Features (i.e., built heritage features, cultural landscapes)

  - Archaeological Features
- **Social Environment Factor (including Built Environment):**
  - Land Use/Social Features
  - Property
  - Air Quality
  - Noise
  - Vibration
  - Visual
  - Utilities
- **Other**
  - Electromagnetic Fields
  - Electromagnetic Interference

FIGURE 4-1 STUDY AREA SECTIONS



PARSONS BRINCKERHOFF
MORRISON HERSHFIELD

4.1 Natural Environment - Terrestrial Features

Baseline natural environmental data was collected via a combination of background review and field investigations undertaken in 2012. For purposes of collecting baseline conditions information (including field surveys), a conservative buffer area within 120m of the rail corridor was applied.

The purpose of the 2012 field investigations was to confirm existing information on Species at Risk (SAR), woodlands, vegetated communities, wetland communities (provincial and local significance) and unevaluated wetlands that was obtained from the Ministry of Natural Resources (MNR) including Natural Heritage Information Centre (NHIC), and Land Information Ontario (LIO). Wildlife habitat, including significant wildlife habitat (e.g. seasonal concentration areas, specialized wildlife habitats, rare vegetation communities, species/habitats of conservation concern and animal movement corridors) was based on visual confirmation, auditory confirmation or by way of indicators (tracks, scat, dens) during field investigations.

Field investigations were completed in May and September 2012. The terrestrial vegetation communities in the study area were classified as community level, according to the Ecological Land Classification (ELC) for Southern Ontario (MNR, 1998). Vegetation was described according to the most dominant species in the various strata (i.e. canopy, sub-canopy, shrub layer, and ground layer). In addition, a Breeding Bird Survey was completed along the rail corridor in July 2012. An Amphibian Survey was conducted on April 30, May 14, and June 5, 2012 using the Marsh Monitoring Protocol (2008).

Based on background review, air photo interpretation and field investigations, no Wetlands or Designated Natural Areas were identified within the study area.

Rail Corridor

With respect to the rail corridor portion of the study area, the rail corridor is comprised of a highly disturbed vegetation community dominated by grasses and field herbs, including Queen Anne's Lace (*Daucus carota*), Common Milkweed (*Asclepias syriaca*), Goldenrod (*Solidago sp.*), and occasional trees and shrubs, all of which are common to disturbed habitats and does not provide wildlife habitat function.

4.1.1 Section 1 – UP Express Union Station to UP Express Bloor Station

Wildlife Habitat and Wildlife Movement Corridors

No MNR-designated significant wildlife habitat features are present within this portion of the Study Area. No birds or nests were observed during the Breeding Bird Study.

Species at Risk (SAR)

The MNR has historical records (i.e., approximately 20+ years old) of eight SAR being observed in vicinity of the Study Area. However, based on air photo interpretation and confirmation via field investigations, there is no suitable habitat for these species within this portion of the Study Area.

The Ontario Breeding Bird Atlas has recent records (i.e., between 2001 and 2005) of five SAR as being observed within 10km of the Study Area. However, based on air photo interpretation and confirmation via field investigations, there is no suitable habitat for these species within this portion of the Study Area.

The Toronto Region Conservation Authority (TRCA) has a 2007 record of one SAR being observed approximately 200m from the Study Area, i.e., Common Nighthawk (*Chordeiles minor*): Special Concern species protected by SARA. However, based on air photo interpretation and confirmation via field investigations, there is no suitable habitat for this species within this portion of the Study Area. As mentioned, no birds or nests were observed during the Breeding Bird Study.

4.1.1.1 Paralleling Station (Ordnance Street)

Based on field investigations, this site contains minimal vegetation (shrubs and saplings) which is common to disturbed habitats (e.g., Trembling Aspen (*Populus tremuloides*), Willow species (*Salix sp*.). The ELC classification for this vegetation community is Cultural Thicket. This site does not provide specialized wildlife habitat or suitable habitat for any potential SAR.

4.1.2 Section 2 - UP Express Bloor Station to UP Express Weston Station

Wildlife Habitat and Wildlife Movement Corridors

No MNR-designated significant wildlife habitat features are present within this portion of the Study Area.

Six species of birds were observed during the Breeding Bird Study: Great Blue Heron (*Ardea herodias*), Spotted Sandpiper (*Actitis macularius*), American Robin (*Turdus migratorius*), Cedar Waxwing (*Bombycilla cedrorum*), Northern Cardinal (*Cardinalis cardinalis*), American Goldfinch (*Carduelis tristis*). However, no nests were observed in this portion of the Study Area during the Breeding Bird Study.

Habitat features for snakes and turtles were observed during field investigations at Black Creek, including rock and brush piles and soft, muddy banks (**Figure 4-2**). The Black Creek valley system also provides some function as a wildlife movement corridor for amphibians. It is somewhat limited in terms of size, habitat diversity and connectivity, however it is a locally significant feature.

FIGURE 4-2 BLACK CREEK

Species at Risk

The MNR has historical records (i.e., approximately within last 20 years) of nine SAR as being observed in the Study Area. The MNR's NHIC database has historical records of seven SAR as being observed within 1 km of the Study Area. Based on air photo interpretation and confirmation via field investigations, there is suitable habitat for four of these SAR within this portion of the study area, including Milksnake, Northern Map Turtle, Blandings Turtle, and Eastern Musk Turtle:

- The Milksnake is best known for occurring in rural areas, where it is most frequently reported in and around buildings, especially old structures. However, it is also found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. The Deciduous Forest (FOD) community at the 3500 Eglinton Avenue West site provides potential Milksnake habitat.

- The Northern Map Turtle inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation (Environment Canada 2011). Black Creek provides potential Northern Map Turtle habitat.

- Blandings Turtles are often observed using clear, eutrophic habitats, including lakes, rivers, streams, marshes or ponds. Black Creek provides potential Blanding's Turtle habitat.

- Eastern Musk Turtles require shallow water with little or no current and soft earth to bury into when they hibernate. Nesting habitat is variable, but it must be close to the water and exposed to direct sunlight (Environment Canada 2011). Black Creek provides potential Eastern Musk Turtle habitat.

The Ontario Breeding Bird Atlas has recent records (i.e., between 2001 and 2005) of five SAR as being observed within 10km of the Study Area. However, based on air photo interpretation and confirmation via field investigations, there is no suitable habitat for these species within this portion of the Study Area.

4.1.2.1 Paralleling Station at 3500 Eglinton Avenue West

Woodlands and Other Vegetated Areas

Vegetation cover on the 3500 Eglinton Avenue West site is primarily characterized as shrubs and saplings which is common to disturbed habitats. The ELC classification for this vegetation community was determined to be Cultural Thicket (see **Figure 4-3**).

FIGURE 4-3 CULTURAL THICKET COMMUNITY AT 3500 EGLINTON AVE. W. SITE

One wooded area was noted during background data review and confirmed during field investigations along the eastern portion of the 3500 Eglinton Avenue West site. This wooded area is classified as Deciduous Forest (FOD) under the ELC system, which is typically dominated by Crack Willow (*Salix fragilis)*, Manitoba Maple. Other trees include American Elm (*Ulmus americana)*, Trembling Aspen, Norway Maple (*Acer platanoides),* White Oak (*Quercus alba).*

It is noted that the TRCA has a 2012 record of a Red Fox (*Vulpes vulpes*) being observed adjacent to the FOD community, however this species was not observed during field investigations.

4.1.3 Section 3 - UP Express Weston Station to Highway 427

Wildlife Habitat and Wildlife Movement Corridors

No MNR-designated significant wildlife habitat features are present within this portion of the Study Area. However, the Humber River provides marginal habitat features for snakes and turtles.

Twelve species of birds were observed during the Breeding Bird Study: Mallard (*Anas platyrhynchos*), Red-tailed Hawk (*Buteo jamaicensis*), Downy Woodpecker (*Picoides pubescens*), Black-capped Chickadee (*Poecile atricapillus*), American Robin (*Turdus migratorius*), Cedar Waxwing (*Bombycilla cedrorum*), Song Sparrow (Melospiza melodia), Northern Cardinal (*Cardinalis cardinalis*), Red-winged Blackbird (Agelaius phoeniceus), Common Grackle (*Quiscalus quiscula*), Baltimore Oriole (*Icterus galbula*), American Goldfinch (*Carduelis tristis*).

No bird's nests were observed during the Breeding Bird study this portion of the Study Area.

Species at Risk

The MNR has historical records (i.e., approximately 20+ years old) of eight SAR being observed in the Study Area. Based on air photo interpretation and confirmation via field investigations, there is only suitable habitat for two SAR within this portion of the study area: Milksnake, and Eastern Ribbonsnake. The deciduous forest community within this portion of the Study Area provides potential Milksnake habitat and the Humber River provides potential habitat for Eastern Ribbonsnake.

The Ontario Breeding Bird Atlas has recent records (i.e., 2001 to 2005) of five SAR as being observed within 10km of the Study Area. However, based on air photo interpretation and confirmation via field investigations, there is no suitable habitat for these species within this portion of the Study Area.

4.1.3.1 EMU Maintenance Facility Site (50 Resources Rd.)

Based on field investigations, this site contains no natural features and does not provide any wildlife habitat function. The site is currently being used as a construction staging area (see **Figure 4-4**)

FIGURE 4-4 50 RESOURCES RD. SITE CONDITIONS

4.1.3.2 Traction Power Distribution Components (175 City View Drive)

Based on field investigations, this site is dominated by grasses and field herbs, including Grass species, Goldenrod, Queen Anne's Lace, Cow Vetch, Milkweed and does not provide wildlife habitat function. It is classified as Cultural Meadow under the ELC.

4.1.4 Section 4 - Highway 427 to UP Express Pearson Station

This section of the study area is comprised of an elevated rail spur line that is approximately 3km in length and approximately 25m above ground level at the highest point. Therefore, an assessment of terrestrial features was not required.

4.2 Natural Environment - Aquatic Features

The study area crosses three watercourses including: Black Creek, Humber River and Mimico Creek (refer to **Figure 4-1**). Aquatic field investigations were completed on May 2012. The assessment included a standard sampling methodology of 200m upstream and 50m downstream of each watercourse crossing where potential fish habitat is present. Field investigations encompassed the following aquatic habitat parameters:

- Water temperature classification (coldwater, warmwater);

- Habitat information/locations;
- Stream morphology (including shoreline habitat);
- Stream substrate and flow;
- Obstructions/barriers to fish passage and major disturbances; and
- "Critical" or important habitat areas including potential spawning areas, good nursery cover, and feeding areas.

Data on existing aquatic habitat features and fish communities in the vicinity was obtained from previous reports, TRCA and MNR. Photographs were taken of the in-stream habitat and bank characteristics of the upstream and downstream reaches (see Natural Environment Assessment Report contained in Appendix A).

4.2.1 Section 1 - UP Express Union Station to UP Express Bloor Station

There are no watercourses in this section of the corridor**.**

4.2.1.1 Paralleling Station (Ordnance Street)

There are no watercourses on or adjacent to this site.

4.2.2 Section 2 - UP Express Bloor Station to UP Express Weston Station

Black Creek crosses the rail corridor at the intersection of Weston Road and Black Creek Drive, and is located in the Humber River Watershed (see **Figure 4-5**). The watercourse does not have significant groundwater inputs and stream flows, therefore characterizing the system as warmwater habitat, which has been heavily affected to varying degrees by past and present urbanization (TRCA, 2008; MNR et al., 2005). Black Creek at this location is a permanent watercourse and has had minimal changes in fish habitat since 2009 (Ecoplans, 2009). Upstream (north) of the rail corridor, Black Creek flows through Keelesdale Park and then continues southeast of Weston Road under the rail corridor and downstream into a concrete lined channel for flood conveyance/protection.

FIGURE 4-5 BLACK CREEK - DOWNSTREAM (SOUTH) OF RAIL CORRIDOR CROSSING, LOOKING UPSTREAM

A fish habitat assessment was completed in May 2012. The banks were heavily vegetated with grasses, shrubs and trees, which provided bank stabilization and some overhanging cover opportunities. Riparian plantings and restoration efforts were evident further upstream in Keelesdale Park. Remaining instream cover was provided by some emergent vegetation and overhanging woody debris. Water quality levels were suitable for warmwater fish survival and spawning.

Historical records from the MNR and TRCA include 20 fish species in Black Creek. Redside dace is the only Species at Risk (SAR) historically found in Black Creek, which is protected as Threatened under the provincial *Endangered Species Act* (2007). The corridor is located in the lower reaches of Black Creek, where there is no presence of Redside Dace (MNR, personal communication, June 5, 2012). There are no other records of aquatic SAR within this reach of Black Creek (NHIC, 2012; DFO, 2012).

4.2.2.1 Paralleling Station (3500 Eglinton Avenue West)

There are no aquatic features on this site, however it is noted that Black Creek is situated to the east.

4.2.3 Section 3 - UP Express Weston Station to Highway 427

The Humber River crosses this section of the corridor, located just west of Weston Road, and east of the Weston Golf and Country Club (see **Figure 4-6**) The Humber River is located within the Humber River Watershed which spans 903 square kilometres from the headwaters on the Niagara Escarpment and Oak Ridges Moraine down to the river mouth on Lake Ontario (TRCA, 2008). This section of the Humber River is located in the Lower Main Humber River Subwatershed (MNR et al., 2005). It is highly urbanized and contains a number of piped and/or channelized watercourses and storm sewer and combined sewer outfalls. This reach does not have significant groundwater inputs and stream flows are supplied primarily by surface runoff and from the upstream catchment.

The Humber River at this location is a permanent watercourse and has had minimal change in fish habitat since 2009 (Ecoplans, 2009). It is categorized as a Large Riverine system being managed for Smallmouth Bass and Rainbow Darter. It supports warmwater fish habitat and provides a migratory function for salmonid species (Rainbow Trout) (MNR et al, 2005). Upstream (north) of the Kitchener/UP Express corridor, the Humber River flows from north of Highway 401 and continues south, past the residential properties and the Weston Golf and Country Club. It continues southwest of Weston Road and outlets further downstream into Lake Ontario.

The fish habitat assessment conducted in May 2012 confirmed existing secondary source information that supports the categorization of the Humber River as a warmwater Large Riverine system. Due to the fact that it provides a migratory function for salmonid species, the Humber River is considered to be a permanent system with moderate sensitivity for fish and fish habitat.

FIGURE 4-6 HUMBER RIVER - UPSTREAM (NORTH) OF RAIL CORRIDOR, LOOKING AT EAST BANK

Historical records from the MNR and TRCA include 64 fish species in this reach of the Humber River. American Eel (*Anguilla rostrata*) and Redside Dace (*Clinostomus elongatus*) are the only Species at Risk historically found in Humber River, which are both listed as Threatened under the provincial *Endangered Species Act* (2007). However, the rail corridor is located in the lower reaches of the Humber River, where there is no presence of American Eel or Redside Dace (DFO, 2012). There are no other records of aquatic SAR within this reach of the Humber River (NHIC, 2012; DFO, 2012).

Humber River Bridge Expansion

The Metrolinx Georgetown South Project involves construction of additional tracks to support the planned service expansion. To accommodate the widening of the Humber River bridge for the additional tracks, each of the eight piers (two of which are within the active channel of the Humber River) of the Humber Bridge were extended by 14m. In a partnership with Metrolinx, TRCA is undertaking measures to compensate for, and mitigate the loss of fish habitat as a result of the bridge expansion. Specifically, the Lower Humber River Marsh (LHRM) Restoration Project, is being implemented by TRCA on behalf of Metrolinx, in accordance with the federal *Fisheries Act*. The project includes the creation of a berm to isolate a large coastal wetland in the lower Humber River, which is part of the Lower Humber River Marshes Provincially Significant Wetland (PSW). The installation of the berm will restrict access of Common Carp (*Cyprinus carpio*) from entering specific areas of the wetland and will enable the establishment and expansion of a diverse natural marsh vegetation community. The LHRM Restoration Project is ongoing.

4.2.3.1 Maintenance Facility (50 Resources Road)

There are no aquatic features on or adjacent to this site.

4.2.3.2 Traction Power Distribution Components (175 City View Drive)

There are no aquatic features on or adjacent to this site.

4.2.4 Section 4 - Highway 427 to UP Express Pearson Station

This section of the study area is comprised of an elevated rail spur line that is approximately 3km in length and approximately 25m above ground level at the highest point. Notwithstanding this, it is noted that Mimico Creek crosses this section of the corridor, located just west of Goreway Drive (refer to **Figure 4-1**). The creek begins south of the Oak Ridges Moraine and drains into the north shore of Lake Ontario, and is located within the Mimico Creek Watershed. TRCA continues to monitor terrestrial and aquatic habitat and has provided strategic management directions to improve the Mimico Creek watershed (TRCA, 2010). Mimico Creek at this location is a permanent watercourse and has had minimal change in fish habitat since 2009 (Ecoplans, 2009).

