

6.	Impact Assessment	6-1
6.1	Methodology	6-1
6.1.1	Range of Potential Impacts	6-3
6.2	Natural Environment – Terrestrial Features.....	6-5
6.2.1	Section 1 - UP Express Union Station to UP Express Bloor Station	6-5
6.2.1.1	Potential Footprint Effects and Mitigation Measures	6-5
6.2.1.2	Net Effects.....	6-7
6.2.1.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-7
6.2.1.4	Net Effects.....	6-10
6.2.1.5	Potential Construction Effects and Mitigation Measures	6-10
6.2.1.6	Net Effects.....	6-13
6.2.2	Section 2 - UP Express Bloor Station to UP Express Weston Station	6-13
6.2.2.1	Potential Footprint Effects and Mitigation Measures	6-13
6.2.2.2	Net Effects.....	6-16
6.2.2.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-16
6.2.2.4	Net Effects.....	6-16
6.2.2.5	Potential Construction Effects and Mitigation Measures	6-17
6.2.2.6	Net Effects.....	6-17
6.2.3	Section 3 - UP Express Weston Station to Highway 427	6-18
6.2.3.1	Potential Footprint Effects and Mitigation Measures	6-18
6.2.3.2	Net Effects.....	6-20
6.2.3.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-22
6.2.3.4	Net Effects.....	6-22
6.2.3.5	Potential Construction Effects and Mitigation Measures	6-22
6.2.3.6	Net Effects.....	6-23
6.2.4	Section 4 - Highway 427 to UP Express Pearson Station.....	6-23
6.2.4.1	Potential Footprint Effects and Mitigation Measures	6-23
6.2.4.2	Net Effects.....	6-24
6.2.4.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-24
6.2.4.4	Net Effects.....	6-24
6.2.4.5	Potential Construction Effects and Mitigation Measures	6-24
6.2.4.6	Net Effects.....	6-24
6.3	Natural Environment – Aquatic Features.....	6-25
6.3.1	Section 1 - UP Express Union Station to UP Express Bloor Station	6-25
6.3.1.1	Potential Footprint Effects and Mitigation Measures	6-25
6.3.1.2	Net Effects.....	6-25
6.3.1.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-25
6.3.1.4	Net Effects.....	6-26

6.3.1.5	Potential Construction Effects and Mitigation Measures	6-26
6.3.1.6	Net Effects.....	6-26
6.3.2	Section 2 - UP Express Bloor Station to UP Express Weston Station	6-26
6.3.2.1	Potential Footprint Effects and Mitigation Measures	6-26
6.3.2.2	Net Effects.....	6-29
6.3.2.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-29
6.3.2.4	Net Effects.....	6-30
6.3.2.5	Potential Construction Effects and Mitigation Measures	6-30
6.3.2.6	Net Effects.....	6-32
6.3.3	Section 3 - UP Express Weston Station to Highway 427	6-32
6.3.3.1	Potential Footprint Effects and Mitigation Measures	6-32
6.3.3.2	Net Effects.....	6-35
6.3.3.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-35
6.3.3.4	Net Effects.....	6-36
6.3.3.5	Potential Construction Effects and Mitigation Measures	6-36
6.3.3.6	Net Effects.....	6-37
6.3.4	Section 4 - Highway 427 to UP Express Pearson Station.....	6-37
6.3.4.1	Potential Footprint Effects and Mitigation Measures	6-37
6.3.4.2	Net Effects.....	6-38
6.3.4.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-38
6.3.4.4	Net Effects.....	6-38
6.3.4.5	Potential Construction Effects and Mitigation Measures	6-38
6.3.4.6	Net Effects.....	6-38
6.4	Natural Environment – Hydrogeological Features	6-39
6.4.1	Section 1 – UP Express Union Station to UP Express Bloor Station	6-39
6.4.1.1	Potential Footprint Effects and Mitigation Measures	6-39
6.4.1.2	Net Effects.....	6-39
6.4.1.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-39
6.4.1.4	Net Effects.....	6-39
6.4.1.5	Potential Construction Effects and Mitigation Measures	6-40
6.4.1.6	Net Effects.....	6-40
6.4.2	Section 2 – UP Express Bloor Station to UP Express Weston Station	6-40
6.4.2.1	Potential Footprint Effects and Mitigation Measures	6-40
6.4.2.2	Net Effects.....	6-41
6.4.2.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-41
6.4.2.4	Net Effects.....	6-41
6.4.2.5	Potential Construction Effects and Mitigation Measures	6-41
6.4.2.6	Net Effects.....	6-41
6.4.3	Section 3 – UP Express Weston Station to Highway 427	6-42

6.4.3.1	Potential Footprint Effects and Mitigation Measures	6-42
6.4.3.2	Net Effects.....	6-43
6.4.3.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-43
6.4.3.4	Net Effects.....	6-43
6.4.3.5	Potential Construction Effects and Mitigation Measures	6-43
6.4.3.6	Net Effects.....	6-44
6.4.4	Section 4 - Highway 427 to UP Express Pearson Station.....	6-44
6.4.4.1	Potential Footprint Effects and Mitigation Measures	6-44
6.4.4.2	Net Effects.....	6-44
6.4.4.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-44
6.4.4.4	Net Effects.....	6-44
6.4.4.5	Potential Construction Effects and Mitigation Measures	6-44
6.4.4.6	Net Effects.....	6-45
6.5	Natural Environment – Contaminated Sites.....	6-46
6.5.1	Section 1 - UP Express Union Station to UP Express Bloor Station	6-46
6.5.1.1	Potential Footprint Effects and Mitigation Measures	6-46
6.5.1.2	Net Effects.....	6-46
6.5.1.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-46
6.5.1.4	Net Effects.....	6-47
6.5.1.5	Potential Construction Effects and Mitigation Measures	6-47
6.5.1.6	Net Effects.....	6-47
6.5.2	Section 2 – UP Express Bloor Station to UP Express Weston Station	6-47
6.5.2.1	Potential Footprint Effects and Mitigation Measures	6-48
6.5.2.2	Net Effects.....	6-48
6.5.2.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-48
6.5.2.4	Net Effects.....	6-48
6.5.2.5	Potential Construction Effects and Mitigation Measures	6-49
6.5.2.6	Net Effects.....	6-49
6.5.3	Section 3 - UP Express Weston Station to Highway 427	6-49
6.5.3.1	Potential Footprint Effects and Mitigation Measures	6-49
6.5.3.2	Net Effects.....	6-50
6.5.3.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-50
6.5.3.4	Net Effects.....	6-50
6.5.3.5	Potential Construction Effects and Mitigation Measures	6-50
6.5.3.6	Net Effects.....	6-50
6.5.4	Section 4 - Highway 427 to UP Express Pearson Station.....	6-50
6.6	Cultural Heritage	6-51
6.6.1	Section 1 - UP Express Union Station to UP Express Bloor Station	6-55
6.6.1.1	Potential Footprint Effects and Mitigation Measures (Bathurst St. Bridge).....	6-55

6.6.1.2	Net Effects.....	6-56
6.6.1.3	Potential Footprint Effects and Mitigation Measures (King St. Rail Overpass)	6-57
6.6.1.4	Net Effects.....	6-57
6.6.1.5	Potential Footprint Effects and Mitigation Measures (Fort York and Garrison Common National Historic Site and Heritage Conservation District)	6-57
6.6.1.6	Net Effects.....	6-61
6.6.1.7	Potential Construction Effects (Bridges/Rail Overpasses)	6-62
6.6.1.8	Net Effects.....	6-62
6.6.1.9	Potential Construction Effects (Fort York Heritage District).....	6-62
6.6.1.10	Net Effects	6-62
6.6.2	Section 2 - UP Express Bloor Station to UP Express Weston Station	6-62
6.6.2.1	Potential Footprint Effects and Mitigation Measures (Wallace Ave. Pedestrian Bridge)	6-63
6.6.2.2	Net Effects.....	6-64
6.6.2.3	Potential Effects and Mitigation Measures (Rogers Road Bridge)	6-64
6.6.2.4	Net Effects.....	6-64
6.6.2.5	Potential Effects and Mitigation Measures (Jane Street Bridge).....	6-64
6.6.2.6	Net Effects.....	6-65
6.6.2.7	Potential Construction Effects and Mitigation Measures	6-65
6.6.2.8	Net Effects.....	6-65
6.6.3	Section 3 - UP Express Weston Station to Highway 427	6-65
6.6.3.1	Potential Footprint Effects and Mitigation Measures (Humber River Rail Overpass)	6-65
6.6.3.2	Net Effects.....	6-66
6.6.3.3	Potential Construction Effects and Mitigation Measures	6-66
6.6.3.4	Net Effects.....	6-67
6.6.4	Section 4 – Highway 427 to UP Express Pearson Station.....	6-67
6.6.4.1	Potential Footprint Effects and Mitigation Measures	6-67
6.6.4.2	Net Effects.....	6-67
6.6.4.3	Potential Construction Effects and Mitigation Measures	6-67
6.6.4.4	Net Effects.....	6-67
6.7	Archaeology.....	6-68
6.7.1	Section 1 - UP Express Union Station to UP Express Bloor Station	6-68
6.7.1.1	Potential Footprint Effects and Mitigation Measures	6-68
6.7.1.2	Net Effects.....	6-68
6.7.1.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-68
6.7.1.4	Net Effects.....	6-68
6.7.1.5	Potential Construction Effects and Mitigation Measures	6-69
6.7.1.6	Net Effects.....	6-71
6.7.2	Section 2 - UP Express Bloor Station to UP Express Weston Station	6-71
6.7.3	Section 3 - UP Express Weston Station to Highway 427	6-71

6.7.4	Section 4 – Highway 427 to UP Express Pearson Station.....	6-72
6.8	Land Use/Social Features	6-73
6.8.1	Section 1 - UP Express Union Station to UP Express Bloor Station	6-73
6.8.1.1	Potential Footprint Effects and Mitigation Measures	6-73
6.8.1.2	Net Effects.....	6-74
6.8.1.3	Potential Operations and Maintenance Effects	6-74
6.8.1.4	Net Effects.....	6-75
6.8.1.5	Potential Construction Effects.....	6-75
6.8.1.6	Net Effects.....	6-75
6.8.2	Section 2 - UP Express Bloor Station to UP Express Weston Station	6-75
6.8.2.1	Potential Footprint Effects and Mitigation Measures	6-75
6.8.2.2	Net Effects.....	6-77
6.8.2.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-77
6.8.2.4	Net Effects.....	6-77
6.8.2.5	Potential Construction Effects and Mitigation Measures	6-77
6.8.2.6	Net Effects.....	6-78
6.8.3	Section 3 - UP Express Weston Station to Highway 427	6-78
6.8.3.1	Potential Footprint Effects and Mitigation Measures	6-78
6.8.3.2	Net Effects.....	6-80
6.8.3.3	Potential Operations and Maintenance Effects	6-80
6.8.3.4	Net Effects.....	6-80
6.8.3.5	Potential Construction Effects.....	6-80
6.8.3.6	Net Effects.....	6-80
6.8.4	Section 4 – Highway 427 to UP Express Pearson Station.....	6-80
6.8.4.1	Potential Footprint Effects and Mitigation Measures	6-80
6.8.4.2	Net Effects.....	6-81
6.8.4.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-81
6.8.4.4	Net Effects.....	6-81
6.8.4.5	Potential Construction Effects.....	6-81
6.8.4.6	Net Effects.....	6-81
6.9	Property.....	6-82
6.9.1	Section 1 - UP Express Union Station to UP Express Bloor Station	6-82
6.9.1.1	Potential Footprint Effects and Mitigation Measures	6-82
6.9.1.2	Net Effects.....	6-83
6.9.1.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-83
6.9.1.4	Net Effects.....	6-84
6.9.1.5	Potential Construction Effects.....	6-84
6.9.1.6	Net Effects.....	6-84
6.9.2	Section 2 - UP Express Bloor Station to UP Express Weston Station	6-84

6.9.2.1	Potential Footprint Effects and Mitigation Measures	6-84
6.9.2.2	Net Effects.....	6-85
6.9.2.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-85
6.9.2.4	Net Effects.....	6-85
6.9.2.5	Potential Construction Effects and Mitigation Measures	6-85
6.9.2.6	Net Effects.....	6-85
6.9.3	Section 3 - UP Express Weston Station to Highway 427	6-86
6.9.3.1	Potential Footprint Effects and Mitigation Measures	6-86
6.9.3.2	Net Effects.....	6-87
6.9.3.3	Potential Operations and Maintenance Effects and Mitigation Measures	6-87
6.9.3.4	Net Effects.....	6-87
6.9.3.5	Potential Construction Effects and Mitigation Measures	6-87
6.9.3.6	Net Effects.....	6-87
6.9.4	Section 4 – Highway 427 to UP Express Pearson Station.....	6-87
6.9.4.1	Potential Footprint Effects and Mitigation Measures	6-87
6.9.4.2	Net Effects.....	6-87
6.10	Air Quality	6-88
6.10.1	Air Quality Effects Assessment – Rail Corridor	6-88
6.10.1.1	Potential Operations and Maintenance Effects and Mitigation Measures	6-88
6.10.1.2	Potential Construction Effects	6-89
6.10.1.3	Net Effects	6-90
6.10.2	Air Quality Effects Assessment – Stationary Facilities.....	6-90
6.10.2.1	Potential Operations and Maintenance Effects and Mitigation Measures	6-91
6.10.2.2	Net Effects	6-91
6.10.2.3	Potential Construction Effects and Mitigation Measures	6-91
6.10.2.4	Net Effects	6-91
6.10.3	Air Quality Effects Assessment – EMU Maintenance Facility.....	6-91
6.10.3.1	Sources of Emissions.....	6-91
6.10.3.2	Sensitive Points of Reception	6-92
6.10.3.3	Applicable Criteria	6-92
6.10.3.4	Assessment Methodology	6-92
6.10.3.5	Assessment Results.....	6-93
6.10.3.6	Net Effects	6-94
6.10.3.7	Potential Construction Effects and Mitigation Measures	6-94
6.10.3.8	Net Effects	6-94
6.11	Noise	6-95
6.11.1	Noise Effects Assessment – Rail Corridor	6-95
6.11.1.1	Potential Operations and Maintenance Effects and Mitigation Measures	6-95
6.11.1.2	Net Effects	6-97

6.11.1.3	Potential Construction Effects and Mitigation Measures	6-98
6.11.1.4	Net Effects	6-102
6.11.2	Noise Effects Assessment – Stationary Facilities	6-102
6.11.2.1	Potential Operations and Maintenance Effects – Paralleling Station (Ordinance Street)	6-103
6.11.2.2	Net Effects	6-103
6.11.2.3	Potential Construction Effects and Mitigation Measures – Paralleling Station (Ordinance Street)	6-104
6.11.2.4	Net Effects	6-104
6.11.2.5	Potential Operations and Maintenance Effects and Mitigation Measures – Paralleling Station (3500 Eglinton Avenue West)	6-104
6.11.2.6	Net Effects	6-105
6.11.2.7	Potential Construction Effects and Mitigation Measures - Paralleling Station (3500 Eglinton Avenue West)	6-105
6.11.2.8	Net Effects	6-105
6.11.3	Noise Effects Assessment – Traction Power Distribution Components (175 CityView Drive)	6-105
6.11.3.1	Potential Construction Effects and Mitigation Measures	6-105
6.11.3.2	Net Effects	6-106
6.11.4	Noise Effects Assessment – EMU Maintenance Facility	6-106
6.11.4.1	Potential Operations and Maintenance Effects and Mitigation Measures	6-106
6.11.4.2	Net Effects	6-115
6.11.4.3	Potential Construction Effects and Mitigation Measures	6-115
6.11.4.4	Net Effects	6-116
6.12	Vibration	6-117
6.12.1	Vibration Effects Assessment – Rail Corridor	6-117
6.12.1.1	Potential Operations and Maintenance Effects and Mitigation Measures	6-117
6.12.1.2	Net Effects	6-118
6.12.1.3	Potential Construction Effects and Mitigation Measures	6-118
6.12.2	Vibration Effects Assessment – Paralleling Stations	6-121
6.12.2.1	Potential Operations and Maintenance Effects – Paralleling Stations	6-121
6.12.2.2	Net Effects	6-121
6.12.2.3	Potential Construction Effects – Paralleling Stations	6-121
6.12.2.4	Net Effects	6-121
6.12.3	Vibration Effects Assessment – Traction Power Distribution Components (175 City View Drive)	6-122
6.12.3.1	Potential Construction Effects – Traction Power Distribution Components (175 City View Drive)	6-122
6.12.3.2	Net Effects	6-122
6.12.4	Vibration Effects Assessment – EMU Maintenance Facility	6-122
6.12.4.1	Potential Operations and Maintenance Effects – EMU Maintenance Facility	6-122
6.12.4.2	Net Effects	6-123

6.12.4.3	Potential Construction Effects – EMU Maintenance Facility	6-123
6.12.4.4	Net Effects	6-123
6.14	Visual	6-124
6.14.1	Methodology	6-124
6.14.1.1	Receptor Considerations	6-124
6.14.1.2	Criteria	6-124
6.14.2	Section 1 – UP Express Union Station to UP Express Bloor Station.....	6-125
6.14.2.1	Potential Effects and Mitigation Measures.....	6-125
6.14.2.2	Net Effects	6-134
6.14.3	Section 2 – UP Express Bloor to UP Express Weston Station	6-135
6.14.3.1	Potential Effects and Mitigation Measures.....	6-135
6.14.3.2	Net Effects	6-137
6.14.4	Section 3 – UP Express Weston Station to Highway 427.....	6-143
6.14.4.1	Potential Effects and Mitigation Measures.....	6-143
6.14.4.2	Net Effects	6-144
6.14.5	Section 4 - Highway 427 to UP Express Pearson Station	6-148
6.14.5.1	Potential Effects and Mitigation Measures.....	6-148
6.14.5.2	Net Effects	6-148
6.15	Traffic	6-151
6.16	Utilities	6-154
6.16.1.1	Utility Categories	6-154
6.16.1.2	Net Effects	6-156
6.17	Electromagnetic Fields (EMF)	6-157
6.17.1	Approach	6-157
6.17.1.1	International Industry Standards (EMF)	6-157
6.17.2	EMF Assessment Results	6-159
6.17.2.1	Rail Corridor	6-159
6.17.2.2	Vicinity of Traction Power Facilities.....	6-159
6.17.2.3	Passenger Stations & EMU Maintenance Facility	6-160
6.17.2.4	Mitigation Measures.....	6-160
6.17.2.5	Net Effects	6-160
6.18	Electromagnetic Interference	6-162
6.18.1	Approach	6-162
6.18.1.1	Study Limitations	6-162
6.18.1.2	Industry Standards (EMI)	6-163
6.18.2	EMI Assessment Results	6-164
6.18.2.1	Potential EMI Effects and Mitigation Measures - Rail Corridor	6-165

6.18.2.2	Net Effects	6-165
6.18.2.3	Potential EMI Effects - Extremely Low Frequency	6-165
6.18.2.4	Net Effects	6-165
6.18.2.5	Potential EMI Effects - Radio Frequency	6-165
6.18.2.1	Net Effects	6-166
6.18.3	Future Work (EMI/EMF)	6-166
6.18.3.1	Prepare EMC Analysis Report	6-166
6.18.3.2	Frequency Management Plan (Detailed Design)	6-166
6.18.3.3	Construction Phase	6-167
6.18.3.4	Commissioning Phase	6-167
6.18.3.5	Operations/Maintenance Phase	6-167
6.19	Stray Current	6-168
6.20	Summary of Mitigation and Monitoring	6-169

List of Tables

Table 6-1	Range of potential effects – UP Express Electrification	6-3
Table 6-2.	Summary of Cultural Heritage Resources (CHR) and potential impacts	6-53
Table 6-3	Summary of property requirements – section 1	6-82
Table 6-4.	Summary of property requirements – section 2	6-84
Table 6-5.	Summary of property requirements – section 3	6-86
Table 6-6	Estimated UP Express System Wide EMU Regional 24-hr Contaminant Emission Rates	6-88
Table 6-7	Estimated UP Express System Wide DMU Local 24-hr Contaminant Emission Rates	6-89
Table 6-8.	Applicable Criteria	6-92
Table 6-9.	Summary of Model Results	6-93
Table 6-10 –	MOEE/GO Transit Draft Protocol Noise Impact Ratings	6-96
Table 6-11 –	Sound Level Limits for Construction Equipment (NPC-115)	6-99
Table 6-12 –	Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) (NPC-300) – Class 1 Areas	6-103
Table 6-13 –	Nearest Sensitive Points of Reception to MF	6-107
Table 6-14	Applicable Sound Level Criteria for Maintenance Facility	6-110
Table 6-15.	Assessment Results (Plane of Window Points of Reception) – Regular Operations	6-111
Table 6-16.	Assessment Results (Plane of Window Points of Reception) –	6-113
Table 6-17	Summary of Potential Impacts and Mitigation Measures – Section 1: UP Express Union Station to UP Express Bloor Station	6-131
Table 6-18	Summary of Potential Impacts and Mitigation Measures – Section 2: UP Express Bloor Station to UP Express Weston Station	6-139
Table 6-19	Summary of Potential Impacts and Mitigation Measures – Section 3: UP Express Weston Station to Hwy 427	6-145

Table 6-20 Summary of Potential Impacts and Mitigation Measures – Section 4: Highway 427 to UP Express Pearson Station.....	6-149
Table 6-21 Summary of Potential Impacts Utilities and Mitigation Measures.....	6-155
Table 6-22 Exposure limits for fundamental frequency electric fields	6-158
Table 6-23 Exposure limits for fundamental frequency magnetic fields	6-158
Table 6-24 Magnetic and Electric Field STrength Limits Established for UP Express	6-159
Table 6-25 Summary of Potential Effects, Mitigation and Monitoring/Commitments.....	6-170

List of Figures

Figure 6-1 Terrestrial Features – Section 1 (Vicinity Of Ordnance Paralleling Station)	6-6
Figure 6-2. Terrestrial Features – Section 2 (Vicinity Of 3500 Eglinton Ave. W. Paralleling Station)	6-15
Figure 6-3. Terrestrial Features – Section 3 (Vicinity Of EMU Maintenance Facility)	6-19
Figure 6-4. Terrestrial Features – Section 3 (Vicinity Of Traction Power Substation)	6-21
Figure 6-5 Aquatic Features – Section 2	6-28
Figure 6-6 Example Of Rope Access Installation Method	6-31
Figure 6-7 Aquatic Features – Section 3	6-34
Figure 6-8 Example Of Bridge Protection Barrier	6-56
Figure 6-9 Potentially Affected Heritage Attributes Within The Fort York Precinct.....	6-59
Figure 6-10 Ordnance Paralleling Station Location Shown On 1857 Map	6-70
Figure 6-11 Pantograph On Electric Train	6-97
Figure 6-12 Points Of Reception –EMU Maintenance Facility.....	6-108
Figure 6-13 Proposed Barrier Location	6-112
Figure 6-14 Prediction Results: Regular Operations (With Mitigation)	6-114
Figure 6-15 Corridor As Viewed West Of Bathurst Street Bridge	6-126
Figure 6-16 View Looking North From Garrison Common Of The Lakeshore Line And Ordnance Triangle And The Proposed Paralleling Station Location.	6-128
Figure 6-17 View Looking North-East From Fort York Rampart Wall And Bathurst Street Bridge	6-129
Figure 6-18 View Looking At Interior Of Fort From Fortification Entrance.....	6-129
Figure 6-19 View Looking North From Wallace St. Pedestrian Bridge With Proposed Ocs Structures	6-136
Figure 6-20 View Of Proposed Ray Avenue Gantries	6-138

6. Impact Assessment

The purpose of this chapter is to summarize the potential effects associated with the UP Express Electrification project, a description of proposed avoidance/mitigation/compensation measures (as required), and establishment of the resulting net effects.

6.1 Methodology

The baseline conditions information (see Chapter 4) was used as the basis from which the potential impacts of constructing and operating/maintaining the electrified UP Express service were identified, and consideration of the preliminary design prepared for the UP Express Electrification project. The impact assessment process was based on carrying out the following three steps:

- Identify potential effects (positive and negative);
- Establish avoidance/mitigation/compensation measures to eliminate or minimize potential negative effects (as required); and
- Identify net effects (i.e., residual effects after applying mitigation measures).

For purposes of differentiating the various types of potential environmental impacts related to the UP Express Electrification undertaking, they were characterized and grouped as follows:

Footprint Impacts	Potential displacement or loss of existing environmental features within the Study Area due to implementation of the physical UP Express Electrification project components (e.g., paralleling station facilities, EMU Maintenance Facility).
Operations and Maintenance Impacts	Potential (long term) effects on existing environmental features (including receptors) due to operations and maintenance activities associated with the electrified UP Express service (e.g., operation of the electrified UP Express system, operation of EMU Maintenance Facility, etc.).
Construction Impacts	Potential disruption/disturbance (short term) effects on existing environmental features (including receptors) due to construction activities associated with the UP Express Electrification project (e.g., construction of OCS components, construction of traction power distribution facilities, etc.).

With this process in mind, the following subsections document the impact assessment carried out with respect to natural, social, cultural environmental factors:

- **Natural Environment Factor:**
 - Terrestrial Features (i.e., vegetation, wildlife/wildlife habitat, etc.)
 - Aquatic Features (i.e., surface water, fish/fish habitat, stormwater management)

- 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
 - Traffic
 - Utilities
- **Other**
 - Electromagnetic Fields
 - Electromagnetic Interference
 - Stray Current

In keeping with the format established in Chapter 4, this chapter has been organized according to the four respective Study Area sections, and includes a description of the potential effects, proposed avoidance/mitigation/compensation measures to eliminate or minimize the potential effects, followed by identification of net effects (positive or negative). In general, mitigation measures were identified based on a combination of best management practices and development of more specific mitigation measures as appropriate to address project-specific impacts.

6.1.1 Range of Potential Impacts

The following interactions matrix (**Table 6-1**) summarizes the environmental factors that may be affected by the UP Express electrification project components / activities. The intent of the matrix is to guide the more detailed assessment of potential impacts contained in the following sections by establishing (at a high-level), the scope and types of environmental effects that may occur with respect to both operation/maintenance of the electrified UP Express service and site-specific project facilities and activities. Generally, an “x” was identified wherever an interaction between an identified project component and an environmental factor is expected to occur.

TABLE 6-1 RANGE OF POTENTIAL EFFECTS – UP EXPRESS ELECTRIFICATION

PROJECT PHASES / COMPONENTS			ENVIRONMENTAL FACTORS															
	Terrestrial (Vegetation Communities, Soil)	Wildlife & Wildlife Habitat (Including Migratory Birds)	Aquatic (Surface Water & Fish/Fish Habitat)	Groundwater Quality & Quantity	Stormwater Management	Contaminated Properties	Cultural Heritage	Archaeology	Land Us/Social Features	Property Acquisition	Air Quality	Noise/Vibration	Visual	Traffic	Utilities	Electromagnetic Fields	Electromagnetic Interference	Stray Current
OPERATIONAL PHASE																		
Traction Power Distribution																		
Overhead Contact System (OCS)		X					X			X			X			X	X	
Electrified UP Express Trains												X				X	X	
Paralleling Station - Ordnance					X				X				X			X	X	
Paralleling Station – 3500 Eglinton Avenue West					X								X			X	X	
Gantries													X					
25 kV Feeders (underground via duct banks)										x					X			
Grounding and Bonding System															X			
EMU Train Maintenance (at EMU Maintenance Facility)					X				X				X	X				

CONSTRUCTION PHASE																		
Installation of OCS foundations (within rail ROW)						X				X	X	X			X			
Install OCS support structures (within rail ROW)												X			X			
Installation of Gantry foundations (within rail ROW)						X						X			X			
OCS wire installation															X			
Install bridge protection barriers/grounding grids							X							X		X		
Soil excavation (install underground duct banks, grounding and bonding)	X					X				X	X				X			
Site preparation/clearing (paralleling stations, maintenance facility)	X					X		X			X							
Building/foundation construction (paralleling stations, maintenance facility)	X			X		X					X		X		X			
Rail and track construction (at EMU Maintenance Facility)	X										X	X						
Operation of heavy trucks and machinery											X	X	X					

6.2 Natural Environment – Terrestrial Features

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

6.2.1.1 Potential Footprint Effects and Mitigation Measures

Installation of OCS

The installation of OCS foundations/poles within the rail corridor may result in damage to soils due to compaction, which may prevent vegetation from re-establishing. However, this effect is considered negligible as the existing rail corridor is heavily disturbed, therefore no mitigation measures are proposed.

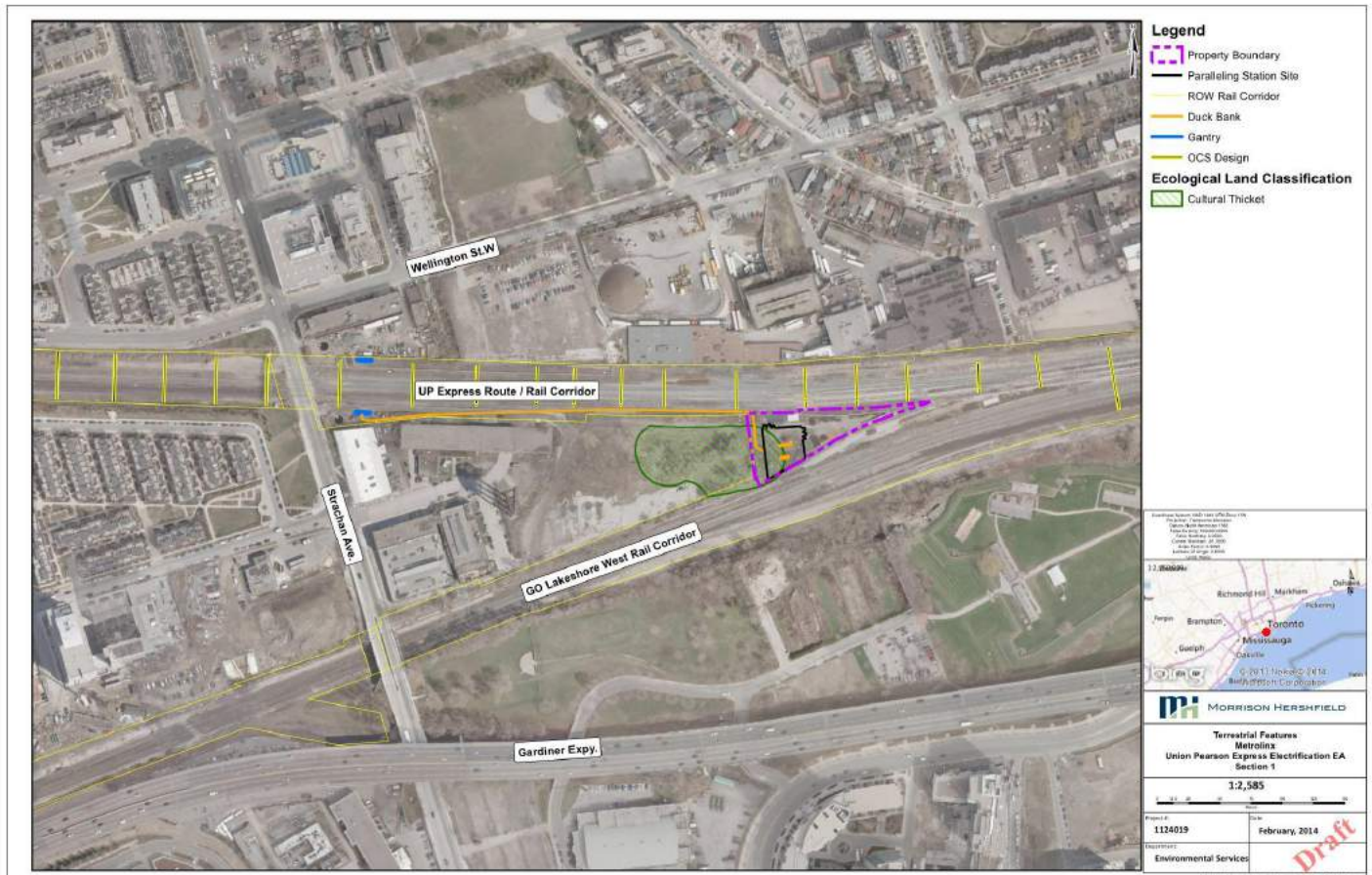
In addition, installation of OCS foundations and gantries may require vegetation removals/clearing within the existing Metrolinx owned rail corridor. However, it is noted that the existing rail corridor is composed of a culturally influenced vegetation community dominated by non-native grasses and field herbs common to disturbed habitats. These effects are therefore considered negligible and no mitigation/compensation measures are proposed.