4.3 Natural Environment - Hydrogeological Features

The topography of the Study Area is generally smoothly sloping from north to south, and is incised by Mimico Creek and the Humber River. The Study Area is contained within two physiographic regions: the Peel Plain and, from approximately Bloor/Dundas to Lake Ontario, the Lake Iroquois Sand Plain (Chapman and Putnam, 1984). Within the Peel Plain, the surficial geology is dominated by the silty clay Halton Till and clayey silt Newmarket Till, whereas within the Lake Iroquois Sand Plain the surficial geology is dominated by coarse-grained shallow water deposits (sands and gravels).

The overburden deposits generally thicken towards the north, away from Lake Ontario, being typically 10 m thick on the Lake Iroquois Sand Plain, and up to 60 m thick in the Peel Plain. Overburden is thickest within the infilled bedrock valleys. Bedrock in the area is shale of the Georgian Bay Formation (Hewitt, 1966).

Two principal regional aquifer systems exist in the Study Area, being the Scarborough Aquifer Complex (SAC, deltaic sediments with sand and clay members) and the Thorncliffe Aquifer Complex (TAC, lake deposits of stratified sands, silt, and varved clay), separated by the Sunnybrook Aquitard (see Sharpe, 1980 for geology, and TRCA, 2008 and 2010 for hydrostratigaphy). In the Lake Iroquois Sand Plain, the SAC is absent and the thin overburden corresponds to the. In the Peel Plain, both SAC and TAC are present, but are overlain and protected by up to 10m of low permeability Halton and/or Newmarket Till. The Scarborough Aquifer is underlying the Thorncliffe Aquifer Complex. Groundwater quality is monitored in the nine Provincial Groundwater Network (PGWN) wells and at twelve municipal water supply wells, all of which are situated to the north, outside the study area.

Within the Study Area, groundwater is generally not used for water supply, and the SAC and TAC are unexploited (Singer et al., 2003). The Study Area is highly urbanized and is serviced with water from Lake Ontario. Within the Lake Iroquois Sand Plain, the aquifer-like sediments area highly vulnerable to contamination (no protective low permeability sediments, shallow water table), and the groundwater quality may reflect this fact, although no groundwater quality data is available (TRCA, 2010). Within the Peel Plain, the SAC and TAC are identified as significant regional aquifers, although they are unexploited as a water supply (CTC Source Protection Region, 2012). Where the rail corridor crosses the Humber River and Mimico Creek, groundwater discharge contributes to baseflow in these watercourses. However, since the Study Area is characterized by a high proportion of impermeable surfaces (buildings, roads, parking lots, etc.), groundwater recharge and the quantity of associated baseflow are limited.

There are no municipal wells within the Study Area, and no significant groundwater recharge areas.

4.3.1 Section 1 - UP Express Union Station to UP Express Bloor Station

This section of the corridor is situated close to the shore of Lake Ontario, within the Iroquois Plain physiographic region (Chapman and Putnam, 1984). Surficial sediments in the area are represented by the glacial tills (silty clay to silt till) in the area adjacent to Lake Ontario and by glacial shallow water

deposits of Lake Iroquois (sand and gravel of the Thorncliffe Formation, Sharpe, 1980) in the area adjacent to Bloor Station. Four geotechnical boreholes were completed in this area (at Strachan Avenue), and the soils encountered in them was generally consistent with the mapped geology (fill over clayey silt to silty clay).

This area is highly urbanized and exists entirely within storm sewer catchment. There is virtually no groundwater recharge, highly vulnerable groundwater (due to surficial soils and shallow water table), and no human use of or ecological function for groundwater.

4.3.1.1 Paralleling Station (Ordnance Street)

Refer to hydrogeological features description in Section 4.3.1 above.

4.3.2 Section 2 - UP Express Bloor Station to UP Express Weston Station

The section of the corridor is also situated in the Iroquois Plain physiographic region, because the latter follows the low topography associated with the current Humber River, and the associated bedrock valley. Beach sand and lacustrine silt and clays represent the predominant deposited material, including the sand and gravel deposits (where the corridor crosses St. Clair Ave the soils are particularly coarse grained). According to TRCA (2008), the SAC is almost 60 m thick along the entirety of this section of the corridor, within an infilled bedrock valley. One geotechnical borehole was completed in this area (at Denison Road East), and the soils encountered in them was generally consistent with the mapped geology (sandy and gravely fill over sand and silty clay). The water table was encountered at approximately 2 m below ground surface (Trow Associates, 2009).

This area is highly urbanized, and from St. Clair south to Bloor Station is contained within a storm sewer catchment. From St. Clair Avenue north, the UP Express is within the watershed of the Humber River, and its eastern tributary, Black Creek, which are shallow groundwater discharge zones. The Humber River and Black Creek are identified as intake protection zones (IPZs) by TRCA Source Protection Region (2012). Groundwater has the potential to transport contaminants to these IPZs. Groundwater recharge in this area is limited by the impermeable surfacing (buildings, roads, parking lots, etc.) and the storm sewer network. Groundwater is highly vulnerable to contamination, and there is no human use of groundwater.

4.3.2.1 Paralleling Station (3500 Eglinton Avenue West)

Refer to hydrogeological features description contained in Section 4.3.2 above.

4.3.3 Section 3 - UP Express Weston Station to Highway 427

The section of the corridor is situated in the Peel Plain physiographic region (Chapman and Putnam, 1984), and is demarcated at east and west by the deep valleys cut into this plain by the Humber River

and Mimico Creek, respectively. Surficial deposits along the corridor comprise of clayey silt till (Newmarket and Halton Tills), a regional aquitard. According to TRCA (2008), the SAC and TAC are almost absent in this area, wheras the Newmarket till is up to 20m thick. Six geotechnical boreholes were completed in this area (at Lawrence Avenue West), and the soils encountered in them was generally consistent with the mapped geology (fill over clayey silt till). The shale of the Georgian Bay Formation was encountered at less than 5 m depth, and the water table was encountered at approximately 2m depth (Trow Associates, 2009).

This area is highly urbanized and includes the Humber River and Mimico Creek. These watercourses are supported by groundwater discharge during the summer months. However, the contribution of groundwater to baseflow in this portion of the Study Area is limited due to the high proportion of impermeable surfaces (buildings, roads, parking lots, etc.), the storm sewer network, and low permeability soils. There is no human use of groundwater.

4.3.3.1 EMU Maintenance Facility (50 Resources Road)

Refer to hydrogeological features description contained in Section 4.3.3 above.

4.3.3.2 Traction Power Distribution Components (175 City View Drive)

Refer to hydrogeological features description contained in Section 4.3.3 above.

4.3.4 Section 4 - Highway 427 to UP Express Pearson Station

This section of the study area is comprised of an elevated rail spur line that is approximately 3 km in length and approximately 25m above ground level at the highest point. Therefore, an assessment of hydrogeological features is not provided.

4.4 Contaminated Sites

As documented in the 2009 Georgetown South Service Expansion and Union-Pearson Rail Link (GSSE-UPRL) EPR, previous contaminant investigations (Phase I and Phase II Environmental Site Assessments) have been completed along the rail corridor between Strachan Avenue and Highway 427, as well as at former industrial properties along the UP Express Spur alignment (between Highway 427 and Toronto Pearson). The findings of these investigations identified a number of existing and potential site contamination issues along the corridor attributed to the nature of past and current land uses within and adjacent to the rail corridor, including:

- Former coal storage yards;
- Former large industrial facilities;
- Former brownfield properties, i.e. former industrial properties redeveloped into residential properties;

- Existing large industrial facilities including manufacturing and chemical storage;
- Gas stations and service garages;
- Automotive wrecking yards;
- Numerous piles of railway ties within the corridor; and
- Oil storage sheds and former train stations within the corridor.

In addition, there is potential for contaminated rail ballast, bedding and fill material attributed to the use of slag, coal cinders and ash, which are typical of railway corridors.

4.4.1 Section 1 - UP Express Union Station to UP Express Bloor Station

Refer to Section 4.4 above for a summary of site contamination conditions along the rail corridor.

4.4.1.1 Paralleling Station (Ordnance Street)

Metrolinx currently owns the property at Ordnance Street (south of the Kitchener/UP Express rail corridor, just east of Ordnance Street), therefore a Phase I ESA was not conducted.

The proposed gantries at this location are anticipated to be located within the rail corridor ROW. The duct bank alignment at this location is anticipated to be directly adjacent to/parallel to the rail corridor ROW.

4.4.2 Section 2 - UP Express Bloor Station to UP Express Weston Station

Refer to Section 4.4 above for a summary of site contamination conditions along the rail corridor.

4.4.2.1 Paralleling Station (3500 Eglinton Avenue West)

The Paralleling Station in Section 2 is to be located on a former Kodak manufacturing and processing facility at 3500 Eglinton Avenue West As part of the due diligence process related to the Eglinton Crosstown LRT project being undertaken by Metrolinx, Phase 2 Environmental Site Assessments were conducted at this site by Golder Associates Ltd. and by AMEC. These studies found that soil and groundwater on this site are impacted by petroleum hydrocarbons, volatile organic compounds, metals and inorganics at levels in excess of applicable MOE effects-based (*Table 3*) site condition standards. In accordance with Ontario Regulation 153/04 a Risk Assessment (RA) approach is proposed as part of the Crosstown LRT project to protect human health and the environment during and following construction.

With this in mind, it has been assumed for the purposes of the UP Express Electrification EA that the potential contamination effects during operation/construction will be mitigated through conformance with the RA approach and CPU as established for the future Crosstown design/build project, which will be applicable to all activities proposed at the 3500 Eglinton Avenue West site.

4.4.3 Section 3 - UP Express Weston Station to Highway 427

Refer to Section 4.4 above for a summary of site contamination conditions along the rail corridor.

4.4.3.1 EMU Maintenance Facility (50 Resources Road)

There have been a number of ESA studies previously completed on the 50 Resources Road site, including:

- A Phase 1 ESA was completed in 2005 as part of decommissioning the previous Labatt brewery
- A Phase 2 ESA was completed in 2006 as a result of the recommendations in the 2005 Phase I ESA. The Phase 2 ESA resulted in several work programs involving remediation activities on the site to remove USTs, remove two concrete effluent tanks and two fuel oil tanks, installation of monitoring wells surrounding the former tank cavities, and preparation of a report documenting these activities.
- In 2008, additional remedial work was carried out including excavation of impacted soil. A total of 10,100 metric tonnes of hydrocarbon-impacted soil was reported to have been removed from the property.
- In 2008, Phase 1 and Phase 2 ESAs were also completed as part of which resulted in further remediation work to address soil and groundwater contamination in the former equipment storage area, former fuelling facility and former maintenance garage areas. This was documented in a 2008 report.
- Following this remediation work, another Supplemental Phase 2 ESA was completed by Golder in September 2008. As a result, a remediation program was completed to address two specific areas of the property:
    - The area of PHC-impacted soil situated south of the former maintenance garage; and
    - The area of PAH-impacted soil located in the east-central portion of the 50 Resources Road property (situated off the site).
- Following the 2008 remediation work, a Record of Site Condition was submitted by Golder on August 2009 with a certification date of February 11, 2009. The RSC applies to an area of 14,699 hectares. The RSC allows for future commercial or industrial development on the site.

However, there is potential that future soil excavation activities during construction may encounter materials exceeding applicable MOE Site Condition Standards. Refer to EPR Chapter 6 for assessment of potential site contamination effects.

4.4.3.2 Traction Power Distribution Components (175 City View Drive)

The potential effects related to the new TPS are being assessed by Hydro One as part of a separate Class EA process (refer to *Hydro One's Union Pearson Express Electrification Traction Power Substation Class Environmental Assessment – Draft Environmental Study Report*). Notwithstanding this, it is noted that

the Metrolinx power distribution components, including the gantries and duct banks, are being assessed under the Transit Project Assessment Process for the UP Express Electrification EA.

The proposed gantries are anticipated to be located within the rail corridor ROW. The duct bank alignment at this location is anticipated to be directly adjacent to/parallel to the rail corridor ROW.

4.4.4 Section 4 - Highway 427 to UP Express Pearson Station

This section of the study area is comprised of an elevated rail spur line that is approximately 3 km in length and approximately 25m above ground level at the highest point. Therefore, an assessment of contaminated sites was not required.

4.5 Cultural Heritage

A Cultural Heritage Resource Assessment (CHAR) was carried out as part of the UP Express Electrification EA which entailed identification of several built heritage resources (also referred to as heritage properties for purposes of this report) and cultural heritage landscapes both along and in the vicinity of the UP Express rail corridor, as well as those located on and in the vicinity of the proposed electrification facility sites. The CHAR involved: 1) background historic research, including review of primary and secondary source research and historic mapping to identify early settlement patterns and broad agents or themes of change in a study area, and 2) a field review to confirm the location and condition of previously identified cultural heritage resources. The field review is also utilized to identify cultural heritage resources that have not been previously identified on federal, provincial, or municipal databases. A copy of the CHAR is contained in Appendix C.

For the purposes of the CHAR, the term cultural heritage resource was used to describe both cultural landscapes and built heritage features. A cultural landscape is perceived as a collection of individual built heritage features and other related features that together form farm complexes, roadscapes and nucleated settlements. Built heritage features are typically individual buildings or structures that may be associated with a variety of human activities, such as historical settlement and patterns of architectural development.

4.5.1 Metrolinx Interim Cultural Heritage Management Process (2013)

Metrolinx has developed an internal process to screen and evaluate potential impacts to cultural heritage resources related to Metrolinx undertakings, called the Metrolinx Interim Cultural Heritage Management Process (2013). This methodology involves the use a checklist based on the Ministry of Tourism, Culture and Sport (MTCS) "*Check Sheet for Environmental Assessments, Screening for Impacts to Built Heritage and Cultural Heritage Landscapes*" to identify:

- Known built heritage resources and cultural heritage landscape resources previously identified by municipal, provincial, or federal authorities; and,
- Potential built heritage resources and cultural heritage landscape resources that require more documentation to determine cultural heritage value or interest.

As part of the heritage evaluation process outlined in the Metrolinx Interim Cultural Heritage Management Process (2013), a qualified heritage specialist (qualified person) will evaluate the property including conducting research, gather documentary evidence and consult appropriate groups and individuals in order to understand the cultural heritage value of the property. The evaluation step also involves applying the "Criteria for Determining Cultural Heritage Value or Interest" set out in Ontario Regulation 9/06 under the Act to determine the cultural heritage value or interest of the property; and applying the "Criteria for Determining Cultural Heritage Value of Provincial Significance" set out in Ontario Regulation 10/06 to determine whether the property is of Provincial Significance and make recommendations as to whether the property meets these criteria.

In addition, Metrolinx has established a Heritage Committee (MHC) to administer the Metrolinx Interim Cultural Heritage Management Process (2013) and ensure that heritage obligations as set out in applicable federal and provincial statutes and policy are met.

With this in mind, the following subsections summarize the information collected during the baseline conditions phase of the EA.

4.5.2 Section 1 - UP Express Union Station to UP Express Bloor Station

Section 1 of the study area runs through the historic core of the City of Toronto and numerous nineteenth-century settlement centres. This portion of the corridor retains numerous properties that have been listed on the municipal heritage inventory or designated under Part IV or Part V of the *Ontario Heritage Act.* This section of the corridor also passes through three known or potential Heritage Conservation Districts (HCD), which include the Union Station and Draper HCDs (designated under Part V of the *OHA*) and the proposed West Queen West and Liberty Village HCDs, which have been authorized for study by the City of Toronto, and the Fort York and Garrison Common National Historic Site and Heritage Conservation District (designated under Part V of the *OHA*).

Based on background review of previous studies/reports and field investigations, **Table 4-1** lists the cultural heritage resources identified within Section 1.

With regard to the *Level of Recognition* column in Table 4-1, the various designations are defined as follows:

- Designated under Part IV of the Ontario Heritage Act (applies to individual buildings/properties);
- Designated under Part V of the Ontario Heritage Act (applies to districts or groups of resources/properties);
- Listed by the municipality (means that the municipality has identified a property as having heritage value but evaluation/designation under the Ontario Heritage Act has not yet taken place);
- Identified during field review (means a resource was identified during the field review stage of the UP Express Electrification assessment and no prior recognition exists).

In addition, it is noted that the *Metrolinx Status* column reflects the current status of each CHR in accordance with the evaluation process for determining cultural heritage value or interest, as set out in the Metrolinx Interim Cultural Heritage Management Process (2013) (see Section 4.6.1):

- Potential Provincial Heritage Property – is a property owned by the Metrolinx and has been identified as a potential heritage property via a Cultural Heritage Screening Report. The heritage status has not yet been established by the Metrolinx Heritage Committee.

- Conditional Heritage Property - is a property not owned by the Metrolinx, or has joint ownership with another party, and has been identified as potential heritage property via a Cultural Heritage Screening Report.

TABLE 4-1 BASELINE CULTURAL HERTIAGE RESOURCES – SECTION 1

CHR	Description	Level of Recognition	Metrolinx Status
1	Bathurst Street Bridge	Listed Heritage Property (City of Toronto);	Potential Provincial Heritage Property
2	Strachan Avenue Level Crossing[1]	N/A	N/A
3	King Street Subway	Listed Heritage Property (City of Toronto)	Potential Provincial Heritage Property
4	Queen Street Subway	Evaluated, Local Significance (Golder Associates 2011a)	Potential Provincial Heritage Property
5	Lansdowne Avenue Subway	Evaluated; Local Significance (Golder Associates 2011a)	Potential Provincial Heritage Property
6	Dundas Street Bridge	Identified during field review	n/a
15	805 Wellington St W (Industrial Building)	Identified during field review	Conditional Heritage Property
16	99 Sudbury Street (Industrial Building)	Identified during field review	Conditional Heritage Property
28	UP Express Corridor	Identified during field review	Conditional Heritage Property
32	Union Station Heritage Conservation District	Designated under Part V of the *Ontario Heritage Act*	Conditional Heritage Property
34	Proposed West Queen West Heritage Conservation District	Under study by the City of Toronto	Conditional Heritage Property
35	Fort York and Garrison Common Heritage Conservation District	Designated under Part V of the *Ontario Heritage Act*	Conditional Heritage Property
B1	Brock Avenue Subway	Evaluated; No heritage significance**	n/a
B2	Bloor Street Subway	Evaluated; No heritage significance**	n/a

**Golder Associates 2011a, Heritage impact assessment, Georgetown South Service Expansion, Union-Pearson Rail Link, Railway Subways, Queen Street West, Brock Avenue, Lansdowne Avenue, Bloor Street West, and Dupont Street, City of Toronto, Ontario. Report Number 10-1151-0241-R01

[1] *The Strachan Avenue Grade Separation is currently under construction as part of the Metrolinx Georgetown South project.*

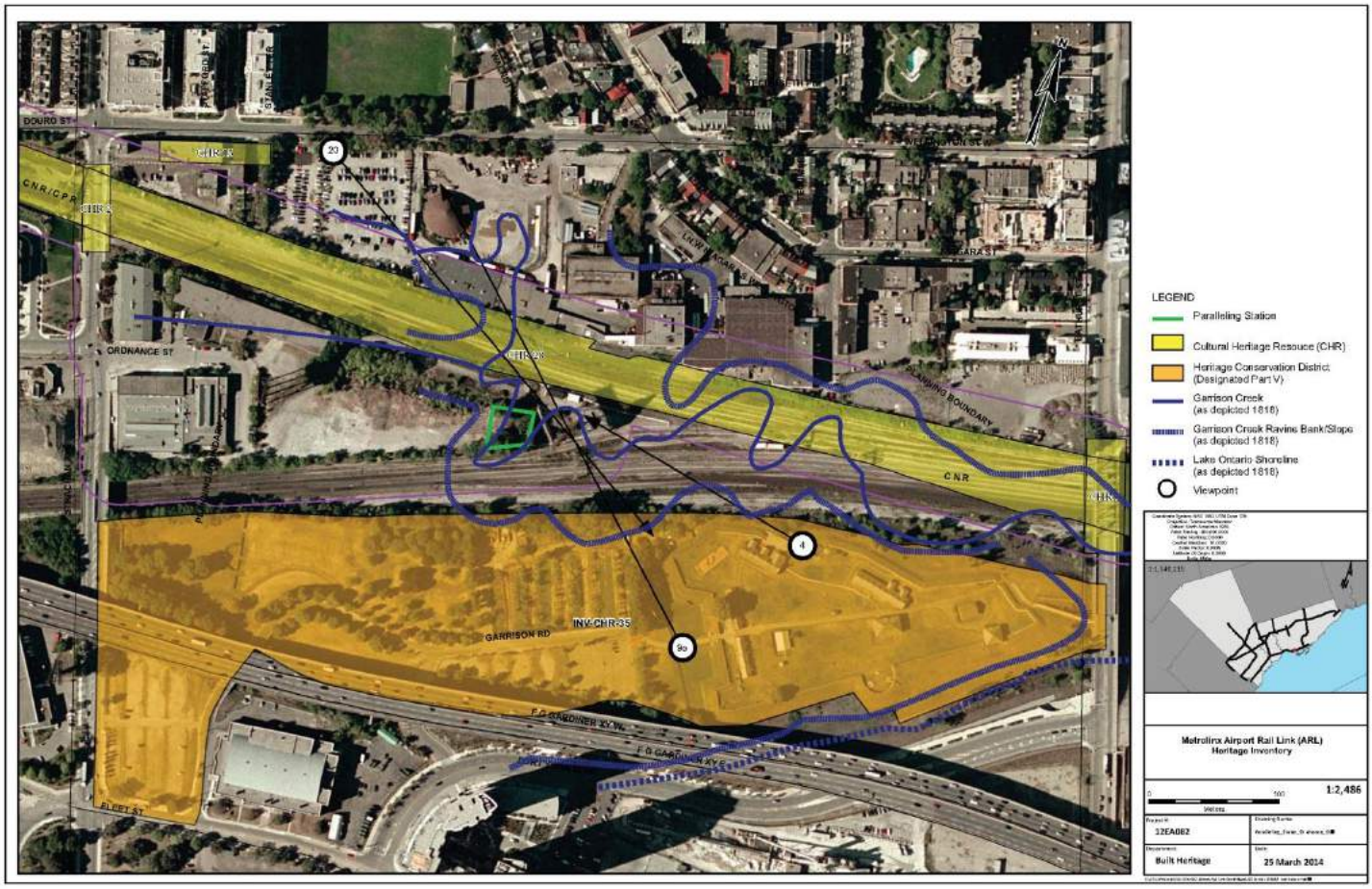
4.5.2.1 Paralleling Station (Ordnance Street)

The proposed Paralleling Station is located at the east end of 10 Ordnance Street. The property forms part of a triangular shaped parcel bounded by Ordnance Street on the west, rail lines on the north, east, and south. The Fort York and Garrison Common National Historic Site and Heritage Conservation District (CHR 35) is located in close proximity to the Paralleling Station site, immediately south of the rail lines (see **Figure 4-7**). While the Fort York and Garrison Common National Historic Site and Conservation District is not within the proposed Paralleling Station site, three heritage attributes associated with Fort York and Garrison Common (i.e., Garrison Creek and Garrison Creek Ravine, darkness/no light, viewpoints) are located within the limits of the Paralleling Station site.

The Fort York and Garrison Common National Historic Site and Heritage Conservation District is bounded to the north by the Canadian National Railway lines, to the east by Bathurst Street, to the south by York Boulevard and to the west by Strachan Avenue, although portions of the district extend past Strachan Avenue and Bathurst Street on the east and west. The Heritage Conservation District boundaries relate to city owned land directly connected with Fort York (Catherine Naismith Architects 2010:25). It should be noted that there are associated sites and attributes within a broader cultural heritage landscape outside the boundaries of the Heritage Conservation District. These attributes include views to and from the fort in addition to landscape features.

Adjacent lands, as defined in the draft *Fort York Heritage Conservation District Study and Plan,* are approximately bounded by Portland Street/Dan Leckie Way the east, Lake Shore Boulevard and Coronation Park in the south, the first line of Exhibition Grounds and Crawford Street in the west, and King Street to the north. The lands within this boundary are also known as Fort York Precinct. The Fort York Precinct encompasses the original Garrison Common Reserve and the lake-fill lands to the south. The proposed Paralleling Station is adjacent to the Fort York site and falls within the Fort York Precinct.

FIGURE 4-7 CULTURAL HERITAGE FEATURES IN PROXIMITY TO ORDNANCE PARALLELING STATION



PARSONS BRINCKERHOFF
MORRISON HERSHFIELD

4.5.3 Section 2 - UP Express Bloor Station to UP Express Weston Station

This section of the study area includes nineteenth century settlement centres that first developed as separate communities in York Township and were later annexed to the City of Toronto in the late nineteenth and early twentieth-centuries. Section 2 of the corridor retains numerous properties that are listed on Toronto's municipal heritage inventory or are designated under Part IV or Part V of the Ontario Heritage Act.

In addition, this section of the corridor is located in close proximity to two known or potential Heritage Conservation Districts (HCD), which include the Phase 1 Weston HCD and Phase 2 Weston HCD.

Based on background review of previous studies/reports and field investigations, **Table 4-2** lists the cultural heritage resources identified within Section 2. **Figure 4-8** below illustrates the Wallace Avenue Pedestrian Bridge (CHR 7).

FIGURE 4-8 WALLACE AVENUE PEDESTRIAN BRIDGE

TABLE 4-2 BASELINE CULTURAL HERTIAGE RESOURCES – SECTION 2

CHR	Description	Level of Recognition[2]	Metrolinx Status[3]
7	Wallace Avenue Pedestrian Bridge	Listed Heritage Property (City of Toronto)	Conditional Heritage Property
B3	Dupont Street Subway	Evaluated; No heritage significance**	n/a
B4	St. Clair Avenue Subway	Evaluated; No heritage significance***	n/a
B5	Rogers Road Bridge	Identified through background research	Conditional Heritage Property
B6	Eglinton Avenue Subway	Evaluated; No heritage significance***	n/a
B7	Ray Avenue Subway	Evaluated; No heritage significance***	n/a
B8	Jane Street Bridge	Identified through background research	Conditional Heritage Property
8	Dennison Road Level Crossing	Identified during field review	Conditional Heritage Property
17	371 Wallace Avenue (Industrial Building)	Identified during field review	Conditional Heritage Property
18	30 Edwin (Industrial Building)	Identified during field review	Conditional Heritage Property
19	1655 Dupont Street (Industrial Building)	Listed Heritage Property (City of Toronto)	Conditional Heritage Property
20	143 Old Weston Road (Industrial Building)	Identified during field review	Conditional Heritage Property
26	Mount Dennis Historic Settlement	Identified during field review	Conditional Heritage Property
27	Weston Historic Settlement	Identified during field review	Conditional Heritage Property
29	3500 Eglinton Avenue West (Kodak Lands)	Evaluated, Local Significance (Taylor Hazell Architects 2012)	Potential Provincial Heritage Property

**Golder Associates 2011a, Heritage impact assessment, Georgetown South Service Expansion, Union-Pearson Rail Link, Railway Subways, Queen Street West, Brock Avenue, Lansdowne Avenue, Bloor Street West, and Dupont Street, City of Toronto, Ontario. Report Number 10-1151-0241-R01

***Golder Associates 2011b, Heritage Impact Assessment, St. Claire Subway to Highway 27 Overpass, Seven Subways, Two Railway Underpasses, One Railway Overpass, Two Residences, and Two Cultural Heritage Landscapes, Georgetown South Service Expansion and Union Pearson Rail Link, City of Toronto, Ontario. RQQ-201t No: RQQ-2010-TS-007

[2] *As defined in Section 4.5.2.*
[3] *As defined in Section 4.5.2*

4.5.3.1 Paralleling Station (3500 Eglinton Ave. W.)

The 3500 Eglinton Avenue West property is a well-documented site that is known to retain cultural heritage value (see Taylor Hazell Architects 2012). Specifically, Building No. 9 on the Kodak Site is noted as having cultural heritage value. It is noted this property was identified by Metrolinx as the preferred site for the new Maintenance and Storage Facility (MSF) to be constructed as part of the Eglinton Crosstown Light Rail Transit project (Metrolinx Eglinton Crosstown LRT EPR Addendum, October 2013). In coordination with the Eglinton Crosstown MSF team, it was confirmed that the 3500 Eglinton Avenue West site will accommodate the Eglinton Crosstown MSF as well as the paralleling station required for UP Express electrification. With this in mind, it is noted that potential impacts on Building 9 were assessed as part of the Metrolinx Eglinton Crosstown LRT EA and this feature is to be preserved as part of the Eglinton Crosstown LRT project. Therefore, no further analysis was required as part of the UP Express Electrification EA.

4.5.1 Section 3 - UP Express Weston Station to Highway 427

This portion of the corridor includes one historic settlement centre and retains numerous properties that have been listed on Toronto's municipal heritage inventory or designated under Part IV or Part V of the *Ontario Heritage Act*. In addition, this section of the corridor is located in close proximity to two known or potential Heritage Conservation Districts (HCD), which include the Phase 1 Weston HCD and Phase 2 Weston HCD. The Humber River Bridge (CHR 13) (see **Figure 4-9**) is a significant cultural heritage resource based on its design, associative, and contextual values.

Based on background review of previous studies/reports and field investigations, **Table 4-3** lists the cultural heritage resources identified within Section 3 of the study area.

FIGURE 4-9 HUMBER RIVER BRIDGE

TABLE 4-3 BASELINE CULTURAL HERITAGE RESOURCES – SECTION 3

CHR[4]	Description	Level of Recognition[5]	Metrolinx Status[6]
12	Humber River	Identified; Canadian Heritage River	Conditional Heritage Property
13	Humber River Bridge	Evaluated; Local and Provincial Significance (Golder Associates 2011b)	Potential Provincial Heritage Property
14	Carlingview Drive Level Crossing	Identified during field review	Conditional Heritage Property
21	2417 Weston Road (Residence; demolished)	Evaluated, Local Significance (ASI 2011)	n/a (demolished)
22	6 Humberview Crescent (Residence)	Evaluated; Local Significance (Golder Associates 2011b)	Conditional Heritage Property
23	50 St. Philips Road (Golf Course)	Identified during field review	Conditional Heritage Property
27	Weston Historic Settlement Centre	Identified during field review	Conditional Heritage Property
B9	Lawrence Avenue Subway	Evaluated; No heritage significance***	n/a
B10	Weston Road Subway	Evaluated; No heritage significance***	n/a
B11	Islington Avenue Bridge	Evaluated; No heritage significance***	n/a
B12	Kipling Avenue Subway	Evaluated; No heritage significance***	n/a
B13	Martin Grove Subway	Evaluated; No heritage significance***	n/a
B14	Highway 401 Bridge	Evaluated; No heritage significance***	n/a
B15	Highway 27 Overpass	Evaluated; No heritage significance***	n/a

***Golder Associates 2011b, Heritage Impact Assessment, St. Claire Subway to Highway 27 Overpass, Seven Subways, Two Railway Underpasses, One Railway Overpass, Two Residences, and Two Cultural Heritage Landscapes, Georgetown South Service Expansion and Union Pearson Rail Link, City of Toronto, Ontario. RQQ-201t No: RQQ-2010-TS-007

[4] *Following baseline conditions data collection, CHRs 9, 10, 11 were removed (based on information provided by Metrolinx, February 2014). Accordingly, these three resources were not carried forward for further assessment.*
[5] *As defined in Section 4.5.2.*
[6] *As defined in Section 4.5.2.*

4.5.1.1 EMU Maintenance Facility Site (50 Resources Road)

The EMU Maintenance Facility site located at 50 Resources Road is currently an active construction site with heavy machinery and was in use as a high traffic area for dump trucks. No cultural heritage resources were identified within the 50 Resources Road site.

4.5.1.2 Traction Power Distribution Components (175 CityView Drive)

Lands surrounding the 175 City View Drive site subject site contain parcels used for industrial purposes. A review of historic maps and aerial mapping from 1860, 1878, 1931, and 1947 confirm that the site was developed in the latter half of the twentieth century. A review of mid-twentieth century maps confirms that at this time the subject rail corridor was established, however, the many spur lines that presently lead north and south from the rail corridor were not yet established. A review of construction history and development of Highway 427 and Highway 409 confirms that portions of these highways in the vicinity of the study area were established in the early to mid-1970s. Given that the surrounding land uses are largely industrial, it is highly likely that development of the area for industrial purposes was historically linked to the establishment of freeways in the Province of Ontario, which would have served as the primary mode of transportation for the movement of industrial goods during this period.