A small number of OCS structure foundations may be located outside of the rail corridor (to be refined/confirmed during detailed design). However, vegetation removals required for the installation of these foundations will be negligible.

Ordnance Paralleling Station

The gantries associated with the Ordnance paralleling station are located within Metrolinx's rail ROW, therefore potential effects related to vegetation are as described above. Similarly, the duct banks extending from the paralleling station facility to the gantries will be routed in parallel to the rail corridor. The proposed paralleling station at Ordnance Street will require clearing a nominal 0.09 hectares of vegetation (Cultural Thicket community) (see **Figure 6-1**), which is dominated by shrubs and saplings common to disturbed habitats. These areas are not considered rare or environmentally sensitive communities and no rare vegetation was observed during field investigations. Since complete vegetation removal will be required in order to implement the paralleling station facility, there will be no remaining land available on the Ordnance site for vegetation retention zones. Notwithstanding this, Metrolinx will consider developing a restoration plan as part of the detailed design phase that entails vegetation planting at other viable locations in the vicinity of the corridor to offset vegetation loss to the extent possible.

FIGURE 6-1 TERRESTRIAL FEATURES – SECTION 1 (VICINITY OF ORDNANCE PARALLELING STATION)



Indirect Effects

Although no nests were observed during the 2012 Breeding Bird Study (as part of baseline data collection), the potential vegetation removals discussed above may result in loss of wildlife habitat if any bird's nests are destroyed during this clearing. Nests of migratory birds are protected by the federal *Migratory Birds Convention Act*. This Act prohibits harm to migratory birds and their nests, eggs and young. Nests of Species at Risk birds are protected by the provincial *Endangered Species Act*. Under this Act, no person shall kill, harm, harass, capture or take a living member of a protected species or damage or destroy its habitat. As a result, the following mitigation measures are proposed in order to reduce or mitigate the potential for adverse effects on birds and their nests:

- Where possible, vegetation removals shall be scheduled before April 1st to avoid the breeding bird season.
- Prior to construction, the contractor shall inspect the construction area for nests and eggs and advise the Contract Administrator of any locations of nests and eggs immediately.
- The contractor shall not destroy nests and eggs of protected migratory birds during migratory bird nesting season (April 1 to July 15) to avoid a permit under the Migratory Birds Convention Act. If an active nest of a migratory bird must be damaged or destroyed, a permit under this Act is required.
- The contractor shall not destroy nests and eggs of protected Species at Risk birds to avoid a permit under the Endangered Species Act. If the nest of a protected Species at Risk must be damaged or destroyed, a permit under this Act is required.
- If a nest is removed from a structure (e.g., bridge/overhead structure/GO Station, the structure/station will be netted outside of the breeding bird season to prevent the recurrence of nesting activity. The contractor shall monitor the area daily for the recurrence of nesting activity upon removal of nests and notify the Contract Administrator immediately if a nest reappears.

6.2.1.2 Net Effects

No net adverse effects from the OCS installation are anticipated. The Paralleling Station at Ordance Street will result in removal of a nominal 0.09 hectares of vegetation. The proposed mitigation measures outlined above will reduce or mitigate vegetation loss to the extent possible. In addition, the mitigation measures as outlined above will reduce the potential for adverse effects on birds and their nests.

6.2.1.3 Potential Operations and Maintenance Effects and Mitigation Measures

Operation of the Electrified UP Express

In flight, there is potential for birds to collide into trains or the Overhead Catenary System (OCS) that are often difficult to see. In addition, there is potential for birds to be electrocuted when they

simultaneously touch two conductor cables or one conductor cable and a neutral wire or grounded pole. It is noted that the risk of electrocution is greater for medium to large size birds (e.g., raptors) that may use poles for perching, nesting and roosting (Haas et al, 2005).

As a result, the following mitigation measures are proposed:

- The rail corridor will be regularly cleared of any vegetation, wildlife carcasses or debris that may be attractive to wildlife.
- For OCS wires of different electrical potential, conductors will be spaced 1.5m apart or greater whenever possible to reduce the risk of bird electrocution. For UP Express, a minimum clearance of approximately 2.75m is to be achieved between two different OCS wires which have different electrical potentials (which may be separately isolated and grounded). Where this clearance is not possible, the neutral cable will be made clearly visible with suitable markers (The Edison Electric Institute's Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service. 2005), such as anti-bird flash. **Appendix A** provides for an overview of the options for markers that can be applied.
- For OCS wires of the same electrical potential (such as situations where there are intersecting wires), the electrical clearance can be reduced to a minimum of 600 mm, regardless of whether live or grounded. If this electrical clearance cannot be achieved, then insulation or suitable covering of wires is to be provided (such as twin contact wire cover or anti-bird flash over strips) (The Edison Electric Institute's Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service. 2005). This measure can be applied at any point in the catenary system and is not restricted to bridges alone. **Appendix A** provides for an overview of the options for coverings that can be applied.
- Any bird or other wildlife mortality will be documented to identify areas of concern and determine the need for follow-up mitigation measures, as well as review the effectiveness of current mitigation measures.
- Provide perching opportunities through the planting of trees or installation of perching structures of various heights (i.e., 2 to 10m) away from the OCS.
- Perform monthly inspections during the breeding bird period (April 1 to July 15) for nests on the OCS structures and install exclusion devices on areas where birds are attempting to nest after the birds have vacated the area.

Maintenance of OCS (including Bridges/Overhead Structures/UP Express Stations)

During the operation of the electrified UP Express, regular maintenance of the OCS, including on bridges, overhead structures, and UP Express stations may require the removal of bird's nests on structures and on vegetation. Nests of migratory birds are protected by the federal *Migratory Birds Convention Act*. This Act prohibits harm to migratory birds and their nests, eggs and young. Nest of Species at Risk birds are protected by the provincial *Endangered Species Act*. Under this Act, no person shall kill, harm, harass, capture or take a living member of a protected species or damage or destroy its habitat.

As a result, the following mitigation measures are proposed in order to reduce or mitigate the potential for adverse effects on birds and their nests:

- The contractor shall inspect the structure (OCS portal/bridge/station) for nests and eggs and advise the Contract Administrator of any locations of nests and eggs immediately.
- The contractor shall not destroy nests and eggs of protected migratory birds during migratory bird nesting season (April 1 to July 15) to avoid a permit under the *Migratory Birds Convention Act*. If an active nest of a migratory bird must be damaged or destroyed, a permit under this Act is required.
- The contractor shall not destroy nests and eggs of protected Species at Risk birds to avoid a permit under the *Endangered Species Act*. If the nest of a protected Species at Risk must be damaged or destroyed, a permit under this Act is required.
- If a nest is removed from a structure (OCS portal/bridge/station), the structure will be netted outside of the breeding bird season to prevent the recurrence of nesting activity. The contractor shall monitor the area daily for the recurrence of nesting activity upon removal of nests and notify the Contract Administrator immediately if a nest reappears.

Maintenance of Ordnance Paralleling Station

The paralleling station facility will be equipped with an oil containment system for the maintenance of autotransformers. The oil containment system will have open area covered with non-skid galvanized steel grating on all sides of the transformer concrete pad and will conform to applicable codes/standards/guidelines.

During maintenance activities associated with the paralleling station, use of oils and insulating fluids may be required. As a result, accidental spills may occur during the handling and storage of these products. The following mitigation measures are proposed to reduce the potential for contamination to occur due to accidental spills:

- The paralleling station will be fully equipped with spill containment and oil/water separation facilities. In the event on an equipment failure, oily water will not escape from the site.
- An Emergency Preparedness and Response Plan will govern spill response.
- Spill cleanup and response equipment will be located on site.
- Transportation of fuel will be conducted in compliance with the *Transportation of Dangerous Goods Act*.
- Spill decks will be used for transferring products to smaller containers.
- Fire extinguishers will be located near petroleum, oil and lubricants storage areas.
- Routine inspection of the paralleling station, including transformer oil will be carried out
- All necessary precautions will be implanted to prevent the spillage and release of hazardous materials to the environment.

- All leaks or spills will be immediately reported to the Ministry of the Environment, Spills Action Centre at 1-800-268-6060.

6.2.1.4 Net Effects

Net adverse effects on birds (mortality) due to operation of the OCS will be minimized with the implementation of the mitigation measures, i.e., provision of minimum OCS wire clearances and/or installation of insulation/coverings/markers, as outlined above. Similarly, the risk of damaging or destroying a protected Migratory Bird species or its habitat during bridge/station maintenance activities will be minimized based on implementation of the mitigation measures described above.

In addition, the potential for contamination to occur as a result of an accidental spill during Paralleling Station maintenance activities will be minimized through implementation of the above listed mitigation measures.

6.2.1.5 Potential Construction Effects and Mitigation Measures

Installation of Duct Banks/Gantries/Grounding Grid

Soil excavation will be required as part of installing the duct banks (approximately 4m wide, 1m deep) from the gantry location at to the Ordnance paralleling station site (see **Figure 6-1**). Gantry foundations will be installed along the rail ROW. Similarly, soil excavation is required in order to install grounding and bonding material within the paralleling station Ordnance property boundary. Soil excavation may result in erosion of the work areas during excavations and/or soil storage, therefore the following mitigation measures are proposed:

- Adhere to relevant guidelines and Ontario Provincial Standard Specifications, including consideration of TRCA¹ Erosion and Sediment Control Guidelines to Urban Construction) and Ontario Provincial Standards Specifications (OPSS) – OPSS 577 (Erosion and Sediment Control Measures).
- Where temporary storage of the soil is required, the soil will be stored immediately adjacent to the excavation site.
- Topsoil and subsoil will not be mixed nor will topsoil be contaminated with any other material.
- Silt fencing will be installed around all designated work areas to prevent any offsite transport of sediment.
- Exposed soils will be hydroseeded within 45 days, both for temporary work areas and final grades.
- Existing vegetation on embankments shall be maintained as long as possible and new slopes shall be stabilized as soon as possible by seeding and mulching.

¹ As a Crown Agency, GO/Metrolinx is exempt from the Conservation Authorities Act and as such does not have a requirement to apply for and obtain permits from conservation authorities. Wherever possible, GO/Metrolinx will engage the conservation authority on specific projects (or components thereof) and will adhere to requirements when and where possible.

In addition, there is potential for invasive and disturbance-tolerant non-native species to establish on exposed stockpiles of excavated soils, or be introduced on equipment during construction. Construction activities may cause the spread of Emerald ash borer (*Agrilus planipennis*), an invasive insect found on ash trees within the City of Toronto. The following mitigation measures are proposed:

- Where possible, excavated soils should be stored for a period of less than 45 days.
- Where excavated soils must be stored for a period longer than 45 days, they should be covered or seeded with a cover crop, such as annual oats or annual rye.
- Once soils are replaced, they should be re-seeded with a native seed mix suited to the site conditions based on consideration of TRCA² seed mix guidelines (TRCA 2004).
- Equipment should be cleaned between sites to prevent the spread of invasive species.
- Vegetation removals must be carried out in a manner in compliance with the Ministerial Order issued by the Federal Government which identifies prohibitions and restrictions of movement on trees, leaves, logs, lumber, wood/wood chips from all ash species. Unless authorized by a Movement Certificate issued by the CFIA, moving these products out of the Regulated Area is prohibited. This is necessary to prevent the spread of the Emerald Ash Borer (EAB) to un-infested areas in other parts of Ontario and Canada. The Contractor must dispose of all wood at a registered Waste Facility.

Accidental spills

During construction, equipment may leak, or spills may occur. Accidental contamination may occur during the handling and storage of toxic products such as fuel and concrete mixtures.

- The paralleling station will be fully equipped with spill containment and oil/water separation facilities. In the event of an equipment failure, oily water will not escape from the site.
- An Emergency Preparedness and Response Plan will govern spill response.
- Spill cleanup and response equipment will be located on site.
- Fuel transport will be conducted in compliance with the Transportation of Dangerous Goods Act.
- Spill decks will be used for transferring products to smaller containers.
- Fire extinguishers will be located near petroleum, oil and lubricants storage areas.
- Routine inspection of the paralleling station facility, including transformer oil will be carried out.
- All necessary precautions will be implemented to prevent the spillage and release of hazardous materials to the environment.
- All leaks or spills will be immediately reported to the Ministry of the Environment, Spills Action Centre at 1-800-268-6060.

Installation of OCS on Bridges/Overhead Structures/UP Express Stations

² As a Crown Agency, GO/Metrolinx is exempt from the Conservation Authorities Act and as such does not have a requirement to apply for and obtain permits from conservation authorities. Wherever possible, GO/Metrolinx will engage the conservation authority on specific projects (or components thereof) and will adhere to requirements when and where possible.

During the installation of OCS on bridges/overhead structures/UP Express stations nests of migratory birds may be encountered. Nests of migratory birds are protected by the federal *Migratory Birds Convention Act*. This Act prohibits harm to migratory birds and their nests, eggs and young. Nest of Species at Risk birds are protected by the provincial *Endangered Species Act*. Under this Act, no person shall kill, harm, harass, capture or take a living member of a protected species or damage or destroy its habitat. As a result, the following mitigation measures are proposed in order to reduce or mitigate the potential for adverse effects on birds and their nests:

- The contractor shall inspect the structure (bridge/station) for nests and eggs and advise the Contract Administrator of any locations of nests and eggs immediately.
- The contractor shall not destroy nests and eggs of protected migratory birds during migratory bird nesting season (April 1 to July 15).
- The contractor shall not destroy nests and eggs of protected Species at Risk birds.
- If a nest is removed from a structure (bridge/overhead structure/station), the structure will be netted outside of the breeding bird season to prevent the recurrence of nesting activity. The contractor shall monitor the area daily for the recurrence of nesting activity upon removal of nests and notify the Contract Administrator immediately if a nest reappears.

Temporary construction impacts

Construction traffic will generate dust, noise and light that may affect vegetation and wildlife. During the growing season, dust can coat vegetation, limiting photosynthesis, respiration, transpiration and other growth processes (Farmer, 1991). Wildlife utilizing the site may be temporarily displaced during construction. However, these animals are already exposed to high noise levels and are tolerant of urban conditions. Mitigation measures to reduce or mitigate the potential for adverse effects caused by construction activities include:

- Dust should be controlled as much as possible by watering of appropriate surfaces. The contractor shall adhere to relevant guidelines and Ontario Provincial Standard Specifications, including OPSS 506 (Dust Control). Appropriate lengths of silt fencing will be installed along the perimeter of minimized, designated work areas to limit construction impacts.
- All construction equipment and vehicles will yield the right-of-way to wildlife, if it is safe to do so.
- Advise workers to perform visual survey of machinery and work area prior to commencing work since wildlife may be found basking or hiding on or under equipment, rocks, debris piles etc.
- Do not allow construction debris to accumulate on-site and on the soils surface but regularly clean up the site to reduce the possibility of wildlife using debris piles for shelter.
- Clean up all litter daily and provide waste disposal containers so wildlife does not ingest indigestible materials or become entangled in debris.
- Any wildlife incidentally encountered during construction will be protected and will not be knowingly harmed.

- Advise workers to stop work and inform the Contract Administrator if any snakes, turtles or other potential Species at Risk are encountered.
- Advise workers to perform a visual survey of machinery and work area prior to commencing work since wildlife may be found hiding in or under equipment, rocks, debris piles, etc. and any individuals found shall be left to move on their own or moved properly out of harm's way in the direction they were heading.
- All workers should be provided with awareness training (e.g. factsheets) that addresses the existence of Species at Risk on site, identification of those species and proper actions when an individual is encountered and/or needs to be moved out of harm's way.
- Report all Species at Risk sightings and encounters to the MNR Aurora District office using the appropriate reporting form within two business days.
- If a nesting snake or turtle is found the MNR shall be notified immediately and a 10 m buffer zone shall be flagged around the site and that area protected from harm during the nesting season.

6.2.1.6 Net Effects

Net adverse effects related to soil erosion and potential for invasive and disturbance-tolerant non-native species to establish on exposed stockpiles of excavated soils will be minimized via implementation of the mitigation measures outlined above. The potential for soil contamination related to accidental spills will be minimized. The potential for adverse effects on birds and their nests related to OCS construction activities will be mitigated based on implementation of the above listed mitigation measures. Potential temporary displacement of wildlife during construction activities will be minimized by ensuring the mitigation measures described above are implemented and adhered to by the Contractor.

In addition, an Environmental Inspector will be responsible for ensuring that all environmental mitigation measures are properly installed, implemented and maintained during construction.

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

6.2.2.1 Potential Footprint Effects and Mitigation Measures

Installation of OCS

Section 6.2.1.1 above contains a discussion of the potential effects and mitigation measures related to installation of OCS.

Paralleling Station – 3500 Eglinton Avenue West

The proposed location for the paralleling station is at 3500 Eglinton Avenue West (see **Figure 6-2**). It is noted that this site at 3500 Eglinton Avenue West (former Kodak property) was identified by Metrolinx as the proposed location for the planned Eglinton Crosstown Light Rail Transit (LRT) Maintenance and Storage Facility (MSF) (Metrolinx Eglinton Crosstown LRT EPR Addendum, October 2013). As per the

October 2013 EPR Addendum, the proposed MSF will require the entire Kodak property area. As a result, the potential footprint impacts and associated mitigation measures associated with construction and implementation of the MSF were captured and documented as part of the Eglinton Crosstown LRT Environmental Assessment process via the October 2013 EPR Addendum.

Subsequently, in coordination with the Eglinton Crosstown MSF project team, it was confirmed that the Kodak site will accommodate the MSF as well as the Paralleling Station required for UP Express electrification. As a result, a provision for the proposed Paralleling Station will be incorporated into the detailed design/build plans for the Eglinton LRT MSF. Therefore, the final location of the Paralleling Station within the Kodak property limits (owned by Metrolinx) will be determined as part of the detailed design phase for the Eglinton LRT MSF. Notwithstanding this, since the potential impacts and mitigation measures related to developing the entire Kodak property were previously captured in the Final Eglinton Crosstown LRT EPR Addendum, there will be no new net adverse effects associated with locating the Paralleling Station facility on the Kodak site.

FIGURE 6-2. TERRESTRIAL FEATURES – SECTION 2 (VICINITY OF 3500 EGLINTON AVE. W. PARALLELING STATION)



Indirect Effects

Although no nests were observed during the 2012 Breeding Bird Study (as part of baseline data collection), the potential vegetation removals discussed above may result in loss of wildlife habitat if any bird's nests are destroyed during this clearing. Nests of migratory birds are protected by the federal *Migratory Birds Convention Act*.

Section 6.2.1.1 above provides a more detailed discussion of potential indirect effects on wildlife habitat and proposed mitigation measures.

6.2.2.2 Net Effects

There are no new net adverse footprint effects to vegetation cover or wildlife habitat at the 3500 Eglinton Avenue West paralleling station site.

6.2.2.3 Potential Operations and Maintenance Effects and Mitigation Measures

Operation of the Electrified UP Express

Section 6.2.1.3 above provides a discussion of potential effects and mitigation measures related to operation of the electrified UP Express.

Maintenance of OCS (including Bridges/Overhead Structures/UP Express Stations)

Section 6.2.1.3 above provides a discussion of potential effects and mitigation measures related to maintenance of OCS.

Maintenance of Paralleling Station

Section 6.2.1.3 above provides a discussion of potential effects and mitigation measures related to maintenance activities associated with paralleling stations.

6.2.2.4 Net Effects

Net adverse effects on birds (mortality) due to operation of the OCS will be minimized with the implementation of the mitigation measures outlined above. Similarly, the risk of damaging or destroying a protected Migratory Bird species or its habitat during bridge/station maintenance activities will be minimized based on implementation of the mitigation measures described above. In addition, the potential for contamination to occur as a result of an accidental spill during Paralleling Station maintenance activities will be minimized through the above listed mitigation measures.

6.2.2.5 Potential Construction Effects and Mitigation Measures***Paralleling Station***

Refer to the potential effects and mitigation measures as outlined in **Section 6.2.1.5** above.

Installation of Duct Banks/Gantries

Soil excavation (under Industry St. and Ray Ave.) will be required as part of installing duct banks (approximately 4m wide, 1m deep) from the gantry location at Ray Ave to the 3500 Eglinton Avenue West site (see **Figure 6-2**). Gantry foundations will be installed within the rail ROW. Soil excavation may result in erosion of the work areas during excavations and/or soil storage, therefore the mitigation measures as outlined in **Section 6.2.1.5** above are proposed:

Accidental spills

During construction, equipment may leak, or spills may occur. Accidental contamination may occur during the handling and storage of toxic products such as fuel and concrete mixtures. Therefore, the mitigation measures as outlined in **Section 6.2.1.5** above are proposed

Installation of OCS on Bridges/Overhead Structures/UP Express Stations

Refer to the potential effects and mitigation measures as outlined in **Section 6.2.1.5** above.

Temporary construction impacts

Refer to the potential effects and mitigation measures as outlined in **Section 6.2.1.5** above.

6.2.2.6 Net Effects

Net adverse effects related to soil erosion and potential for invasive and disturbance-tolerant non-native species to establish on exposed stockpiles of excavated soils will be minimized via implementation of the mitigation measures outlined above. The potential for soil contamination related to accidental spills will be minimized. The potential for adverse effects on birds and their nests related to OCS construction activities will be mitigated based on implementation of the above listed mitigation measures. Potential temporary displacement of wildlife during construction activities will be minimized by ensuring the mitigation measures described above are implemented and adhered to by the Contractor.

In addition, an Environmental Inspector will be responsible for ensuring that all environmental mitigation measures are properly installed, implemented and maintained during construction.

6.2.3 Section 3 - UP Express Weston Station to Highway 427**6.2.3.1 Potential Footprint Effects and Mitigation Measures**Installation of OCS

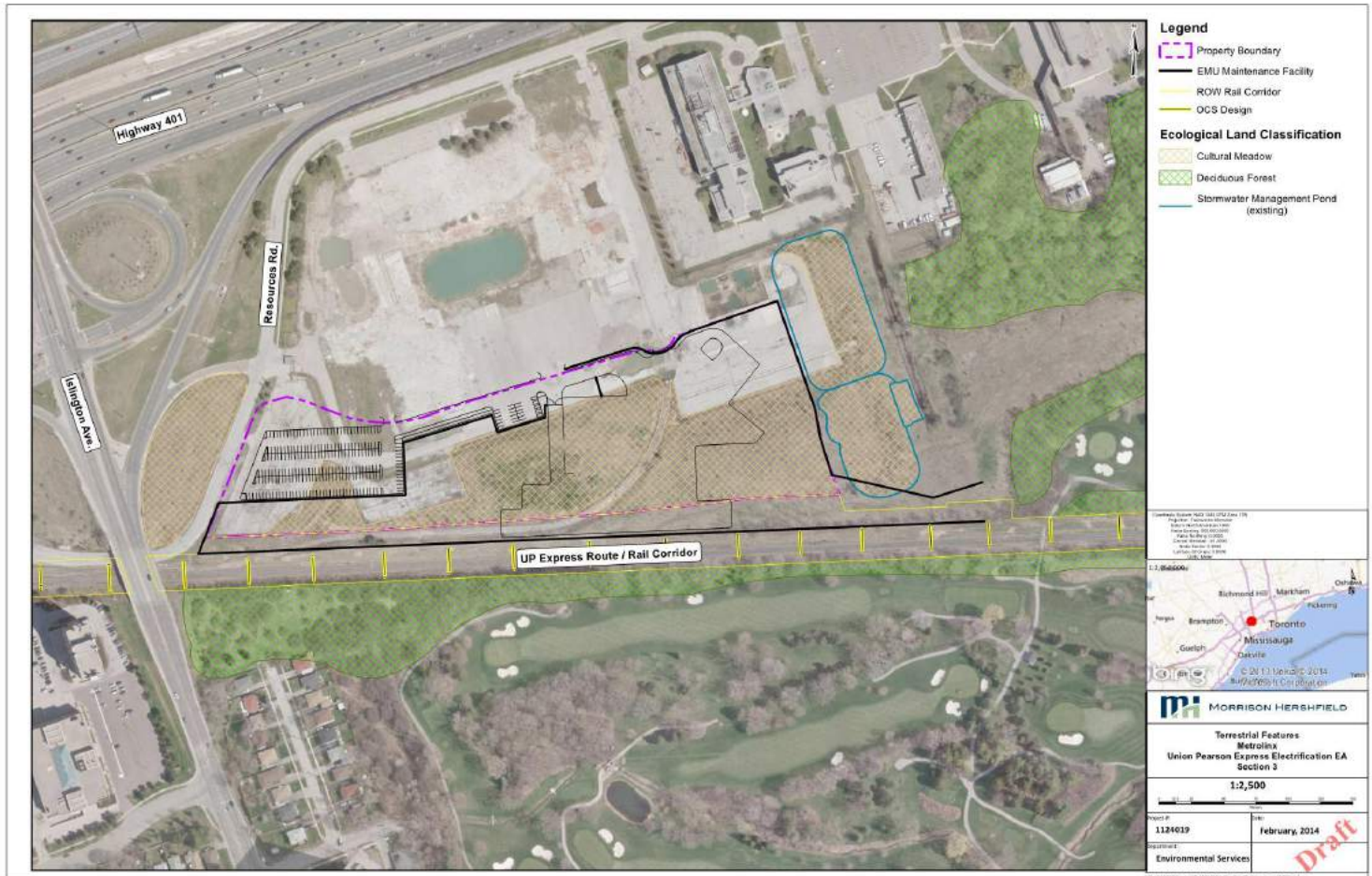
Please refer to **Section 6.2.1.1** above for detailed discussion of potential effects and mitigation measures related to installation of OCS.

EMU Maintenance Facility

Minimal vegetation clearing will be required as part of implementing the proposed EMU Maintenance Facility at 50 Resources Road. During 2012 field investigations, the site was observed to be dominated by non-native grasses and field herbs, (including Grass species, Goldenrod, Queen Anne's Lace, Cow Vetch, Milkweed) common to disturbed habitats and does not provide wildlife habitat function (see **Figure 6-3**). However, currently the site is being used as construction staging area.

Notwithstanding this, Metrolinx will consider developing a restoration plan as part of the detailed design phase that entails vegetation planting at other viable locations in the vicinity of the corridor to offset vegetation loss to the extent possible.

FIGURE 6-3. TERRESTRIAL FEATURES – SECTION 3 (VICINITY OF EMU MAINTENANCE FACILITY)



Traction Power Distribution Components at City View Drive

The proposed traction power distribution components at the City View Drive site are limited to proposed gantries and underground duct banks. These two components will require negligible vegetation removal. The vegetation at this site is dominated by non-native grasses and field herbs (Cultural Meadow community) common to disturbed habitats and does not provide wildlife habitat function (see **Figure 6-4**).

These areas are not considered rare or environmentally sensitive communities and no rare vegetation was observed during field investigations. Therefore, no mitigation measures are proposed.

Indirect Effects

Although no nests were observed during the 2012 Breeding Bird Study (as part of baseline data collection), the potential vegetation removals discussed above may result in loss of wildlife habitat if any bird's nests are destroyed during this clearing. Nests of migratory birds are protected by the federal *Migratory Birds Convention Act*.

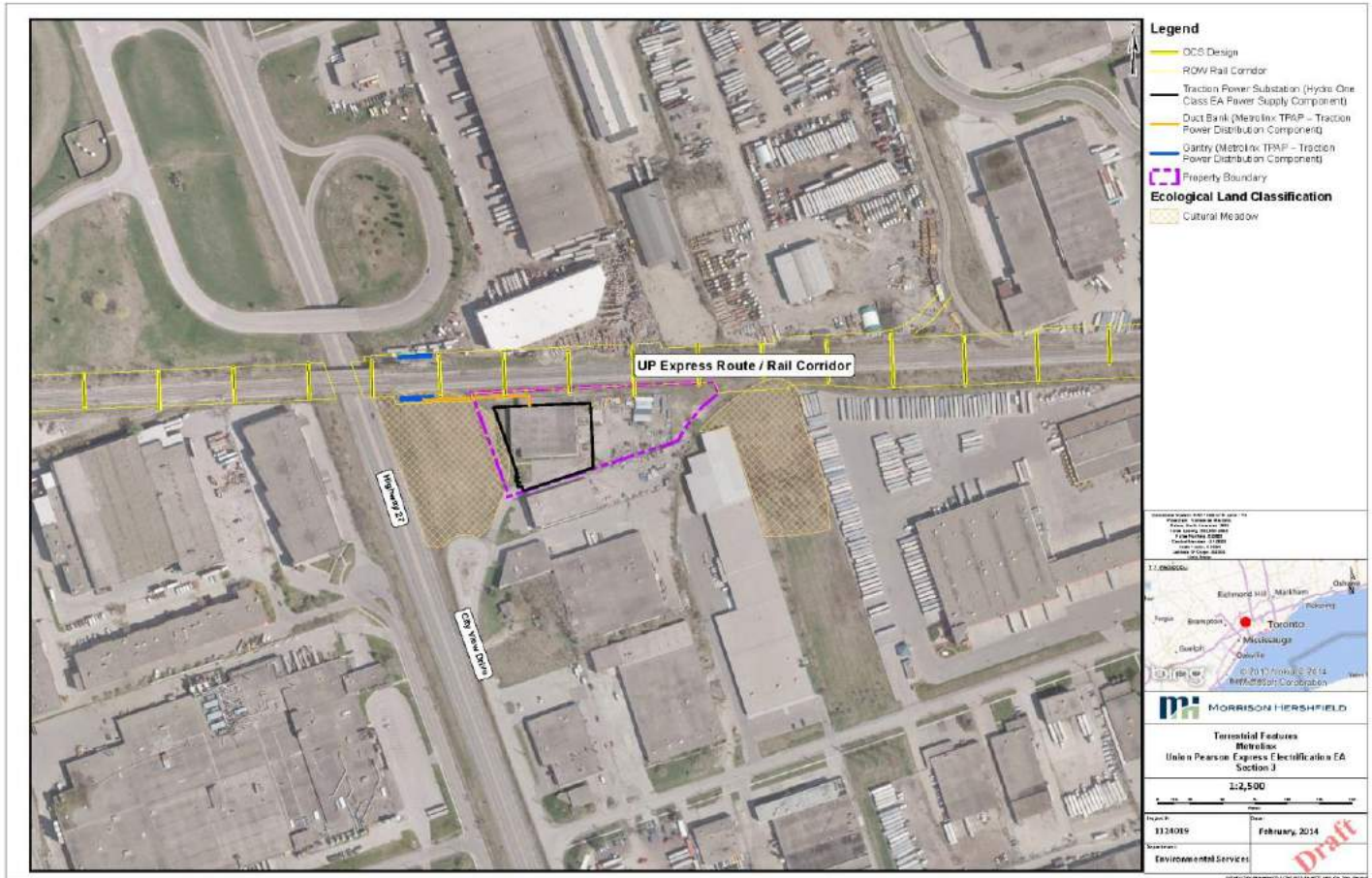
Refer to **Section 6.2.1.1** above for a more detailed discussion of potential indirect effects on wildlife habitat and proposed mitigation measures.

6.2.3.2 Net Effects

Implementation of the mitigation/compensation measures described above will result in no net adverse effects to vegetation cover or wildlife habitat at the EMU Maintenance Facility site at Resources Road. The potential for adverse effects on birds and their nests will be reduced or mitigated.

There will be negligible vegetation removal associated with the duct banks and gantries for the traction power substation at City View Drive.

Figure 6-4. Terrestrial Features – Section 3 (Vicinity of Traction Power Substation)



6.2.3.3 Potential Operations and Maintenance Effects and Mitigation MeasuresOperation of the Electrified UP Express

Refer to **Section 6.2.1.3** above for a detailed discussion of potential effects and mitigation measures related to operation of the electrified UP Express.

Maintenance of OCS (including Bridges/Overhead Structures/UP Express Stations)

Refer to **Section 6.2.1.3** above for a detailed discussion of potential effects and mitigation measures related to maintenance of the OCS.