The property sits in an industrial landscape made up of factories some of which may date to the middle or late twentieth century. Within its immediate geographic context, the site retains buildings and groupings of buildings that are visually and functionally similar to many sites within the surrounding area. In this sense, the site including the circa mid-twentieth-century industrial building, are typical landscape features and land uses, widely represented in the surrounding area and which do not relate to an early or rare form of industrial development in the City of Toronto.

No cultural heritage resources were identified within the 175 City View Drive site.

4.5.2 Section 4 - Highway 427 to UP Express Pearson Station

This section of the study area is comprised of an elevated rail spur line that is approximately 3km in length and approximately 25m above ground level at the highest point. Accordingly, no cultural heritage effects are anticipated to the rail line or other cultural heritage resources since the physical project components will be contained to the airport spur line only. Notwithstanding this, the identified cultural heritage resources within Section 4 are listed in **Table 4-4.**

TABLE 4-4 BASELINE CULTURAL HERITAGE RESOURCES – SECTION 4

CHR	Description	Level of Recognition[7]	Metrolinx Status[8]
24	Mimico Creek	Identified during field review	Conditional Heritage Property
25	Toronto Pearson Airport	Listed Heritage Property (City of Mississauga)	Conditional Heritage Property

[7] *As defined in Section 4.5.2.*
[8] *As defined in Section 4.5.2.*

4.6 Archaeology

As part of the previous 2009 Georgetown South Service Expansion and Union-Pearson Rail Link (GSSE-UPRL) EA, a Stage 1 Archaeological Assessment of the rail corridor was undertaken to identify known and potential archaeological resources within the vicinity of the corridor. As a result, the assessment of archaeological features for the UP Express Electrification EA was limited to completion of a Stage 1 Archaeological Assessment for all proposed electrification facility sites (outside of the rail corridor).

The assessment consisted of a visual inspection of each study area in order to assess the terrain and archaeological potential factors identified during the background research. The field inspection was undertaken to determine if there were areas extensive and intensive disturbance and steeply sloped or wet areas, which had no or low archaeological potential. It was also intended to determine what survey strategies would be appropriate for a Stage 2 assessment, if required.

Archaeological recommendations were made based on the background historic research, property inspection, locations of known or registered archaeological sites, previous archaeological assessments and indicators of archaeological potential.

The following subsections summarize the results of the Stage 1 Archaeological Assessment. A copy of the Stage 1 Archaeological Assessment is included as Appendix D.

4.6.1 Section 1 - UP Express Union Station to UP Express Bloor Station

4.6.1.1 Paralleling Station (Ordnance Street)

The Paralleling Station encompasses a rectangular 0.1 hectare area at the east end of the Ordnance Triangle Lands triangle formed by Strachan Avenue along the west and two rail lines to the north and south. It is approximately 400m west of the Bathurst Street Bridge. There is a large billboard superstructure currently on the property. The previous archaeological studies by Archaeological Services Inc. in 2008 and 2009 for the Fort York pedestrian bridge and the GSSE-UPRL EA determined that there is potential for remains related to the 1857-1891 GWR engine house and turntable and further investigation of this area should be subject to Stage 2 assessment prior to any proposed impacts (ASI 2008, 2009). The UP Express Electrification Stage 1 assessment concurred with this determination.

As a result, a Stage 2 Archaeological Assessment should be conducted on the Ordnance Paralleling Station site with archaeological potential prior to any impacts by the proposed electrification project. This work will be done in accordance with the MTCS's Standards and Guidelines for Consultant Archaeologists (MTCS 2011), in order to identify any archaeological remains that may be present and identify appropriate mitigation measures if required.

4.6.2 Section 2 - UP Express Bloor Station to UP Express Weston Station

4.6.2.1 Paralleling Station (3500 Eglinton Avenue West)

Based on the Stage 1 Archaeological Assessment completed for the UP Express Electrification EA, this property no longer has archaeological potential due to extensive and intensive disturbance. No further archaeological assessment was recommended.

In addition, as mentioned, the 3500 Eglinton Avenue West property was identified by Metrolinx as the preferred site for the new Maintenance and Storage Facility (MSF) to be constructed as part of the Crosstown Light Rail Transit project (Metrolinx Crosstown LRT EPR Addendum, October 2013). Subsequently, in coordination with the Crosstown MSF team, it was confirmed that the 3500 Eglinton Avenue West site will accommodate the Crosstown MSF as well as the paralleling station required for UP Express electrification. With this in mind, it is noted that potential archaeological impacts were assessed as part of the Metrolinx Crosstown LRT EA. Therefore, no further analysis was required as part of the UP Express Electrification EA.

4.6.3 Section 3 - UP Express Weston Station to Highway 427

4.6.3.1 EMU Maintenance Facility Site (50 Resources Road)

This property is currently being used for a staging area for a commercial development to the north but aerial photography indicates that the study area was originally disturbed during the construction of the former brewery first built in 1961 then expanded in 1971 (Sneath 2001). The City of Toronto Archaeological Master Plan (AMP) indicates that the paved areas around the former brewery no longer had archaeological potential but the lands between the brewery and existing railway had potential for archaeological resources. The Stage 1 assessment determined that there was no longer any archaeological potential following the 1970's era expansion of the brewery and more recent construction activity has even further disturbed the area. No further archaeological assessment was recommended.

4.6.3.2 Traction Power Distribution Components (175 City View Drive)

Duct banks are to be routed parallel to the rail corridor from the 175 City View Drive TPS to the gantries. The 175 City View Drive site is flat and level but is down-cut from the lands immediately to the west. The Toronto AMP indicates archaeological potential at both the west and east ends of this property but these areas have been significantly impacted by past construction as recently as 1970. There is no remaining archaeological potential associated with this site based on the Stage 1 Archaeological Assessment. No further archaeological assessment was recommended.

4.6.4 Section 4 - Highway 427 to UP Express Pearson Station

There are no traction power distribution facility sites proposed in this section of the study area, therefore a Stage 1 assessment was not undertaken.

4.7 Land Use/Social Features

Land use along the rail corridor generally consists of residential and industrial/commercial areas. The rail corridor from UP Express Union Station to UP Express Pearson Station is primarily within the City of Toronto; however, west of Highway 401, the corridor is within the City of Mississauga (Region of Peel).

Except for the rail spur which begins at Highway 427, the entire rail corridor from UP Express Union Station to Highway 427 is zoned UT (Utility and Transportation). The spur potion from Highway 427 to the airport is zoned E (Employment Industrial). A number of studies, including Master Plans, Zoning Reviews, and Urban Design Guidelines, are being undertaken for areas adjacent to the corridor and associated facilities.

A copy of the Land Use Assessment Report is included as Appendix B.

4.7.1 Section 1 – UP Express Union Station to UP Express Bloor Station

4.7.1.1 Existing Land Use

Land use in the vicinity of Section 1 of the rail corridor is comprised of a mix of residential, industrial and commercial land uses. Included in this area are lands and numerous buildings that have been redeveloped from industrial/commercial land use to residential land use.

As part of 2012 field reconnaissance, 14 child care centres, 3 long term care centres, and 12 schools were documented, all of which are situated more than 100 m from the rail corridor.

Paralleling Station (Ordnance Street)

The paralleling station site is located at the “Ordnance triangle” where the Lakeshore West rail corridor splits from the Kitchener rail corridor. Currently, the site contains Metrolinx signal bungalows, a power substation for switches and pump station, and a multi-story advertisement sign.

The property has been the focus of a development proposal involving the redevelopment of lands, zoned Industrial to a mixed-use development comprising of residential towers, park land, and commercial/office space. The proposed development will include a touchdown point for the proposed Fort York pedestrian and cycling bridge, thus linking Stanley Park to the north, Liberty Village to the west and the lakefront to the south.

With the exception of 30 Ordnance Street, which is privately owned, the western portion of the property in the triangle is owned by Build Toronto and is currently in a five-year Official Plan review being conducted by the City of Toronto.

The easterly portion of the site (owned by Metrolinx and the site of the proposed Paralleling Station) is currently zoned *Industrial (I3)* under former *City of Toronto Zoning By-law No. 438-86*, and permits the presence of accessory facilities to railways. Discussions with City of Toronto Planning staff in March 2014 confirmed that there are no zoning conflicts for the Paralleling Station.

The closest social facility to the paralleling station is Downtown Kids Academy, approximately 400m away on King Street near Strachan Avenue.

4.7.1.2 Planned Land Use

There are a number of neighbourhoods within this section that have undertaken specific planning studies in order to manage land use issues such as increasing development pressure, revitalization and linkages to adjacent neighbourhoods, including:

- Fort York Master Plan;
- Niagara Neighbourhood Built Form and Density Study;
- West Queen West Triangle Zoning Review;
- King Liberty Village Urban Design Guidelines;
- Garrison Common North Secondary Plan; and
- Ward 18 Local Area Study.

In addition, the City of Toronto is presently undergoing the five-year review of the Official Plan which includes a Municipal Comprehensive Review (MCR) of all Employment Lands. The Ordnance Triangle proposed re-development zoning by-law amendment is pending the completion of this Municipal Comprehensive Review. The property east of Strachan Avenue to the split in the rail corridors is a triangular shape and has been the focus of a development proposal involving the redevelopment of lands, zoned Industrial to a mixed-use development comprising of residential towers, park land, and commercial/office space. The proposed development will include a touchdown point for the proposed Fort York Pedestrian and Cycling Bridge, thus linking Stanley Park to the north, Liberty Village to the west and the lakefront to the south. In addition, the planned King St. Pedestrian Bridge that will connect the western leg of Duoro Street and west leg of Western Battery Road in Liberty Village is also located in Section 1.

The Toronto Bike Plan outlines a detailed cycling network across the city and proposes a number of expansions. The West Toronto Railpath is a multi-use pathway intended to provide a connection from Toronto's junction neighbourhood to downtown Toronto and currently follows a segment of the GO rail corridor. Due to insufficient space within the GO rail corridor to accommodate extension of the existing railpath north of Cariboo Road, alternatives to extending are under consideration by the City. Metrolinx and the City continue to collaborate on developing a more integrated network that is safe and convenient (Metrolinx 2008).

4.7.2 Section 2 - UP Express Bloor Station to UP Express Weston Station

4.7.2.1 Existing Land Use

From Bloor Station to Eglinton Avenue, land use is primarily a mix of residential and industrial/commercial. In this area, the rail corridor serves numerous spur lines for industrial use and connects with the CP Rail Galt, North Toronto and MacTier Subdivisions, in an area known as the West Toronto Diamond (located at the intersection of Keele St. and Dundas Street West). It is noted that the West Toronto Diamond will be reconfigured due to the rail-to-rail and rail-to-road grade separation currently being constructed as part of the Georgetown South Service Expansion project. Between Eglinton Avenue and Weston Station, the rail corridor passes through the Mount Dennis Community, where land use is predominantly residential.

It is noted that four social facilities (Santa Maria School, Hollis Child Care Centre, Royal Day Care Centre, and C.R. Marchant Middle School) are within 100 m of the rail corridor. It is noted that the Hollis Child Care Centre is to be closed/relocated as part of the Crosstown project.

Paralleling Station (3500 Eglinton Avenue West)

Existing land use at the preferred at 3500 Eglinton Avenue West paralleling station site is characterized as open space, surrounded by commercial land use to the south (consisting of a No Frills supermarket and associated parking lot), more commercial area to the north, and residential area to the west, and recreational to the east.

The property at 3500 Eglinton Avenue West is currently open space and is zoned as *Employment Industrial* (*EI* under new City By-law, under appeal) and Strategic Industrial Employment (*SI* under former City By-law). Permitted uses with conditions for *EI* include public utility and transportation use. Conditions for these uses are:

• *Public utility:* must be enclosed by walls and comply with the lot coverage, minimum building setback, and maximum building height for the E zone if it is: a) an electrical transformer station; or b) a natural gas regulator station.

• *Transportation use*: A building or structure used as a transportation use must comply with all zoning regulations for a building on that lot.

Permitted uses for *SI* include industrial uses.

Discussions with City of Toronto Planning staff in March 2014 confirmed that there are no zoning conflicts for the Paralleling Station.

The closest social facilities to this site are Super Kids Day Care Centre and Hollis Child Care Centre, however both are more than 100m to the west of the proposed paralleling station. In addition, as noted above, the Hollis Child Care Centre is to be closed/relocated as part of the Crosstown LRT project.

It is noted this property was identified by Metrolinx as the preferred site for the new Maintenance and Storage Facility (MSF) to be constructed as part of the Crosstown Light Rail Transit project (Metrolinx Crosstown LRT EPR Addendum, October 2013). Subsequently, in coordination with the Crosstown MSF team, it was confirmed that the 3500 Eglinton Avenue West site will accommodate the Crosstown MSF as well as the paralleling station required for UP Express electrification.

4.7.2.2 Planned Land Use

It is anticipated that future growth along the corridor will be focused around areas served by transit, and as such, intensification around the stations (Bloor and Weston) is anticipated. Secondary Plans will continue to guide the growth to ensure compatible land use occurs adjacent to the rail corridor.

In addition, Metrolinx's Mobility Hub study for Mount Dennis recommends a number of ways to address barriers to pedestrian movement and connectivity of neighbourhoods, including creating multi-use trails and pedestrian concourses, widening sidewalks, and installing landscaping to make for a safer and more pleasant pedestrian environment (Metrolinx Mount Dennis Mobility Hub Study 2013).

4.7.3 Section 3 - UP Express Weston Station to Highway 427

4.7.3.1 Existing Land Use

From Weston Station (at Lawrence Avenue) to the Humber River, the rail corridor passes through the Weston Community where land use is predominantly residential. From the Humber River to Highway 401, the rail corridor passes through the Weston Golf and Country Club and alongside some commercial/industrial lands. From Highway 401 to Highway 427, rail corridor passes through a predominantly industrial/commercial area, which includes Woodbine Race Track.

There were no social facilities identified during the 2012 field reconnaissance that are within 100m of the rail corridor.

EMU Maintenance Facility Site (50 Resources Road)

The proposed site for the EMU Maintenance Facility is located at the southeast corner of Islington Avenue and Resources Road and is currently being used as a construction staging area. The site is surrounded by Resources Rd. to the west, the rail corridor to the south, and the Lowes retail store to the north. Commercial, residential, and recreational (Weston Golf and Country Club) land uses occur to the south, west and east of the site.

With respect to current land use zoning on the Resources Rd. site, land at the site is zoned as *Class 1 Industrial (I.C1)* under former General Etobicoke Zoning Code V131. An amendment to Chapter 304 for the Etobicoke Zoning Code refers to 50 Resources Road, and states that ancillary maintenance facilities for a railway yard are prohibited (refer to Chapter 6 for further detail).
The closest social facilities (Don Bosco Catholic Secondary School and School of Experimental Education) are more than 700m south of the Resources Road site on either side of Islington Avenue.

Traction Power Distribution Components (175 City View Drive)

The proposed site of the Hydro One Traction Power Substation (TPS) at 175 City View Drive (and associated gantries/duct banks) is currently vacant located at the southeast corner of Highway 27 and Dixon Road. It is bordered on the north by the rail corridor and there are industrial/commercial uses surrounding the site. There are no social facilities within at least 500m of the proposed TPS site.

Land at the 175 City View Drive site is zoned *Employment Industrial (EI)*.

4.7.3.2 Planned Land Use

No land use studies are currently available along this segment of the corridor.

4.7.4 Section 4 - Highway 427 to UP Express Pearson Station

4.7.4.1 Existing Land Use

This section of the study area is comprised of an elevated rail spur line that is approximately 3km in length and approximately 25m above ground level at the highest point. From a land use perspective, this portion of the study area passes through the Mimico Creek flood plain and industrial/commercial lands prior to entering the Toronto Pearson lands and ending at Terminal 1.

From west of Highway 401 to the end of the proposed spur line, the rail corridor passes through the Pearson Eco-Business Zone, an initiative known as “Partners in Project Green” launched by Toronto Region Conservation Authority (TRCA) and the Greater Toronto Airports Authority (GTAA). The Zone encompasses over 12,000 hectares of industrial and commercial land surrounding the airport. The vision of the project is to work with local businesses in transforming the lands surrounding the airport into an internationally recognized environmentally sustainable business zone around Toronto Pearson(Partners in Project Green, n.d.).

West of Highway 427, the rail corridor passes into the City of Mississauga, and thus zoning is subject to the City of Mississauga’s Zoning By-law (City of Mississauga, 2007). The proposed rail spur, which begins at Highway 427 and terminates at Pearson Airport, passes through lands zoned Employment (E2), Greenbelt (G1), and Airport (AP).

The rail spur corridor is elevated and passes through lands zoned Employment, Greenbelt and Airport. The Employment lands permit a number of uses and as such future uses may evolve through re-development or revitalization initiatives. E2 lands are designated for a number of indoor uses related to employment, including offices, manufacturing, wholesaling, restaurants, and so on.

G1 lands are designated for a limited range of uses and activities specific to the protection of people and property from flooding and erosion hazards, and the protection of natural features. Permitted uses are:

- Flood control;
- Stormwater management;
- Erosion control;
- Natural heritage features and areas conservation; and
- Accessory uses (trails, passive recreational uses, fences for natural protection and heritage areas, and parking areas).

AP lands are designated specifically for Pearson Airport and accessory uses.

There are no social facilities within at least 500m of this section of the rail corridor.

4.7.4.2 Planned Land Use

As mentioned, the rail spur corridor is elevated and passes through lands zoned Employment, Greenbelt and Airport. The Employment lands permit a number of uses and as such future uses may evolve through re-development or revitalization initiatives.

4.8 Air Quality

4.8.1 Approach

4.8.1.1 Rail Corridor

The UP Express service will commence operations with train sets comprised of DMUs. Air quality impacts attributable to the implementation of the UP Express service operating with DMUs were previously evaluated as part of the Approved GSSE-URPL EA, which included the following support studies/reports completed by Metrolinx:

- *Air Quality Assessment Georgetown South Service Expansion & Union Pearson Rail Link, Toronto, Ontario – July 2009* (2009 Air Quality Assessment GSSE); and
- *Georgetown South & Airport Rail Link Final Report Air Quality Impact Assessment – Enhanced Analysis May 11, 2011* (Enhanced Air Quality Analysis Report).

With respect to baseline air quality conditions along the UP Express route (from the future UP Express Union Station to UP Express Pearson station, along the existing Union Station and Kitchener Rail Corridors), baseline conditions include the existing pollutant burden within the study area and include the operation of Tier 4 Diesel Multiple Units (DMUs) for the UP Express service. Therefore, for the purposes of the UP Express Electrification EA, baseline air quality conditions within the UP Express route (rail corridor) are considered to be the modelled air quality impacts from the July 2009 Georgetown South Service Expansion and Union-Pearson Rail Link Environmental Assessment, which are based on the operation of Tier 4 DMUs plus background monitoring data from representative MOE monitoring stations.

As mentioned, the 2009 EA for the GSSE-UPRL included the 2009 Air Quality Assessment GSSE, and the Enhanced Air Quality Analysis Report. These reports considered air quality impacts associated with the operation of DMUs added to a background within the study area based on available monitoring data. It is noted that the Enhanced Air Quality Analysis Report (2011) is an update to the original 2009 GSSE-UPRL EA Air Quality Assessment based on MOE comments on the original report.

As described in Chapter 3, the scope of the UP Express Electrification EA is limited to replacing diesel powered UP Express trains (DMUs) with electric powered trains (EMUs), which will subsequently have a net positive effect on air quality within the corridor (due to removal of diesel powered UP Express trains). In addition, since baseline air quality conditions were previously established through the studies as described above, further documentation/discussion of baseline air quality conditions has not been included in this EPR.

Therefore, for the purposes of the UP Express Electrification EA, baseline conditions are considered to be the modelled air quality impacts associated with the operation of Tier 4 DMUs plus background monitoring data from representative MOE monitoring stations, based on the most recent 2011 Enhanced Air Quality Analysis Report (http://www.gotransit.com/gts/en/docs/GTS_Enhanced_AQ_Analysis.pdf).

A summary of the Tier 4 Future Build modelling methodology within the 2011 Enhanced Air Quality Analysis Report is as follows:

- Study area was the Kitchener (UP Express) rail corridor from Bathurst Street extending northwesterly to the airport spur and into Terminal 1 at Pearson International Airport;
- Contaminants of concern were: $PM_{2.5}$, NO_2 and SO_2;
- Ozone Limiting Method (OLM) was used to estimate the maximum short-term NO_2 concentrations resulting from emissions of NO_x;
- UP Express, GO Transit, VIA and CN/CP railway emissions within the study area were modelled with CAL3QHCR for the full build;
- Hourly background contaminant concentrations from MOE Toronto West monitoring station (Station ID 35125 located at 125 Resources Road) for the year 2007 were added to model results;
- Modelling was completed with 2007 meteorological data from Toronto Pearson (surface data) and Buffalo (upper air data); and
- Model predicted concentrations were assessed at the 10 representative worst case receptor locations as identified within the 2009 Air Quality Assessment GSSE Report.

Greenhouse Gas Emissions

Baseline conditions for greenhouse gas emissions resulting from Tier 4 DMUs operating within the UP Express Corridor are based on results presented within the 2009 Air Quality Assessment GSSE Report.

4.8.1.2 Paralleling Stations

Paralleling station equipment will include switchyard components, a switchgear room, a control room and power transformers. Baseline conditions associated with the proposed locations for two new paralleling stations (power distribution facilities) have not been documented as these facilities do not contain equipment that emit air contaminants (i.e., no adverse air quality effects anticipated).

4.8.1.3 EMU Maintenance Facility

Since there contaminant emissions are anticipated from the operation of the new EMU Maintenance Facility, it was necessary to provide a detailed description of baseline conditions at this location.

Baseline conditions for the proposed EMU Maintenance Facility location are based on historical ambient monitoring. The MOE maintains a network of ambient monitoring stations and the Toronto West monitoring station (Station ID 35125 located at 125 Resources Road) is located approximately 400m from the proposed EMU Maintenance Facility location. Therefore, baseline conditions associated with the proposed EMU Maintenance Facility are based on average 90th percentile contaminant concentrations from the five most recent years of monitoring data from the MOE Toronto West monitoring station.

The expected contaminant emissions from the proposed maintenance facility are products of combustion from natural gas-fired equipment and an emergency diesel generator. Contaminant emissions from the UP Express Corridor are also products of combustion from locomotive and DMU diesel engines; therefore, for consistency purposes, the same contaminants of concern (i.e., $PM_{2.5}$, NO_2 and SO_2) that are documented for the rail corridor are also used to establish baseline conditions associated with the proposed Maintenance Facility location.

A copy of the Air Quality Assessment Report is contained in Appendix E.

4.8.2 Baseline Air Quality Conditions – EMU Maintenance Facility Site

As outlined in Section 4.8.1 above, the description of baseline air quality conditions for purposes of the UP Express Electrification EA is limited to the EMU Maintenance Facility location at 50 Resources Road.

4.8.2.1 Background Pollutant Concentrations

Ambient background concentrations used in air quality assessments represent the contribution from sources such as upwind industrial facilities, other roadways, transboundary pollution, etc. that are not included in the modelling. It is important to add background pollutant concentrations to modelled concentrations in order to assess the combined effect of all sources at a specific receptor location for comparison against relevant objectives and standards.

The 2011 Enhanced Air Quality Analysis Report identified the Ministry of the Environment Toronto West monitoring station (125 Resources Road) as representative of background contaminant concentrations within the study area. For the 2011 Enhanced Air Quality Analysis assessment, hourly data from this monitoring station for the year 2007 were added to hourly model results based on 2007 meteorological data. This approach considered a variable background rather than a constant 90th percentile concentration, and by combining background contaminant concentrations with model results from the same hour of meteorological data, this approach represented a more accurate depiction of expected contaminant concentrations.

For the proposed EMU Maintenance Facility, a conservative 90th percentile value from monitoring data

was used. Typically, annual average pollutant levels tend to vary from year to year due to changes in emissions sources, changes in activity levels and variations in meteorological conditions. Therefore, to establish baseline air quality conditions for the new EMU Maintenance Facility, background concentrations from the five most recent years of available monitoring data from the MOE Toronto West monitoring station were used. A summary of 90th percentile background pollutant values established for the new EMU Maintenance Facility are provided in **Table 4-5** below.

TABLE 4-5 90TH PERCENTILE BACKGROUND VALUES USED FOR EMU MAINTENANCE FACILITY

Pollutant	Averaging Period	90th Percentile Background Value	Ontario AAQC
$PM_{2.5}$	24 hour	12.8 µg/m^3	30 µg/m^3 (CWS[2])
	Annual	6.8 µg/m^3	10.0 µg/m^3 (CAAQS[3])
NO_2[1]	1 hour	67.3 µg/m^3	400 µg/m^3
	24 hour	56.3 µg/m^3	200 µg/m^3
SO_2[1]	1 hour	7.7 µg/m^3	690 µg/m^3
	24 hour	6.9 µg/m^3	275 µg/m^3
	Annual	3.3 µg/m^3	55 µg/m^3

Note: [1] Background levels were converted from ppb to µg/m^3 assuming 10°C

[2] Canada Wide Standard based on the 24 hour 98th percentile ambient measurement annually, averaged over three consecutive years. To be reduced to 28 µg/m3 in 2015 and 27 µg/m3 in 2020

[3] Canadian Ambient Air Quality Standard. Standard comes into effect in 2015, to be reduced to 8.8 µg/m^3 in 2020.

4.9 Noise

4.9.1 Approach

4.9.1.1 Rail Corridor

The UP Express service will commence operations with train sets comprised of DMUs. Noise impacts attributable to the implementation of the UP Express service operating with DMUs were previously evaluated as part of the Approved GSSE-URPL EA, which included the following support studies/reports completed by Metrolinx:

- *Noise and Vibration Impact Assessment GO Transit Georgetown South Service Expansion and Union-Pearson Rail Link.* J.E. Coulter Associates Limited, July 2009.
- *Georgetown South Rail Corridor Expansion – Operational Noise and Vibration Assessment*. AECOM, February 2012.

Baseline conditions associated with noise along the UP Express route are characterized primarily by road and rail traffic. Rail traffic includes freight (CN and CP) and passenger (VIA and GO) trains, and for the purposes of the UP Express Electrification EA also includes the operation of DMUs for the commencement of UP Express service.

Therefore, for purposes of the UP Express Electrification EA, baseline noise conditions within the UP Express rail corridor are considered to be the modelled and/or measured noise levels from the *July 2009 Georgetown South Service Expansion* and *Union-Pearson Rail Link EA* and *February 2012 Georgetown South Rail Corridor Expansion Assessment,* which provide the base case noise conditions as of Opening Day 2015 with DMU service operating for UP Express.

To provide context, the baseline noise conditions associated with the UP Express service operating with DMUs were established in accordance with the *Ministry of the Environment (MOE) / GO Transit Draft Protocol for Noise and Vibration Assessment* (MOE, 1995) as part of the previous noise study completed for the corridor: *Georgetown South Rail Corridor Expansion Operational Noise and Vibration Assessment Report, AECOM, February 201*2. As outlined in *Appendix B* of the February 2012 AECOM report, the noise levels were based on 10 car GO trains, VIA Rail passenger trains and CN/CP freight trains, as well as the DMU trains associated with the UP Express line. The noise impact of increasing from a two- car UP Express shuttle to a three-car UP Express shuttle was also reviewed. Based on this analysis, noise walls were recommended at certain areas along the UP Express corridor.

Sound levels predicted by AECOM as part of the 2012 report (as an update to the GSSE-UPRL EA) describing operations on Opening Day 2015 (with DMUs on the UP Express), inclusive of proposed mitigation (i.e., noise walls), are summarized in the respective sections below as the baseline noise

conditions for each section of the corridor. As a result, no additional modelling has been completed for the characterization of baseline sound levels along the UP Express corridor.

4.9.1.2 Paralleling Station Facilities

In the MOE publication NPC-300, the MOE requires that operational noise produced by stationary facilities (such as the proposed maintenance facility and paralleling stations) must not exceed either a set of minimum MOE sound level criteria or the minimum background sound level during the period of operation, whichever is higher.

The proposed paralleling station locations are in areas that are anticipated to have high background noise levels due to existing urban hum. In addition, based on a literature review of comparable projects, noise generated by the equipment associated with paralleling stations such as transformers, switchgear, etc. is anticipated to be negligible. Therefore, the minimum MOE criteria are sufficient for the purposes of establishing compliance. With this in mind, the MOE minimum criteria have been presented to represent baseline noise conditions at the PS sites (as opposed to establishing baseline conditions through traffic noise modelling or monitoring).

4.9.1.3 EMU Maintenance Facility

As mentioned, as per MOE publication NPC-300, the MOE requires that operational noise produced by stationary facilities (such as the proposed maintenance facility and paralleling stations) must not exceed either a set of minimum MOE sound level criteria or the minimum background sound level during the period of operation, whichever is higher.

Operations at the EMU Maintenance Facility have the potential to produce audible off-site sound levels (i.e., sound from maintenance activities audible through bay doors, sources associated with building ventilation, power generation, cooling, and on-site vehicle movements). Since there are noise sensitive receptors in close proximity to the maintenance facility site (<100 m), along with elevated background noise conditions due to local high-traffic roads (i.e., Islington Avenue, Highway 401), background noise level information has been obtained for this evaluation. Ambient noise monitoring was completed by AECOM (2012) and Valcoustics (2009) at the closest receptors to the EMU MF as part of the Georgetown South Rail Corridor Expansion study. This monitoring data was used to establish baseline conditions for this project at two of the receptor locations. Traffic noise modelling was used to establish background at a nearby apartment complex, and the MOE default limits were applied to the remainder of receptors to represent background.

A copy of the Noise and Vibration Assessment Report is contained in Appendix F.

4.9.2 Section 1 - UP Express Union Station to UP Express Bloor Station

The land uses along this segment of the corridor include a mixture of residential (including detached and semi-detached dwellings, townhouses, as well as high-rise and low-rise multi-unit buildings), commercial buildings, park space and institutional lands (i.e., schools/daycare centres/places of worship). This segment of the GO rail corridor extends through a high density area of the City of Toronto. Several sensitive receptors are located within 20m of the rail corridor.

Baseline sound levels through this section of the corridor are characterized by train traffic within the corridor (consisting of traffic associated with CN and CP freight trains, VIA and GO passenger trains, and the UP Express trains operating with DMU engines), as well as varying degrees of road traffic depending on the location along the segment. Sources of road traffic noise include highway traffic from the Gardiner Expressway at the south end of the study area, as well as traffic on several major east-west and north-south arterial roads in the City of Toronto, including King Street, Queen Street, Dundas Street West, Bloor Street West and Lansdowne Avenue. Receptors in this area also experience intermittent overhead noise from air traffic utilizing the Billy Bishop Airport.

Sound levels due to operations within the GO Kitchener corridor were modelled at a total of forty-nine (49) individual sensitive points of reception along this segment in support of the *Georgetown South Rail Corridor Expansion – Operational Noise and Vibration Assessment* (AECOM, 2012) report to determine the impact of the new UP Express line. These receptors were representative of sensitive locations throughout the segment at various separation distances and operating conditions.

The sound levels that were predicted by AECOM in the 2012 *Georgetown South Rail Corridor Expansion – Operational Noise and Vibration* Assessment (AECOM, 2012). The sound levels are presented as 16-hour daytime and 8-hour night-time "energy equivalent" sound levels, or L_{eq}. The L_{eq} metric is used to describe a time-varying sound as a single sound level. For daytime hours, the time period to be assessed is the 16-hour period from 07:00 to 23:00. The night-time period is then the eight-hour period between 23:00 to 07:00.

The ranges of sound levels predicted along this segment of the corridor including freight traffic (CN and CP), commuter passenger trains (GO and VIA), and the UP Express trains operating with DMU engines are summarized in **Table 4-6** for Opening Day operations, and Full Build operations.

TABLE 4-6 – BASELINE SOUND LEVELS – SECTION 1

Scenario	Daytime (16-hr L_{eq}, dBA)		Night-time (8-hr L_{eq}, dBA)	
	Minimum	Maximum	Minimum	Maximum
Opening Day (2015)	56	73	54	68
Full Build	61	80	57	76

The variation in sound level at each receptor was dependent upon the distance between the receptor and the rail corridor, the receptor height, the presence of any obstacles to noise propagation (i.e., noise

barriers or buildings), and the speed of the trains, which varies depending on the location along the segment.

The sound levels identified above account for the presence of existing noise mitigation measures (i.e., barrier walls) as well as noise mitigation measures that were recommended in the *Georgetown South Rail Corridor Expansion – Operational Noise and Vibration* Assessment (AECOM, 2012). Metrolinx has committed to installing all proposed noise barriers in time for opening day operations.

4.9.2.1 Paralleling Station (Ordnance Street)

The nearest sensitive receptors are located at a proposed residential development located approximately 180m from the proposed facility. Baseline sound levels at this location are characterized by the rail traffic within the Kitchener and Lakeshore GO corridors (consisting of traffic associated with CN and CP freight trains, VIA and GO passenger trains, and the UP Express trains operating with DMU engines), and road traffic from the Gardiner Expressway and local streets such as Strachan Avenue and Bathurst Street. Receptors in this area also experience intermittent overhead noise from air traffic utilizing the Billy Bishop Airport.