Operation of EMU Maintenance Facility

Stormwater management (SWM) ponds may attract birds, amphibians and reptiles and expose them to water contaminated with potentially harmful substances (e.g. salt, gas and oil). However, this is largely unavoidable and the habitat generated by the creation of SWM ponds typically balances the potential for negative effects related to exposure to contaminated water. Notwithstanding this, the following mitigation measure is proposed in order to reduce the potential for adverse effects on birds, amphibians and reptiles:

- Installation of an oil and grit separator is recommended for the drainage system upstream of the storm water management pond (situated adjacent to the EMU MF on Resources Road)

6.2.3.4 Net Effects

Net adverse effects on birds (mortality) due to operation of the OCS will be minimized with the implementation of the mitigation measures outlined above. The potential for adverse effects on birds, amphibians and reptiles related to possible contamination of the SWM pond during EMU MF operation will be minimized through implementation of the recommended mitigation measure. Similarly, the risk of damaging or destroying a protected Migratory Bird species or its habitat during bridge/station maintenance activities will be minimized based on implementation of the mitigation measures described above.

6.2.3.5 Potential Construction Effects and Mitigation MeasuresInstallation of Duct Banks

Soil excavation will be required as part of installing the duct banks (approximately 4m wide, 1m deep) from the gantry location to the TPS site (see **Figure 6-4**). Gantry foundations will be installed within the

rail ROW. Soil excavation may result in erosion of the work areas during excavations and/or soil storage, therefore the mitigation measures as outlined in **Section 6.2.1.5** above are proposed. In addition, there is potential for invasive and disturbance-tolerant non-native species to establish on exposed stockpiles of excavated soils, or be introduced on equipment during construction. Therefore, the mitigation measures as outlined in **Section 6.2.1.5** above are proposed.

Accidental Spills

During construction, equipment may leak, or spills may occur. Accidental contamination may occur during the handling and storage of toxic products. Therefore the mitigation measures as outlined in **Section 6.2.1.5** above are proposed.

Installation of OCS on Bridges/Overhead Structures/UP Express Stations

Refer to **Section 6.2.1.5** above for a detailed discussion of potential effects and mitigation measures related to installation.

Temporary construction activities

Refer to **Section 6.2.1.5** above for a detailed discussion of potential effects and mitigation measures related to temporary construction activities.

6.2.3.6 Net Effects

Net adverse effects related to soil erosion and potential for invasive and disturbance-tolerant non-native species to establish on exposed stockpiles of excavated soils will be minimized via implementation of the mitigation measures outlined above. The potential for soil contamination related to accidental spills will be minimized. The potential for adverse effects on birds and their nests related to OCS construction activities will be mitigated based on implementation of the above listed mitigation measures. Potential temporary displacement of wildlife during construction activities will be minimized by ensuring the mitigation measures described above are implemented and adhered to by the Contractor.

In addition, an Environmental Inspector will be responsible for ensuring that all environmental mitigation measures are properly installed, implemented and maintained during construction.

6.2.4 Section 4 - Highway 427 to UP Express Pearson Station

6.2.4.1 Potential Footprint Effects and Mitigation Measures

Installation of OCS

The installation of OCS foundations/poles on the spur section of the UP Express route is not anticipated to result in any adverse effects on vegetation or wildlife, as the spur is an elevated structure.

6.2.4.2 *Net Effects*

No net adverse effects on vegetation or wildlife are anticipated.

6.2.4.3 *Potential Operations and Maintenance Effects and Mitigation Measures*

Operation of the Electrified UP Express

Refer to **Section 6.2.1.3** above for a detailed discussion of potential effects and mitigation measures related to operation of the electrified UP Express.

Maintenance of OCS (including Bridges/Overhead Structures/UP Express Stations)

Refer to **Section 6.2.1.3** above for a detailed discussion of potential effects and mitigation measures related to maintenance of the OCS.

6.2.4.4 *Net Effects*

Net adverse effects on birds (mortality) due to operation of the OCS will be minimized with the implementation of the mitigation measures outlined above. Similarly, the risk of damaging or destroying a protected Migratory Bird species or its habitat during COS maintenance activities will be minimized based on implementation of the mitigation measures described above.

6.2.4.5 *Potential Construction Effects and Mitigation Measures*

Since the spur section of the UP Express route is an elevated structure, no potential adverse effects related to vegetation or wildlife are anticipated.

6.2.4.6 *Net Effects*

No net adverse effects related to vegetation or wildlife are anticipated.

6.3 Natural Environment – Aquatic Features

This section summarizes the potential effects on aquatic features, including surface water, fish/fish habitat, and stormwater management within the study area, as well as mitigation measures (as appropriate).

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

6.3.1.1 Potential Footprint Effects and Mitigation Measures

There are no watercourses in this section of the corridor.

6.3.1.2 Net Effects

No net effects on watercourses or fish/fish habitat.

6.3.1.3 Potential Operations and Maintenance Effects and Mitigation Measures

There are no watercourses in this section of the corridor.

Stormwater Management

The change in the ground surface at the facility location from current conditions may result in alterations to the current storm water drainage patterns. Therefore, the following measures will be carried out by Metrolinx during detailed design:

- ▶ During detailed design, a stormwater management plan/design will be carried out by Metrolinx and will address: quantity control, erosion control, and quality control.
- ▶ To control both water quality and quantity of stormwater discharge, stormwater management measures will be defined as part of the detailed design phase of the project in accordance with the *Ministry of the Environment's Stormwater Management Planning and Design Manual (2003)*.
- ▶ The stormwater management plan/design will be developed in consultation with MOE, City of Toronto, and the Toronto and Region Conservation Authority³ (TRCA), as appropriate.
- ▶ Oil and grit separators will be designed to achieve the desired level of water quality treatment in accordance with the stormwater management plan/design.
- ▶ The stormwater management design will be coordinated with the City of Toronto's design for the adjacent park to be built to the west of the Paralleling Station.

³ As a Crown Agency, GO/Metrolinx is exempt from the Conservation Authorities Act and as such does not have a requirement to apply for and obtain permits from conservation authorities. Wherever possible, GO/Metrolinx will engage the conservation authority on specific projects (or components thereof) and will adhere to requirements when and where possible.

- ▶ The design of the paralleling station foundations shall ensure water drains to the site drainage system and prevents standing water at or under equipment and structural steel.
- ▶ The design of the foundations associated with the HV transformers and autotransformers shall prevent oil from entering the site drainage system and contain fluids in accordance with federal, provincial, and local codes.
- ▶ An Environmental Compliance Approval (ECA) for stormwater works will be obtained from the MOE prior to construction.

6.3.1.4 *Net Effects*

No net effects on watercourses or fish/fish habitat. With respect to stormwater management, no adverse effects on surface water are anticipated based on implementation of the above noted measures during detailed design.

6.3.1.5 *Potential Construction Effects and Mitigation Measures*

There are no watercourses in this section of the corridor.

6.3.1.6 *Net Effects*

No net effects on watercourses or fish/fish habitat.

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

6.3.2.1 *Potential Footprint Effects and Mitigation Measures*

Installation of OCS on Bridges/Overhead Structures

Black Creek is located in Section 2. The installation of OCS will occur within the existing UP Express route/corridor on the existing Black Creek bridge. More specifically, the OCS will be attached to the bridge via a pair of steel brackets attached to the outside face of a bridge pier. Since the OCS portal structures will be placed on the existing bridge deck and not in or adjacent to the water, there will be no anticipated footprint impacts to Black Creek (see **Figure 6-5**). Similarly, no adverse effects to Black Creek or fish/fish habitat are anticipated as a result of installing OCS structures as they are to be located within the existing Metrolinx rail corridor ROW away from the watercourse.

3500 Eglinton Ave. W. Paralleling Station

The proposed Paralleling Station at 3500 Eglinton Avenue West is located in Section 2. **Figure 6-5** depicts the proposed location of the paralleling station.

The proposed Paralleling Station is situated approximately 280m from the Black Creek (see **Figure 6-5**). As previously mentioned, since the potential impacts and mitigation measures related to developing the entire Kodak property were previously captured in the Final Eglinton Crosstown LRT EPR Addendum, there will be no new net adverse effects on Black Creek associated with locating the Paralleling Station facility on the 3500 Eglinton Avenue West site. Similarly, permitting requirements under *O. Reg. 166/06* will also be addressed through the Metrolinx Eglinton Crosstown LRT Maintenance and Storage Facility detailed design phase.

FIGURE 6-5 AQUATIC FEATURES – SECTION 2



6.3.2.2 Net Effects

No new net adverse effects on Black Creek watercourse or fish/fish habitat are anticipated in relation to the installation of OCS structures on Black Creek Bridge, or the Eglinton Avenue West Paralleling Station. O. Reg. 166/06 permitting requirements will be addressed as part of the Metrolinx Eglinton Crosstown LRT Maintenance and Storage Facility detailed design phase.

6.3.2.3 Potential Operations and Maintenance Effects and Mitigation Measures**Operation of the Electrified UP Express & Maintenance of OCS on Bridges/Overhead Structures**

Operation of the electrified UP Express route and OCS maintenance activities will be contained within the UP Express rail corridor, including on Black Creek bridge. Therefore, there are no potential adverse effects related to operations/maintenance on the Black Creek watercourse or fish/fish habitat.

Operations and Maintenance at 3500 Eglinton Avenue West Paralleling Station

Operations and maintenance activities associated with the Paralleling Station at 3500 Eglinton Avenue West will be situated approximately 280m respectively from Black Creek. Therefore no adverse effects on the watercourse or fish/fish habitat are anticipated.

Stormwater Management

As previously mentioned, the proposed paralleling station at 3500 Eglinton Ave. W. is to be integrated with the proposed Metrolinx Eglinton Crosstown Maintenance and Storage Facility (MSF), which is also planned for this property. With this in mind, stormwater management measures related to development of the entire 3500 Eglinton Ave. W. property were assessed as part of the approved TPAP EPR Addendum completed for Eglinton Crosstown project. Specifically, within the *October 2013 Eglinton Crosstown EPR Addendum document, (Section 5.3.2.1)*, Metrolinx committed to the following stormwater management measures for the proposed development at 3500 Eglinton Avenue West:

- A Stormwater Management System (SWM) is required at the Eglinton Crosstown MSF site, which will be consistent with the Toronto Green Development Standard, including the provision for green roofs. Current MSF design standards require imbedded track, and a network of paved roads and parking areas, the overall site will be highly impervious. The SWM system will be designed on this basis, with appropriate storage and outlet controls. The SWM is planned to outlet to the 1200 millimetre diameter storm sewer that is located on Industry Street.
- The storm runoff will be discharged to Black Creek and the Humber River. The SWM system will be designed to achieve an Enhanced Level of water quality treatment, as per the *Ministry of the Environment's Stormwater Management Planning and Design Manual (2003)* and using low

impact development techniques where feasible. Due to land constraints on Eglinton Avenue, oil grit separators will be designed to achieve the desired level of water quality treatment.

- An on-site SWM pond is protected for within the current design of the Eglinton Crosstown MSF site to control both water quality and quantity of stormwater discharge before the connection to the municipal storm sewer network. The SWM pond will be further defined as part of the detailed design phase of the project of the Eglinton Crosstown MSF project.
- Modification to the existing Environmental Compliance Approval for stormwater works will be obtained from MOE with respect to the stormwater management plan for the 3500 Eglinton Ave. W. site, as required.

6.3.2.4 Net Effects

No net adverse effects on Black Creek or fish/fish habitat related to operations and maintenance are anticipated. Stormwater will be managed as per the Stormwater Management System (SWM) that will be implemented as part of the Eglinton Crosstown MSF site development, therefore no net adverse effects on surface water are anticipated.

6.3.2.5 Potential Construction Effects and Mitigation Measures

Installation of OCS on Bridges/Overhead Structures

Construction activities will occur either from the road (resulting in no impacts to aquatic features) or within the existing UP Express rail corridor on Black Creek bridge (above the watercourse) as part of installing OCS. Specifically, the brackets for the OCS portal structures will be installed on the bridge piers in such a way that avoids the need for scaffolding built up around the piers from ground level (see **Figure 6-6** below). Access to the outside face of the pier will be from the bridge deck with materials being brought to the construction site using rail mounted vehicles and then lowered over the side of the bridge. Since the portal structures will be placed on the existing bridge deck and not in or adjacent to the water, no direct adverse effects to Black Creek or fish/fish habitat are anticipated as a result of the OCS installation activities.

FIGURE 6-6 EXAMPLE OF ROPE ACCESS INSTALLATION METHOD

As mentioned, no direct construction related impacts to Black Creek are anticipated. However, potential indirect effects of the construction works include siltation, introduction of contaminants into the watercourse through the use of industrial equipment, and construction debris. These potential impacts can be mitigated by implementing the following measures that will result in no net adverse impacts to Black Creek:

- Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment to the waterbody, and ensure site is stabilized prior to removal following construction;
- Stabilize and re-vegetate all areas of disturbed/exposed soil following construction;
- Stockpiles will be located at a minimum of 30m from the watercourse and isolated to ensure material will not enter any watercourse or ditchline. All stockpiles will be removed upon completion of the works and the site restored, as appropriate;
- Ensure Spills Management Plan and spill kits are on-site at all times for implementation in the event of an accidental spill during construction;
- Operate, store and maintain all equipment and associated materials in a manner that prevents the entry of any deleterious substance to the waterbody;
- All mobile equipment will have drip pans installed and refueling will take place no closer than 30m to any study area watercourses or ditchlines in order to prevent water contamination due to accidental fuel spills;
- All construction debris and litter will be removed frequently;
- Limit access to waterbody and banks to protect riparian vegetation and minimize bank erosion; and
- Use shrouding to trap and prevent concrete and other bridge materials from entering the watercourse.

3500 Eglinton Avenue West Paralleling Station

Construction activities related to the Paralleling Station at 3500 Eglinton Avenue West will take place approximately 280m from Black Creek. Therefore, no potential adverse effects on the Black Creek watercourse or fish/fish habitat related to paralleling station construction are anticipated.

6.3.2.6 Net Effects

Potential indirect effects to Black Creek watercourse related to OCS construction activities (on Black Creek bridge) will be mitigated based on implementation of the mitigation measures described above. In addition, an Environmental Inspector will be responsible for ensuring that all environmental mitigation measures are properly installed, implemented and maintained during construction.

6.3.3 Section 3 - UP Express Weston Station to Highway 427

6.3.3.1 Potential Footprint Effects and Mitigation Measures

Installation of OCS on Bridges/Overhead Structures

The Humber River Bridge will require new OCS portal structures spanning over the bridge deck. The OCS portal structures will be attached to the bridge via installation of a pair of steel brackets attached to the outside face of the bridge piers. Since the portal structures will be placed on the existing bridge deck and not in or adjacent to the water, there are no anticipated adverse footprint impacts to the Humber River.

It is noted that no adverse effects to Humber River or fish/fish habitat are anticipated in relation to the installation of OCS structures as they will be located within the existing Metrolinx rail corridor ROW.

Traction Power Distribution Components at City View Drive

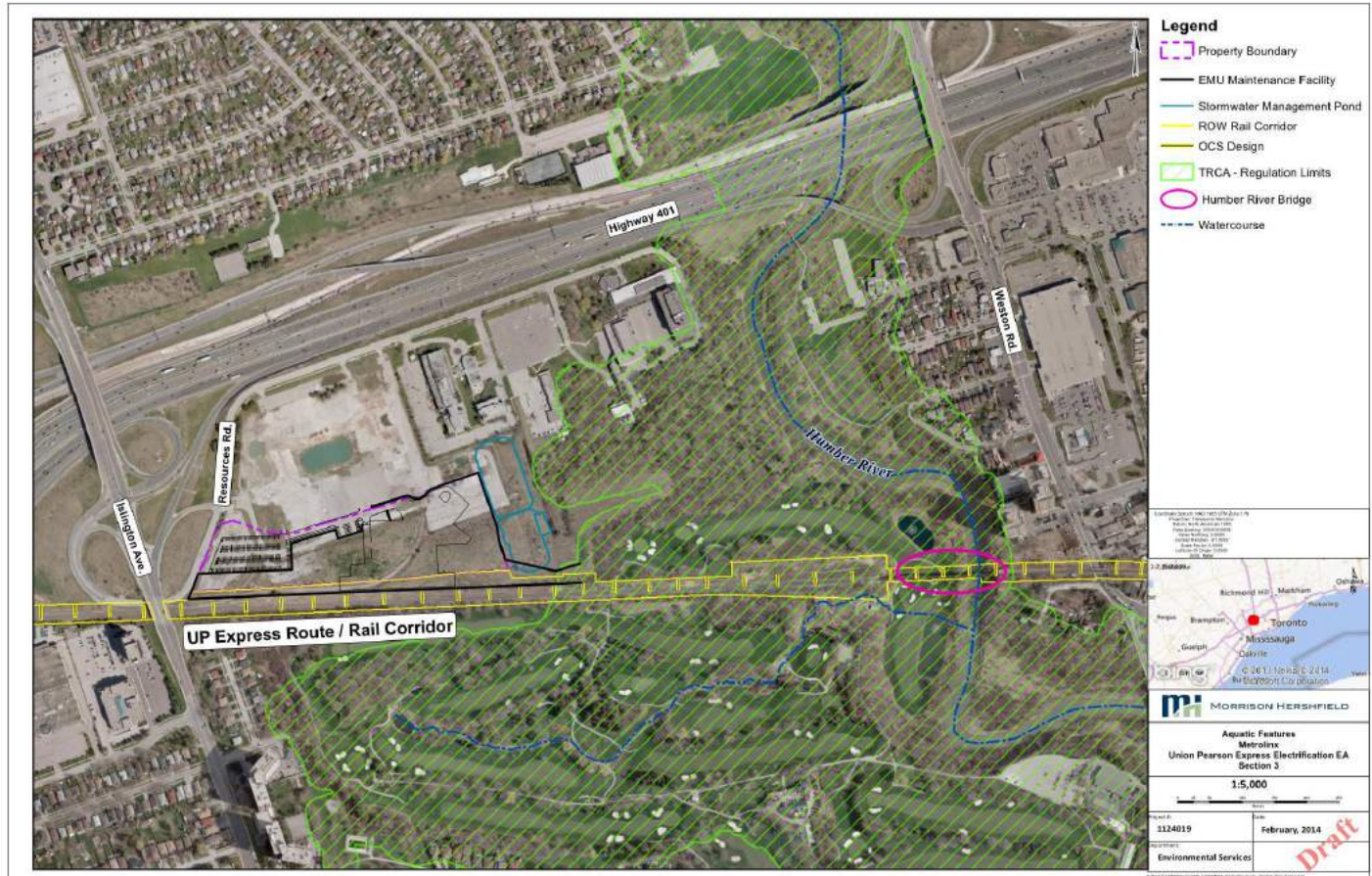
The proposed traction power distribution components at the City View Drive are limited to proposed gantries and underground duct banks. There are no watercourses in the vicinity of the CityView Drive site, therefore there are no adverse effects on surface water or fish/fish habitat. Stormwater management effects related to the proposed Traction Power Substation at this site have been included in the *Hydro One Union Pearson Express Electrification Traction Power Substation Class Environmental Assessment - Draft Environmental Study Report*.

EMU Maintenance Facility (Resources Road)

The EMU Maintenance Facility at 50 Resources Road site (see **Figure 6-7**) is located approximately 400m from Humber River. Therefore, no footprint impacts on the watercourse are anticipated.

No adverse effects on the Humber River watercourse or fish/fish habitat are anticipated due to the implementation of the EMU Maintenance Facility.

FIGURE 6-7 AQUATIC FEATURES – SECTION 3



6.3.3.2 Net Effects

No net adverse effects are anticipated as the footprint related to the installation of OCS portal structures, and EMU Maintenance Facility are located at sufficient distances away from the Humber River watercourse.

6.3.3.3 Potential Operations and Maintenance Effects and Mitigation Measures**Operation of the Electrified UP Express & Maintenance of OCS on Bridges/Overhead Structures**

Operation of the electrified UP Express route and OCS maintenance activities will be contained within the UP Express rail corridor, including on the Humber River Bridge. Therefore, there are no potential adverse effects related to operations/maintenance on this watercourse or fish/fish habitat.

Operation and Maintenance of EMU Maintenance Facility (Resources Road)

The EMU Maintenance Facility at 50 Resources Road will be situated approximately 400m from Humber River, therefore no adverse effects on Humber River or fish/fish habitat related to operations or maintenance of the EMU MF are anticipated.

Stormwater Management

As part of the property acquisition process previously carried out by Metrolinx for the 50 Resources Rd. site, it was confirmed that stormwater runoff from the entire 14.7 ha site bounded by Resources Rd. to the north and the rail corridor to the south (which encompasses the 5 hectare 50 Resources Rd. site where the EMU maintenance facility is to be located) will be accommodated by the stormwater (SWM) pond situated adjacent to the site, to the east. The report entitled *Stormwater Management Report* (prepared in support of the *Draft Plan of Subdivision Application - May, 2011*) describes the design of the SWM pond and confirms the following:

- The mixed employment/commercial subdivision will provide quality and quantity control measures through a future municipal stormwater management facility. The subdivision will have a release rate of $0.455 \text{ m}^3/\text{s}$ which is lower than the determined governing target release rate of $0.70 \text{ m}^3/\text{s}$ in the previous Functional Servicing Report (FSR). The SWM pond will provide erosion control and Level 1 treatment (80% TSS removal) as per the MOE guidelines. 5 mm runoff will be infiltrated/attenuated within the developed subdivision areas. The report demonstrates that the proposed stormwater management design meets the criteria for: quantity control, erosion control, and quality control as that were determined through recommendations provided by the City of Toronto, Ministry of Transportation (MTO),

and the Toronto and Region Conservation Authority⁴ (TRCA). A copy of this report is included in *Appendix A*.

In addition to this, a subsequent assessment was completed which assessed site constraints and feasibility options for altering/modifying/relocating the existing SWM pond at 50 Resources Road, if necessary based on the conceptual design of the proposed Metrolinx EMU Maintenance Facility at 50 Resources Rd. As the current conceptual design plan for the EMU maintenance facility cuts across the southwest corner of the existing SWM pond (see Figure 6-7), the purpose of this assessment was to examine options for modifying the existing SWM pond to address this. Depending on the outcome of the preliminary design (to be completed), further consultation with regulatory authorities/affected stakeholders will be required during the subsequent preliminary and/or detailed design stages if it is determined there is a requirement to modify the SWM pond design. If deemed necessary during preliminary and/or detailed design, the recommended option for altering/modifying/relocating the existing SWM pond will be confirmed prior to operation of the proposed EMU Maintenance Facility.

Modification to the existing Environmental Compliance Approval for stormwater works will be obtained from MOE, with respect to the stormwater management plan for the Resources Rd., site, as required.

6.3.3.4 Net Effects

No net adverse effects on Humber River or fish/fish habitat are anticipated due to operations and maintenance activities associated with OCS, EMU Maintenance Facility. Stormwater will be managed via the existing stormwater management pond located adjacent (to the east) to the 50 Resources Rd. site.

6.3.3.5 Potential Construction Effects and Mitigation Measures

Installation of OCS on Bridges/Overhead Structures

As mentioned above, OCS portal structures will be attached to the Humber River Bridge via steel brackets attached to the outside face of a bridge pier. Specifically, the brackets for the OCS portal structures will be installed on the bridge piers in such a way that (e.g., using rope access) avoids the need for scaffolding built up around the piers from ground level (see **Figure 4-2** above). Access to the outside face of the pier will be from the bridge deck with materials being brought to the construction site using rail mounted vehicles and then lowered over the side of the bridge.

No direct construction related impacts to Humber River or fish/fish habitat are anticipated due to OCS installation. Potential indirect effects of the construction works include: siltation, introduction of

⁴ As a Crown Agency, GO/Metrolinx is exempt from the Conservation Authorities Act and as such does not have a requirement to apply for and obtain permits from conservation authorities. Wherever possible, GO/Metrolinx will engage the conservation authority on specific projects (or components thereof) and will adhere to requirements when and where possible.

contaminants into the watercourse through the use of industrial equipment, and construction debris. These potential impacts will be mitigated by implementing the following measures and will result in no construction related adverse effects to the Humber River:

- Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment to the waterbody, and ensure site is stabilized prior to removal following construction;
- Stabilize and re-vegetate all areas of disturbed/exposed soil following construction;
- Stockpiles will be located at a minimum of 30m from the watercourse and isolated to ensure material will not enter any watercourse or ditchline. All stockpiles will be removed upon completion of the works and the site restored, as appropriate;
- Ensure Spills Management Plan and spill kits are on-site at all times for implementation in the event of an accidental spill during construction;
- Operate, store and maintain all equipment and associated materials in a manner that prevents the entry of any deleterious substance to the waterbody;
- All mobile equipment will have drip pans installed and refueling will take place no closer than 30m to any study area watercourses or ditchlines in order to prevent water contamination due to accidental fuel spills;
- All construction debris and litter will be removed frequently;
- Limit access to waterbody and banks to protect riparian vegetation and minimize bank erosion; and
- Use shrouding to trap and prevent concrete and other bridge materials from entering the watercourse.

Construction of EMU Maintenance Facility

The EMU Maintenance Facility at 50 Resources Road will be situated approximately 400m from Humber River, therefore no construction related impacts are anticipated on the Humber River or fish/fish habitat.

6.3.3.6 Net Effects

Potential indirect effects to Humber River watercourse related to construction activities will be mitigated based on implementation of the mitigation measures described above, therefore no net effects on Humber River are anticipated. In addition, an Environmental Inspector will be responsible for ensuring that all environmental mitigation measures are properly installed, implemented and maintained during construction.

6.3.4 Section 4 - Highway 427 to UP Express Pearson Station

6.3.4.1 Potential Footprint Effects and Mitigation Measures

Installation of OCS on Bridges/Overhead Structures

Mimico Creek is located in Section 4, however the proposed OCS infrastructure will be implemented on the elevated spur line, (situated above Mimico Creek). Therefore no footprint impacts on the Mimico Creek or fish/fish habitat are anticipated.

6.3.4.2 Net Effects

No net adverse effects are anticipated on Mimico Creek.

6.3.4.3 Potential Operations and Maintenance Effects and Mitigation Measures**Operation of the Electrified UP Express & Maintenance of OCS**

Since Mimico Creek watercourse flows under the elevated spur line within this section, and the UP Express electrification operations and maintenance activities will occur on the existing UP Express route/rail corridor, no operations and maintenance impacts are anticipated on this watercourse or fish/fish habitat.

6.3.4.4 Net Effects

No net adverse effects are anticipated.

6.3.4.5 Potential Construction Effects and Mitigation Measures**Installation of OCS**

OCS poles will be installed on the catenary supports along the spur portion of the UP Express route via hi-rail vehicles. Therefore, no adverse construction related impacts on Mimico Creek or fish/fish habitat are anticipated.

6.3.4.6 Net Effects

No net adverse effects are anticipated.

6.4 Natural Environment – Hydrogeological Features

Hydrogeological features considered in this impact assessment include aquifers, aquitards and other aquifer-protecting strata; features dependent on groundwater such as wells, springs, creeks and rivers during dry periods and certain wetlands (e.g. fens, marshes); and features sensitive to hydrogeological changes such as unconsolidated clays, and existing contaminant plumes.

6.4.1 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. The surficial soil consists of glacial till (silty clay to silt till) in the area adjacent to Lake Ontario and glacial shallow water deposits of Lake Iroquois (sand and gravel of the Thorncliffe Formation) in the area adjacent to Bloor Station.

6.4.1.1 *Potential Footprint Effects and Mitigation Measures*

This section is characterized by an urban setting and human/ecological use of groundwater is negligible. In addition, the subsurface footprint of the Ordinance paralleling station grounding grid, gantry foundations, duct banks, and OCS foundations are relatively small and shallow. Therefore, no adverse hydrogeological impacts are anticipated in relation to the project footprint and no mitigation measures are recommended.

6.4.1.2 *Net Effects*

No net adverse hydrogeological effects related to the project footprint are anticipated in Section 1.

6.4.1.3 *Potential Operations and Maintenance Effects and Mitigation Measures*

During maintenance activities associated with the Ordinance Paralleling Station, use of oils and insulating fluids may be required. As a result, accidental spills may occur during the handling and storage of these products. Such spills have the potential to contaminate groundwater. The mitigation measures as described in Section 6.2.1.5 (above) should be implemented to reduce the potential for adverse effects on groundwater.

6.4.1.4 *Net Effects*

There is potential for groundwater contamination resulting from accidental spills during paralleling station maintenance. However, the risk will be minimized through implementation of the mitigation measures as described above.

6.4.1.5 Potential Construction Effects and Mitigation Measures

A grounding grid will be installed at an approximate 1m depth beneath the Ordinance Paralleling Station. Similarly, duct banks will be installed from the Ordinance paralleling station to the gantry locations, at an approximate 1m depth. During installation of the grounding grid and duct banks, it is not anticipated that groundwater will be encountered given their shallow depth. Therefore, no potential adverse effects on groundwater are anticipated.

Gantry foundations will be installed at approximate 4m depth. OCS structure foundations will be installed to an approximate 5m depth. Groundwater may be encountered during this construction, and minor amounts removed along with any excess soil. However, the potential impact on groundwater due to these construction activities will be imperceptible.

The potential for groundwater contamination may result from mobile vehicle re-fuelling during construction. This risk will be minimized by implementing the following measures:

- Vehicle refueling should be done in designated areas only, preferably situated on a paved, impermeable surface
- An emergency response plan should be prepared by the contractor to establish methods to clean up accidental spills

6.4.1.6 Net Effects

There are no net effects related to encountering and/or removing groundwater during construction of the paralleling station foundations, grounding grid, duct banks and OCS and gantry foundations. The potential for groundwater contamination during spillage of fuels during construction will be minimized through implementation of the above listed mitigation measures.

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

This section of the corridor is situated within the Iroquois Plain physiographic region. The surficial soil consists of beach sand and lacustrine silt and clays including sand and gravel deposits.

6.4.2.1 Potential Footprint Effects and Mitigation Measures

This section is characterized by an urban setting and human/ecological use of groundwater is negligible. In addition, there is limited contribution of groundwater recharge in this area to baseflow in the Humber River and Black Creek. The subsurface footprint of the 3500 Eglinton Avenue West paralleling station grounding grid, gantry foundations, duct banks, and OCS foundations are relatively small and shallow. Therefore, no adverse hydrogeological impacts are anticipated in relation to the subsurface project footprint and no mitigation measures are recommended.

6.4.2.2 Net Effects

No net adverse hydrogeological effects related to the project footprint are anticipated in Section 2.

6.4.2.3 Potential Operations and Maintenance Effects and Mitigation Measures

During maintenance activities associated with the paralleling station at Eglinton Avenue West, use of oils and insulating fluids may be required. As a result, accidental spills may occur during the handling and storage of these products. Such spills have the potential to contaminate groundwater. The mitigation measures as described in Section 6.2.1.5 (above) should be implemented to reduce the potential for adverse effects on groundwater.

6.4.2.4 Net Effects

There is potential for groundwater contamination resulting from accidental spills during paralleling station maintenance. However, the risk will be minimized through implementation of the mitigation measures as described above.

6.4.2.5 Potential Construction Effects and Mitigation Measures

A grounding grid will be installed at an approximate 1m depth beneath the Paralleling Station at Eglinton Avenue West. Similarly, duct banks will be installed from the 3500 Eglinton Avenue West paralleling station to the gantry locations, at approximately 1m depth. During installation of the grounding grid and duct banks, it is not anticipated that groundwater will be encountered given their shallow depth. Therefore, no potential adverse effects on groundwater are anticipated.

Gantry foundations will be installed at approximate 4m depth. OCS foundations will be installed to approximately 5m depth. Groundwater may be encountered during this construction, and minor amounts removed along with any excess soil. The impact on groundwater due to this construction activity will be imperceptible.

The potential for groundwater contamination may result from mobile vehicle re-fuelling during construction. This risk can be minimized by implementing the following measures:

- Vehicle refueling should be done in designated areas only, preferably situated on a paved, impermeable surface
- An emergency response plan should be prepared by the contractor to establish methods to clean up accidental spills

6.4.2.6 Net Effects

There are no net adverse effects related to encountering and/or removing groundwater during construction of the paralleling station foundations, grounding grid, duct banks and OCS foundations. The potential for groundwater contamination during spillage of fuels during construction will be minimized through implementation of the above listed mitigation measures.

6.4.3 Section 3 – UP Express Weston Station to Highway 427

This section of the corridor is situated in the Peel Plain physiographic region, 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 are comprised of clayey silt till.

The EMU Maintenance Facility will consist of a storage yard for EMUs and electrification maintenance equipment, main shop building with administrative/transportation offices, car inspection and repair areas, parts rooms, and utility rooms, an enclosed train washer, OCS/Wayside Electrification sub-shop and related exterior tracks, train storage tracks, employee parking, and yard roadways. A diesel powered emergency backup generator will be present in case of power failures.

This section also includes the proposed Traction Power Substation at 175 City View Drive (*refer to Union Pearson Express Electrification Traction Power Substation Class Environmental Assessment Draft Environmental Study Report*). In addition, duct banks and gantries will need to be installed by Metrolinx as part of the power distribution components of UP Express electrification.

6.4.3.1 Potential Footprint Effects and Mitigation Measures

This section is characterized by an urban setting and human/ecological use of groundwater is negligible. In addition, there is limited contribution of groundwater recharge in this area to baseflow in the Humber River and Mimico Creek. The subsurface footprint of the gantry foundations duct banks associated with the Traction Power Substation at 175 City View Drive, and OCS foundations are relatively small and shallow. Therefore, no adverse hydrogeological impacts are anticipated in relation to the project footprint and no mitigation measures are recommended.

EMU Maintenance Facility

The EMU Maintenance Facility will occupy land which is currently undeveloped and will consist primarily of rail siding, an approximately 0.5 hectare maintenance building. There is a stormwater management pond east of the EMU Maintenance Facility site that has been designed to manage flow associated with the adjacent Lowes retail development. Implementation of the EMU Maintenance Facility has the potential to change or redistribute groundwater recharge, which contributes to baseflow at the Humber River approximately 360m to the east. To ensure that baseflow contribution to the Humber River from this site is unaffected by the EMU Maintenance Facility development, the stormwater management pond design should be reviewed to ensure that a zero-net reduction in groundwater recharge will be achieved.

6.4.3.2 Net Effects

There is potential for the EMU Maintenance Facility to change the amount and location of groundwater recharge. To ensure that baseflow at the nearby Humber River is unaffected, the storm water management pond(s) design should be reviewed to ensure that a zero-net change in groundwater recharge over the development footprint will be achieved. No other net adverse hydrogeological effects are anticipated in Section 3.

6.4.3.3 Potential Operations and Maintenance Effects and Mitigation Measures

During operation of the EMU Maintenance Facility, there is potential for accidental spillage of various contaminants including oils, fuels, lubricants, metals, and solvents. Such spills have the potential to contaminate groundwater, and mitigation measures as described in Section 6.2.1.5 should be implemented to reduce this potential. In addition, installation of an oil and grit separator is recommended for the drainage system upstream of the storm water management pond.

6.4.3.4 Net Effects

With the implementation of mitigation measures to reduce the potential impact of accidental spills and to minimize contaminants from entering the storm water management pond, no net adverse effects on groundwater are anticipated.

6.4.3.5 Potential Construction Effects and Mitigation Measures

Construction of the EMU Maintenance Facility will involve more significant earth works and the potential for dewatering during construction of deeper building foundations. Given the fine-grained nature of the area soils and the surrounding land use (mainly industrial land, transportation corridors, minor residential, and a golf course), adverse hydrogeological effects of this dewatering are not anticipated. The potential need for dewatering will be further assessed during detailed design, as will the requirement for a Permit to Take Water (PTTW) from Ministry of the Environment (if more than 50,000 litres per day of groundwater is to be pumped). Specifically, impacts will be assessed and strategies for mitigation will be proposed as required as part of the PTTW application process.

Considering the shallow trenching for installation of the duct banks at 175 City View, it is not anticipated that groundwater will be encountered. Therefore, no potential adverse effects on groundwater are anticipated.

Gantry foundations will be installed at approximate 4m depth. OCS structure foundations will be installed to approximately 5m depth. Groundwater may be encountered during this construction, and

minor amounts removed along with any excess soil. However, the impact on groundwater due to this construction activity will be imperceptible.

The potential for groundwater contamination may result from mobile vehicle re-fuelling during construction. This risk will be minimized by implementing the following measures:

- Vehicle refueling should be done in designated areas only, preferably situated on a paved, impermeable surface
- An emergency response plan should be prepared by the contractor to e
- Establish methods to clean up accidental spills

6.4.3.6 *Net Effects*

There are no net adverse effects related to encountering and/or removing groundwater during construction of duct banks, gantries, or OCS foundations. No net adverse effects are anticipated due to dewatering potentially required during construction of the EMU Maintenance Facility foundations, and the PTTW process will be followed in the event that dewatering in amounts greater than 50 m³/day is required. The potential for groundwater contamination during spillage of fuels during construction will be minimized through implementation of the above listed mitigation measures.

6.4.4 Section 4 - Highway 427 to UP Express Pearson Station

6.4.4.1 *Potential Footprint Effects and Mitigation Measures*

This portion of the corridor is an elevated spur line. There are no potential adverse effects on hydrogeological features.

6.4.4.2 *Net Effects*

No net effects.

6.4.4.3 *Potential Operations and Maintenance Effects and Mitigation Measures*

This portion of the corridor is an elevated spur line. There are no potential adverse effects on hydrogeological features.

6.4.4.4 *Net Effects*

No net effects.

6.4.4.5 *Potential Construction Effects and Mitigation Measures*

This portion of the corridor is an elevated spur line. There are no potential adverse effects on hydrogeological features.

6.4.4.6 *Net Effects*

No net effects.

6.5 Natural Environment – Contaminated Sites

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 Pearson Airport). 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.

This section of the report discusses the potential impacts of the UP Express Electrification project on, or relating to, existing contaminated sites.

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

6.5.1.1 *Potential Footprint Effects and Mitigation Measures*

There are no potential footprint impacts on or relating to existing contaminated sites. No mitigation measures are recommended.

6.5.1.2 *Net Effects*

No net effects.

6.5.1.3 *Potential Operations and Maintenance Effects and Mitigation Measures*

There are no potential operations/maintenance impacts on or relating to existing contaminated sites in this Section. No mitigation measures are recommended.

6.5.1.4 Net Effects

No net effects.

6.5.1.5 Potential Construction Effects and Mitigation Measures

There is potential for disturbance of contaminated soil and/or groundwater during construction at the Ordance paralleling station site. Improperly handled excess contaminated soil and contaminated groundwater pumped during dewatering (if any) has the potential to contaminate property and surface water, respectively. Without appropriate preventative measures, workers can be exposed to unacceptable levels of contamination during construction. Dust generated during construction can spread contamination.

Therefore, the following mitigation measures, based on best management practices, will be implemented to manage contamination:

- A health and safety plan be developed and implemented for construction workers;
- Contaminated soils and groundwater will be managed in accordance with provincial legislation and regulations (i.e., Ontario Environmental Protection Act, Ontario Regulation 347, Transportation of Dangerous Goods Act and Regulations, Ontario Regulation 153/04).
- An excess materials management plan will be developed and implemented;
- Pumped groundwater (if required) will be treated such that discharge considers TRCA⁵ and City of Toronto water guidelines and requirements;
- Dust control will be practiced during construction.

It is noted that in 2010, SPL Beatty completed a Phase 1 and Phase 2 Environmental Site Assessment that included the Ordance location. The report recommendations are being followed by Metrolinx in relation to managing contaminated material.

6.5.1.6 Net Effects

Based on implementation of the mitigation measures outline above, no net adverse effects related to disturbance of contaminated soil and/or groundwater during construction or handling of excess contaminated soil and pumped groundwater are anticipated.

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

⁵ As a Crown Agency, GO/Metrolinx is exempt from the Conservation Authorities Act and as such does not have a requirement to apply for and obtain permits from conservation authorities. Wherever possible, GO/Metrolinx will engage the conservation authority on specific projects (or components thereof) and will adhere to requirements when and where possible.

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. (March 2011) and by AMEC Environment and Infrastructure (January, 2013). 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 (Golder Associates Ltd., January 2013) as part of the Eglinton Crosstown LRT project to protect human health and the environment during and following construction. It is anticipated that a Certificate of Property Use (CPU) will be issued for the site that must be adhered to. A CPU is a control document that is issued by the Ministry of the Environment to a property owner in relation to an accepted risk assessment (RA) that is required to implement risk management measures (RMMs). A CPU will be issued for the site and must be followed with respect to risk management measures employed at the site. 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 Eglinton Crosstown design/build project, which will be applicable to all activities proposed at the 3500 Eglinton Avenue West site.

6.5.2.1 *Potential Footprint Effects and Mitigation Measures*

There are no potential footprint impacts on or relating to existing contaminated sites. No mitigation measures are recommended.

6.5.2.2 *Net Effects*

No net effects.

6.5.2.3 *Potential Operations and Maintenance Effects and Mitigation Measures*

The Risk Assessment approach (as outlined above) for management of soil and groundwater contamination on the former Kodak facility property at 3500 Eglinton Avenue West may require risk management measures (e.g., incorporation of vapor mitigation measures into new building design, and/or capping of soils with concrete asphalt, granular materials, or earth fill (to prevent exposure of soil-bound contaminants) to prevent exposure of workers to contamination. Excess soil may also require disposal at a specialized facility depending on soil quality.

6.5.2.4 *Net Effects*

Based on the Risk Assessment approach to be carried out as part of the Eglinton Crosstown LRT MSF project at the 3500 Eglinton Avenue West site to address soil and groundwater contamination, and

based on the implementation of the above noted mitigation measures, no net adverse effects during operation of the paralleling station are anticipated.

6.5.2.5 *Potential Construction Effects and Mitigation Measures*

There is potential for disturbance of contaminated soil and/or groundwater during construction. Improperly handled excess contaminated soil and contaminated groundwater pumped during dewatering (if any) has the potential to contaminate property and surface water, respectively. Also, without appropriate preventative measures, workers can be exposed to unacceptable levels of contamination during construction. Dust generated during construction can spread contamination.

The RA approach to be carried out for redevelopment of the 3500 Eglinton Avenue West site as the Eglinton MSF may formalize the requirements for protection of workers during construction. At a minimum, the mitigation measures noted in Section 6.1.3 will be required.

6.5.2.6 *Net Effects*

Based on the Risk Assessment approach to be carried out as part of the Eglinton Crosstown LRT MSF project at the 3500 Eglinton Avenue West and based on the implementation of the above noted mitigation measures, no net adverse effects during construction are anticipated.

6.5.3 Section 3 - UP Express Weston Station to Highway 427

6.5.3.1 *Potential Footprint Effects and Mitigation Measures*

A Phase I and Phase II Environmental Site Assessment was carried out for the EMU Maintenance Facility site on 50 Resources Road in 2005 and 2006 respectively. Remedial works were carried out in 2008 based on 2006 Phase II ESA as well as new ESAs carried out in 2008. A Record of Site Conditions was submitted by Golder on August 2009, allowing for future commercial or industrial development on the site. However, there is potential that future soil excavation activities may encounter materials exceeding applicable MOE Site Condition Standards.

In addition, a Phase I and Phase II ESA were carried out for the TPS site on City View Drive by Coffey Geotechnics Inc. in May, 2012. The Phase II findings were as follows:

- No further investigation is currently warranted, as the concentration of metals and inorganics, PHCs, VOCs, and PAHs in soil and groundwater all met the applicable MOE Table 3 Standards.
- If an RSC is required in the future, the May 2012 Phase 2 ESA will require updating in order to conform to the requirements of *O. Reg 153.04* as amended. The previous Phase 1 ESA will also need to be upgraded to meet the requirements of *O. Reg 153/04* if an RSC is required.
- All monitoring wells should be decommissioned in accordance with Ontario Regulation 903 when no longer required.

There are no potential footprint impacts on or relating to existing contaminated sites. No mitigation measures are recommended.

6.5.3.2 Net Effects

No net adverse footprint impacts are anticipated in relation to existing contaminated sites in Section 3.

6.5.3.3 Potential Operations and Maintenance Effects and Mitigation Measures

There are no potential operations/maintenance impacts on or relating to existing contaminated sites in this Section. No mitigation measures are recommended.

6.5.3.4 Net Effects

No net adverse effects anticipated.

6.5.3.5 Potential Construction Effects and Mitigation Measures

There is potential for disturbance of contaminated soil and/or groundwater during construction. Improperly handled excess contaminated soil and contaminated groundwater pumped during dewatering (if any) has the potential to contaminate property and surface water, respectively. Also, without appropriate preventative measures, workers can be exposed to unacceptable levels of contamination during construction. Dust generated during construction can spread contamination.

As a result, the mitigation measures as described in Section 6.1.3 will be implemented.

6.5.3.6 Net Effects

The potential for property /surface water contamination during construction will be minimized by implementing the mitigation measures outlined in Section 6.1.3. The potential for workers to be exposed to unacceptable levels of contamination during construction will be minimized by implementing the appropriate preventative measures as outlined above.

6.5.4 Section 4 - Highway 427 to UP Express Pearson Station

This section of the corridor is an elevated spur line therefore no adverse effects related to contaminated sites are anticipated.

6.6 Cultural Heritage

To assess the potential impacts of the undertaking, identified cultural heritage resources (CHR) were considered in relation to a range of possible effects as outlined in the Ministry of Tourism, Culture and Sport document entitled *Screening for Impacts to Built Heritage and Cultural Heritage Landscapes* (September 2010), which include but are not limited to the following:

- **Destruction, removal, or relocation** of any, or part of any, significant heritage attribute or feature;
- **Alteration**, which means a change in any manner and includes restoration, renovation, repair or disturbance;
- **Shadows** created that alter the appearance of a heritage attribute or change the visibility of a natural feature of plantings, such as a garden;
- **Isolation** of a heritage attribute from its surrounding environment, context, or a significant relationship;
- **Direct or indirect obstruction** of significant views or vistas from, within, or to a built and natural feature;
- **A change in land use** such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces; and,
- **Soil disturbance** such as a change in grade, or an alteration of the drainage pattern or excavation.

Cultural heritage resources may be affected in a variety of ways: resources may experience displacement (i.e., removal), if they are located within the project footprint; they may also be indirectly affected through disruption by the introduction of physical, visual, audible, or atmospheric elements that are not in keeping with their character and/or setting.

Table 6-2 summarizes the cultural heritage resources that were identified within or adjacent to the UP Express study area. All cultural heritage resources were considered against the *Screening for Impacts to Built Heritage and Cultural Heritage Landscapes* (MTCS 2010) document (as outlined above). With regard to the *Level of Recognition* column, 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):

- 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.

It should be noted that several resources have been previously evaluated (*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-2011 No: RQQ-2010-TS-007, Taylor Hazell Architects, 2012*). Accordingly, this assessment uses the information gathered in these reports to identify cultural heritage attributes and evaluate the potential impacts posed to these resources.

With this in mind, the subsections below provide additional detail on the potential effects on CHRs within each the study area section, as well as proposed mitigation measures (where appropriate), and resulting net effects. It is further noted that no negative impacts are anticipated to any cultural heritage resource in the study area during the operation/maintenance of the electrified UP Express system, therefore the discussion of effects is limited to potential footprint effects and construction related effects.

TABLE 6-2. SUMMARY OF CULTURAL HERITAGE RESOURCES (CHR) AND POTENTIAL IMPACTS

Study Area Section	CHR# ⁶	Description ⁷	Level of Recognition	Metrolinx Status	Potential Impact*
1	1	Bathurst Street Bridge	Listed Heritage Property (City of Toronto);	Potential Provincial Heritage Property	Alteration
	2	Strachan Avenue Level Crossing ⁸	N/A	N/A	None
	3	King Street Subway	Listed Heritage Property (City of Toronto)	Potential Provincial Heritage Property	Alteration
	4	Queen Street Subway	Evaluated, Local Significance (Golder Associates 2011a)	Potential Provincial Heritage Property	None
	5	Lansdowne Avenue Subway	Evaluated; Local Significance (Golder Associates 2011a)	Potential Provincial Heritage Property	None
	6	Dundas Street Bridge	Identified during Baseline Conditions field review	n/a ⁹	None
	15	805 Wellington Street West (Industrial Building)	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	16	99 Sudbury Street (Industrial Building)	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	28	Existing GO Rail Corridor	Identified during Baseline Conditions field review	Conditional Heritage Property	None ¹⁰
	32	Union Station Heritage Conservation District	Designated under Part V of the <i>Ontario Heritage Act</i>	Conditional Heritage Property	None
	34	Proposed West Queen West Heritage Conservation District	Under study by the City of Toronto	Conditional Heritage Property	None
	35	Fort York and Garrison Common Heritage Conservation District	Designated under Part V of the <i>Ontario Heritage Act</i>	Conditional Heritage Property	Obstruction of views; temporary soil disturbance
	B1	Brock Avenue Subway	Evaluated; No heritage significance**	n/a	None
	B2	Bloor Street Subway	Evaluated; No heritage significance**	n/a	None
2	7	Wallace Avenue Pedestrian Bridge	Listed Heritage Property (City of Toronto)	Conditional Heritage Property	Alteration
	B3	Dupont Street Subway	Evaluated; No heritage significance**	n/a	None
	B4	St. Clair Avenue Subway	Evaluated; No heritage significance***	n/a	None
	B5	Rogers Road Bridge	Identified through background research	Conditional Heritage Property	Alteration
	B6	Eglinton Avenue Subway	Evaluated; No heritage significance***	n/a	Alteration
	B7	Ray Avenue Subway	Evaluated; No heritage significance***	n/a	None
	B8	Jane Street Bridge	Identified through background research	Conditional Heritage Property	Alteration
	8	Dennison Road Level Crossing	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	17	371 Wallace Avenue (Industrial Building)	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	18	30 Edwin (Industrial Building)	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	19	1655 Dupont Street (Industrial Building)	Listed Heritage Property (City of Toronto)	Conditional Heritage Property	None
	20	143 Old Weston Road (Industrial Building)	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	26	Mount Denis Historic Settlement	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	27	Weston Historic Settlement	Identified during Baseline Conditions field review	Conditional Heritage Property	None

⁶ CHRs are as identified in Chapter 4 of this EPR.

⁷ It is noted that in some cases, there may be joint ownership of bridge/rail overpass structures (e.g., City of Toronto and Metrolinx). In addition, ownership of bridges/rail overpasses may be governed by agreements, which will need to be further discussed with the City of Toronto during the detailed design phase. Accordingly, where Metrolinx has authorization to alter a heritage structure, Metrolinx will follow the Metrolinx Interim Cultural Heritage Management Process (2013).

⁸ The Strachan Avenue Grade Separation is currently under construction as part of the Metrolinx Georgetown South Project.

⁹ This bridge does not require further study since it is less than 40 years old and does not meet criteria set out in the MTCS Screening for Impacts to Built Heritage and Cultural Heritage Landscapes checklist (See Appendix C – CHAR).

¹⁰ The installation of OCS structures associated with the UP Express Electrification project will not impact the heritage value of the rail corridor since the proposed work will not alter the alignment, width of the ROW, or track arrangement (See Appendix C – CHAR)..

Study Area Section	CHR# ⁶	Description ⁷	Level of Recognition	Metrolinx Status	Potential Impact*
	29	3500 Eglinton Avenue West (former Kodak Lands)	Evaluated, Local Significance (Taylor Hazell Architects 2012)	Potential Provincial Heritage Property	None ¹¹
3	12	Humber River	Identified; Canadian Heritage River	Conditional Heritage Property	None
	13	Humber River Bridge	Evaluated; Local and Provincial Significance (Golder Associates 2011b)	Potential Provincial Heritage Property	Alteration
	14	Carlingview Drive Level Crossing	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	21	2417 Weston Road (Residence; demolished)	Evaluated, Local Significance (ASI 2011)	n/a (demolished)	None
	22	6 Humberview Crescent (Residence)	Evaluated; Local Significance (Golder Associates 2011b)	Conditional Heritage Property	None
	23	50 St. Philips Road (Golf Course)	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	27	Weston Historic Settlement Centre	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	B9	Lawrence Avenue Subway	Evaluated; No heritage significance***	n/a	None
	B10	Weston Road Subway	Evaluated; No heritage significance***	n/a	None
	B11	Islington Avenue Bridge	Evaluated; No heritage significance***	n/a	None
	B12	Kipling Avenue Subway	Evaluated; No heritage significance***	n/a	None
	B13	Martin Grove Subway	Evaluated; No heritage significance***	n/a	None
	B14	Highway 401 Bridge	Evaluated; No heritage significance***	n/a	None
	B15	Highway 27 Overpass	Evaluated; No heritage significance***	n/a	None
4	24	Mimico Creek	Identified during Baseline Conditions field review	Conditional Heritage Property	None
	25	Pearson Airport	Listed Heritage Property (City of Mississauga)	Conditional Heritage Property	None

**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

¹¹ The potential impacts and mitigation measures related to developing the entire 3500 Eglinton Avenue West property were previously assessed as part of the Final Crosstown LRT EPR Addendum (October 2013), therefore there will be no new adverse effects on CHRs associated with the paralleling station footprint on this site.

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

In addition, to the CHRs listed in Table 6-2, 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*).

It is anticipated that three CHRs may be affected by the proposed undertaking in Section 1, as follows:

- Bathurst Street Bridge (CHR 1)
- King Street Bridge (CHR 3)
- Fort York Heritage Conservation District (CHR 35)

6.6.1.1 Potential Footprint Effects and Mitigation Measures (Bathurst St. Bridge)

The cultural heritage significance of the Bathurst Street Bridge (CHR 1) has yet to be evaluated since this bridge was not included in previous studies. The Bathurst Street Bridge is listed as a cultural heritage resource by the City of Toronto (City of Toronto 2013a). The Bathurst Street Bridge was originally known as the Humber River Bridge. It was constructed in 1903 but was later moved to its present location in 1916. The direction of the bridge was adjusted in 1931.

Potential effects to this CHR include displacement of heritage attributes and/or disruption of setting due to the addition of a bridge protection barrier (see **Figure 6-8** for example of a bridge barrier).

The following mitigation/monitoring measures are recommended:

- Carry out a Cultural Heritage Evaluation Recommendation Report (CHER) to identify heritage value and attributes (during detailed design);
- If found to have cultural heritage value in accordance with the Metrolinx Interim Cultural Heritage Management Process (2013), a Heritage Impact Assessment (HIA) will be conducted (during detailed design) in consultation with the Ministry of Tourism, Culture and Sport and City of Toronto Heritage Preservation Services to further identify potential impacts and appropriate mitigation measures;
- Undertake final design of the bridge following the recommendations (e.g., heritage attributes to be conserved) outlined in the HIA;
- Follow Metrolinx Interim Cultural Heritage Management Process (2013) for managing heritage assets.

6.6.1.2 Net Effects

Displacement and/or disruption to the Bathurst Street Bridge would be minimized by carrying out a CHER to identify heritage value and attributes and, if required, a HIA to identify specific impacts and mitigation measures to be implemented.

FIGURE 6-8 EXAMPLE OF BRIDGE PROTECTION BARRIER



Notes: Photo from Stratford Town U.K.

6.6.1.3 Potential Footprint Effects and Mitigation Measures (King St. Rail Overpass)

The cultural heritage significance of the King Street Rail Overpass (CHR 3) is yet to be evaluated since this bridge was not included in previous studies. The King Street Subway is listed as a cultural heritage resource by the City of Toronto. It was constructed in 1888 with Charles Sproatt as the Engineer and B. Gibson as the contractor. The bridge originally had a wooden deck, which was replaced with a concrete deck in 1975 (City of Toronto 2013b).

Potential effects to this CHR include displacement of heritage attributes and/or disruption of setting due to the addition of an OCS structure attachment to the bridge.

Therefore, the mitigation/monitoring measures as listed above will be implemented (refer Section 6.6.1.1).

6.6.1.4 Net Effects

Displacement and/or disruption to the King Street Subway would be minimized by carrying out a CHER to identify heritage value and attributes and, if required, a HIA to identify specific impacts and mitigation measures to be implemented.

6.6.1.5 Potential Footprint Effects and Mitigation Measures (Fort York and Garrison Common National Historic Site and Heritage Conservation District)

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. 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 are located within the limits of the Paralleling Station site.

The Fort York site is well studied and has numerous recommendations on how to handle development in the vicinity of the fort. A review of Fort York planning documents revealed that the planned Paralleling Station has the potential to disrupt heritage attributes such as established viewpoints, the former alignment of Garrison Creek, and the darkness of the fort (see Catherine Naismith Architects 2010:67; du ToitAllsopp Hillier 2004; The Friends of Fort York and Garrison Common, and The Fort York Review Board 2000). It should be noted that the Fort York Heritage Conservation District Study and Plan is in draft form and is not yet complete.

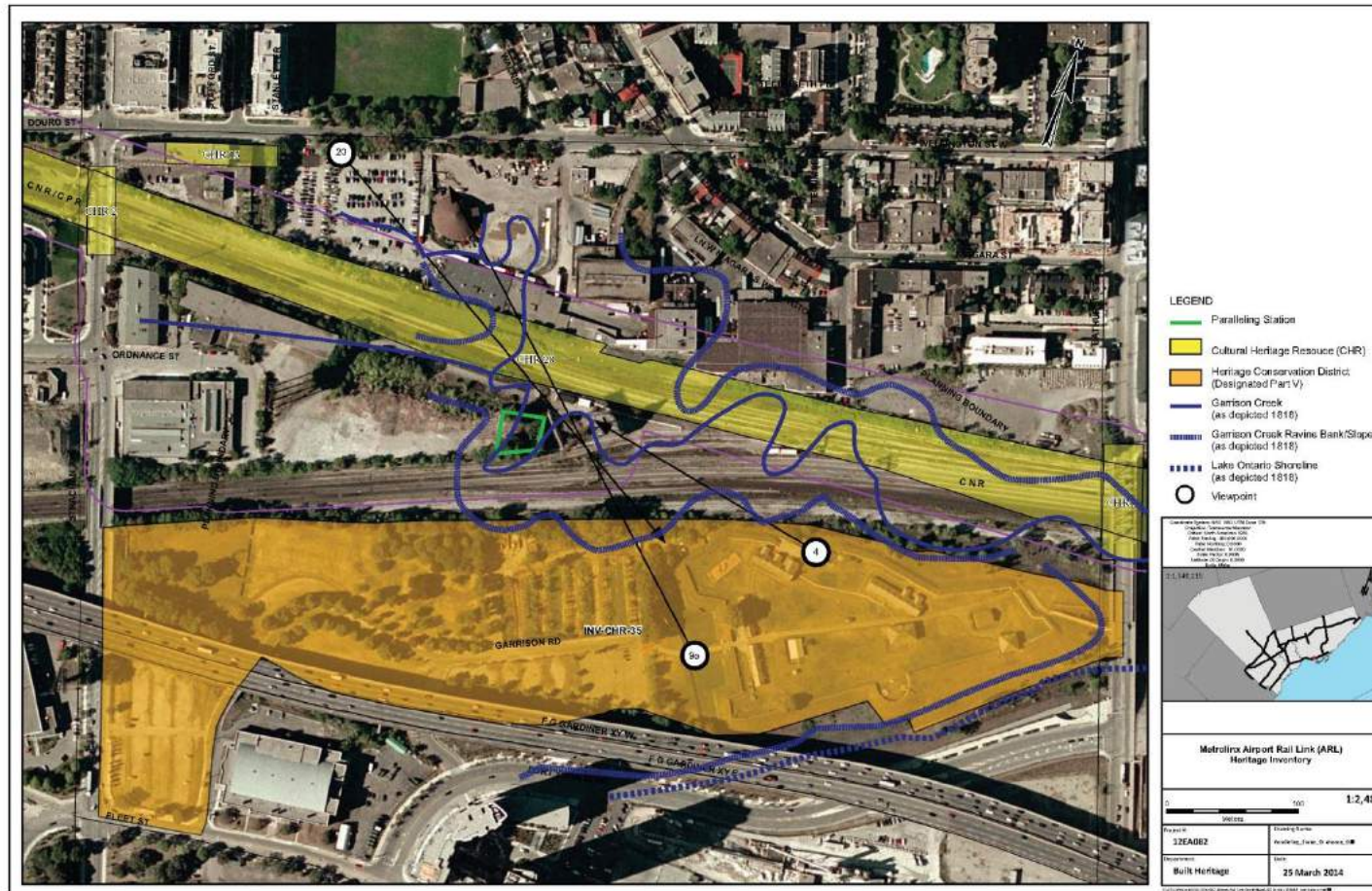
The Fort York and Garrison Common National Historic Site and Heritage Conservation District is bounded to the north by the railway lines, to the east by Bathurst Street, to the south by York Boulevard and to the west by Strachan Avenue, although portions of the district extend past Strachan Avenue and 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.

The potentially affected heritage attributes are shown in **Figure 6-9**, and descriptions of these attributes are provided below.

FIGURE 6-9 POTENTIALLY AFFECTED HERITAGE ATTRIBUTES WITHIN THE FORT YORK PRECINCT



Heritage Attributes within the Fort York Precinct

The heritage attributes within the Fort York Precinct include the following:

Garrison Creek and Garrison Creek Ravine

Both the original alignment of Garrison Creek and the former Garrison Creek Ravine are identified as heritage attributes in the Fort York Precinct (Catherine Naismith Architects 2010:87) and are located within the planned footprint for the Paralleling Station (Ordinance Street).

It is noted that the Garrison Creek and Garrison Creek Ravine are identified as archaeological attributes in addition to being heritage attributes. The results of the Stage 1 Archaeological Assessment carried out as part of the UP Express Electrification EA recommended that a Stage 2 assessment be completed for the paralleling station site.

Darkness/No light

The draft *Fort York Heritage Conservation District Study and Plan* identifies that there is a no-light policy at Fort York that was first established as a military priority. As described by the plan, “Today, the Fort is an oasis of darkness in the centre of the city” (Catherine Naismith Architects 2010:79). The darkness of Fort York is considered a heritage attribute due to its association with the military origins of the Fort (Catherine Naismith Architects 2010:120).

Viewpoints

The proposed paralleling station is located within viewpoints 4, 9e, and 20:

- **Viewpoint 4:** Framed views through twinned embrasures in the ramparts (Northeast of the Officers’ Barracks) looking northwest up the valley of the Garrison Creek. The view conveys the elevated position of the Fort and the Fort’s relationship to Garrison Creek Valley. The view is most notably impacted by the foreground vegetation, the abattoir, billboards, and the railway (Catherine Naismith Architects 2010:72).
- **Viewpoint 9e:** Looking northwest across the dry moat to the Garrison Creek Valley and the earliest sub-division of the Garrison Reserve associated with Fort York. The view conveys the elevated position of the Fort and its relationship to Garrison Creek. Non-contributory features include the metal security fence, vegetation along the railway embankment and the abattoir (Catherine Naismith Architects 2010:74).
- **Viewpoint 20:** Representative view from a sequence along Wellington Street looking down the Garrison Creek Valley and across the railway tracks to the Fort. This view is critical in that it conveys the relationship of the Fort to Garrison Creek. Non-contributory features include the

public works yard, abattoir, railway tracks, billboards as well as miscellaneous vegetation. This view may also be impacted by the proposed Fort York Pedestrian Bridge (Catharine Naismith Architects 2010:78).

The protection and enhancement of the identified views of the Fort and its context have been recognized in all Fort York related planning initiatives over the past several years, including the draft *Fort York Heritage Conservation District Study and Plan* (Catherine Naismith Architects 2010: 67), the *Fort York Neighbourhood Public Realm Plan* (du Toit/Allsopp Hillier 2004) and *Fort York: Setting it Right* (The Friends of Fort York and Garrison Common and the Fort York Management Board 2000).

Discussion of Potential Effects

Potential effects on the heritage attributes within the Fort York Precinct include potential displacement and/or disruption of the original alignment of Garrison Creek, obstruction/disruption of identified/protected views (Viewpoints 4, 9e, and 20), and/or disruption of setting through the introduction of light sources (required for safety/security).

As a result, the following mitigation/monitoring measures are recommended:

- A Visual Impact Assessment (VIA)¹² should be carried out to determine the impact of the Paralleling Station on identified viewpoints to and from Fort York;
- Carry out a Stage 2 archaeological assessment for the paralleling station site, as recommended through the Stage 1 Archaeological Assessment completed as part of the EA (see Appendix D)
- During detailed design, lighting (required for safety/security) within the Paralleling Station should be designed to have minimal impact to the darkness of Fort York; and,
- The detail design plans for the Paralleling Station should be submitted to Heritage Preservation Services at the City of Toronto (<http://www.toronto.ca/heritage-preservation/>) and to the Friends of Fort York (<http://www.fortyork.ca/contact.html>) for review and comment prior to construction.