As this location is adjacent to the existing GO rail corridor, baseline sound levels at this location will be in the same range as outlined in Table 4-9. As mentioned, the paralleling station will be assessed as a stationary source on the basis of a maximum one-hour operating scenario for each period in which it is projected to operate (day, evening and night). For such an assessment, the MOE outlines that the evaluation criteria may be either the MOE default minimum sound level limits, or actual background sound levels established through either modelling or monitoring. The sound levels presented in Table 4-9 cannot be used for establishing criteria as these are not minimum one-hour background sound levels. Since the paralleling station is not anticipated to generate adverse noise effects, the minimum MOE criteria are sufficient for the purposes of establishing compliance (see **Table 4-7** for a summary of sound level limits[9] from NPC-300).

TABLE 4-7 EXCLUSION LIMIT VALUES OF ONE-HOUR EQUIVALENT SOUND LEVEL (LEQ, DBA) (NPC-300)

[9] *The points of reception in the vicinity of the stationary sources associated with this project are considered to be located in Class 1 Areas: an area with an acoustical environment typical of a major population centre, where the background noise is dominated by the activities of people, usually road traffic, often referred to as "urban hum".*

Period	Time of Day	Class 1 Area
Outdoor Points of Reception		
Day	07:00 – 19:00	50
Evening	19:00 – 23:00	50
Plane of Window Noise Sensitive Spaces		
Day	07:00 – 19:00	50
Evening	19:00 – 23:00	50
Night	23:00 – 07:00	45

4.9.3 Section 2 - UP Express Bloor Station to UP Express Weston Station

This segment of the corridor extends north-west from Bloor Station to Weston Station. The land uses along this segment of the corridor include a mixture of residential (including detached and semi-detached dwellings, townhouses, as well as high-rise and low-rise multi-unit buildings), commercial buildings, and institutional lands (i.e., schools/daycare centres/places of worship). This segment of the GO Kitchener rail corridor extends through a high density area of the City of Toronto. Several sensitive receptors are located within 20m of the rail corridor.

Baseline sound levels through this section of the corridor are characterized by train traffic within the corridor (consisting of traffic associated with CN and CP freight trains, VIA and GO passenger trains, and the UP Express trains operating with DMU engines), as well as varying degrees of road traffic depending on the location along the segment. Sources of road traffic noise include several major east-west and north-south arterial roads in the City of Toronto, including Bloor Street West, Weston Road, St. Clair Avenue West, Eglinton Avenue West, Black Creek Drive, Jane Street and Lawrence Avenue.

Sound levels due to operations within the GO Kitchener corridor were modelled at a total of 55 individual sensitive points of reception along this segment in support of the *Georgetown South Rail Corridor Expansion – Operational Noise and Vibration* Assessment (AECOM, 2012)to determine the impact of the new UP Express line (AECOM, 2012). These receptors were representative of sensitive locations throughout the segment at various separation distances and operating conditions.

The ranges of sound levels predicted along this segment of the corridor including freight traffic (CN and CP), commuter passenger trains (GO and VIA), and the UP Express trains operating with DMU engines are summarized in **Table 4-8** for Opening Day operations, and Full Build operations.

TABLE 4-8 – BASELINE SOUND LEVELS – SECTION 2

Scenario	Daytime (16-hr L_{eq}, dBA)		Night-time (8-hr L_{eq}, dBA)	
	Minimum	Maximum	Minimum	Maximum
Opening Day (2015)	55	74	56	70
Full Build	59	77	58	74

The variation in sound level at each receptor was dependent upon the distance between the receptor and the rail corridor, the receptor height, the presence of any obstacles to noise propagation (i.e., noise barriers or buildings), and the speed of the trains, which varies depending on the location along the segment.

The sound levels identified above account for the presence of existing noise mitigation measures (i.e., barrier walls) as well as noise mitigation measures that were recommended in the *Georgetown South Rail Corridor Expansion – Operational Noise and Vibration* Assessment (AECOM, 2012). Metrolinx has committed to installing all proposed noise barriers in time for opening day in 2015.

4.9.3.1 Paralleling Station (3500 Eglinton Avenue West)

The nearest sensitive receptors to the 3500 Eglinton Avenue West location are located approximately 250m from the proposed paralleling station facility. Baseline sound levels at this location are characterized by the rail traffic within the UP Express route/corridor (consisting of traffic associated with CN and CP freight trains, VIA and GO passenger trains, and the UP Express trains operating with DMU engines), and road traffic from Eglinton Avenue West and Black Creek Drive.

As this location is adjacent to the rail corridor, baseline sound levels at this location will be in the same range as outlined in Table 4-8. In the assessment of noise impacts, the paralleling station is to be assessed as a stationary source on the basis of a maximum one-hour operating scenario for each period in which it is projected to operate (day, evening and night). For such an assessment, the MOE outlines that the evaluation criteria may be either the MOE default minimum sound level limits, or actual background sound levels established through either modelling or monitoring. The sound levels presented in Table 4-8 cannot be used for establishing criteria as these are not minimum one-hour background sound levels. Since the paralleling station is not anticipated to generate adverse noise effects, the minimum MOE criteria are sufficient for the purposes of establishing compliance (see **Table 4-7** above).

4.9.4 Section 3 - UP Express Weston Station to Highway 427

This segment of the rail corridor extends north-west from Weston Station, and curves to the west at St. Phillips Road. The land uses along this segment of the corridor include a mixture of residential (including

detached and semi-detached dwellings, townhouses, as well as high-rise and low-rise multi-unit buildings), commercial / industrial lands, recreational areas (golf course), and institutional lands (i.e., school/daycare/place of worship). The rail corridor extends through a high density area of the City of Toronto. Several sensitive receptors are located within 20m of the rail corridor.

Baseline sound levels through this section of the corridor are characterized by train traffic within the corridor (consisting of traffic associated with CN and CP freight trains, VIA and GO passenger trains, and the UP Express trains operating with DMU engines), as well as varying degrees of road traffic depending on the location along the segment. Sources of road traffic noise include highway noise from Highway 401, 409, 27 and 427 at the north end of this segment, as well as several major east-west and north-south arterial roads in the City of Toronto, including Weston Road, Islington Avenue, Kipling Avenue, and Martin Grove Road.

Sound levels due to operations within the GO Kitchener corridor were modelled at a total of thirty-three (33) individual sensitive points of reception along this segment in support of the *Georgetown South Rail Corridor Expansion – Operational Noise and Vibration* Assessment (AECOM, 2012 to determine the impact of the new UP Express service (AECOM, 2012). These receptors were representative of sensitive locations throughout the segment at various separation distances and operating conditions.

The ranges of sound levels predicted along this segment of the corridor including freight traffic (CN and CP), commuter passenger trains (GO and VIA), and the UP Express trains operating with DMU engines are summarized in **Table 4-9** for Opening Day operations, and Full Build operations.

TABLE 4-9 – BASELINE SOUND LEVELS – SECTION 3

Scenario	Daytime (16-hr L_{eq}, dBA)		Night-time (8-hr L_{eq}, dBA)	
	Minimum	Maximum	Minimum	Maximum
Opening Day (2015)	52	74	57	73
Full Build	55	78	60	75

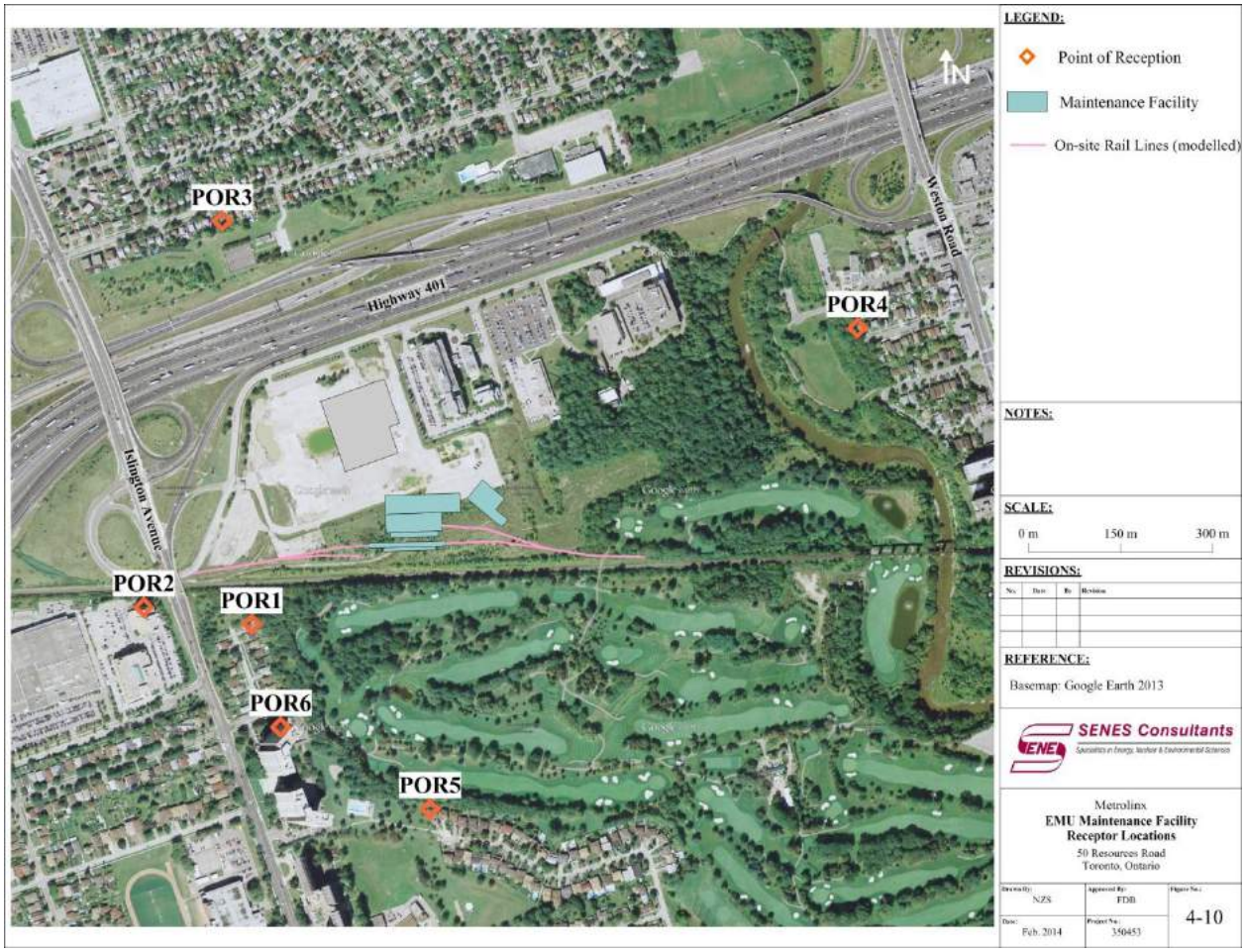
The variation in sound level at each receptor was dependent upon the distance between the receptor and the rail corridor, the receptor height, the presence of any obstacles to noise propagation (i.e., noise barriers or buildings), and the speed of the trains, which varies depending on the location along the segment.

The sound levels identified above account for the presence of existing noise mitigation measures (i.e., barrier walls) as well as noise mitigation measures that were recommended in the *Georgetown South Rail Corridor Expansion – Operational Noise and Vibration* Assessment (AECOM, 2012).Metrolinx has committed to installing all proposed noise barriers in time for opening day operations.

4.9.4.1 EMU Maintenance Facility Site (50 Resources Road)

The proposed location for the new EMU Maintenance Facility is at 50 Resources Road, near the intersection of Islington Avenue and Highway 401. The nearest sensitive receptors are located approximately 90m from the proposed facility (see **Figure 4-10).** Baseline sound levels at this location are characterized by the rail traffic within the Kitchener/UP Express rail corridor (consisting of traffic associated with CN and CP freight trains, VIA and GO passenger trains, and the UP Express trains operating with DMU engines), and road traffic from Highway 401 and 409, and Islington Avenue.

FIGURE 4-10 EMU MAINTENANCE FACILITY RECEPTOR LOCATIONS



PARSONS BRINCKERHOFF
MORRISON HERSHFIELD

For the purposes of assessing potential noise impacts, the EMU maintenance facility will be evaluated as a stationary source on the basis of a maximum one-hour operating scenario for each period in which it is projected to operate (day, evening and night). For such an assessment, the MOE outlines that the evaluation criteria may be either the MOE default minimum sound level limits, or actual background sound levels established through either modelling or monitoring. The sound levels presented in Table 4-9 cannot be used for establishing criteria as these are not minimum one-hour background sound levels

AECOM (2012) and Valcoustics (2009) completed continuous sound level measurements at the nearest receptors to the proposed EMU maintenance facility (houses on Adriatic Road, and the Quality Inn Hotel on Islington Avenue). The minimum hourly sound levels for each period of operation (day, evening and night) are to be applied as criteria in the assessment of impacts at these receptors (see Chapter 6), and are summarized in **Table 4-10**.

TABLE 4-10 MINIMUM MEASURED BACKGROUND AT EMU MAINTENANCE FACILITY RECEPTORS

Receptor	Measured Minimum One-Hour L_{eq} (dBA)		
	Day [07:00 – 19:00]	Evening [19:00 – 23:00]	Night [23:00 – 07:00]
19 Adriatic Road (POR1)	53.8	52.5	49.4
Quality Inn Hotel (POR2)	56.8	56.1	50.9

For receptors where no background measurement data were available, traffic noise modelling was used to establish background conditions at an apartment complex to the south of the facility, for which the upper stories are exposed to the maintenance facility with no shielding from nearby buildings; however, are also similarly exposed to Highway 401. The background levels were predicted using the MOE traffic model STAMSON with hourly traffic data for Highway 401 between Weston Road and Islington Avenue provided by the Ontario Ministry of Transportation (MTO). The predicted sound levels due to road traffic are summarized in **Table 4-11**. The MOE default minimum criteria were applied to represent background at all other points of reception included in the assessment.

TABLE 4-11 MINIMUM PREDICTED BACKGROUND AT EMU MAINTENANCE FACILITY RECEPTORS

Receptor	Measured Minimum One-Hour L_{eq} (dBA)		
	Day [07:00 – 19:00]	Evening [19:00 – 23:00]	Night [23:00 – 07:00]
2101 Islington Ave (Apartment; POR6)	67.2	66.9	61.5

4.9.4.2 Traction Power Distribution Components (175 City View Drive)

No operational noise impacts are anticipated with respect to the proposed gantries and underground duct banks. Therefore, a description of baseline noise conditions at this location was not required.

4.9.5 Section 4 - Highway 427 to UP Express Pearson Station

Baseline sound levels in the vicinity of the spur line are primarily characterized by highway traffic on Highway 427 and 409, air traffic associated with Toronto Pearson, and the UP Express trains operating with DMU engines on the spur line. Local road traffic on Airport Road/Dixon Road also contributes to sound levels in the vicinity of the spur line.

The area in the vicinity of the spur line is made up of commercial / industrial lands and airport lands. Several hotels are located over 500m away from the UP Express route. No sensitive receptors have been assessed in this area. It is anticipated that local noise from the UP Express line will be insignificant at these locations in comparison to air traffic noise, highway noise and local road noise.

4.10 Vibration

4.10.1 Approach

The UP Express service will commence operations with train sets comprised of DMUs. Vibration impacts attributable to the implementation of the UP Express service operating with DMUs were previously evaluated as part of the Approved GSSE-URPL EA, which included the following support studies/reports completed by Metrolinx:

- *Noise and Vibration Impact Assessment GO Transit Georgetown South Service Expansion and Union-Pearson Rail Link.* J.E. Coulter Associates Limited, July 2009.
- *Georgetown South Rail Corridor Expansion – Operational Noise and Vibration Assessment*. AECOM, February 2012.

As a result, for purposes of the UP Express Electrification EA, baseline vibration conditions within the rail corridor are considered to be the measured vibration levels from the July 2009 *Georgetown South Service Expansion and Union-Pearson Rail Link EA* and *February 2012 Georgetown South Rail Corridor Expansion Assessment* (which considered the impact of the 2015 UP Express DMU service).

Vibration measurements were conducted along the GO Kitchener corridor in 2009, in support of the GSSE-UPRL EA and the 2012 update to the GSSE-UPRL EA. The measurements were conducted at typical setback distances for receptors within each segment, and mitigation measures were identified by in the 2012 AECOM report in instances where elevated levels of vibration due to operation of UP Express DMU trains were noted. With this in mind, a discussion of the baseline vibration conditions (in 2015) within each segment of the corridor is provided in the following sections.