6.6.1.6 Net Effects

Displacement and/or disruption of the original alignment of Garrison Creek would be mitigated through archaeological assessment to determine the presence or absence of archaeological resources at the paralleling station site. The disruption of identified viewpoints would be minimized or mitigated to the extent possible through the implementation of recommendations prescribed in the VIA. Disruption to the setting of Fort York through the introduction of light sources would be mitigated through the sensitive design of lighting within the paralleling station.

¹² The Visual Impact Assessment Report is contained in Appendix I.

6.6.1.7 Potential Construction Effects (Bridges/Rail Overpasses)

With respect to all bridges/rail overpasses identified as CHRs in this EPR, the construction activities associated with installing bridge protection barriers, OCS attachments, and grounding grids (also referred to as flash plates, see Chapter 5) to bridges/rail overpasses will have potential short-term disruption effects (e.g., introduction of physical, visual, noise-related, and atmospheric elements that are not in keeping with the character of the bridge) to the setting of those bridges that have been identified as CHRs.

To minimize these potential temporary effects, staging areas (if required) should be carefully selected so that they are non-invasive and avoid all heritage attributes. In addition, pre-construction vibration studies may be required to mitigate any potential vibration related impacts (to be determined during detailed design).

6.6.1.8 Net Effects

Short-term disruption effects to bridges will be minimized through the mitigation measures described above.

6.6.1.9 Potential Construction Effects (Fort York Heritage District)

The construction activities associated with installing the paralleling station components have the potential to disturb/displace the original alignment of Garrison Creek and the original topography of Garrison Creek Ravine through the removal of soil. In addition, construction activities will have potential short-term disruption effects (e.g., introduction of physical, visual, noise-related, and atmospheric elements) that are not in keeping with the character of the of Fort York Precinct.

To minimize these potential temporary effects, staging areas (if required) should be carefully selected so that they are non-invasive and avoid all heritage attributes. In addition, pre-construction vibration studies may be required to mitigate any potential vibration related impacts (to be determined during detailed design). Pre-construction conditions should be re-established through post-construction landscape treatments, where appropriate. If possible, construction activities should avoid the removal of soil in the vicinity of Garrison Creek and the former Garrison Creek Ravine.

6.6.1.10 Net Effects

Short-term disruption effects to Fort York Precinct will be minimized through the mitigation measures described above.

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

Section 2 includes a proposed paralleling station at 3500 Eglinton Avenue West. It is noted that the former Kodak property located at 3500 Eglinton Avenue West (owned by Metrolinx) is 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). This property is a well-documented site; the identified heritage attributes are limited to Building #9, which is located in the southwest portion of the site (Taylor Hazell Architects 2012). As per the October 2013 EPR Addendum, the proposed MSF will require the entire Kodak property area. As a result, the potential footprint impacts and associated mitigation measures associated with construction and implementation of the MSF were captured and documented as part of the Eglinton Crosstown LRT EA process via the EPR Addendum.

Subsequently, in coordination with the Eglinton Crosstown MSF team, it was confirmed that the Kodak site will accommodate the MSF as well as the paralleling station required for UP Express electrification. As a result, a provision for the proposed Paralleling Station will be incorporated into the detailed design/build plans for the Eglinton Crosstown LRT MSF. Therefore, the final location of the Paralleling Station within the Kodak property limits will be determined as part of the detailed design phase for the Eglinton Crosstown LRT MSF. Since the potential impacts and mitigation measures related to developing the entire Kodak property were previously captured as part of the Final Eglinton Crosstown LRT EPR Addendum (October 2013), there will be no new adverse effects on CHRs associated with the paralleling station footprint or associated construction activities on the Kodak site.

It is anticipated that three CHRs may be affected by the proposed undertaking in Section 2 as follows:

- Wallace Avenue Pedestrian Bridge (CHR 7)
- Rogers Road Bridge (CHR B5)
- Jane Street Bridge (CHR B8)

6.6.2.1 Potential Footprint Effects and Mitigation Measures (Wallace Ave. Pedestrian Bridge)

The cultural heritage significance of the Wallace Street Bridge (CHR 7) is yet to be evaluated since this bridge was not included in previous studies. The Wallace Street Bridge is listed as a cultural heritage resource by the City of Toronto. It was constructed in 1907 with Frazer Matthews (Chief Engineer), C.H. Rust (City Engineer), and the Ontario Bridge Company (contractor). The City of Toronto Works Department constructed the footings (City 2013c).

Potential effects to this CHR include displacement of heritage attributes and/or disruption of setting due to the addition of a bridge protection barrier, attachment of a grounding grid, and potential alteration of the bridge deck to accommodate the OCS.

Therefore, the mitigation/monitoring measures as listed above will be implemented (refer Section 6.6.1.1).

6.6.2.2 *Net Effects*

Displacement and/or disruption to the Wallace Avenue Pedestrian Bridge would be minimized by carrying out a CHER to identify heritage value and attributes and, if required, a HIA to identify specific impacts and mitigation measures to be implemented.

6.6.2.3 *Potential Effects and Mitigation Measures (Rogers Road Bridge)*

The cultural heritage significance of the Rogers Road Bridge (CHR B5) is yet to be evaluated since this bridge was not included in previous studies. The Rogers Road Bridge was constructed in 1934 and is a reinforced concrete deck and girder bridge. This bridge is not listed on the Toronto Heritage Inventory..

Potential effects to this CHR include displacement of heritage attributes and/or disruption of setting due to the addition of a bridge protection barrier and attachment of a grounding grid.

Therefore, the mitigation/monitoring measures as listed above will be implemented (refer Section 6.6.1.1).

6.6.2.4 *Net Effects*

Displacement and/or disruption to the Rogers Road Bridge would be minimized by carrying out a CHER to identify heritage value and attributes and, if required, a HIA to identify specific impacts and mitigation measures to be implemented.

6.6.2.5 *Potential Effects and Mitigation Measures (Jane Street Bridge)*

The cultural heritage significance of the Jane Street Bridge (CHR B8) is yet to be evaluated since this bridge was not included in previous studies. The Jane Street Bridge was constructed in 1961 and is a reinforced concrete deck on steel girders. This bridge is not listed on the Toronto Heritage Inventory.

Potential effects to this CHR include displacement of heritage attributes and/or disruption of setting due to the addition of a bridge protection barrier.

Therefore, the mitigation/monitoring measures as listed above will be implemented (refer Section 6.6.1.1).

6.6.2.6 *Net Effects*

Displacement and/or disruption to the Jane Street Bridge would be minimized by carrying out a CHER to identify heritage value and attributes and, if required, a HIA to identify specific impacts and mitigation measures to be implemented.

6.6.2.7 *Potential Construction Effects and Mitigation Measures*

The potential short-term disruption effects during bridge construction activities are detailed in Section 6.6.1.5 above, along with proposed mitigation measures.

6.6.2.8 *Net Effects*

Short-term disruption effects to bridges would be minimized through the mitigation measures described in Section 6.6.1.5.

6.6.3 Section 3 - UP Express Weston Station to Highway 427

This section of the corridor is located in proximity to two known or potential Heritage Conservation Districts (HCD), which include the Phase 1 Weston HCD and Phase 2 Weston HCD. In addition, the Humber River Bridge (CHR 13) is identified as a significant cultural heritage resource based on its design, associative, and contextual values. Section 3 also includes a proposed EMU Maintenance Facility located at 50 Resources Road. As discussed in Chapter 4 of this EPR, this site is currently an active construction site with heavy machinery. No cultural heritage resources were identified within the 50 Resources Road site. Similarly, no cultural heritage resources were identified within the 175 City View Drive site where a new traction power substation¹³ is to be located.

It is anticipated that one CHR will be affected by the proposed undertaking in Section 3, as follows:

- Humber River Rail Overpass (CHR 13)

6.6.3.1 *Potential Footprint Effects and Mitigation Measures (Humber River Rail Overpass)*

The Humber River Rail Overpass dates to 1856. This resource has been previously evaluated, as a Heritage Impact Assessment (HIA) was completed in 2011 (by Golder Associates on behalf of Metrolinx) as part of fulfilling the EA approval conditions associated with the Georgetown South Service Expansion

¹³ Refer to *Hydro One's Union Pearson Express Electrification Traction Power Substation Class Environmental Assessment – Draft Environmental Study Report*

and Union-Pearson Rail Link EA, and documented in a report entitled: *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. (Golder Associates, 2011).*

The 2011 HIA recommended that the bridge be classified as a Provincial Heritage Property of Provincial Significance. This assessment included information on the background history, description, and assessment of significance of the Humber River Rail Overpass (Golder Associates 2011). Golder's 2011 report also included a statement of cultural heritage value and a list of heritage attributes for the Humber River Rail Overpass. The 2011 HIA found that the Humber River Rail Overpass retains cultural heritage value and has local and provincial significance (Golder, 2011).

It is further noted that a CHER for the Humber River Bridge is to be undertaken following completion of Georgetown South Project construction works, in order to identify heritage attributes. The CHER will then be reviewed by the Metrolinx Heritage Committee (as outlined in Section 6.6.1.1 above).

Accordingly, the Humber River Bridge is currently considered to be a *Potential Provincial Heritage*.

Potential effects to this CHR include displacement of heritage attributes and/or disruption of setting (i.e. brick piers with stone footings, gunite repairs and board finish on the south side of the bridge) due to the proposed attachment of OCS portal structures to the bridge piers (via wall brackets).

Therefore, the mitigation/monitoring measures as listed above will be implemented (refer Section 6.6.1.1).

6.6.3.2 Net Effects

Displacement and/or disruption to the Humber River Bridge would be minimized by carrying out a HIA to identify specific impacts and mitigation measures to be implemented.

6.6.3.3 Potential Construction Effects and Mitigation Measures

The construction activities associated with attaching OCS portal structures to the bridge will have potential short-term disruption effects (e.g., introduction of physical, visual, noise-related, and atmospheric elements that are not in keeping with the character of the bridge). In addition, there is potential for short-term disruption effects to the bridge piers due to the attachment of brackets.

As a result, the mitigation measures as outlined in Section 6.6.1.5 are to be implemented.

In addition, post-construction rehabilitation of the Humber River bridge piers should be carried out (should they be adversely affected during construction activities).

6.6.3.4 Net Effects

Short-term disruption effects to the Humber River Bridge will be minimized through the mitigation measures described in Section 6.6.1.5 and 6.6.3.3.

6.6.4 Section 4 – Highway 427 to UP Express Pearson Station

This section of the corridor in Toronto is generally characterized by industrial buildings and land-use, which mainly dates to the second half of the twentieth-century, and has undergone dramatic change due to the construction of Highway 401, 409, and 427. In contrast, the section of the corridor located in the City of Mississauga dates to the 1930s when the Malton Airport was developed. Airport land-use continues to dominate this landscape in the form of Pearson International Airport.

6.6.4.1 Potential Footprint Effects and Mitigation Measures

No cultural heritage resources are expected to be affected by the proposed undertaking in Section 4, since the physical project components will be contained to the elevated spur line.

6.6.4.2 Net Effects

No net effects on cultural heritage resources are anticipated in Section 4.

6.6.4.3 Potential Construction Effects and Mitigation Measures

No potential effects on cultural heritage resources are anticipated due to construction activities in Section 4, since the physical project components will be contained to the elevated spur line.

6.6.4.4 Net Effects

No net effects on cultural heritage resources are anticipated due to construction activities in Section 4.

6.7 Archaeology

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

6.7.1.1 Potential Footprint Effects and Mitigation Measures

As described in Chapter 4, Stage 1 Archaeological Assessments were carried out at all new properties identified for the traction power distribution facilities, and have been submitted to the Ministry of Tourism, Culture and Sport (MTCS) in compliance with Section 65 of the *Ontario Heritage Act*.

Within Section 1, the findings of the Stage 1 Archaeological Assessment (December, 2012) (see Appendix D) indicated that the east end of the Ordnance paralleling station location overlaps with potential archaeological remains of a railway roundhouse that dates back to 1857 (**Figure 6-10**).

Therefore, a Stage 2 Archaeological Assessment is recommended for the Ordnance Paralleling Station location (including the proposed underground duct bank route).

Monitoring

Should additional property be required outside of the current plan, further archaeological assessment will be required.

Should previously unknown or unassessed deeply buried archaeological resources be uncovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*. Any person discovering human remains must immediately notify the police or coroner and the Registrar of Cemeteries, Ministry of Government Services. In addition, consultation with relevant Aboriginal communities will be initiated in the event that archaeological resources or human remains are discovered.

6.7.1.2 Net Effects

Based on implementation of the above noted mitigation and monitoring measures, no net adverse effects are anticipated on archaeological features.

6.7.1.3 Potential Operations and Maintenance Effects and Mitigation Measures

No potential effects on archaeological features are anticipated during operation/maintenance.

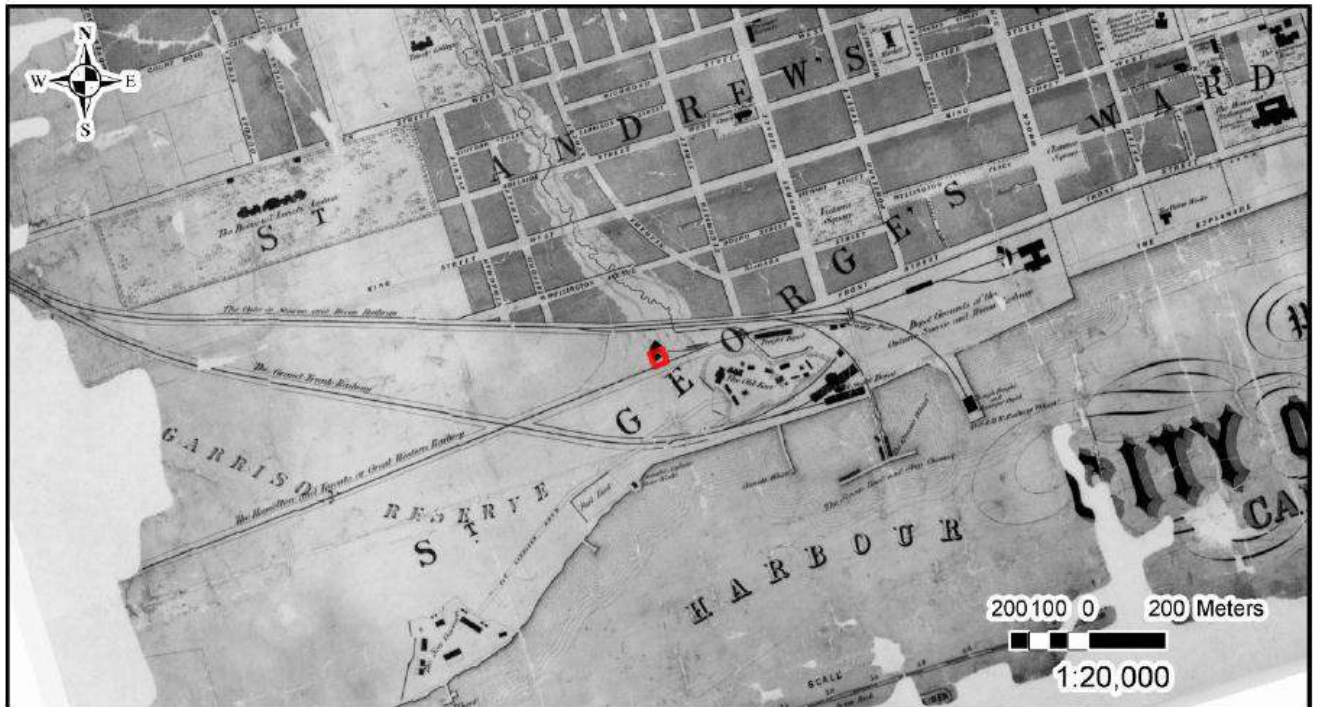
6.7.1.4 Net Effects

No net effects on archaeological features are anticipated during operation/maintenance.

6.7.1.5 *Potential Construction Effects and Mitigation Measures*

Refer to Section 6.7.1.1 for a description of potential effects.

FIGURE 6-10 ORDNANCE PARALLELING STATION LOCATION SHOWN ON 1857 MAP



Fleming 1857, University of Toronto Map Library

6.7.1.6 Net Effects

Based on implementation of the above noted monitoring measures, no net adverse effects are anticipated on archaeological features.

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

Based on the Stage 1 Archaeological Assessment completed for the UP Express Electrification EA, the 3500 Eglinton Avenue West property within Section 2 no longer has archaeological potential due to extensive and intensive disturbance. No further archaeological assessment was recommended as part of the UP Express Electrification EA.

In addition, as previously 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, the mitigation and monitoring measures as outlined in the Crosstown LRT EPR Addendum (October 2013) will be implemented by Metrolinx.

Monitoring

Should additional property be required outside of the current plan, further archaeological assessment will be required.

In addition, the same monitoring measures as outlined in Section 6.7.1.1 above will be implemented.

6.7.3 Section 3 - UP Express Weston Station to Highway 427

The findings of the Stage 1 Archaeological Assessment completed for the UP Express Electrification EA indicated that there is no longer any archaeological potential at the EMU Maintenance Facility site located at 50 Resources Road. Therefore, no further archaeological assessment was recommended.

Similarly, with respect to the routing of duct banks at the 175 City View Drive site, it was determined through the Stage 1 Archaeological Assessment that there is no remaining archaeological potential. Therefore, no further archaeological assessment was recommended.

Monitoring

Should additional property be required outside of the current plan, further archaeological assessment will be required.

In addition, the same monitoring measures as outlined in Section 6.7.1.1 above will be implemented.

6.7.4 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 archaeological assessment was not undertaken.

Monitoring

Should additional property be required outside of the current plan, further archaeological assessment will be required.

6.8 Land Use/Social Features

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

6.8.1.1 Potential Footprint Effects and Mitigation Measures

Effects on Existing Land Use/Social Features

This corridor segment from Union Station west to Bloor Station is a highly urbanized area consisting of a mix of high density residential, industrial and commercial land uses. The electrified trains will be operating in the same corridor as GO Trains and will replace the DMU trains. The conversion of the UP Express service from diesel power to electric power in this segment of the corridor entails the addition of a number of features such as an overhead contact system (OCS), a paralleling station, and gantries. It is recognized that given the pre-existing rail corridor and GO stations, electrification will not result in a change in land use of the corridor's footprint, except for a small number of cases where minor encroachments outside the rail corridor are required to accommodate OCS support structures (refer to Section 6.9.1 below).

Based on the current preliminary design, two OCS foundations at Sudbury St. are to be located outside the rail corridor and will encroach slightly into adjacent land uses. During detailed design, options for refining portal locations will be examined to avoid the encroachment, if possible. In addition, Metrolinx will continue to engage the City of Toronto to discuss potential design options for the Sudbury St. portal location during detailed design, if the encroachment cannot be avoided.

Paralleling Station – Ordnance Street

The Paralleling Station is located where Lakeshore West and Kitchener GO rail corridor separate. Currently, the site contains Metrolinx signal bungalows, a power substation for switches and pump station, and a multi-story advertisement sign. With the exception of 30 Ordnance Street, which is privately owned, and the tip of the triangle which is owned by Metrolinx, the remaining 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. It is noted that negotiations with the adjacent property owner are currently underway with respect to road relocation on the Ordnance site.

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 proposed gantries associated with the Ordnance paralleling station will be located within the existing Metrolinx-owned property; therefore no footprint impacts are anticipated in relation to these

components. It is noted that an easement may be required for the duct bank, though this will also not lead to any footprint impacts to land use.

There are no social facilities are within 100m of the corridor in this section of the study area.

Effects on Planned Land Use

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. The planned King St. Pedestrian Bridge that will connect the western leg of Douro Street and west leg of Western Battery Road in Liberty Village is also located in Section 1.

Monitoring

Provisions for electrification will be incorporated into the final designs of the proposed Fort York Pedestrian and Cycling Bridge and proposed King St. Pedestrian Bridge, as required.

With regard to the zoning designation at 50 Resources Rd., as a Crown Agency, Metrolinx is not bound by zoning by-laws passed by municipalities under s.34 of the *Planning Act* and as such does not have a requirement to apply for and obtain zoning amendments. However, Metrolinx will consult with, and have regard for, the City of Toronto's planning policies with regard to specific projects (or components thereof) and will comply with the City's requests when and where reasonable.

6.8.1.2 *Net Effects*

The electrification of the rail ROW will not result in a change in land use of the corridor's footprint, therefore no adverse net effects are anticipated. Metrolinx will engage with the City with respect to potential design options for the portal foundations at Sudbury St., if the encroachment cannot be avoided.

The UP Express electrification undertaking includes modifications (where required) to existing bridges and rail overpasses in order to accommodate the OCS and provide grounding provisions. Modifications also include bridge protection barriers to provide pedestrian and equipment safety and security.

The proposed use of the property (i.e., paralleling station and duct bank) is compatible with the adjacent land uses. Similarly, the Paralleling Station is not anticipated to negatively affect future development within this zoning context.

6.8.1.3 *Potential Operations and Maintenance Effects*

No potential effects on land use are anticipated during operations/maintenance. It is noted that nuisance related effects (e.g., air quality, noise, vibration) are documented in Sections 6.10, 6.11, and 6.12 below.

6.8.1.4 Net Effects

No net effects on land use are anticipated during operations/maintenance.

6.8.1.5 Potential Construction Effects

There is potential for minor, temporary effects on land use during construction due to construction staging areas, equipment storage areas, etc. that may be required. Potential temporary easement requirements are further discussed in Section 6.9.1.5 below. It is also noted that nuisance related effects during construction (e.g., air quality, noise, vibration) are documented in Sections 6.10, 6.11, and 6.12 below.

6.8.1.6 Net Effects

Net effects related to potential temporary easement requirements during construction are documented in Section 6.9.1.5 below.

6.8.2 Section 2 - UP Express Bloor Station to UP Express Weston Station**6.8.2.1 Potential Footprint Effects and Mitigation Measures****Effects on Existing Land Use**

This corridor segment from Bloor Station to Weston Station is a highly urbanized area consisting of a mix of high density residential, industrial and commercial land uses. The electrified trains will be operating in the same corridor as GO Trains and will replace the DMU trains. The conversion of the UP Express service from diesel power to electric power in this segment of the corridor entails the addition of a number of features such as an overhead contact system (OCS), a Paralleling Station, and gantries. Station upgrades are underway at Bloor and Weston GO Stations. There are future plans for a station at Mount Dennis. Project works are located within the existing rail corridor and station lands; however some minor easements may be required to accommodate some of the OCS portal structures. It is recognized that given the pre-existing rail corridor and GO stations, electrification will not result in a change in land use of the corridor's footprint, except for a small number of cases where minor encroachments outside the rail ROW are required to accommodate OCS support structures (refer to Section 6.9.2 below).

Paralleling Station – 3500 Eglinton Avenue West

The Paralleling Station is proposed at 3500 Eglinton Avenue West. The approximate footprint of the Paralleling Station is 40m x 25m. 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.

It is noted that the former Kodak property located at 3500 Eglinton Avenue West 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). As per the October 2013 EPR Addendum, the proposed MSF will require the entire Kodak property area. As a result, the potential footprint impacts and associated mitigation measures associated with construction and implementation of the MSF were captured and documented as part of the Eglinton Crosstown LRT Environmental Assessment process via the EPR Addendum.

Subsequently, in coordination with the Eglinton Crosstown MSF team, it was confirmed that the Kodak site will accommodate the MSF as well as the Paralleling Station required for UP Express electrification. As a result, a provision for the proposed Paralleling Station will be incorporated into the detailed design/build plans for the Eglinton Crosstown LRT MSF. Therefore, the final location of the Paralleling Station within the Kodak property limits (owned by Metrolinx) will be determined as part of the detailed design phase for the Eglinton Crosstown LRT MSF. Notwithstanding this, since the potential impacts and mitigation measures related to developing the entire Kodak property were previously captured in the Final Eglinton Crosstown LRT EPR Addendum, there will be no new net adverse land use effects associated with locating the Paralleling Station facility on the Kodak site.

The proposed gantries will be located within the existing Metrolinx-owned property; therefore no footprint impacts are anticipated in relation to these components. Easements required from the City of Toronto in order to install the duct bank along Industry Street and Ray Avenue will have no effects on land use, as the use of the road will not be affected once construction is complete.

Effects on Planned Land Use

Within this section, the St. Clair Avenue West Avenue Study identified that the railway lines pose a significant challenge to fulfilling the vision for the area and recommended new crosswalks and pedestrian rail crossings be created to overcome the significant barrier to pedestrian movement and to improve linkages to adjacent communities. It is recognized that the rail corridor poses a barrier particularly to pedestrian movement and connectivity of neighbourhoods in general; however, electrification of the UP Express route is not anticipated to change the current situation. Metrolinx's Mobility Hub study for Mount Dennis recommends a number of ways to address this, 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).

Monitoring

In addition, the monitoring provisions as outlined in Section 6.8.1.1 above will be implemented.

6.8.2.2 *Net Effects*

The electrification of the rail ROW (including installation of gantries) will not result in a change in land use, therefore no adverse net effects are anticipated. The Paralleling Station is considered to be a compatible land use with the existing zoning for the property. Similarly, the Paralleling Station is not anticipated to negatively affect future development within this zoning context.

The UP Express electrification undertaking includes modifications (where required) to existing bridges and rail overpasses in order to accommodate the OCS and provide grounding provisions. Modifications also include bridge protection barriers to provide pedestrian safety and security.

6.8.2.3 *Potential Operations and Maintenance Effects and Mitigation Measures*

No potential effects on land use are anticipated during operations/maintenance. There are four social facilities (Santa Maria School, Hollis Child Care Centre, Royal Day Care Centre, and C.R. Marchant Middle School) within 100 m of the corridor in this section. It is noted that the Hollis Child Care Centre is to be closed/relocated as part of the Eglinton Crosstown LRT project. Refer to Sections 6.10, 6.11, and 6.12 below for a description of potential effects related to air quality, noise, vibration, respectively.

6.8.2.4 *Net Effects*

No net effects on land use are anticipated during operations/maintenance.

6.8.2.5 *Potential Construction Effects and Mitigation Measures*

There is potential for temporary effects due to traffic disruption and nuisance effects (dust, noise) on land use and local residents during construction activities associated with installing the duct banks/feeders under Industry Rd. and Ray Ave. in this particular area.

The duration of required road closures during construction will be minimized to the extent possible and temporary traffic detours will be implemented in order to mitigate temporary effects related to access.

Potential temporary easement requirements are further discussed in Section 6.9.1.5 below. It is also noted that nuisance related effects during construction (e.g., air quality, noise, vibration) are documented in Sections 6.10, 6.11, and 6.12 below.

6.8.2.6 *Net Effects*

Temporary nuisance effects (traffic disruption) on local residents in the vicinity of Industry Rd. and Ray Ave. will be minimized to the greatest extent possible. Potential effects on access (residential/business) will be mitigated.

Net effects related to potential temporary easement requirements during construction are documented in Section 6.9.1.5 below.

6.8.3 Section 3 - UP Express Weston Station to Highway 427

6.8.3.1 *Potential Footprint Effects and Mitigation Measures*

Effects on Existing Land Use

This corridor segment from Weston Station to Highway 427 passes through a predominately residential area, however portions of this segment do pass recreational features (Weston Golf and Country Club) and some commercial/industrial lands. The conversion of the UP Express service from diesel power to electric power in this segment of the corridor entails the addition of an overhead contact system (OCS), gantries, and a new maintenance facility, which is to be located on Metrolinx-owned property (50 Resources Rd.). It is recognized that given the pre-existing rail corridor and GO stations, electrification will not result in a change in land use of the corridor's footprint, except for a small number of cases where minor encroachments outside the rail ROW are required to accommodate OCS support structures (refer to Section 6.9.3 below).

EMU Maintenance Facility – 50 Resources Road

The EMU Maintenance Facility required to service EMU trains will be located at 50 Resources Road, Etobicoke. The footprint of the facility is approximately five hectares. The property is currently being used as a construction staging area, and immediately adjacent land use includes transportation corridors

on three sides (Highway 401, Islington Avenue and Highway 401 ramps, and the rail corridor) as well as industrial land uses. The facility footprint requirements can be accommodated on the property.

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. Discussions with City of Toronto Planning staff in March 2014 confirmed that there is a zoning conflict with the proposed Maintenance Facility. As a Crown Agency, Metrolinx is not bound by zoning by-laws passed by municipalities under s.34 of the *Planning Act* and as such does not have a requirement to apply for and obtain zoning amendments. However, Metrolinx will consult with, and have regard for, the City of Toronto's planning policies with regard to specific projects (or components thereof) and will comply with the City's requests when and where reasonable.

Traction Power Distribution Components at CityView Drive TPS

A Traction Power Substation (TPS) is also required within this segment of the corridor. The TPS is located at 175 City View Drive at the southeast corner of Highway 27 and Dixon Road. Adjacent land use includes the rail corridor, Hydro One transmission line corridor and industrial/commercial uses (refer to *Hydro One's Union Pearson Express Electrification Traction Power Substation Class Environmental Assessment – Draft Environmental Study Report*). The potential effects related to the new TPS are being assessed by Hydro One as part of a separate Class EA process.

It is noted that installation of the Metrolinx power distribution components (i.e., gantries and duct banks) are considered compatible land uses, as the City View Drive site is an industrial site and is currently zoned *Employment Industrial (EI)*.

There are no social facilities are within 100m of the corridor in this section of the study area.

Planned Land Use

No land use studies were available along this section of the corridor during the impact assessment phase of the UP Express Electrification EA.

Monitoring

With respect to the 50 Resources Rd. site, as a Crown Agency, Metrolinx is not bound by zoning by-laws passed by municipalities under s.34 of the *Planning Act* and as such does not have a requirement to apply for and obtain zoning amendments. However, Metrolinx will consult with, and have regard for, the City of Toronto's planning policies with regard to specific projects (or components thereof) and will comply with the City's requests when and where reasonable.

The monitoring provisions as outlined in Section 6.8.1.1 above will be implemented.

6.8.3.2 *Net Effects*

The electrification of the rail ROW will not result in a change in land use, therefore no adverse net effects are anticipated. The gantries and duct banks proposed at the 175 City View Drive location are considered compatible land uses with the existing zoning designations.

The UP Express electrification undertaking includes modifications (where required) to existing bridges and rail overpasses in order to accommodate the OCS and provide grounding provisions. Modifications also include bridge protection barriers to provide pedestrian and equipment safety and security.

6.8.3.3 *Potential Operations and Maintenance Effects*

No potential effects on land use are anticipated during operations/maintenance. It is noted that nuisance related effects (e.g., air quality, noise, vibration) are documented in Sections 6.10, 6.11, and 6.12 below.

6.8.3.4 *Net Effects*

No net effects on land use are anticipated during operations/maintenance.

6.8.3.5 *Potential Construction Effects*

There is potential for minor, temporary effects on land use during construction due to construction staging areas, equipment storage areas, etc. that may be required. Potential temporary easement requirements are further discussed in Section 6.9.1.5 below. It is also noted that nuisance related effects during construction (e.g., air quality, noise, vibration) are documented in Sections 6.10, 6.11, and 6.12 below.

6.8.3.6 *Net Effects*

Net effects related to potential temporary easement requirements during construction are documented in Section 6.9.1.5 below.

6.8.4 Section 4 – Highway 427 to UP Express Pearson Station

6.8.4.1 *Potential Footprint Effects and Mitigation Measures*

Existing Land Use

This segment of the UP Express route is an elevated spur line that passes into the City of Mississauga west of Highway 427, and as such is subject to the City of Mississauga's Zoning By-law. The land use effects related to implementation of the new spur line were captured in the *Georgetown South Service Expansion and Union Pearson Rail Link Environmental Assessment (2009)*. There are no facilities required to support the electrification of the corridor in this section. Therefore, there are no land use footprint impacts anticipated.

Planned Land Use

It is unlikely that the electrification of the rail corridor will impede any future land use in the Greenbelt land use designation. The rail spur passes through the Pearson Eco-Business Zone and as such is not anticipated to impede the development of this area into an environmentally sustainable business zone. The proposed electrified UP Express line is considered compatible with the environmentally sustainable philosophy of the business zone.

No adverse negative effects on planned land uses are anticipated.

6.8.4.2 Net Effects

No net adverse effects on existing or planned land uses are anticipated in this Section of the corridor.