4.10.2 Section 1 - UP Express Union Station to UP Express Bloor Station

Adjustment of the measured vibration levels to account for the projected train speeds indicated that vibration levels along this segment generally exceed the MOE default criterion of 0.14 mm/s (approximately 75 VdB). Unmitigated vibration levels are predicted to be in the range of 75 – 88 VdB (0.14 – 0.64mm/s) at distances of 30 to 40m. There are receptors within 30 m of the corridor, which may experience unmitigated vibration levels approaching or exceeding 90 VdB. As per MOE requirements, the 2012 AECOM report identified mitigation measures for all locations where vibration levels were predicted to exceed 0.14 mm/s or existing pre-expansion levels by greater than 25 per cent.

The 2012 AECOM report recommended ballast mats as the preferred mitigation option for this segment. Ballast mats are anticipated to provide vibration attenuation in the range of 10 to 15 VdB (FTA, 2006). A potential range of vibration levels along the corridor is 65 to approximately 80 VdB with mitigation in place. While the MOE default criteria would be exceeded at some locations, the levels are anticipated to be an improvement over pre-expansion levels where mitigation has been installed.

4.10.2.1 Paralleling Station (Ordnance Street)

Based on a literature review of comparable projects, vibration generated by the equipment associated with paralleling stations such as transformers, switchgear, etc. is anticipated to be negligible. Therefore, as no adverse impacts are anticipated, it was not necessary to establish baseline vibration conditions for compliance purposes. Similarly, no vibration monitoring was completed.

4.10.3 Section 2 - UP Express Bloor Station to UP Express Weston Station

Adjustment of the measured vibration levels to account for the projected train speeds indicated that vibration levels along this segment generally exceed the MOE default criterion of 0.14mm/s (approximately 75 VdB). Unmitigated vibration levels are predicted to be in the range of 78 – 93 VdB (0.2 – 1.13mm/s) at distances of 13 to 49m. As per MOE requirements, the 2012 AECOM report had identified mitigation measures for all locations at which vibration levels were predicted to exceed 0.14 mm/s or existing pre-expansion levels by greater than 25 per cent.

The 2012 AECOM report recommended ballast mats as the preferred mitigation option in this segment. Ballast mats are anticipated to provide vibration attenuation in the range of 10 - 15 VdB (FTA, 2006). A potential range of vibration levels along the corridor is 68 to approximately 83 VdB with mitigation in place. While the MOE default criteria would be exceeded at some locations, the levels are anticipated to be an improvement over pre-expansion levels where mitigation has been installed.

4.10.3.1 Paralleling Station (3500 Eglinton Avenue West)

Based on a literature review of comparable projects, vibration generated by the equipment associated with paralleling stations such as transformers, switchgear, etc. is anticipated to be negligible. Therefore, as no adverse impacts are anticipated, it was not necessary to establish baseline vibration conditions for compliance purposes. Similarly, no vibration monitoring was completed.

4.10.4 Section 3 - UP Express Weston Station to Highway 427

The vibration measurements conducted along this segment (and adjusted for speed) indicate that vibration levels are generally expected to be in the range of 65 to 76 VdB (0.05 to 0.16 mm/s) at distances of 33 to 46 m. It should be noted that there are receptors within 33m of the rail corridor, which would result in vibration levels approaching or exceeding 80 VdB. The 2012 AECOM report indicated that mitigation would be required at various locations along the segment in instances where the MOE criteria of 0.14mm/s or existing pre-expansion levels were exceeded by greater than 25 per cent.

A portion of this rail segment (between John Street and approximately 1.2km west of John Street) will be installed on concrete slab, which is anticipated to limit vibration propagation from this segment. For

the remaining affected areas, the recommended mitigation measure is ballast mats. Ballast mats are anticipated to provide vibration attenuation in the range of 10 - 15 VdB (FTA, 2006).

4.10.4.1 EMU Maintenance Facility Site (50 Resources Road)

Based on review of the Resources Road Maintenance Facility Conceptual Design Report, September 2013, the maintenance facility will include the following operational components:

- Bay doors (assumed to be open with maintenance activities, interior equipment audible);
- Building ventilation roof exhaust fans;
- Chiller unit (with enclosure);
- Cooling tower;
- Emergency generator (with enclosure);
- EMU engines idling on the storage track with air compressor and HVAC systems active;
- On-site truck movements (to/from loading bay);
- On-site rail (EMU) movements; and
- Tri-generation system (with enclosure).

The above listed facility components do not represent significant sources of vibration. Therefore, it was not necessary to establish baseline vibration conditions, as no potential vibration effects on nearby receptors are anticipated in relation to operation of the EMU Maintenance Facility. Similarly, no vibration monitoring was completed.

4.10.4.2 Traction Power Distribution Components (175 City View Drive)

No operational vibration impacts are anticipated with respect to the proposed gantries and underground duct banks. Therefore, a description of baseline vibration conditions at this location was not required.

4.10.5 Section 4 - Highway 427 to UP Express Pearson Station

As there are no sensitive points of reception within this section of the study area, vibration levels have not been measured historically. As such, there is no further discussion of baseline vibration levels in this area.

4.11 Visual

4.11.1 Visual Inventory

As part of establishing the existing environmental context, a description of the existing visual context and setting will be developed including an overview of the existing rail corridor and proposed sites for electrification facilities including the inherent landscape characteristics, land use and built form (along the rail corridor and new properties), and existing natural/cultural features. Existing features related to the existing rail network such as, track work, the nature of the corridor (width, horizontal and vertical alignments, bridge/overpass structures, passenger stations will be documented where appropriate.

In addition, the following visual/aesthetics considerations were noted as part of baseline data collection:

- Key viewing opportunities of the rail corridor (i.e. vistas to and along the railroad and electrification facility sites)
- Locations of sensitive viewers and viewer locations in the vicinity of the study area

4.11.2 Section 1 – UP Express Union Station to UP Express Bloor Station

The multiple track rail corridor from Union Station is the widest in the study area (± 70-102 metres). This sunken area of the rail corridor has highly defined built form edges west from Union Station through to Strachan Avenue. It ranges in depth from +/- 20 metres to +/- 8 metres from Union Station to the Strachan. In the vicinity of the CN Tower, the rail corridor narrows to 40m before widening its cross-section once more at Spadina Avenue (± 86m).

Beyond the Bathurst Street Bridge, there is a vista of the tracks diverging as the Lakeshore rail line proceeds southwest and the corridor swings to the northwest. The corridor then narrows to ± 20-30m in width. Refer to **Figures 4-11** to **4-14**.

FIGURE 4-11 LOOKING EAST AT UNION STATION REDEVELOPMENT FROM PEDESTRIAN OVERPASS AT SIMCOE ST.

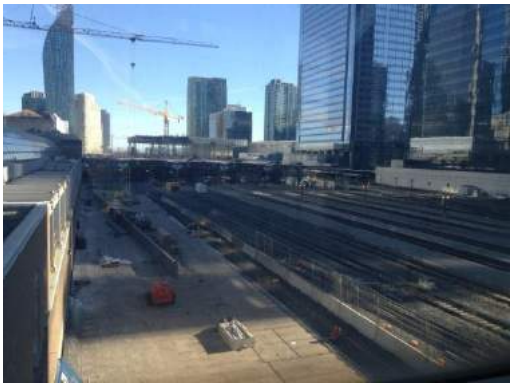
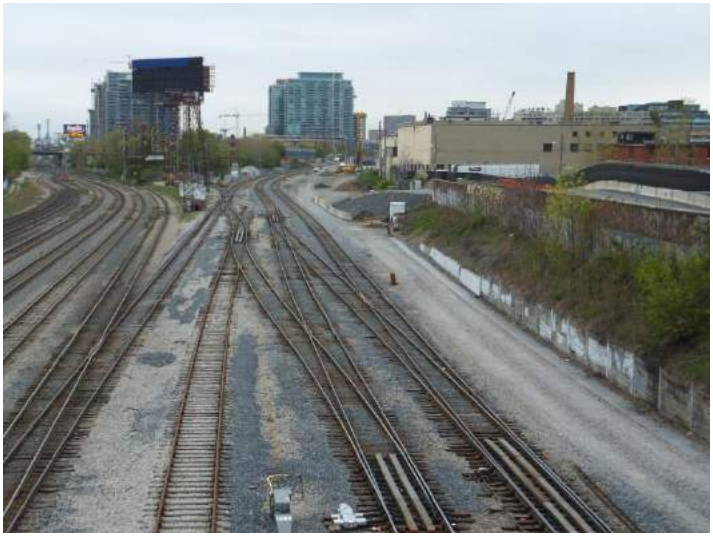


FIGURE 4-12 LOOKING EAST FROM BATHURST STREET BRIDGE

FIGURE 4-13 LOOKING WEST FROM BATHURST STREET BRIDGE.

FIGURE 4-14 ORDNANCE TRIANGLE, AS VIEWED FROM WEST OF BATHURST STREET BRIDGE



There are a wide range of views of the corridor from Union Station to King Street due to the increased development density and the high percentage of multi-storey buildings. There are extensive viewing opportunities from high rise business and residential towers, hotels, recreational and tourism facilities and the numerous pedestrian and vehicular bridges which traverse the rail corridor. Land use from Bathurst Street to King Street is a mixture of industrial, warehousing, with medium-density to high rise residential land uses. There will be views of electrification from multi-storey development, especially in the redeveloped north Liberty Village and south King Street developments. The Strachan Avenue underpass (currently under construction) has a unique lattice arch structure.

Fort York National Historic Site

This heritage feature is an important visual consideration as highlighted in the *Metrolinx Cultural Heritage Assessment Report (January 2014*). Fort York and Garrison Common is on the south side of the rail corridor (Figure 4-15), west of Bathurst Street to beyond Strachan Avenue, and views to and from this heritage features will be assessed.

In the section from King Street to Bloor Station the rail corridor becomes elevated (just before King Street and its width is narrower and more consistent in width (± 25m)). There is also vegetation along the edges of the rail right-of-way within this section. Surrounding land uses are composed of a mix of industrial/commercial and medium to high density residential. It is noted that many areas adjacent to this segment of the corridor are under redevelopment.

FIGURE 4-15 FORT YORK & GARRISON COMMON AS VIEWED FROM NORTH OF CORRIDOR, WEST OF BATHURST ST.

FIGURE 4-16 VIEW OF KING STREET SUBWAY LOOKING EAST

All street crossings of the rail corridor components are set below the grade of the rail lines (King Street (Figure 4-16), Queen Street West, Brock Avenue, Landsdowne Avenue and Bloor Street West). The proposed electrification components (i.e., overhead contact system)), will be visible from approaches to the bridges by both vehicles and pedestrians, which will represent an aesthetic change once electrification is implemented.

North of Dundas Street, the West Toronto Railpath parallels the corridor. Therefore, electrification components will be visible to recreational users of this linear multi-use pathway.

4.11.3 Section 2 – UP Express Bloor Station to UP Express Weston Station

The corridor north of Bloor Street is wider and is more vegetated than the previous corridor segment. Land uses are generally a mix of industrial uses and warehousing. There are also a number of low to high density residential areas in this segment. The rail corridor is in close proximity to these receptors. Refer to **Figures 4-17** and **4-18**.

FIGURE 4-17 VIEW LOOKING NORTH FROM WALLACE AVENUE PEDESTRIAN BRIDGE

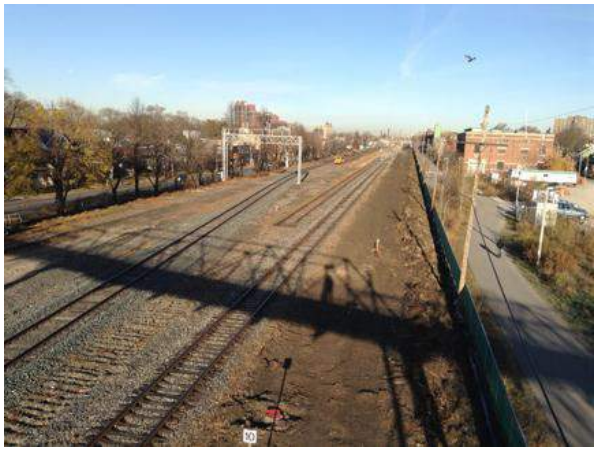


FIGURE 4-18 VIEW LOOKING EAST OF RAIL CORRIDOR OF CONNECTION PATH TO THE WEST TORONTO RAILPATH

4.11.4 Section 3 - UP Express Weston Station to Highway 427

This section of the corridor is divided into three (3) visually distinctive segments as follows.

From Weston Station progressing north to Weston Road, the corridor is typical of previous sections north of Queen Street, in that the corridor is vegetated on either side of the rails and has a mixture of industrial and residential areas land uses. Refer to **Figure 4-19**.

FIGURE 4-19 VIEW LOOKING SOUTH ALONG WESTON ROAD

The City of Toronto's Keelesdale Park, is in close proximity to the corridor but the corridor is well-screened by mature vegetation.

Given the existence of this railway corridor adjacent the pockets of residential areas (especially north of the Weston tunnel) viewer sensitive locations will be impacted by OCS structures that are placed in close proximity to the receptor location.

After crossing Weston Road the corridor traverses the most natural and scenic section of the UP Express project area. This portion of the line traverses the Humber River valley utilizing earthen berms and a high level bridge. The corridor has major sections of the Weston Golf and Country Club located below and on either side of the rail corridor. This 1.4 km segment comprises trees on either side of the corridor, therefore, for the most part, is well-screened from the low density residential areas adjacent to Weston Road, and south of the Islington Avenue overpass.

After crossing under Islington Avenue and Highway 401 the rail corridor is surrounded by more modern industrial warehouse and manufacturing uses. The only exception is the Woodbine Racetrack which fronts onto the corridor from Highway 27 to Highway 427.

It is recognized that there are also potential visual effects associated with the proposed EMU Maintenance Facility at Resources Rd. However, the rail corridor in the vicinity of the Resources Rd. site is situated primarily in an industrial/commercial area, with a few pockets of residential areas; therefore viewer sensitivity is not considered significant for the majority of this segment.

4.11.5 Section 4 – Highway 427 to UP Express Pearson Station

An elevated spur line is currently being constructed, from Highway 427 to the future UP Express Pearson Station (Terminal 1). After passing over Goreway Drive and Mimico Creek the elevated UPE spur line crosses predominantly business park and industrial lands set amongst an extensive roadway and parking lot network. Refer to **Figure 4-20**.

There are no sensitive viewer locations in this section.

FIGURE 4-20 VIEW OF UP EXPRESS ELEVATED SPUR LINE TERMINATING AT TERMINAL 1

4.12 Utilities

As part of the UP Express Electrification EA, existing public and private utilities and underground infrastructure (utilities) were identified within the study area as part of the TPAP. These locations were based on plans from the Georgetown South (GTS) Expansion project and the Union Station Rail Corridor (USRC). It is noted that based on consultation with NavCanada, there is an underground jet fuel line of unknown size and material in the vicinity of the UP Express spur line. This fuel line will be further investigated and mitigation measures developed (as required), as part of the more detailed Utility assessment to be carried out during the detailed design phase. Field investigations and detailed utility searches were not undertaken as part of the EA. Rather, these more detailed investigations would need to be undertaken during the subsequent detailed design phase.

It is also noted that there are a significant number of utilities being relocated as part of the Georgetown South construction work that is currently ongoing along the corridor. As a result, the assessment of any additional utility conflicts due to UP Express Electrification will need to be reviewed by Metrolinx as part of the Detailed Design phase.

There are numerous utilities located along the rail corridor. The majority of these utilities are local distribution utilities that cross the existing corridor providing services to residential neighbourhoods and commercial and industrial areas on both sides of the rail right-of-way. These utilities typically traverse the corridor at the existing road crossings; however, there are some utilities located in between the road crossings. There are also long distance transmission pipelines and hydro lines which cross the existing rail corridor.

4.12.1 Overview of Known Utilities

Based on background review, there are approximately 374 known discrete utilities routed across or parallel to the rail corridor which were determined by reviewing available utility documentation.

The UP Express Utilities Report prepared as part of the preliminary design phase provides further detail and contains a comprehensive Utility Classification Table which summarizes each of the discrete utilities along with their approximate location and classification type.

Due to the linear nature of utilities, the four study area sections as referred to in previous sections above have not been applied for the purposes of describing existing utilities. With this in mind, the following subsections summarize the existing utilities in the vicinity of the study area.