6.8.4.3 Potential Operations and Maintenance Effects and Mitigation Measures

No potential effects on land use are anticipated during operations/maintenance.

6.8.4.4 Net Effects

No net effects on land use are anticipated during operations/maintenance.

6.8.4.5 Potential Construction Effects

There is potential for minor, temporary effects on land use during construction due to construction staging areas, equipment storage areas, etc. that may be required. Potential temporary easement requirements are further discussed in Section 6.9.1.5 below. It is also noted that nuisance related effects during construction (e.g., air quality, noise, vibration) are documented in Sections 6.10, 6.11, and 6.12 below.

6.8.4.6 Net Effects

Net effects related to potential temporary easement requirements during construction are documented in Section 6.9.1.5 below.

6.9 Property

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

6.9.1.1 Potential Footprint Effects and Mitigation Measures

Table 6-3 summarizes the areas within Section 1 where property easements will be required, with further detail provided below.

TABLE 6-3 SUMMARY OF PROPERTY REQUIREMENTS – SECTION 1

Type of Structure(s)	Location	Number/Structure Installation Type	Approximate total area required	Type of easement required	Public/Private property owner
Duct Bank	Ordnance paralleling station site	Underground duct	1320 m ²	Permanent	Public
OCS Structure MTCC	0.365 km to 0.638 km	11 wall attachments	N/A	Permanent	Private
OCS Structure to the west of the John Street bridge on south side (CN Tower.)	0.675 km	1 wall attachment	N/A	Permanent	Private
OCS Structure East of Peter Street on the north side (RBC Data Center)	0.785 km and 0.8111 km	2 foundations	8 m ²	Permanent	Private
OCS Structure (north footings) Sudbury Street	3.603 km and 3.654 km	2 foundations	8 m ²	Permanent	Public
OCS Structure (south footings) Joe Shuster Way	3.603 km and 3.654 km	2 wall attachments	N/A	Permanent	Private

With respect to the underground duct banks (to install high voltage feeders) that will be routed from the Ordnance Paralleling Station to the gantries at Strachan, an area of approximately 1320 m² may require property easement from the City of Toronto. There are negotiations underway with Build Toronto to determine the alignment of the Metrolinx access road.

From 0.365km to 0.638km, there are 11 portal structures that cannot be accommodated within the existing rail ROW, which will need to be attached to privately owned property (building, retaining wall). Therefore, permanent easements from the will be required in order to install these structures.

At 0.534 to 0.721, the preliminary design indicated there are six OCS structure foundations that could not be accommodated within the existing Metrolinx owned rail corridor. Further investigations indicated that there may be sufficient space to locate the OCS structure foundations between the retaining wall and the tracks. Therefore, this will be refined during detail design.

There are two OCS structure (north footings), just east of Peter Street, where foundations that cannot currently be accommodated within the existing Metrolinx owned rail corridor (at chainages 0.785 km and 0.8111 km). Each foundation will require an area of approximately 4 m². Therefore, permanent easements totaling approximately 8 m² will be required from a private property owner for installing these foundations.

There are two OCS structure foundations (north footings) that cannot be accommodated within the existing Metrolinx owned rail corridor (at chainages 3.603km and 3.654km) near Sudbury Street. Each foundation will require an area of approximately 4 m². Therefore, a permanent easement of approximately 8 m² will be required from the City of Toronto for installing these foundations.

In addition, the two south footings of the OCS structures at these locations (at chainages 3.603km and 3.654 km) will need to be attached to the retaining wall or installed on the south side of wall (Liberty Village Mural Wall / Joe Shuster Way) along the corridor in this section, which is privately owned. As a result, permanent easements will be required in order to install these OCS attachments.

During detailed design, further advancements to the OCS design will be made to determine whether the location of OCS portal structures can be refined in such a way that avoids the need for property acquisition/easements. Where this is not possible, Metrolinx will proceed with acquiring property easements in accordance with standard Metrolinx procedures and policies.

6.9.1.2 *Net Effects*

Property acquisition/easements will be avoided where possible. In locations where acquisition/easements cannot be avoided, property easements will be obtained for permanent use of their property in accordance with standard Metrolinx procedures and policies.

6.9.1.3 *Potential Operations and Maintenance Effects and Mitigation Measures*

No adverse effects to property ownership are anticipated in relation to operations/maintenance of the electrified UP Express system.

6.9.1.4 *Net Effects*

There are no net effects to property ownership anticipated in relation to operations/maintenance of the electrified UP Express system.

6.9.1.5 *Potential Construction Effects*

During the detailed design phase, requirements for any additional contractor storage areas, equipment maintenance areas, material laydown areas, areas required to obtain access for construction activities, etc. will be confirmed. These locations may require temporary property easement agreements with private and/or public property owners (i.e., City of Toronto).

Therefore, Metrolinx will negotiate temporary construction easements with property owners on a case-by-case basis in accordance with standard Metrolinx procedures and policies. Following construction, Metrolinx will reinstate lands to pre-construction conditions.

In the event that a property owner submits a claim for property damage, Metrolinx will conduct investigations.

6.9.1.6 *Net Effects*

Property owners will be compensated in accordance with standard Metrolinx procedures and policies for temporary use of their property.

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

6.9.2.1 *Potential Footprint Effects and Mitigation Measures*

Table 6-4 summarizes the areas within Section 2 where property easements will be required, with further detail provided below.

TABLE 6-4. SUMMARY OF PROPERTY REQUIREMENTS – SECTION 2

Type of Structure(s)	Location	Number/Structure Installation Type	Approximate total area required	Type of easement required	Public/Private property owner
Duct Banks	3500 Eglinton Avenue West paralleling station site	Underground ducts	2200 m ²	Permanent	Public

Underground duct banks (to install high voltage cables) will be routed from the 3500 Eglinton Avenue West Paralleling Station under Industry Street and Ray Avenue to the gantries located at Ray Avenue. As a result, a total area of approximately 2200m² (i.e., 1000 m² under Industry St. and approximately 1200m² under Ray Avenue) will require permanent easements from the City of Toronto.

During detailed design, further advancements to the OCS design will be made to determine whether the location of OCS portal structures can be refined in such a way that avoids the need for property acquisition/easements. Where this is not possible, Metrolinx will proceed with acquiring property easements in accordance with standard Metrolinx procedures and policies.

6.9.2.2 *Net Effects*

Property acquisition/easements will be avoided where possible. In locations where acquisition/easements cannot be avoided, property easements will be obtained for permanent use of their property in accordance with standard Metrolinx procedures and policies.

6.9.2.3 *Potential Operations and Maintenance Effects and Mitigation Measures*

No adverse effects to property ownership are anticipated in relation to operations/maintenance of the electrified UP Express system.

6.9.2.4 *Net Effects*

There are no net effects to property ownership anticipated in relation to operations/maintenance of the electrified UP Express system.

6.9.2.5 *Potential Construction Effects and Mitigation Measures*

The same potential effects as described in Section 6.9.1.5 above are applicable to Section 2.

6.9.2.6 *Net Effects*

The same net effects as described in Section 6.9.1.6 above are applicable to Section 2.

6.9.3 Section 3 - UP Express Weston Station to Highway 427

6.9.3.1 Potential Footprint Effects and Mitigation Measures

Table 6-5 summarizes the areas within Section 3 where property easements will be required, with further detail provided in the following section.

TABLE 6-5. SUMMARY OF PROPERTY REQUIREMENTS – SECTION 3

Type of Structure(s)	Location	Number/Structure Installation Type	Approximate total area required	Type of easement required	Public/Private property owner
Duct Banks	175 City View Drive Traction Power Substation ¹⁴ site	Underground ducts	400 m ²	Permanent	Public
OCS Structure east of Hydro One corridor on south side	19.592 km, 19.646 km	2 foundations	2.4 m ²	Permanent	Public
OCS Structure east of Highway 27 on south side	19.834 km, 19.873 km	2 foundations	2.4 m ²	Permanent	Public
Islington Avenue Bridge	16+737 km	Attach to bridge with resilient arm/tunnel arms, barrier protection required	N/A	Permanent	Public

With respect to the underground duct banks (to install high voltage cables) that will be routed from the 175 City View Drive traction power substation to the gantries at Highway 27, an area of approximately 400 m² will need to be acquired from the City of Toronto.

At 19.592km and 19.646km, there are two OCS structure foundations that cannot be accommodated within the existing Metrolinx owned rail corridor. Each foundation will require an area of approximately 1.2 m². Therefore, permanent easements totaling approximately 2.4 m² will be required from Hydro One Networks Inc. for installing these foundations.

At 19.834km, 19.873km there are two OCS structure foundations that cannot be accommodated within the existing Metrolinx owned rail corridor. Each foundation will require an area of approximately

¹⁴ The Traction Power Substation is being assessed by Hydro One under the Class EA for Minor Transmission Facilities.

1.2 m². Therefore, permanent easements totaling approximately 2.4m² will be required from the City of Toronto for installing these foundations.

During detailed design, further advancements to the OCS design will be made to determine whether the location of OCS portal structures can be refined in such a way that avoids the need for property acquisition/easements. Where this is not possible, Metrolinx will proceed with acquiring property easements in accordance with standard Metrolinx procedures and policies.

6.9.3.2 *Net Effects*

Property acquisition/easements will be avoided where possible. In locations where acquisition/easements cannot be avoided, property easements will be obtained for permanent use of their property in accordance with standard Metrolinx procedures and policies.

6.9.3.3 *Potential Operations and Maintenance Effects and Mitigation Measures*

No adverse effects to property ownership are anticipated in relation to operations/maintenance of the electrified UP Express system.

6.9.3.4 *Net Effects*

There are no net effects to property ownership anticipated in relation to operations/maintenance of the electrified UP Express system.

6.9.3.5 *Potential Construction Effects and Mitigation Measures*

The same potential effects as described in Section 6.9.1.5 above are applicable to Section 3.

6.9.3.6 *Net Effects*

The same net effects as described in Section 6.9.1.6 above are applicable to Section 3.

6.9.4 Section 4 – Highway 427 to UP Express Pearson Station

6.9.4.1 *Potential Footprint Effects and Mitigation Measures*

There are no property acquisition/easement requirements within Section 4.

6.9.4.2 *Net Effects*

There will be no net effects related to property acquisition within Section 4.

6.10 Air Quality

6.10.1 Air Quality Effects Assessment – Rail Corridor

6.10.1.1 Potential Operations and Maintenance Effects and Mitigation Measures

EMUs are electrically powered and there are no anticipated local contaminant emissions associated with the operation of EMUs. However, there will be indirect regional contaminant and greenhouse gas (GhG) emissions associated with the generation of electricity within the Province of Ontario.

The *Traction Power System Simulations Report (LTK Engineering Services, 2012)* estimated that system wide, UP Express EMUs will consume energy at a rate of 49,911.8 kVAh during a 24-hour period. To estimate regional 24-hour emissions from the operation of the UP Express, average emission rates from the projected Ontario electrical supply mix were multiplied by this estimated electrical energy consumption rate (see Table 6-6 below).

TABLE 6-6 ESTIMATED UP EXPRESS SYSTEM WIDE EMU REGIONAL 24-HR CONTAMINANT EMISSION RATES

Contaminant	Ontario Wide Average Emission Rate* (g/kWh)	UP Express System Wide EMU 24-hour Contaminant Emission Rate (kg/24-hrs)
PM _{2.5}	0.002	0.11
NO ₂	0.030	1.52
SO ₂	0.004	0.22
GhG (CO ₂ e)	32.4	1,618

* Calculated year 2020 values from 2005 Integrated Power Service Plan (IPSP) data and Ontario Power Authority (OPA) Supply Mix Summary for Electricity Production

To identify potential effects, local contaminant emissions from baseline DMU operations during a 24-hour period were also estimated. The operation of EMUs is expected to require 8.9% less energy to operate versus DMUs due to energy savings from regenerative braking. DMUs are also expected to consume 51.5 L diesel per DMU per round trip, with three car consists and 70 round trips per day. Based on these parameters and U.S. EPA Tier 4 non-road diesel emission factors, baseline UP Express system wide local 24-hour contaminant emission rates with DMUs were estimated (see Table 6-7 below).

TABLE 6-7 ESTIMATED UP EXPRESS SYSTEM WIDE DMU LOCAL 24-HR CONTAMINANT EMISSION RATES

Contaminant	UP Express System Wide DMU 24-hour Contaminant Emission Rate (kg/24-hrs)
PM _{2.5}	2.20
NO ₂	190.9
SO ₂	2.27
GhG (CO ₂ e)	32,509

*Emission rates based on data from:
Traction Power System Simulations Report, 2012

A comparison of estimated EMU (Table 6-6) and DMU (Table 6-7) 24-hour contaminant emission rates indicates reductions based on the electrification of the UP Express.

6.10.1.2 Potential Construction Effects

The following provides an overview of the potential air emissions effects during UP Express electrification construction activities along the corridor (e.g., OCS installation, gantry installation) (as outlined in Section 5.13 of this EPR), along with proposed mitigation measures as appropriate.

Air emissions associated with UP Express electrification construction activities (as outlined in Section 5.13 of this EPR) will include dust (including PM_{2.5}) and typical combustion emissions, which include PM_{2.5}, NO₂ and SO₂, from construction equipment. These emissions are expected to be of relatively short duration and are unlikely to have any long term adverse effects on the surrounding area/environment. Furthermore, potential effects related to dust can be mitigated through the use of proper controls, such as:

- periodic watering of unpaved (non-vegetated) areas;
- seed/re-vegetate all exposed soil as soon as possible;
- periodic watering of any stockpiles;
- limiting the speed of construction vehicular travel;
- cover all trucks hauling excess material;
- use of water sprays during the loading, unloading of any aggregate materials;
- sweeping and/or water flushing of the entrances to the construction zones; and
- Install silt fences around site perimeter to prevent dust migration.

6.10.1.3 Net Effects

Air emissions effects on the surrounding area due to construction activities along the corridor will be minimized to the extent possible, and will be temporary in nature.

6.10.2 Air Quality Effects Assessment – Stationary Facilities

There are two paralleling stations proposed as part of the UP Express Electrification project as follows:

- Section 1 – Paralleling Station at Ordnance Street
- Section 2 – Paralleling Station at 3500 Eglinton Avenue West

6.10.2.1 Potential Operations and Maintenance Effects and Mitigation Measures

As previously described in Chapter 5, each paralleling station is comprised of one power transformer (10 MVA), two autotransformers (25 kV each) and a control/switchgear room. There are no sources of atmospheric emissions associated with paralleling station equipment. Accordingly, there are no anticipated contaminant emissions from operation of the paralleling stations.

6.10.2.2 Net Effects

There will be no net adverse air emissions effects during operation of the paralleling stations.

6.10.2.3 Potential Construction Effects and Mitigation Measures

Air emissions associated with paralleling station construction activities (see Chapter 5) include dust (including PM_{2.5}) and typical combustion emissions, which include PM_{2.5}, NO₂ and SO₂, from construction equipment. These emissions are expected to be of relatively short duration and are unlikely to have any long term adverse effects on the surrounding area/environment. Furthermore, potential effects related to dust can be mitigated through the use of proper controls, as outlined in Section 6.10.1.2 above.

6.10.2.4 Net Effects

Air emissions effects on the surrounding area due to construction activities associated with the paralleling stations will be minimized to the extent possible, and will be temporary in nature.

6.10.3 Air Quality Effects Assessment – EMU Maintenance Facility

The following provides a summary of the air emission effects assessment associated with the proposed EMU Maintenance Facility at 50 Resources Road. It is noted that a qualitative approach was applied with respect to establishing potential air emissions effects during operation of the maintenance facility.

6.10.3.1 Sources of Emissions

The proposed EMU Maintenance Facility will operate 24-hours per day and will include the following equipment with emissions to atmosphere:

- Cooling Tower
- Diesel Fired Emergency Generator
- Natural Gas-Fired Trigeneration System
- Natural Gas-Fired Unit Heaters

PM_{2.5}, NO₂ and SO₂ emission rates for the above sources were derived from a combination of manufacturer specifications, U.S. Environmental Protection Agency emission factors and engineering calculations. Calculations and assumptions for emission rate calculations are provided in the Air Quality Assessment Report, as *Appendix D* (see Appendix E).

6.10.3.2 Sensitive Points of Reception

The closest receptors to the Maintenance Facility are residences on Adriatic Road located south of the rail corridor, approximately 80m away. However, the location of maximum impacts is immediately adjacent to the site property line; therefore, compliance was assessed at the location of maximum impacts and at the nearest receptor location.

6.10.3.3 Applicable Criteria

Applicable criteria are outlined in Table 6-8 below.

TABLE 6-8. APPLICABLE CRITERIA

Pollutant	Averaging Period	Ontario AAQC
PM _{2.5}	24 hour	30 µg/m ³ (CWS ¹)
	Annual	10.0 µg/m ³ (CAAQS ²)
NO ₂	1 hour	400 µg/m ³
	24 hour	200 µg/m ³
SO ₂	1 hour	690 µg/m ³
	24 hour	275 µg/m ³
	Annual	55 µg/m ³

Notes: ¹ 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

² Canadian Ambient Air Quality Standard. Standard comes into effect in 2015, to be reduced to 8.8 µg/m³ in 2020.

It should be noted that criteria for emissions from testing of the emergency diesel generator are limited to NO_x (as NO₂) emissions at 1,880 µg/m³ over a half-hour period.

6.10.3.4 Assessment Methodology

The U.S. EPA AERMOD pollutant air dispersion model was used for assessing air quality effects from the proposed Maintenance Facility, with impacts assessed at the property boundary and the nearest

receptor location. Dispersion modeling includes modeling emissions from the proposed EMU Maintenance Facility, with model results added to 90th percentile values from the five most recent years of available monitoring data. Default MOE meteorological data from Pearson Airport was used. Dispersion modelling followed Ministry of the Environment Guideline A-11 Air Dispersion Modelling Guideline for Ontario.

6.10.3.5 Assessment Results

Table 6-9 presents the maximum predicted contaminant concentrations at the property line and at the closest receptor location. The maximum predicted concentrations for all contaminants are below applicable Ontario Ambient Air Quality Criteria (AAQC) criteria, therefore no mitigation measures are recommended.

TABLE 6-9. SUMMARY OF MODEL RESULTS

Contaminant	Total Facility Emission Rate (g/s)	Averaging Period	Background Concentration ($\mu\text{g}/\text{m}^3$)	Maximum Off-Property Concentration (Includes Background) ($\mu\text{g}/\text{m}^3$)	Maximum Concentration at Nearest Receptor (Includes Background) ($\mu\text{g}/\text{m}^3$)	AAQC Limit ($\mu\text{g}/\text{m}^3$)
Nitrogen Oxides (as NO ₂)	0.232 ¹	½-hour	80.8	225 ²	94 ²	1,880
	0.170	1 hour	67.3	140	78	400
		24 hour	56.3	78	59	200
Sulphur Dioxide (SO ₂)	0.001	1 hour	7.7	8.1	7.8	690
		24 hour	6.9	7.0	6.9	275
		annual	3.3	3.3	3.3	55
PM _{2.5}	0.014	24 hour	12.8	22.8	13.7	27 ³
		annual	6.8	7.8	6.8	8.8 ³

Notes:

¹ Site wide emissions including emergency generator (per MOE 4131e - Emergency Generator Checklist)

² 1-hr AERMOD output was multiplied by 1.2 to estimate half-hour averaging period emissions per ADMGO, March 2009

³ Canadian Ambient Air Quality Standard (CAAQS) that comes into effect in 2020

It is noted that the emission inventory and dispersion modelling was conducted on a “maximum effects” basis where all equipment was assumed to be operating simultaneously at their maximum rated capacities under worst case meteorological conditions.

6.10.3.6 Net Effects

No net adverse air emissions effects on the surrounding area due to operation of the EMU maintenance facility are anticipated.

6.10.3.7 Potential Construction Effects and Mitigation Measures

Air emissions associated with EMU maintenance facility construction activities (see Chapter 5) include dust (including PM_{2.5}) and typical combustion emissions, which include PM_{2.5}, NO₂ and SO₂, from construction equipment. These emissions are expected to be of relatively short duration and are unlikely to have any long term adverse effects on the surrounding area/environment. Furthermore, potential effects related to dust can be mitigated through the use of proper controls, as outlined in Section 6.10.1.2 above.

6.10.3.8 Net Effects

Air emissions effects on the surrounding area due to construction activities associated with the EMU maintenance facility will be minimized to the extent possible, and will be temporary in nature.

6.11 Noise

6.11.1 Noise Effects Assessment – Rail Corridor

6.11.1.1 Potential Operations and Maintenance Effects and Mitigation Measures

Background

The UP Express service will commence operations with train sets comprised of Diesel Multiple Unit (DMU) trains. Potential noise impacts attributable to the implementation of the UP Express service operating with DMUs were previously evaluated as part of the Approved *Georgetown South Service Expansion and Union Pearson Rail Link Environmental Assessment, 2009 (GSSE UPRL EA)* completed by Metrolinx, which included the following support studies/reports:

- *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 part of these previous studies, noise mitigation (e.g., noise walls) was recommended and implemented into the design plans. The planned noise mitigation (noise walls) will be in place prior to the conversion from DMU to EMU trains, and are therefore considered part of the base case scenario.

Key Assumptions

The UP Express Electrification EA is assessing the effect of replacing the DMU train sets with equivalent EMU train sets. All other characteristics of the service are projected to remain the same – the trains will operate in the same configuration on the same rail alignment (no new tracks are to be installed as part of the UP Express electrification project). The daily number of trips will not change, nor will the projected train speeds.

The MOEE/GO Transit Draft Protocol (Draft Protocol) requires a comparison between pre-project (i.e., baseline) sound conditions and predicted post-project sound conditions at sensitive receptor locations in order to evaluate the degree of impact attributable to the project under evaluation. Noise effects related to conversion from DMUs to EMUs were assessed using the scale provided in Table 6-10 with predicted impacts of 5 dB or greater (i.e., a "significant" impact) resulting in a requirement to evaluate noise control/mitigation options.

TABLE 6-10 – MOEE/GO TRANSIT DRAFT PROTOCOL NOISE IMPACT RATINGS

Adjusted Impact Level	Impact Rating
0 – 2.99 dB	Insignificant
3 – 4.99 dB	Noticeable
5 – 9.99 dB	Significant
10+ dB	Very Significant

Pre-project sound levels in the UP Express corridor have been described in Chapter 4 of this EPR. Baseline sound levels are generally 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 corridor, and intermittent overhead noise from air traffic utilizing the Billy Bishop and Pearson International Airports.

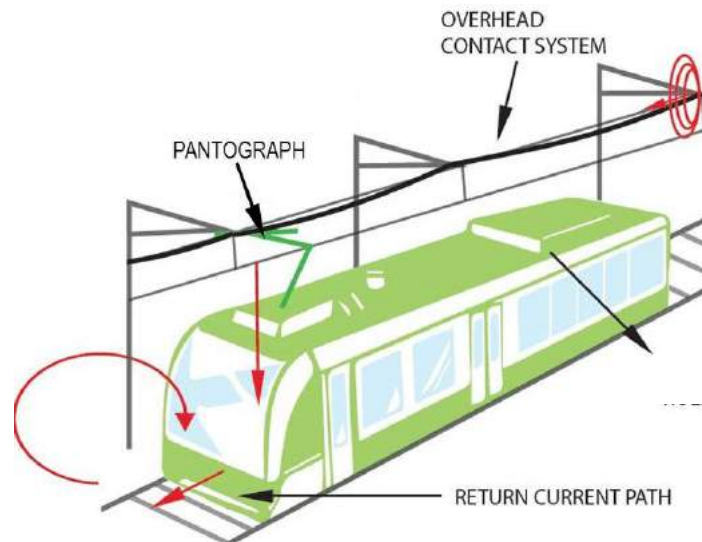
Discussion of Potential Noise Effects

Predictions of post-project sound levels are typically completed through modeling at sensitive points of reception in order to evaluate potential noise impacts in accordance with the Draft Protocol. However, as noted previously, the scope of the UP Express Electrification EA is limited to assessing the potential effect of replacing diesel trains (DMUs) with electric trains (EMUs) while all other characteristics of the service remain the same (i.e., rail alignment, trips per day, speed). With this in mind, the noise assessment for the project is essentially premised on identifying the difference in sound output of the EMU trains versus the DMU trains.

Metrolinx has provided noise specifications to the DMU manufacturer for the design of DMUs which will operate initially along the UP Express corridor. Accordingly, Metrolinx will establish the same or more stringent noise specifications for the EMU train sets. Therefore, for purposes of this noise assessment, noise levels associated with the EMU train are assumed to be equal to (worst case scenario) or lower than the noise levels of the DMU predecessor.

While the noise output of the EMU engine will be equal to or less than the DMU, the EMU will feature a pantograph that connects to the OCS to power the train (see **Figure 6-11**).

FIGURE 6-11 PANTOGRAPH ON ELECTRIC TRAIN



The EMU pantograph represents a noise source due to friction between the pantograph and the OCS wires when the train is in motion. Based on background research, catenary noise has been identified as a potential nuisance effect in high-speed rail (HSR) systems. HSR has been defined by the American Society of Civil Engineers (ASCE) as rail speed greater than 201km/h, a speed much higher than the design speed capacity of the UP Express (i.e., approximately 144km/h). Pantograph noise is composed of aerodynamic noise from the pantograph itself, spark noise caused by contact loss, and sliding noise generated between the contact strips and the overhead contact line (Kurita et. al, 2006). Catenary noise is greatest at high speeds (i.e., greater than 125mph) due to arc discharge noise that occurs due to a chattering phenomenon between the slider and wire (Arai & Yoshito, 1975). At lower speeds (i.e., UP Express), it is anticipated that engine and wheel-rail noise will be the dominant sources of noise.

6.11.1.2 Net Effects

As mentioned, the UP Express Electrification project does not involve construction of new rail lines or increasing traffic on existing rail lines; rather the scope of the project is limited to replacing one technology (DMUs) with another (EMUs) of equal or lesser sound output. Since the noise levels associated with the EMU will be equal to (worst case scenario) or lower than the noise levels of a DMU, and since the noise mitigation measures (barrier walls) required as part of the previous 2009 Georgetown South project will remain in place upon conversion to EMUs, no net adverse noise effects are anticipated by replacing DMUs with EMUs. Therefore, the maximum net impact is considered to be 0 dB, which is "Insignificant" in terms of the *Draft Protocol*, and no further evaluation is required.

6.11.1.3 Potential Construction Effects and Mitigation Measures

The following section provides an overview of the applicable regulatory requirements and guidelines as they relate to noise during construction, followed by a discussion of the potential noise effects associated with the UP Express Electrification project.

NPC-115 Publication: Construction Equipment

The MOE does not currently specify sound level limits for construction activities as a whole (i.e., the cumulative impact of various pieces of construction equipment operating simultaneously). The Ontario Model Municipal By-Law that is referenced in the MOE/GO Transit Draft Protocol for consideration in assessing construction activities includes a section called NPC-115 pertaining to construction equipment (MOE, 1978). This publication outlines sound level limits for various individual pieces of equipment operating in various zone types (quiet and residential zones, which have been adopted by the City of Toronto in the Municipal Code).

The sound level limits for the individual equipment types included in NPC-115 are summarized in Table 6-11. It should be noted that Metrolinx may not use all of the equipment¹⁵ listed in this table; rather it is provided as a complete summary of the limits provided in NPC-115.

The following guidelines were also considered, as applicable:

- MOE Publication NPC-118, “Motorized Conveyances”;
- MOE Publication NPC-207, “Impulse Vibration in Residential Buildings”, November 1983; and

¹⁵ While NPC-115 includes separate criteria for equipment manufactured prior to 1981, sound level limits have only been summarized in this report for equipment manufactured after 1981.

TABLE 6-11 – SOUND LEVEL LIMITS FOR CONSTRUCTION EQUIPMENT (NPC-115)

Equipment	Standard	Measurement Distance (m)	Maximum Sound Level (dBA)
Excavator, Dozer, Loader, Backhoe, Other	Quiet Zone	15	Power Rating <75 kW: 83 dBA Power Rating >75 kW: 85 dBA
	Residential Zone		Power Rating <75 kW: 83 dBA Power Rating >75 kW: 85 dBA
Pneumatic Pavement Breaker	Quiet Zone	7	85 dBA
	Residential Zone		85 dBA
Portable Air Compressor	Quiet Zone	7	70 dBA
	Residential Zone		76 dBA
Tracked Drills	Quiet Zone	15	100 dBA
	Residential Zone		100 dBA

Toronto Municipal Code

In addition to the provincial regulatory requirements outlined above, it is recognized that the Toronto Municipal Code outlines a number of requirements pertaining to noise from construction activities and the operation of stationary sources. Similarly, in 2008, the City of Toronto enacted a by-law that addresses vibration from construction activities, and outlines how potential vibration concerns are to be identified and addressed. The by-law provides vibration limits that are not to be exceeded by any construction activity. Similarly, the City of Mississauga Noise Control By-Law 360-79 also provides guidelines related to construction noise.

Although Metrolinx, as a Provincial Agency, is not subject to municipal by-laws, when developing plans for new or expanded infrastructure, Metrolinx coordinates with municipal staff to ensure that the construction plans meet municipal requirements to the greatest extent possible. Specifically, Metrolinx will engage relevant municipalities (City of Toronto, City of Mississauga) during construction planning to ensure that municipal concerns are addressed as much as possible in the construction plans prior to commencement of construction activities.

Potential Noise Effects During Construction

Construction within the rail corridor will not involve the installation of new rail lines. Therefore, construction activities pertaining to the rail corridor are primarily limited to the installation of the OCS,

including support structures and foundations, wiring, gantry installation, as well as installation of grounding and bonding (as required).

As with typical construction projects for transit infrastructure, it is anticipated that construction associated with the UP Express project will cause sound levels at nearby receptor locations to temporarily increase above ambient conditions. The nature of rail corridor construction activity associated with the UP Express Electrification project is such that installation activities will move along the corridor as construction progresses, and therefore sound impacts at any given receptor will be temporary.

A pair of OCS support structure foundations will be installed approximately 50 - 65m apart along the corridor, with one foundation installed on either side of the corridor. There is potential for temporary noise effects due to OCS foundation installation activities. It also is noted that due to a limited construction window), there is potential for some construction activity to be undertaken during night time hours. The need for night time construction will be further reviewed during detailed design through development of more detailed construction plans. Currently, it is anticipated that night time construction activity will involve installation of OCS support structures, which will entail foundation installation and then utilizing a track crane to lift and position the pre-assembled structures along the corridor. These installations will take place at the foundation locations (i.e., every 50-65m), and is not anticipated to be a significant source of noise given the fact that activities will be limited to hoisting the pre-assembled structures. It is also noted that installation of the OCS wiring is not anticipated to be a significant source of noise, and is typically completed by progressing along the corridor using a vehicle wiring unit.

Three sets of gantries will also be installed on either side of the tracks in the vicinity of both paralleling stations (Ordinance St. and 3500 Eglinton Avenue West), and new Traction Power Substation (175 City View Drive). Construction activities associated with installing gantries are anticipated to include the following:

- Install concrete pads and gantry foundations;
- Heavy trucks will transport the gantry structure pieces to the site;
- Assembly of the main and strain gantries will be done on site within the rail corridor where possible and
- High voltage cables (routed in underground duct banks) will be connected to the main gantry.

As previously mentioned, noise mitigation measures (barrier walls) required as part of the previous GSSE-UPRL project will remain in place, and will therefore be in place during construction of the infrastructure supporting the electrification project. These noise walls will assist in reducing construction noise impacts for many receptors along the corridor, for construction activities occurring within the rail corridor.

Notwithstanding this, in order to further minimize potential sound impacts at nearby receptors, the following mitigation measures will be implemented:

- Metrolinx will engage relevant municipalities (City of Toronto, City of Mississauga) during construction planning to ensure that municipal concerns are addressed as much as possible in the construction plans prior to commencement of construction activities.
- For work that is to occur outside of regular hours, the Contractor will be responsible for identifying the implications of noise generated, and to make construction work plans available to Metrolinx, in advance, for its review;
- For work that has a high potential for noise impacts, the Contractor will be responsible for identifying the implications of the noise generated, and to make construction work plans available to Metrolinx, in advance, for its review;
- Contracts shall include explicit indication that all construction equipment used on the project is to meet the sound level criteria from NPC-115 and be well maintained and operating with effective muffling devices that are in good working order;
- The separation distance between construction staging areas and nearby sensitive receptors is to be maximized to the extent possible to reduce noise impacts;
- Any temporary roads for construction vehicle access are to be well maintained and free of pot-holes and ruts to avoid excessive noise from heavy vehicles travelling on uneven surfaces;
- Metrolinx Community Relations staff will communicate construction work and respond to inquiries from residents
- A Communications Protocol is to be established by Metrolinx for receiving, investigating and addressing construction noise inquiries from the public
- Upon receipt of a noise complaint, the Contractor will investigate (as required) to verify whether the established noise mitigation measures have been implemented appropriately, including verification of construction equipment sound levels per NPC-115
- In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be considered by Metrolinx. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives.

6.11.1.4 Net Effects

Since noise walls will be in place along the rail corridor prior to commencement of construction activities, and based on implementation of the mitigation measures described above, sound levels at nearby receptor locations due to construction activity along the corridor will be minimized to the extent possible, and will be temporary in nature. In addition, Metrolinx will ensure that relevant municipalities (City of Toronto, City of Mississauga) are engaged during the subsequent detailed design phase to ensure that municipal concerns are addressed in the construction plans prior to commencement of construction activities.

6.11.2 Noise Effects Assessment – Stationary Facilities

There are two paralleling stations proposed as part of the UP Express Electrification project as follows:

- Section 1 – Paralleling Station at Ordnance Street
- Section 2 – Paralleling Station at 3500 Eglinton Avenue West

These paralleling stations are considered to be stationary noise sources for the purposes of this noise impact assessment. As a result, the following section describes the potential noise effect related to operation of these particular facilities.

MOE Publication NPC-300: Stationary Sources

The MOE has outlined a procedure for evaluating noise from stationary sources in its publication NPC-300 *Environmental Noise Guideline* (MOE, 2013). The sound level limits for stationary sources in this document apply to the proposed paralleling stations.

The sound level limits for stationary sources vary depending on the degree of urban development in the area of application. NPC-300 outlines the sound level limits for urban areas, which are of relevance to the UP Express Electrification project. Two classes of urban areas are defined by the MOE, however the points of reception in the vicinity of the stationary sources associated with this project are considered to be located in Class 1 Areas:

Class 1 Area: *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".*

The sound level limits from NPC-300 for Class 1 areas are summarized in Table 6-12.

TABLE 6-12 – EXCLUSION LIMIT VALUES OF ONE-HOUR EQUIVALENT SOUND LEVEL (LEQ, DBA) (NPC-300) – CLASS 1 AREAS

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

6.11.2.1 Potential Operations and Maintenance Effects – Paralleling Station (Ordnance Street)

A paralleling station is to be located on a property at Ordnance Street where the Kitchener rail corridor and Lakeshore rail corridor converge. The paralleling station is comprised of one autotransformer (10 MVA), two auxiliary transformers and a control / switchgear room located within an approximate 40 m by 25 m footprint.

A paralleling station is to be located on a property adjacent at Ordnance Street where the Kitchener rail corridor and Lakeshore rail corridor converge. The paralleling stations are each comprised of one (1) autotransformer (10 MVA), two (2) auxiliary transformers (~2 MVA) and a control / switchgear room located within an approximate 40 m by 25 m footprint. The sound power level of a typical 10 MVA transformer is approximately 87 dBA (Bies & Hansen, 1997). The MOE outlines a requirement to apply a 5 dB tonal penalty to sources that may exhibit a humming characteristic, and as such is commonly applied to transformers. The resulting sound power level is 92 dBA for the autotransformer. The two auxiliary transformers have been considered to be insignificant in this assessment, due to the difference in rating compared to the main autotransformer. Based on information provided by the design consultant for Metrolinx, the auxiliary transformers would each be expected to have a sound power level of approximately 75 dBA (including the tonal penalty). In general, when sources differ in sound level by greater than 10 dB, the source with the lower sound level is considered insignificant relative to the louder source.

As the predicted sound level attributable to the Paralleling Station at the nearest sensitive receptor is well below the most stringent MOE criteria, the operation of the paralleling station is not anticipated to have adverse noise effects.

6.11.2.2 Net Effects

No net adverse noise effects are anticipated in relation to operation of the paralleling station at Ordnance St.

6.11.2.3 Potential Construction Effects and Mitigation Measures – Paralleling Station (Ordnance Street)

The construction activities for the paralleling stations are expected to be comparable to a typical small-scale urban development project. Despite the temporary nature of these activities, construction may still be considered a source of annoyance, particularly if work occurs outside of normal weekday construction periods when ambient sound levels are the lowest. Construction activities associated with the paralleling stations were summarized in Section 5.13 of this EPR.

In order to minimize potential sound impacts at nearby receptors during construction of the paralleling stations, it is recommended that the mitigation measures as outlined in Section 6.11.1.3 be implemented.

6.11.2.4 Net Effects

Based on implementation of the mitigation measures described above, sound levels at nearby receptor locations due to construction activity at the paralleling station site will be minimized to the extent possible, and will be temporary in nature.

6.11.2.5 Potential Operations and Maintenance Effects and Mitigation Measures – Paralleling Station (3500 Eglinton Avenue West)

A paralleling station is proposed to be located on a property at 3500 Eglinton Avenue West. The paralleling station will be comprised of one autotransformer (10 MVA), two auxiliary transformers and a control/switchgear room located within an approximate 40m x 25m footprint.

The paralleling stations are each comprised of one (1) autotransformer (10 MVA), two (2) auxiliary transformers (~2 MVA) and a control / switchgear room located within an approximate 40 m by 25 m footprint. The sound power level of a typical 10 MVA transformer is approximately 87 dBA (Bies & Hansen, 1997). The MOE outlines a requirement to apply a 5 dB tonal penalty to sources that may exhibit a humming characteristic, and as such is commonly applied to transformers. The resulting sound power level is 92 dBA for the autotransformer. The two auxiliary transformers have been considered to be insignificant in this assessment, due to the difference in rating compared to the main autotransformer. Based on information provided by the design consultant for Metrolinx, the auxiliary transformers would each be expected to have a sound power level of approximately 75 dBA (including the tonal penalty). In general, when sources differ in sound level by greater than 10 dB, the source with the lower sound level is considered insignificant relative to the louder source.

As the predicted sound level attributable to the paralleling station at the nearest sensitive receptor is well below the most stringent MOE criteria, the operation of the paralleling station is not anticipated to have a net adverse noise effect.

6.11.2.6 Net Effects

No net adverse noise effects are anticipated in relation to operation of the paralleling station at 3500 Eglinton Avenue West.

6.11.2.7 Potential Construction Effects and Mitigation Measures - Paralleling Station (3500 Eglinton Avenue West)

The potential construction related noise effects as described in Section 6.11.2.3 above are also applicable to the Paralleling Station at 3500 Eglinton Avenue West.

6.11.2.8 Net Effects

Based on implementation of the mitigation measures described in Section 6.11.1.3 above, sound levels at nearby receptor locations due to construction activity at the paralleling station site will be minimized to the extent possible, and will be temporary in nature.

6.11.3 Noise Effects Assessment – Traction Power Distribution Components (175 CityView Drive)

The traction power distribution components at the proposed 175 City View Drive traction power substation¹⁶ are limited to installation of gantries within the rail corridor ROW (as discussed above) as well as underground duct banks that will extend from the new TPS to the gantries. There are no operational effects associated with the high voltage cables to be installed in the underground duct banks, therefore the discussion of potential effects is limited to construction impacts as described below.

6.11.3.1 Potential Construction Effects and Mitigation Measures

With this in mind, as previously described in Section 5.13 of this EPR the following construction activities will be required in order to install the underground duct banks:

Installation of Underground duct banks

- Excavate soil (approximately 4m wide, 1m depth) via open cut method
- Install high voltage cables (25 kV feeders) within duct banks
- Connect high voltage cables to the main gantry
- Backfill as per design

¹⁶ The new Traction Power Substation is being assessed by Hydro One as part of the Class EA for Minor Transmission Facilities.

In order to minimize potential sound impacts at nearby receptors during construction of the duct banks at City View Drive, it is recommended that the mitigation measures as outlined in Section 6.11.1.3 be implemented, as applicable.

6.11.3.2 *Net Effects*

Based on implementation of the mitigation measures described above, sound levels at nearby receptor locations due to construction activity associated with duct bank installation at the City View Drive site will be minimized to the extent possible, and will be temporary in nature.

6.11.4 Noise Effects Assessment – EMU Maintenance Facility

6.11.4.1 *Potential Operations and Maintenance Effects and Mitigation Measures*

According to NPC-300, stationary sources such as "*storage, maintenance and repair facilities*" are subject to the requirements of the guideline, therefore the maintenance facility has been evaluated in accordance with the requirements of NPC-300 (MOE, 2013). The EMU Maintenance Facility will be operational 24 hours per day, and the maximum operations will occur during night-time hours when the UP Express service is closed (i.e., between 1:00 am and 4:00 am), as this provides a window of time to complete daily maintenance on the EMU train sets.

It is noted that a qualitative modeling approach was carried out for assessing the potential noise effects related to the proposed EMU Maintenance Facility.

EMU Maintenance Facility Noise Sources

Based on review of the Resources Rd. Maintenance Facility Conceptual Design Report, September 2013, noise sources were identified as follows for purposes of this assessment:

- 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
- Trigenation system (with enclosure).

Sound level data for the above sources were derived primarily from manufacturer specifications, or from sound level measurement data compiled as part of previous assessments/projects. The sound data for

on-site truck movements were referenced from literature, and the sound data used to account for the on-site rail movements is described in detail in Appendix A of the UP Express Electrification Noise and Vibration Assessment Report, February 2014 (see **Appendix F**). The sound levels for all sources included in the model are summarized in Appendix B of the UP Express Electrification Noise and Vibration Assessment Report, February 2014 (see **Appendix F**).

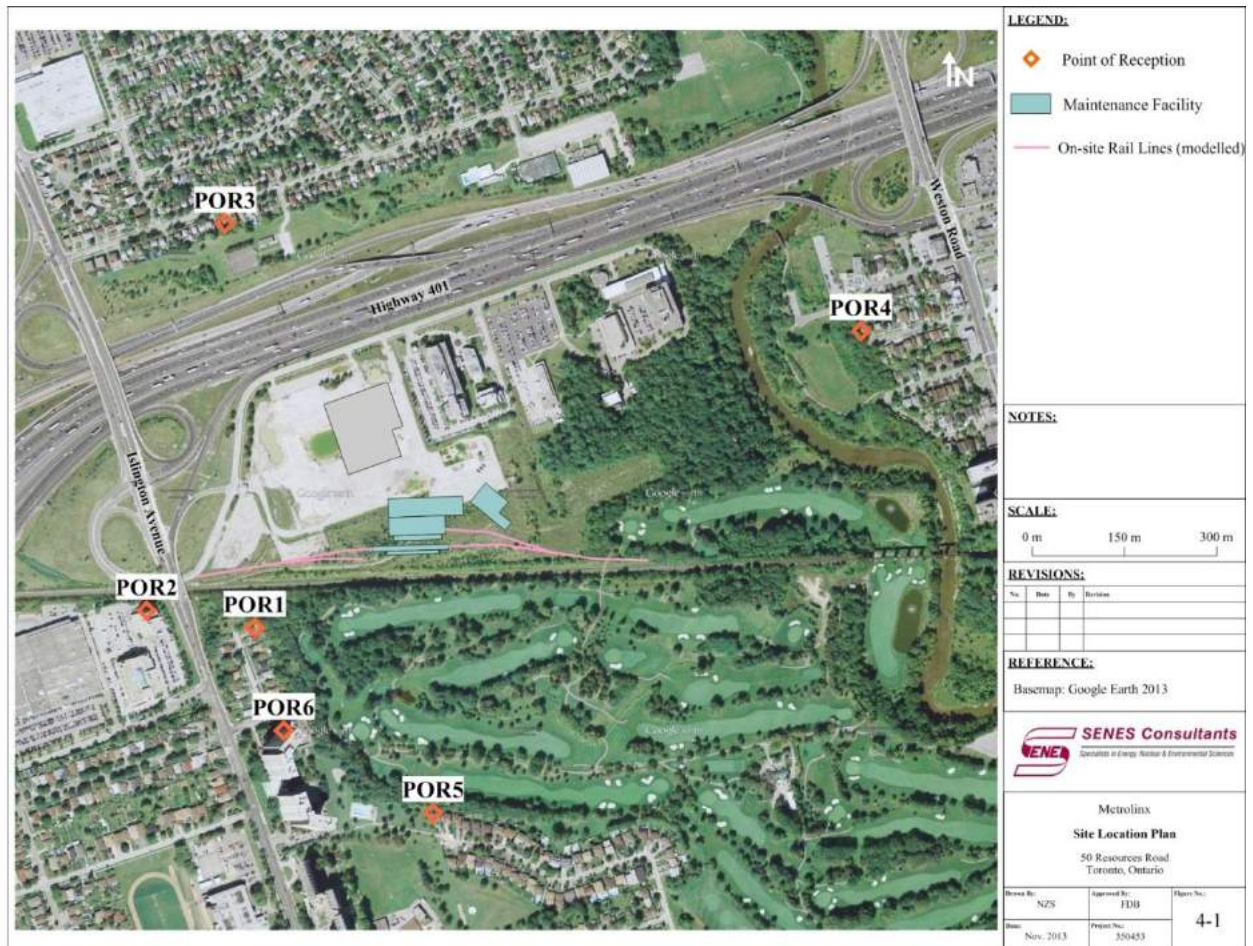
Sensitive Points of Reception

A total of six points of reception have been identified as being representative of the most sensitive receptors in the vicinity of the MF. As per NPC-300, a *Point of Reception (POR)* means "any location on a noise sensitive land use where noise from a stationary source is received." NPC-300 provides sound level criteria both in terms of outdoor locations and plane of window locations, therefore the noise sensitive land uses in this assessment include up to two points of reception. The PORs included in this assessment are summarized in Table 6-13 and are shown in Figure 6-12.

TABLE 6-13 – NEAREST SENSITIVE POINTS OF RECEPTION TO MF

Receptor ID	Receptor Type	Receptor Location	Direction from MF	Distance to MF Property (m)
POR1	House	Adriatic Road	South-west	80
POR2	Hotel	Islington Avenue	West	115
POR3	House	Allenby Road	North	470
POR4	House	Maple Bush Avenue	East	630
POR5	House	Golfwood Heights	South	415
POR6	Apartment	Islington Avenue	South	260

FIGURE 6-12 POINTS OF RECEPTION –EMU MAINTENANCE FACILITY



Applicable Sound Level Criteria

The MOE provides default minimum sound level criteria that are to be applied at a Point of Reception (POR) for assessment purposes, unless actual background conditions are established through modelling or monitoring using approaches acceptable to the MOE. If background conditions are established, the higher of the actual background or the MOE default limits are applied as the sound level criteria at the applicable receptor. The sound level limits vary by time of day.

Background sound level monitoring was completed at two of the PORs included in this assessment (POR1 and POR2) through the previous studies (as listed in Section 6.11.1.1) completed as part of the GSSE-UPRL project. Hourly L_{eq} sound levels were measured at these locations continuously for at least three (3) weeks, and the datasets were reduced based on meteorological conditions during the measurement programs. The minimum one-hour sound level was determined from each final data set for application as the sound level criteria for these PORs. The minimum one-hour background sound levels at the upper story of POR6 were predicted based on traffic modelling in STAMSON, using hourly traffic data for Highway 401 obtained from the Ontario Ministry of Transportation (MTO). The MOE default minimum criteria were applied to the remaining PORs included in the assessment. The assessment criteria are summarized in Table 6-14. It is noted that there is no outdoor point of reception included for POR2, as NPC-300 outlines that outdoor points of reception are not required for "*noise sensitive commercial purpose*" properties (e.g., hotels).

TABLE 6-14 APPLICABLE SOUND LEVEL CRITERIA FOR MAINTENANCE FACILITY

Time of Day	Point of Reception					
	POR1 ¹	POR2 ²	POR3 ³	POR4 ³	POR4 ³	POR6 ⁴
<i>Outdoor Points of Reception</i>						
Day [07:00-19:00]	53.8	N/A	50	50	50	50
Evening [19:00-23:00]	52.5	N/A	50	50	50	50
<i>Plane of Window of Noise Sensitive Spaces</i>						
Day [07:00-19:00]	53.8	56.8	50	50	50	67.2
Evening [19:00-23:00]	52.5	56.1	50	50	50	66.9
Night [23:00-07:00]	49.4	50.9	45	45	45	61.5
NOTE: 1 – sound level limits based upon continuous sound level monitoring completed by Valcoustics 2 – sound level limits based upon continuous sound level monitoring completed by AECOM 3 – sound level limits based upon MOE default minimum values 4 – outdoor point of reception sound level limits based on MOE default minimum values; plane of window sound level limits based upon road traffic modelling in STAMSON						

It is noted that the sound level limits applicable to the testing of the emergency generator are 5 dB higher than those shown in Table 6-14, per NPC-300.

Assessment Methodology

The sound levels were used as inputs for sound level prediction calculations at the nearest sensitive receptors. The calculations were performed using prediction software consistent with the ISO 9613-2 standard.

Assessment Results

As noted previously, the maximum operating condition for the EMU maintenance facility is anticipated to occur at night when daily maintenance is completed on the UP Express trains during the off-hours for the service. It has been assumed that all other regular site operations (e.g., regular maintenance, washing activities, etc.) may also occur on-site during this time period. As such, a single maximum one-hour operations scenario was assessed, consisting of the operation of all noise sources as noted above (with the exception of the emergency generator, assessed separately) and applied to all times of day. The testing of the emergency generator was evaluated separately per NPC-300, and was compared to daytime criteria only, as testing will only take place during daytime hours. The results of the assessment

are summarized in detail in the UP Express Electrification Noise and Vibration Assessment Report, February 2014 (see **Appendix F**).

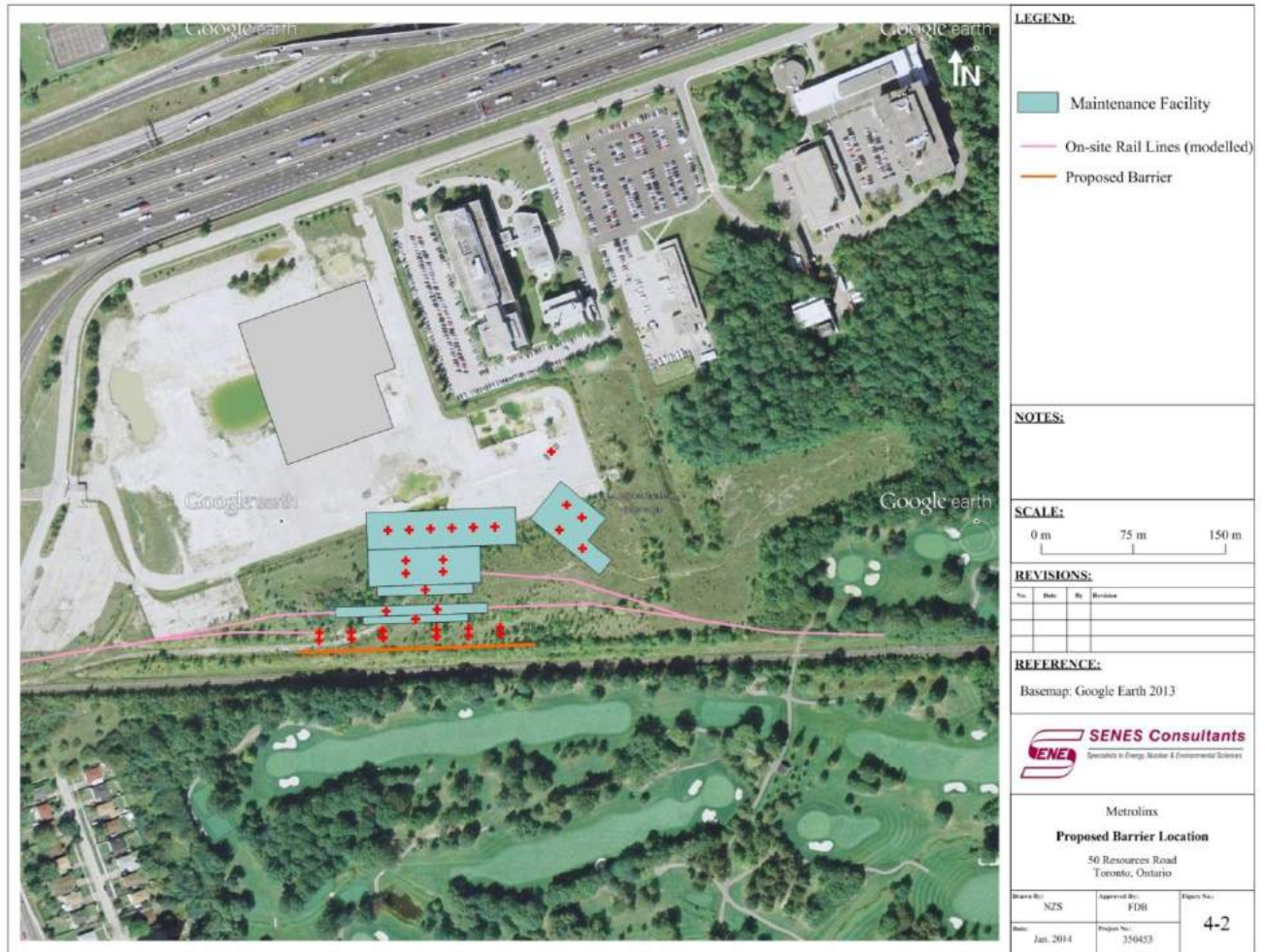
With the exception of the assessment results for regular operations (Plane of Window Points of Reception), it was determined that compliance with sound level limits per NPC-300 would be achieved at all identified PORs.

As shown in Table 6-15, mitigation is required to comply with the sound level limit at POR5. The acoustic model indicates that the idling engines on the storage track are the dominant sources of noise at this location. Therefore, a 5 m noise barrier adjacent to the storage track is proposed on the south side of the proposed maintenance facility, as depicted in Figure 6-13.

TABLE 6-15. ASSESSMENT RESULTS (PLANE OF WINDOW POINTS OF RECEPTION) – REGULAR OPERATIONS

Receptor	Period	Prediction Result (L_{eq} , 1-hr; dBA)	Criteria (L_{eq} , 1-hr; dBA)	Compliance with NPC-300
POR1	Day	49.4	53.8	Yes
	Evening	49.4	52.5	Yes
	Night	49.4	49.4	Yes
POR2	Day	49.9	56.8	Yes
	Evening	49.9	56.1	Yes
	Night	49.9	50.9	Yes
POR3	Day	42.7	50	Yes
	Evening	42.7	50	Yes
	Night	42.7	45	Yes
POR4	Day	40.3	50	Yes
	Evening	40.3	50	Yes
	Night	40.3	45	Yes
POR5	Day	46.1	50	Yes
	Evening	46.1	50	Yes
	Night	46.1	45	No
POR6	Day	49.7	67.2	Yes
	Evening	49.7	66.9	Yes
	Night	49.7	61.5	Yes

FIGURE 6-13 PROPOSED BARRIER LOCATION

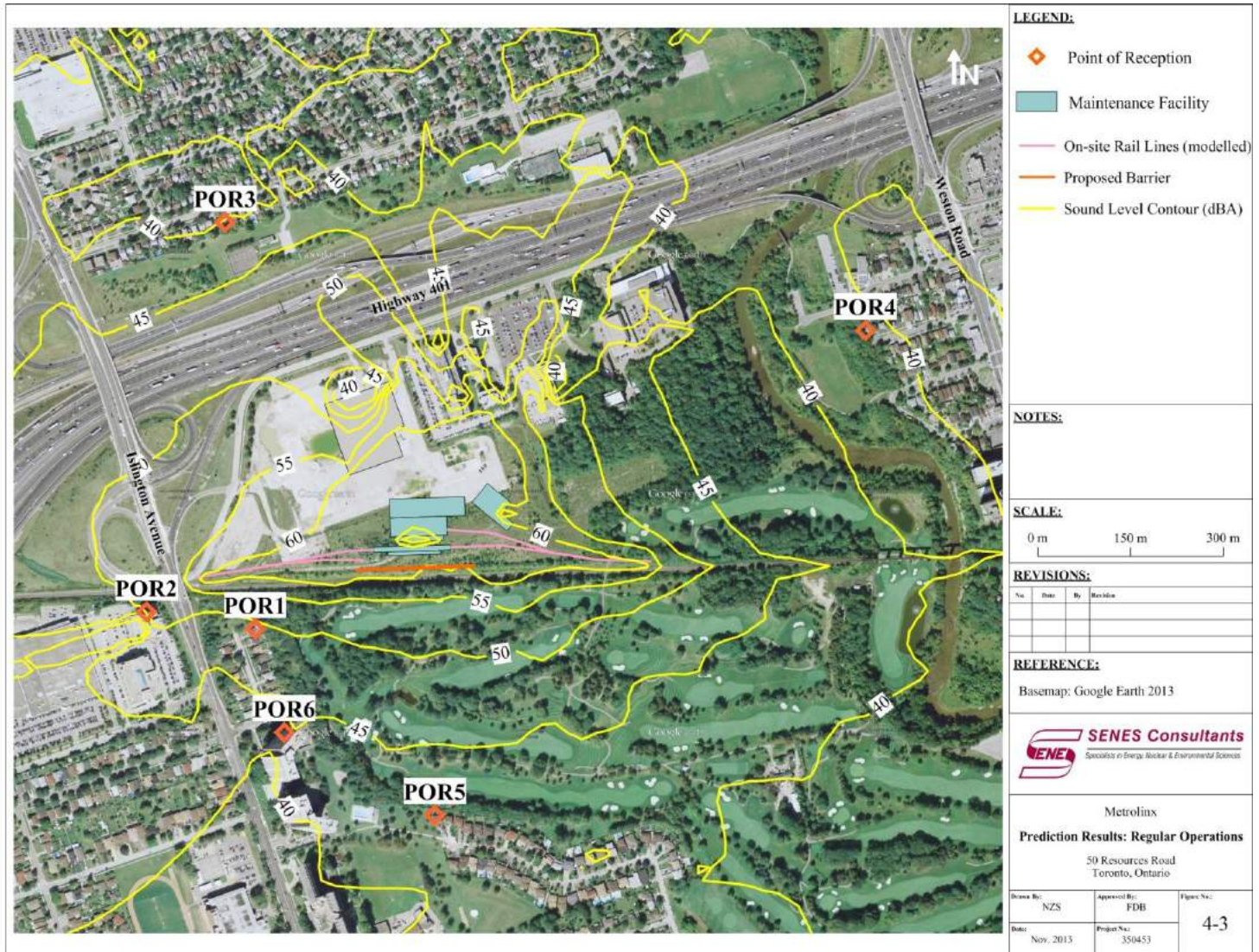


Compliance is predicted at all receptors with the proposed barrier in place (see Appendix F - UP Express Electrification Noise and Vibration Assessment Report, February 2014 for further detail). Contour plots depicting the sound propagation from the site are provided in Figure 6-14. In addition, the specific revised receptor sound levels under regular operations (plane of window POR) with this barrier in place are summarized in Table 6-16.

**TABLE 6-16. ASSESSMENT RESULTS (PLANE OF WINDOW POINTS OF RECEPTION) –
REGULAR OPERATIONS (WITH MITIGATION)**

Receptor	Period	Prediction Result (L_{eq} , 1-hr; dBA)	Criteria (L_{eq} , 1-hr; dBA)	Compliance
POR1	Day	49.1	53.8	Yes
	Evening	49.1	52.5	Yes
	Night	49.1	49.4	Yes
POR2	Day	49.9	56.8	Yes
	Evening	49.9	56.1	Yes
	Night	49.9	50.9	Yes
POR3	Day	42.8	50	Yes
	Evening	42.8	50	Yes
	Night	42.8	45	Yes
POR4	Day	40.3	50	Yes
	Evening	40.3	50	Yes
	Night	40.3	45	Yes
POR5	Day	43.1	50	Yes
	Evening	43.1	50	Yes
	Night	43.1	45	Yes
POR6	Day	49.7	67.2	Yes
	Evening	49.7	66.9	Yes
	Night	49.7	61.5	Yes

FIGURE 6-14 PREDICTION RESULTS: REGULAR OPERATIONS (WITH MITIGATION)



6.11.4.2 Net Effects

Based on implementation of the 5m noise barrier as described above, compliance with sound level limits per NPC-300 will be achieved at all identified PORs during operation of the EMU Maintenance Facility.

Monitoring

It is recommended that the results of the noise modeling assessment carried out as part of the EA for the EMU Maintenance Facility be verified based on the subsequent Preliminary Design to be undertaken for the facility, in order to confirm that no additional noise mitigation measures are required in to achieve compliance with NPC-300.

6.11.4.3 Potential Construction Effects and Mitigation Measures

The construction activities for the EMU Maintenance Facility are expected to be comparable to a typical small-scale urban development project. Despite the temporary nature of these activities, construction may still be considered a source of annoyance, particularly if work occurs outside of normal weekday construction periods when ambient sound levels are the lowest. Construction activities associated with the EMU Maintenance Facility are summarized as follows:

Site Preparation and Construction:

- Clear site
- Site grading
- Remove contaminated soil, if required
- Install building foundations
- Construct the buildings and shops
- Rail and track construction
- Install security fence
- Installation of grounding and bonding of maintenance facility buildings and electrified tracks
- OCS installation at maintenance facility

Access to the Resources Road site will be via a new road (Lowe's Place road) constructed between the Lowes retail store and the MF site (via the east end of the new Lowe's Place road). Construction activities related to the EMU Maintenance Facility are anticipated to occur during daytime hours, however this will be confirmed as part of the more detailed construction plans to be developed during the detailed design phase.

In order to minimize potential sound impacts at nearby receptors during construction of the EMU Maintenance Facility, it is recommended that the mitigation measures as outlined in Section 6.11.1.3 be implemented.

6.11.4.4 Net Effects

Based on implementation of the mitigation measures described above, sound levels at nearby receptor locations due to construction activity at the EMU Maintenance Facility site will be minimized to the extent possible, and will be temporary in nature.

Monitoring

In the presence of persistent noise complaints, Metrolinx will consider undertaking confirmatory monitoring. In addition, noise monitoring may be required during the construction phase in the event that complaints are received in order to confirm that the construction equipment sound levels meet the criteria from MOE publication NPC-115.

Further, it is recommended that the results of the noise modeling assessment carried out as part of the EA for the EMU Maintenance Facility be verified based on the subsequent Preliminary Design to be undertaken for the facility, in order to confirm that no additional noise mitigation measures are required in to achieve compliance with NPC-300.

In addition, an Environmental Compliance Approval (ECA) for noise for the EMU maintenance facility will be required from MOE prior to its implementation

6.12 Vibration

6.12.1 Vibration Effects Assessment – Rail Corridor

6.12.1.1 Potential Operations and Maintenance Effects and Mitigation Measures

Background

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 part of these previous studies, vibration mitigation was recommended and implemented into the design plans for the GSSE-URPL project.

Key Assumptions

The scope of the UP Express Electrification EA vibration assessment is limited to assessing the effect of replacing the DMU trains with EMU trains. As previously mentioned in Section 6.11, all other characteristics of the service are projected to remain the same, i.e., the trains will operate in the same configuration on the same rail alignment (no new tracks are being installed as part of the electrification project), the daily number of trips will not change, nor will the projected train speeds.

Discussion of Vibration Effects

The MOEE/GO Transit Draft Protocol requires a comparison between pre-project (i.e., baseline) vibration conditions and predicted post-project vibration conditions at sensitive receptor locations in order to evaluate the degree of impact attributable to the project under evaluation. Should the predicted increase in vibration be 25 per cent or greater, then an evaluation of vibration control options is required.

Pre-project vibration levels in the corridor have been described in Section 4.10 of this EPR. Vibration measurements were conducted along the GO Kitchener corridor in 2009, in support of the GSSE-UPRL EA, as well as via the subsequent *Georgetown South Rail Corridor Expansion – Operational Noise and Vibration Assessment* (AECOM, February 2012). The measurements were conducted at typical setback distances for receptors within each segment, and mitigation measures were identified in the February

2012 report in instances where elevated levels were noted. Specifically, ballast mats were recommended as the preferred mitigation method, where necessary.