4.12.2 Pipelines

There are four existing pipelines (with possibly four owners) crossing the existing rail right-of-way in the existing hydro corridor at approximately Mile 11.1, just west of Kipling Avenue. There is an additional oil pipeline, owned by the City of Toronto at approximately Mile 6.1, near Old Weston Rd.

National Energy Board (NEB) applicability and requirements related to any relocation work may be necessary as part of the works, if identified during the detailed design phase. However, no relocation, lowering , or extension of the existing protections were identified through the UP Express preliminary design for the proposed work.

These pipelines are:

- Sun-Canadian Pipe Line Company Ltd.: oil pipelines – size to be determined;
- Interprovincial Pipelines/Imperial Oil – Sarnia Products Pipeline: high pressure oil pipelines;
- Interprovincial Pipelines/Trans-Northern Pipelines: high pressure petroleum products pipeline; and,
- Enbridge Pipelines: 300mm diameter high pressure crude oil pipeline.

4.12.3 Water Mains

The City of Toronto has approximately 65 water mains located within the study area from approximately Mile 1.57 to Mile 13.6. City of Toronto water mains vary from 150mm to 1500mm in diameter and most intersect the rail corridor at existing road crossings. The total number of water mains and those at road crossings will be confirmed during the detailed design phase.

4.12.4 Storm Sewers

The City of Toronto has approximately 41 storm sewers located within the study area from approximately Mile 1.34 to Mile 13.5. City of Toronto storm sewers vary from 300mm to 2400mm in diameter and most intersect the rail corridor at existing road crossings. City of Toronto storm sewers also traverse the rail corridor away from existing road crossings. The total number of storm sewers and those at road crossings will be confirmed during the detailed design phase.

4.12.5 Sanitary Sewers

The City of Toronto has approximately 54 sanitary sewers located within the study area. The City of Toronto also maintains numerous combined sewers of various sizes within the study area. City of Toronto sanitary sewers vary from 200mm to 2100mm in diameter and most intersect the rail corridor at existing road crossings. City of Toronto sanitary and combined sewers also traverse the rail corridor away from existing road crossings. The total number of sanitary sewers and those at road crossings will be confirmed during the detailed design phase.

4.12.6 Hydro One Transmission Corridors

Hydro One high-voltage transmission corridors cross the Weston Subdivision at four separate locations with a total of seven crossings. This is comprised of two 115 kVA underground pipe-type plant crossings just east of Strachan Avenue at Tecumseth Street (approximately Mile 1.25) and five high-tension power lines crossing the Weston Subdivision, one between St. Clair Avenue and Rogers Road (approximately Mile 5.63), three at Kipling Avenue (approximately Mile 11.1), and one at Highway 27 (approximately Mile 12.21).

4.12.7 Toronto Hydro Distribution Lines

Toronto Hydro is the main hydro supplier within the City of Toronto and has significant aerial and buried plant (approximately 83 items) located within the study area. Most of the Toronto Hydro plant intersects the rail corridor at existing road crossings. Toronto Hydro also maintains a pole line along the west side of Carlingview Drive that continues along the rail corridor west of Carlingview Avenue and connects to Enersource (Hydro Mississauga) plant at Highway 427.

4.12.8 Gas Mains

Enbridge Gas maintains approximately 42 gas mains located within the study area. The gas mains vary from 75mm to 900mm in diameter and most intersect the rail corridor at existing road crossings. The total number of gas mains and those at road crossings will be confirmed during the detailed design phase.

4.12.9 Bell Canada

Bell Canada maintains numerous aerial cable, buried cable and duct structures (35 in total) within the study area. All existing Bell plant intersects the rail corridor at existing road crossings.

4.12.10 Rogers Cable

Rogers Cable maintains aerial and buried fibre optic TV plant and aerial and buried coaxial TV plant within the study area. It appears that all existing Rogers Cable plant intersects the rail corridor at existing road crossings. At the rail crossings all plant is buried.

4.12.11 MTS Allstream

MTS Allstream maintains underground conduits and duct banks within the study area, crossing the rail corridor at Highway 401 (approximately Mile 10.7) and Ray Avenue (approximately Mile 7.2).

4.12.12 Canada Packers

Canada Packers maintains six utilities, at approximately St. Clair (Mile 5.26 & 5.3), comprising three underground conduits, a water main, a steam pipe, and a hydrogen pipeline.

4.12.13 Private Owner

At approximately Mile 5.26, a storm drain is identified within the study area belonging to a private owner. The private owner will be confirmed during the Detailed Design Phase.

4.12.14 Canadian Gypsum Co.

A ditch culvert at approximately Mile 9.44, has been identified as belonging to the Canadian Gypsum Co.

4.12.15 TELUS

A duct bank, maintained by TELUS, is located at approximately Mile 12.37.

4.12.16 Woodbine Racetrack

Woodbine Racetrack maintains three utilities at approximately Mile 13.06, comprising two water mains and one sanitary sewer.

4.12.17 Utilities Parallel to the Rail Corridor

Utilities are also located within the existing rail corridor running parallel to the existing track alignment. These utilities include CN/CP signals and communications cable and fibre optic cable maintained by various communications companies including 360 Networks, Ledcor Communications and Rogers Communications (formerly Sprint Canada). The signals and communications cables provide power, signal control, wayside communications and telecommunications for railway operations. The fibre optic cable is utilized by a variety of services such as cable, banking, national defence, air traffic control and emergency communications.

4.14 Electromagnetic Fields (EMF)

The following section provides a description of the baseline EMF conditions within the UP Express Electrification study area based on preliminary investigations carried out as part of the EA process.

4.14.1 Overview of EMFs

Electric and magnetic fields (EMFs) arise from natural forces and permeate our environment. In addition to natural background EMF, sources include electric fields which arise anywhere electricity or electrical components are used. Magnetic fields arise wherever there is a flow of electric current. Common manmade sources of EMF are electronics, power stations, transmission lines, telecommunication infrastructure, electric motors, etc. The strength of man-made EMF depends on the characteristics of the source including amongst others, voltage, current strength and frequency. Frequencies in the range of 50/60 Hz are of special interest because most human sources of EMF arise from electric fields in this frequency range.

The generation, distribution and use of electric power are always accompanied by electric and magnetic fields. Most power lines in the world use AC; that is, the voltage and current reverse direction many times a second. In North America, the complete cycle is repeated 60 times a second, i.e., 60 Hz.

Electric and magnetic fields are invisible forces that arise both in nature and by man's activities that uses electricity such as electronics, electric motors, power transmission and distribution lines. The electric and magnetic fields cannot be seen or felt but are present with any electrical equipment that uses electricity. Electric fields for example, are formed whenever a wire is plugged into an outlet, even when the appliance is turned off and magnetic fields are formed when the current is flowing within a device or a wire (Health Canada, 2010).

Electric Fields

Electric fields are proportional to the voltage of the power lines (e.g., overhead contact system) and are relatively stable, i.e., the higher the voltage, the larger the magnitude of the electric field would be. Specifically, the electric field emission from the 2 x 25 kV traction power system will be stable and significantly below industry limits. Electric fields are normally of concern at higher voltage levels (e.g. 230 kV or 500 kV from transmission lines). Therefore, the discussion below is limited to existing conditions as they relate to magnetic fields.

Magnetic Fields

Magnetic fields, however, are not stable since a magnetic field is directly proportional to the current flow which can vary throughout the day depending on power demand. Furthermore, magnetic fields are more difficult to shield. The magnetic field emanation from the overhead contact system is expected to be in the range of 160 mG at ground level due to the OCS current through and the fact that the OCS is

closer to the ground compared to overhead power transmission lines, resulting in less attenuation of the magnetic fields at the ground level.

4.14.2 Approach

In estimating human exposure to electromagnetic fields, existing electromagnetic field levels are measured along the corridor and then added to the estimated emission level of the electrified UP Express system. This process results in an estimate of the overall electromagnetic field strength after the rail corridor is electrified.

As part of the UP Express Electrification EA, an EMF survey was undertaken which involved a preliminary site assessment and conservative analysis to ensure public exposure to electromagnetic fields related to the electrified UP Express is within safe limits and as per relevant industry standards (see Section 6.17 of Chapter 6 for further detail).

Where electromagnetic field values of 10 mG or above were detected during site surveying, further analysis was undertaken. This involved identifying the possible source of the high field strength, such as nearby third party substations and transmission lines.

With this in mind, the EMF study included the following steps:

1. Magnetic field site surveying (using a magnetometer) of the OCS power line frequency (60 Hz) background magnetic field levels along the rail corridor (UP Express route from Union Station to Pearson Airport);
2. Based on the results of the EMF survey, estimation of the maximum EMF levels at the railway right of way for the electrified UP Express[10];
3. Compare these maximum EMF levels to industry standard limits for human exposure to EMF; and
4. Provide EMF mitigation recommendations where these values are exceeded.

The following subsections summarize the results of carrying out Step 1 which led to establishing EMF baseline conditions. Whereas Steps 2 to 4 pertain to the impact assessment phase, and are therefore discussed in Chapter 6 of this EPR.

It should be noted that the frequency scope of the EMF survey was the power line (OCS) frequency[11] (i.e., 60 Hz). This is the frequency range where the predominant EMF emanation is anticipated from the UP Express OCS.

[10] *At the time of the UP Express Electrification EA, details related to the electrified rolling stock were not available, therefore conservative assumptions were made with respect to the EMF assessment that will need to be confirmed during subsequent studies to be completed during the detailed design phase.*

[11] *At the time of the UP Express Electrification EA EMF assessment, details related to the electrified train was not available, therefore conservative assumptions were made that will need to be confirmed during subsequent studies when the vehicle specification has been determined.*

At higher frequencies (i.e. radio-frequency of "RF"), railway EMF emissions are of transient nature (i.e. they normally come from electrified rolling stock and will not permanently pollute the electromagnetic environment). In addition the RF EMF are expected to be below limits permitted by industry standards (as listed above).

4.14.3 Baseline EMF

Throughout the UP Express corridor right of way from UP Express Union Station to UP Express Pearson Station, the background resultant magnetic field did not exceed 10 mG, with the exception of the following areas:

- Approximately from milepost 0.7 to Strachan Ave, there are Hydro One transmission lines that run parallel to the corridor, and which cross the railway corridor. In addition, there is a Hydro One substation in the vicinity of the corridor. The highest resultant magnetic field was measured at 20 mG directly underneath the transmission lines crossing the railway going into the substation, 1 meter above grade. The transmission line voltage was 230 kV.
- North of St Clair Ave. W., there is an overhead transmission line crossing the tracks. The highest resultant magnetic field was 24 mG measured directly underneath the transmission line crossing the railway, 1 meter above grade. The transmission line voltage was 230 kV.
- Near Kipling Ave., three overhead transmission lines cross the tracks. The highest resultant magnetic field was 58 mG measured underneath the transmission lines crossing the railway, 1 meter above grade. The transmission line voltage was 230 kV.
- East of Highway 27, an overhead transmission line crosses the tracks. The highest resultant magnetic field was 59 mG measured directly underneath the transmission line crossing the railway, 1 meter above grade. The transmission line voltage was likely 500 kV or 230 kV.

It is noted that for the Ordnance St. and 3500 Eglinton Avenue West paralleling stations, the strength of the EMF from the underground feeders will be indistinguishable from background levels. Similarly, EMF from the paralleling station equipment will decrease rapidly with increasing distance. Based on the proposed equipment layout at the Ordnance St. and 3500 Eglinton Avenue West paralleling stations, and calculated EMF beyond the site boundaries, the EMF produced by the paralleling station equipment will be indistinguishable from background levels.

4.15 Electromagnetic Interference (EMI)

The following section provides a description of the baseline data that was collected as part of the EMI assessment undertaken as part of the UP Express Electrification EA.

4.15.1 Overview of EMI

4.15.2 Approach

In order to assess potential EMI effects, it was necessary to first identify areas/equipment in the vicinity of the corridor that may be susceptible to electromagnetic interference (EMI) caused by electrification of the UP Express. With this in mind, an inventory of devices potentially susceptible to EMI along the UP Express corridor (and proposed traction power and, maintenance facility sites) was established, and potentially impacted neighbouring facilities, based on carrying out the following steps:

- Desktop analysis to identify existing equipment that may be EMI susceptible to EMI within the railway right of way (ROW) and within neighbouring facilities (e.g., hospitals, scientific research facilities, airports) along the rail corridor.

- Establish EMI Inventory of existing equipment that may be susceptible to EMI within the railway ROW and neighbouring facilities (that may contain EMI susceptible equipment) that may require further assessment and investigation.

- Field checks to verify desktop inventory results

EMI-sensitive sites are often equipped with the electrical devices susceptible to EMI such as medical imaging equipment, MRI, scientific instruments that use charged beams or high precision magnet systems, electron microscopes, electron beam lithography systems, focused ion beams, and systems requiring a very stable magnetic field, such as magnetic field imaging devices and nuclear magnetic resonance spectrometers.

As per *IEEE 241*, the following facilities are considered to be EMI-sensitive sites:

- Research and development laboratories for low-noise circuitry work
- Research and development laboratories using high-energy radio-frequency devices
- Special computer facilities
- Test and measurement laboratories
- Terminal equipment facilities for both line and radio-frequency transmission systems
- Hospital and other biomedical research and treatment rooms
- Control, navigational, communication and monitoring equipment and systems pertaining to industrial sources and airports.

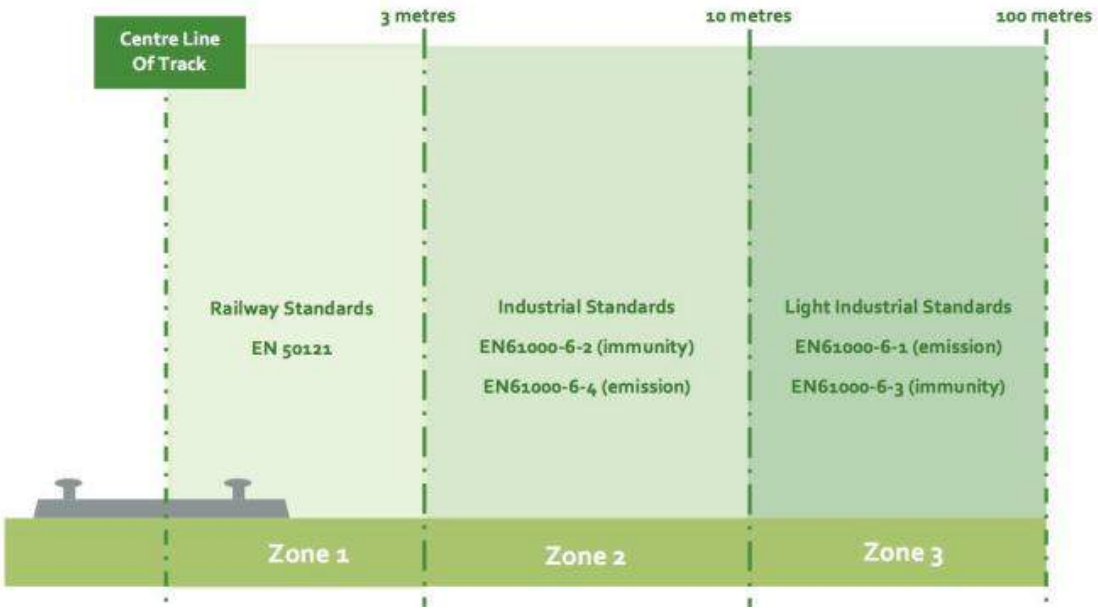
EMI Investigation Zones

All equipment and facilities situated within the range of 100 metres (zone of influence) of the outermost track along the UP Express corridor were identified and documented. As per EN 50121 series standards, beyond 100 metres from the centreline of the outermost track, the electromagnetic fields (EMFs) emanated from the electrified UP Express railway system will be significantly attenuated and will not interfere with EMI susceptible equipment.

This 100 metre range was further divided into three specific zones, defined as follows (see **Figure 4-21**):

- **Zone 1**: Existing equipment within the railway ROW up to 3 metres from the centreline of the outermost track.
- **Zone 2**: Existing equipment and/or facilities (that may contain EMI susceptible equipment) located within the railway ROW and outside the ROW, located within the range of 3 metres and 10 metres from the centreline of the outermost track.
- **Zone 3**: Existing facilities (that may contain EMI susceptible equipment) located within the range of 10 metres and 100 metres from the centreline outermost track.

FIGURE 4-21. EMI ZONES OF INVESTIGATION



4.15.3 Identification of EMI Sensitive Sites/Equipment

During the EMI inventory investigation conducted along the UP Express corridor, EMI susceptible equipment and facilities were identified and documented in the Section 10 of the **EMC Report (Appendix G).**