Post-project vibration levels are typically predicted at sensitive points of reception in order to complete the evaluation of vibration impacts in accordance with the Draft Protocol. However, as noted previously, the UP Express Electrification EA vibration assessment is evaluating the effect of replacing DMUs with EMUs while all other characteristics of the service remain the same. Therefore, determining the vibration impact of the project is essentially based on identifying the probable difference in the vibration output of EMUs versus the DMUs.

Vibration levels from rail sources are primarily driven by the unsprung mass of the unit under evaluation. Metrolinx will require that the unsprung mass of the new EMUs be no greater than that specified for the DMUs. With this in mind, since the vibration levels associated with the EMU are assumed to be equal to (worst case scenario) or lower than the vibration levels of a DMU, and since the vibration mitigation measures established through the previous GSSE-UPRL EA and (subsequent 2012 study) will remain in place upon conversion to EMUs, no net adverse vibration effects are anticipated due to replacing DMUs with EMUs. As a result, no further evaluation is required by the Draft Protocol, as the maximum net impact is predicted to be 0 per cent.

6.12.1.2 *Net Effects*

As mentioned, the UP Express Electrification project does not involve construction of new rail lines or increasing traffic on existing rail lines; rather the scope of the project is limited to replacing one technology (DMUs) with another (EMUs). Since the vibration levels associated with the EMU will be equal to (worst case scenario) or lower than the noise levels of a DMU, and since the vibration mitigation measures (e.g., ballast mats) required as part of the previous 2009 Georgetown South Project will remain in place upon conversion to EMUs, no net adverse vibration effects are anticipated by replacing DMUs with EMUs. Therefore, the maximum net impact is predicted to be 0 per cent in terms of the *Draft Protocol*, and no further evaluation is required.

6.12.1.3 *Potential Construction Effects and Mitigation Measures*

The following section provides an overview of the applicable regulatory requirements and guidelines as they relate to vibration during construction, followed by a discussion of the potential noise effects associated with the UP Express Electrification project.

Toronto Municipal Code

In addition to MOEE/GO Transit Draft Protocol, it is recognized that the Toronto Municipal Code outlines a number of requirements pertaining to vibration from construction activities and the operation of stationary sources. Similarly, in 2008, the City of Toronto enacted a by-law that addresses vibration from

construction activities, and outlines how potential vibration concerns are to be identified and addressed. The by-law provides vibration limits that are not to be exceeded by any construction activity.

Although Metrolinx, as a Provincial Agency, is not subject to municipal by-laws, when developing plans for new or expanded infrastructure, Metrolinx coordinates with municipal staff to ensure that the construction plans meet municipal requirements to the greatest extent possible. Specifically, Metrolinx will engage relevant municipalities (City of Toronto, City of Mississauga) during construction planning to ensure that municipal concerns are addressed as much as possible in the construction plans prior to commencement of construction activities.

Vibration Effects During Construction

Construction within the rail corridor will not involve the installation of new rail lines. Therefore, as outlined in Section 5.13, construction activities pertaining to the rail corridor are primarily limited to the installation of the OCS, including support structures and foundations, wiring, gantry installation, as well as installation of grounding and bonding (as per grounding and bonding design).

As with typical construction projects for transit infrastructure, the construction associated with the UP Express project may cause vibration levels at nearby receptor locations to temporarily increase above ambient conditions. The nature of rail corridor construction activity associated with the UP Express Electrification project is such that installation activities will move along the corridor as construction progresses, and therefore vibration impacts at any given receptor will be temporary.

A pair of OCS support structure foundations will be installed approximately 50 - 65 m apart along the corridor, with one foundation installed on either side of the corridor. There is potential for temporary vibration effects due to OCS foundation installation activities. It also is noted that due to a limited construction window, there is potential for some construction activity to be undertaken during night time hours. The need for night time construction will be further reviewed during detailed design through development of more detailed construction plans. Currently, it is anticipated that night time construction activity may involve installation of OCS foundations and support structures, which will entail utilizing a track crane to lift and position the pre-assembled structures along the corridor. These installations will take place at the foundation locations (i.e., every 50-65m), and is not anticipated to be a significant source of vibration given the fact that activities will be limited to hoisting the pre-assembled structures. It is also noted that installation of the OCS wiring is not anticipated to be a significant source of vibration, and is typically completed by progressing along the corridor using a vehicle wiring unit.

Three sets of gantries will also be installed on either side of the tracks in the vicinity of both paralleling stations (Ordinance St. and 3500 Eglinton Avenue West), and new Traction Power Substation (175 City View Drive). Construction activities associated with installing gantries are anticipated to include the following:

- Install concrete pads and gantry foundations;
- Heavy trucks will transport the gantry structure pieces to the site;
- Assembly of the main and strain gantries will be done on site within the rail corridor; and
- High voltage cables (routed in underground duct banks) will be connected to the main gantry.

As previously mentioned, vibration mitigation measures (ballast mats) required as part of the previous GSSE-UPRL project will remain in place upon conversion to EMUs, and will therefore be in place during construction of the infrastructure supporting the electrification project. These measures will assist in reducing construction vibration impacts for many receptors along the corridor, for construction activities occurring within the rail corridor.

Notwithstanding this, in order to further minimize potential vibration impacts at nearby receptors, the following mitigation measures will be implemented:

- For work that is to occur outside of regular hours, the Contractor will be responsible for identifying the implications of the vibration generated, and to make construction work plans available to Metrolinx, in advance, for its review;
- For work that has a high potential for vibration impacts (e.g., installation of foundation), the Contractor will be responsible for identifying the implications of the vibration generated, and to make construction work plans available to Metrolinx, in advance, for its review;
- Construction equipment with potential to cause off-site vibrations will be operated as far away from vibration-sensitive sites as possible;
- Where possible, activities that have potential to cause off-site vibrations will be phased such that as few as possible are occurring simultaneously;
- Construction activities that have potential to cause off-site vibration during the night-time hours will be avoided, where possible;
- Metrolinx Community Relations staff will communicate construction work and respond to inquiries from residents
- A Communications Protocol is to be established by Metrolinx for receiving, investigating and addressing construction vibration inquiries from the public,
- The Contract documents shall contain a provision that any initial vibration complaint will trigger verification that the general vibration control measures as agreed to are in effect;
- In the presence of persistent vibration complaints, Metrolinx will consider implementing a measurement program to evaluate the vibration impacts;

- In the presence of persistent complaints and subject to the results of a field investigation, alternative vibration control measures may be considered (as required), where reasonably available. In selecting appropriate vibration control measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives.

Monitoring

As mentioned, in the presence of persistent vibration complaints, Metrolinx will consider undertaking confirmatory monitoring.

6.12.2 Vibration Effects Assessment – Paralleling Stations

6.12.2.1 Potential Operations and Maintenance Effects – Paralleling Stations

The paralleling stations will be comprised of electrical equipment (i.e., autotransformer, auxiliary transformers, control/switchgear room) that does not represent significant sources of vibration. Therefore, a detailed assessment of vibration effects was not required. No potential vibration effects on nearby receptors are anticipated in relation to operation of the paralleling stations.

6.12.2.2 Net Effects

No net adverse effects related to vibration are anticipated due to operation of the paralleling stations.

6.12.2.3 Potential Construction Effects – Paralleling Stations

The construction activities related to the paralleling stations were previously described in Section 6.11.2.3 above.

In order to minimize potential vibration impacts at nearby receptors during construction of the paralleling stations, it is recommended that the mitigation measures as outlined in Section 6.12.1.3 be implemented.

6.12.2.4 Net Effects

Potential adverse effects related to vibration during paralleling station construction activities will be minimized based on implementation of the mitigation measures outlined in Section 6.12.1.3.

6.12.3 Vibration Effects Assessment – Traction Power Distribution Components (175 City View Drive)

As outlined in Section 6.11.3, the traction power distribution components at the proposed 175 City View Drive traction power substation¹⁷ are limited to installation of gantries within the rail corridor (as discussed above) as well as underground duct banks that will extend from the new TPS to the gantries. There are no operational vibration effects associated with the 25kv feeders to be installed in the underground duct banks, or with the gantries, therefore the discussion of potential effects is limited to construction impacts as described below.

6.12.3.1 Potential Construction Effects – Traction Power Distribution Components (175 City View Drive)

There are no potential adverse vibration effects anticipated due to gantry or underground duct bank installation.

6.12.3.2 Net Effects

No net adverse effects related to vibration are anticipated due to installation of gantries or underground duct banks at the City View Drive location.

6.12.4 Vibration Effects Assessment – EMU Maintenance Facility

6.12.4.1 Potential Operations and Maintenance Effects – EMU Maintenance Facility

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).

¹⁷ The new Traction Power Substation is being assessed by Hydro One as part of the Class EA for Minor Transmission Facilities.

The above listed facility components do not represent significant sources of vibration. Therefore, a detailed assessment of vibration effects was not required. No potential vibration effects on nearby receptors are anticipated in relation to operation of the EMU Maintenance Facility.

6.12.4.2 *Net Effects*

No net adverse effects related to vibration are anticipated due to operation of the EMU Maintenance Facility.

6.12.4.3 *Potential Construction Effects – EMU Maintenance Facility*

The construction activities related to the EMU Maintenance Facility were previously described in Section 6.11.3.3 above.

In order to minimize potential vibration impacts at nearby receptors during construction of the EMU Maintenance Facility, it is recommended that the mitigation measures as outlined in Section 6.12.1.3 be implemented.

6.12.4.4 *Net Effects*

Potential adverse effects related to vibration during EMU Maintenance Facility construction activities will be minimized based on implementation of the mitigation measures outlined in Section 6.12.1.3.

6.14 Visual

6.14.1 Methodology

The assessment of potential visual impacts due to the introduction of the UP Express Electrification infrastructure entailed analysis of the key areas of concern, with respect to the potential visual impacts on sensitive viewers and viewer locations (as summarized in Section 4.11 of this EPR).

In general, the visual impacts of the following electrification infrastructure components were considered:

- Views of OCS structures (including planned noise walls¹⁸, as relevant) from viewer inferior and superior positions (*i.e., receptor viewing positions from lower and higher elevations respectively, than the rail lines and OCS structures*);
- Views of OCS structures on bridges;
- View of OCS structures from bridges;
- Visual effects of gantries;
- Visual effects of Paralleling Stations (siting and placement); and
- Visual effects related to sensitive cultural features.

The degree of visual impact was determined by assessing the degree of change in visual quality to affected viewer populations. Following identification of potential visual effects, mitigation measures will be developed to minimize potential effects on viewers/viewer locations.

6.14.1.1 Receptor Considerations

As mentioned, the nature and degree of visual impacts are related to increased visibility of electrification components from sensitive receptor locations. Potential impacts are generally greatest due to the size and visual nature of the electrification components being introduced and where receptors are closest to locations where the new infrastructure will dominate a specific viewshed (*i.e., an area that is visible to the human eye from a fixed vantage point*).

6.14.1.2 Criteria

The following four criteria were applied in order to characterize potential visual impacts within each of the corridor segments:

a) Will the proposed infrastructure have a substantial adverse effect on a scenic vista?

¹⁸ Noise mitigation measures (noise barrier walls) are planned as part of the Metrolinx Georgetown South Project at certain locations along the rail corridor. It is assumed that the proposed noise walls will be in place at the time of implementation of UP Express electrification.

b) Will the proposed infrastructure substantially damage scenic resources, including, but not limited to: trees, rock outcroppings, and historic buildings/bridges?

c) Will the proposed infrastructure substantially degrade the existing visual character or quality of the site and its surroundings?

d) Will the proposed infrastructure create a new source of substantial light or glare which would adversely affect day or night time views in the area?

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

6.14.2.1 Potential Effects and Mitigation Measures

The majority of this section of the rail corridor is sunken (-20m to -10m on average) throughout this highly urbanized section until the corridor rises from the Strachan Avenue underpass to the above grade crossing of the King Street subway. Rail infrastructure and the electrification components will be readily seen from viewer superior pedestrian bridges which traverse the corridor and high-rise structures adjacent the corridor.

The proposed electrification infrastructure (i.e., portals) will be visible from multi-storey development due to the height of the proposed OCS structures, (7.9 to 10 m), however the nature of the existing rail corridor is industrial and non-scenic, therefore the introduction of OCS structures is expected to have minor visual effects on receptors for the majority of this section.

Where portals range from 10-12m in height, these will likely have a greater visual effect in this section. Locations in this section include the CN Tower/Rogers Centre complex, either side of the Bathurst Street bridge and the Strachan grade separation, and where the rail line curves north-west past the Strachan underpass close to King Street subway structure. While the Rogers Centre location will have little visual effect (given the depth of corridor at that location), the other 3 locations of portals (>10m in height) will be visible as the corridor has less depth, or is at, or above grade along the section before King Street.

FIGURE 6-15 CORRIDOR AS VIEWED WEST OF BATHURST STREET BRIDGE



The OCS structures will also pass under the proposed Fort York Pedestrian Bridge and the Strachan Avenue grade separation in this section.

Figure 6-15 above illustrates the corridor as viewed west of the Bathurst Street Bridge (viewpoint- +/- 75m) with portal structures spanning both the Lakeshore and Kitchener corridors. Garrison Common is situated to the left, and the Ordnance Triangle separates the two rail corridors. There is an abundance of mature vegetation along edges of Garrison Common adjacent the corridor, which will provide screening of the new OCS structures.

Proposed noise attenuation barriers begin for half a city block along Douro Street before King Street and are not extensive.

North of King Street the rail corridor (8 rail cross-section with OCS structures)) continues as an elevated corridor. Given the largely industrial land uses, with some low density residential, therefore the introduction of OCS structures pose no significant visual effects.

The Strachan Avenue underpass (currently under construction) and its unique lattice arch structures are such that the future electrification components can be designed into their structural design. On either side of the underpass structure portals will range in height between 8-10m in height above the rail, and will be visible 2m above the underpass on the east end and 1m above the underpass on the west end.

Bridge Structures

Two bridge structures with historical interest are located in this section; the Bathurst Street Bridge and the King Street subway. The OCS will pass under the Bathurst Street Bridge, while the electrification components will be on top of the King Street structure. With respect to the bridge structures, to minimize the visual impact, the proposed portal locations should be placed at the greatest distance between bridge spans to reduce their visibility where feasible.

These structure locations should be reviewed during the detailed design to confirm whether they can be placed further distances from the bridge structures. This will reduce their visibility from pedestrians and motorists traversing under and/or over these bridges.

These two bridges (as well as all bridges along the electrified corridor), will require bridge barrier protection. The City has requested that each barrier be designed to suit the design of individual bridges, (*Memo - H. Maki, Director of Urban Design- March 14, 2014 to Metrolinx*) and be transparent where possible to permit viewing. This will be considered during the detailed design.

Fort York National Historic Site

The Historic Fort York fortress is located adjacent the rail corridor from west of Bathurst Street to the Ordnance triangle, where the Lakeshore, non-electrified line, swings south of the Kitchener corridor. The views of Fort York will be affected by electrification, however these are considered negligible given the industrial character of the rail infrastructure and due to the fact that the interior of the Fort is set at a higher elevation than the sunken rail corridor.

Within the Fort itself, it is surrounded by 4m +/- height rampart walls. There are limited views of the upper portion of four portal structures (10-12m in height) west of the Bathurst Street. The vegetation adjacent the rail corridor and the greater viewing distance (70m, plus) and location of portal structures north of the Fort complex further reduce any potential negative effects. Refer to Figures- 6-16, 6-17 and 6-18.

FIGURE 6-16 VIEW LOOKING NORTH FROM GARRISON COMMON OF THE LAKESHORE LINE AND ORDNANCE TRIANGLE AND THE PROPOSED PARALLELING STATION LOCATION.



FIGURE 6-17 VIEW LOOKING NORTH-EAST FROM FORT YORK RAMPART WALL AND BATHURST STREET BRIDGE



FIGURE 6-18 VIEW LOOKING AT INTERIOR OF FORT FROM FORTIFICATION ENTRANCE.



Paralleling Station (Ordinance Street)

This two storey structure located at the visual focal point of the Ordinance Triangle is proposed to be located east of the future Fort York pedestrian bridge, a proposed City park and high density residential development. The paralleling station is proposed in the vicinity of the eastern terminus of the Triangle.

With respect to recommended mitigation measures to reduce the degree of visual impact, the paralleling station facility will be sited in as low a profile as possible, and the exterior transformers and yard screened. Lighting associated with operation of the Paralleling Station will be carefully controlled to ensure that no further light pollution is introduced.

In addition, dark sky lighting policies (IESNA and PP Standards) will be adhered to with respect to all exterior security lighting (full cut off fixtures) of the station and adjacent transformers (as outlined in the Metrolinx CHAR, January 2014 – see Appendix C).

Strachan Avenue Gantries

There will be a gantry set which will have two support structures, one on either side of the corridor east of Strachan Ave. The gantry proposed to be located on the south side of the corridor east of Strachan Avenue will be located adjacent to a new development planned to the south. Site planning for the redevelopment is underway and the screening of the gantry will be considered at part of the detailed design. The gantry on the north side of the corridor is in a visibly open location and will therefore require screening measures to better integrate the structure into this location. Future redevelopment of the lands adjacent to both gantries will have to be designed to address and effectively screen these two facilities.

There are two locations in this area where the corridor is not wide enough to accommodate the portal structures required to span the tracks. The OCS structure at Sudbury Street and Joe Shuster Way will need to be designed in cooperation with the City of Toronto to minimize the impact in these locations.

Net Effects

With incorporation of the above measures, minor net visual effects are anticipated. The potential visual impacts and recommended mitigation measures are summarized in Table 6-17.

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

**TABLE 6-17 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES – SECTION 1: UP EXPRESS UNION STATION TO UP EXPRESS
BLOOR STATION**

Criteria	OCS Support Structures (Portals)	Gantries	Bridges	Paralleling Station
<i>a) Will the proposed infrastructure have a substantial adverse effect on a scenic vista?</i>	<u>Potential Effects:</u> OCS structures are not expected to have substantial adverse visual effects, given the non-scenic industrial nature of the existing rail corridor. Negative effects will be more pronounced in the areas of 10-12 m ht. OCS structures <u>Mitigation Measures:</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design to identify potential visual enhancements to OCS	<u>Potential Effects:</u> The gantry structures on the north and south side of the corridor at Strachan Ave will have negative visual effects. <u>Mitigation Measures:</u> Screening measures will be considered (during detailed design) to screen views of these structures.	<u>Potential Effects:</u> The bridge structures in this section may be visually affected by the introduction of OCS structures. <u>Mitigation Measures:</u> During detailed design, consider locating OCS structures away from existing bridge structures, where possible, to limit visibility to public viewing areas traversing corridor.	<u>Potential Effects:</u> The paralleling station at Ordance is sufficiently sited and integrated (low storey building) at this location, however there are potential visual effects related to external components. <u>Mitigation Measures:</u> Consider screening to ensure external yard and transformers are hidden.

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

	structures.			
<i>b) Will the proposed infrastructure substantially damage scenic resources, including, but not limited to: trees, rock outcroppings, and historic buildings/bridges?</i>	<u>Potential Effects:</u> The views of Fort York will be affected by electrification, however these are considered negligible given the industrial character of the rail infrastructure and that the interior of the Fort is set at a higher elevation than the sunken rail corridor. Negative effects along the corridor limited to the areas of 10-12 m ht. OCS structures <u>Mitigation Measures:</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design to identify potential visual enhancements to OCS	<u>Potential Effects:</u> Potential visual effects associated with the north and south gantry structures. <u>Mitigation Measures:</u> During detailed design, consideration of screening options as well as innovative site planning of future development to screen these structures.	<u>Potential Effects:</u> Visual effects due to: addition of bridge barrier on Bathurst St. Bridge and OCS structure attachments to King St. Rail Overpass. <u>Mitigation Measures:</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto to: identify potential visual enhancements to bridge barriers and possibility of locating OCS portals further away from King St. overpass.	<u>Potential Effects:</u> The paralleling station may have minor effects on scenic resources. <u>Mitigation Measures:</u> Consider barrier walls to screen exterior yard and transformer.

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

	structures.			
<i>c) Will the proposed infrastructure substantially degrade the existing visual character or quality of the site and its surroundings?</i>	<u>Potential Effects</u> Minor potential visual effects given existing industrial nature of rail corridor. Negative effects along the corridor limited to the areas of 10-12 m ht. OCS structures <u>Mitigation Measures</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design to identify potential visual enhancements to OCS structures.	<u>Potential Effects</u> Negative visual effects are anticipated <u>Mitigation Measures</u> During detailed design, consideration of effective screening and innovative site planning of future redevelopment.	<u>Potential Effects</u> Minor potential visual effects given existing industrial nature of rail corridor. Negative effects along the corridor limited to the areas of 10-12 m ht. OCS structures <u>Mitigation Measures</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design to identify potential visual enhancements to OCS structures.	<u>Potential Effects</u> No potential effects. <u>Mitigation Measures</u> No mitigation measure required.
<i>d) Will the proposed infrastructure create a new source of substantial light or glare which would adversely affect day or night time views in the area?</i>	<u>Potential Effects</u> None. <u>Mitigation Measures</u> No mitigation measures required.	<u>Potential Effects</u> None. <u>Mitigation Measures</u> No mitigation measures required.	<u>Potential Effects</u> None. <u>Mitigation Measures</u> No mitigation measures required.	<u>Potential Effects</u> Since security lighting will be required at the paralleling station, this will represent a new light source that may have minor effects on the Fort York

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

				area at night. <u>Mitigation Measures</u> During detailed design, ensure lighting adheres to 'Dark Sky' policy to reduce impact.
--	--	--	--	---

6.14.2.2 Net Effects

With incorporation of the above listed measures, minor net visual effects are anticipated in Section 1 of the corridor.

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

6.14.3.1 *Potential Effects and Mitigation Measures*

The Bloor Street GO station will be designed to accommodate electrification components, including OCS support structures. Electrification components will be visible to industrial, warehousing and mixed-use areas surrounding the station.

Figure 6-19 (below) illustrates the view from the Wallace Avenue Pedestrian Bridge, (located north of the Bloor Station) illustrates the existing land use, the West Toronto Railpath on the east side of the corridor, and the existing signal bridge (white colour) and the proposed OCS structures.

FIGURE 6-19 VIEW LOOKING NORTH FROM WALLACE ST. PEDESTRIAN BRIDGE WITH PROPOSED OCS STRUCTURES



The sky lining of electrification components will be visible from approach roads on either side of the corridor of the rail overpasses located at DuPont Street, Old Weston Road, St Clair Avenue West, Black Creek Drive, Ray Avenue, and Denison Road East.

Portal structures of 8 m in height are proposed for the area north and south of the Wallace Ave. pedestrian bridge (>1 km. distance) these may have a visual effect on immediate receptors, than the majority of this section.

The West Toronto Diamond Grade Separation has significantly reduced the visibility of the rail corridor and of future OCS structures.

This grade separations are considered positive features with respect to reducing the visual impact of the railway and proposed OCS structures.

A Paralleling Station is proposed for 3500 Eglinton Avenue. The facility footprint is 40m x 25m in size will be located on the brownfield site of the former Kodak complex (pending Eglinton MFS final design).

The location on this property should consider the visual impact and compatibility with the Mount Dennis Mobility Hub, the related Heritage Conservation District and the relationship to Industry Avenue. Associated with this facility are gantries located on either side of the corridor at Ray Avenue. It is noted that noise barriers are also planned at this location. These noise walls are approximately 5m in height while the gantry will be approximately 12m in height. This may pose negative visual effects on the adjacent residential and park area (see Figure 6-20).

The West Toronto Railpath runs parallel to the corridor but this path largely traverses through industrial lands and electrification infrastructure will not pose significant new visual impacts.

6.14.3.2 Net Effects

The incorporation of noise barrier walls at Ray Avenue will reduce visual impact, but there will be a residual effect, given the height of the OCS structures that will be visible above the planned noise walls.

With the exception of this specific adverse impact, the net visual effects within the remainder of this section are considered minor/negligible. Table 6-18 provides a summary of the potential visual impacts and mitigation measures within Section 2.

FIGURE 6-20 VIEW OF PROPOSED RAY AVENUE GANTRIES



**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

TABLE 6-18 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES – SECTION 2: UP EXPRESS BLOOR STATION TO UP EXPRESS WESTON STATION

Criteria	OCS Support Structures (Portals)	Gantries	Bridges	Paralleling Station
a) Will the proposed infrastructure have a substantial adverse effect on a scenic vista?	<u>Potential Effects:</u> The majority of OCS structures in this section of the corridor are not expected to have substantial adverse effects given the industrial nature of the existing rail corridor. <u>Mitigation Measures:</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design to identify potential visual enhancements to OCS structures.	<u>Potential Effects:</u> The gantry structures at Ray Avenue are will have potential adverse effects on nearby residents. <u>Mitigation Measures:</u> During detailed design, consider screening, where feasible, to reduce visual effects of the OCS structures. Look to incorporate the screening into an extension of the noise wall.	<u>Potential Effects:</u> Visual effects due to attachment of OCS structures to: Black Creek Rail Overpass and Eglinton Ave. Rail Overpass. Visual effects due to bridge barriers to be added to: Wallace Ave Pedestrian Bridge/Rogers Road and Jane Street. <u>Mitigation Measures:</u> During detailed design, consider options to locate e OCS structures away from bridges/rail overpasses wherever technically feasible to reduce effects on public viewer areas traversing corridor.	<u>Potential Effects:</u> Potential adverse effects on views of nearby Weston Heritage Conservation District (HCD) due to the introduction of the paralleling station at 3500 Eglinton Avenue West (former Kodak site). Potential effects on the planned Mount Denis Mobility Hub. <u>Mitigation Measures:</u> The location of the paralleling station on this property should consider the visual impact and compatibility with the Mount Dennis Mobility Hub, the related HCD and the relationship to Industry Avenue, in consultation with the City of Toronto during detailed design.

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

				During detailed design, consider options for situating the paralleling station in a location on the site that is screened from existing 'Building 9' (heritage feature) located on the 3500 Eglinton Ave. W. site.
<i>b) Will the proposed infrastructure substantially damage scenic resources, including, but not limited to: trees, rock outcroppings, and historic buildings/bridges?</i>	<u>Potential Effects:</u> There may be minor vegetation removals required in order to install OCS structures. <u>Mitigation Measures:</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design to investigate avoidance of minor vegetation removals.	<u>Potential Effects:</u> The gantries will adversely affect scenic resources of park and residential areas. <u>Mitigation Measures:</u> During detailed design, consider screening where feasible to reduce visual effects of the OCS structures.	<u>Potential Effects:</u> No visual effects. <u>Mitigation Measures:</u> No mitigation measure required.	<u>Potential Effects:</u> The paralleling station location is to be placed as to minimize impact to the planned Mount Dennis Mobility Hub, the related HCD and the relationship to Industry Avenue, in consultation with the City of Toronto. <u>Mitigation Measures:</u> During detailed design, further review the siting of the paralleling station on the 3500 Eglinton Ave. W. property to ensure it is appropriately screened (to the extent possible) from the Mount Dennis Mobility Hub, the related HCD and

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

				the relationship to Industry Avenue, in consultation with the City of Toronto.
<i>c) Will the proposed infrastructure substantially degrade the existing visual character or quality of the site and its surroundings?</i>	<u>Potential Effects</u> Minor potential visual effects given existing industrial nature of rail corridor. <u>Mitigation Measures</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design to identify potential visual enhancements to OCS structures.	<u>Potential Effects</u> The gantries will adversely affect scenic resources of park and residential areas. <u>Mitigation Measures</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design to identify potential options for screening gantry structures from scenic resource areas.	<u>Potential Effects</u> Minor visual effects. <u>Mitigation Measures</u> No mitigation measure proposed.	<u>Potential Effects</u> Potential adverse visual effects on nearby residents (Ray Ave./Industry St.). <u>Mitigation Measures</u> During detailed design, consideration of screening options by Metrolinx's Design Review Panel in coordination with the City of Toronto.
<i>d) Will the proposed infrastructure create a new source of substantial light or glare which would adversely affect day or night time views in the area?</i>	<u>Potential Effects</u> None. <u>Mitigation Measures</u> No mitigation measure required.	<u>Potential Effects</u> None. <u>Mitigation Measures</u> No mitigation measure required.	<u>Potential Effects</u> None. <u>Mitigation Measures</u> No mitigation measure required.	<u>Potential Effects</u> Since security lighting will be required at the paralleling station, this will represent a new light source that may have minor effects on the surrounding area.

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

				<u>Mitigation Measures</u> During detailed design, lighting for the paralleling station should be sensitively designed due to historic and adjacent land use surroundings.
--	--	--	--	---

6.14.4 Section 3 – UP Express Weston Station to Highway 427

6.14.4.1 Potential Effects and Mitigation Measures

Electrification components will be visible to industrial, warehousing and mixed-use areas surrounding the station in this section of the corridor. The Weston tunnel initiatives have significantly reduced the visibility of the rail corridor and better connect the Weston community on either side of the railway corridor. Portal structures of 10-12 m in height are proposed for the primarily residential area north of the Weston tunnel, these will have greater negative visual effects than the majority of this section with 7.9-10 m ht. Structures.

The introduction of electrification on the existing Weston Heritage Conservation Districts (HCDs) (Phases 1 and 2) is not considered significant, as these HCDs are typically set back and located on either side of the sunken/covered corridor.

This section of the rail corridor traverses a predominantly residential area to Weston Road with the scattering of some commercial / industrial lands. The Humber River Valley (and the Weston Golf and Country Club) constitute the most significant scenic and natural area of the entire UP Express corridor. The Humber River Bridge traverses the broad Humber River Valley. The portals will be visible along the top of the bridge structure from a number of locations in the valley. These are not considered significant given the greater viewing distances to receptors and height, as well as the extensive recent changes to the original bridge foundation design (related to the Georgetown South project).

The EMU Maintenance Facility which is proposed at 50 Resources Road is considered to be appropriately located with respect to the visual receptors. The site is well screened from the south by the railway's earthen berm and the elevated Humber River Bridge and its elevated embankments. Views from both the Weston Golf and Country Club and the residential enclave south of the Islington interchange are screened. The Maintenance facility will be visible from Highway 401, and the Islington/401 interchange, however any negative effects due to the EMU facility will be negligible due to the high volume and high speed of traffic characteristic of the Highway 401 corridor.

Views from the residential area north of the 401 are from a greater viewer distance and largely screened by existing vegetation and the view is dominated by the visibility of the extensive transportation network associated with the Highway 401 corridor.

Woodbine Racetrack

Electrification components will be visible from the Woodbine Racetrack property in those areas adjacent to the rail corridor. The Grandstand however, is located greater than 950 m viewing distance; therefore views of the OCS structures are considered negligible to the majority of patrons.

Table 6-19 provides a summary of the potential impacts and mitigation measures.

6.14.4.2 *Net Effects*

With incorporation of the mitigation measures, net effects are considered minor in this section of the corridor.

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

TABLE 6-19 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES – SECTION 3: UP EXPRESS WESTON STATION TO HWY 427

Criteria	OCS Support Structures (Portals)	Gantries	Bridges	Emu Maintenance Facility
a) Will the proposed infrastructure have a substantial adverse effect on a scenic vista?	<u>Potential Effects:</u> The majority of OCS structures in this section of the corridor are not expected to have substantial adverse effects given the industrial nature of the existing rail corridor. Negative effects will be more pronounced in the areas of 10-12 m ht. OCS structures. The Humber River Bridge has distant long-range views of OCS structures which will result in limited visual effects. In addition, since the Humber River bridge is not a pedestrian bridge, views are limited to the distant views.	<u>Potential Effects:</u> None. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> The majority of bridge structures in this section of the corridor are located in extensive transportation and industrial park networks. No adverse effects anticipated. <u>Humber River Bridge</u> Negligible adverse effects on view of Humber River Bridge considering the viewing distances from receptors. <u>Mitigation Measures:</u> No mitigation measures proposed.	<u>Potential Effects:</u> The EMU Maintenance Facility station at Resources Road is well-sited with respect to minimizing visual effects. <u>Enhancement Measures:</u> During detailed design, consider landscaping during to further reduce visual effect.

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

	<u>Mitigation Measures:</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design to identify potential visual enhancements to OCS structures.			
<i>b) Will the proposed infrastructure substantially damage scenic resources, including, but not limited to: trees, rock outcroppings, and historic buildings/bridges?</i>	<u>Potential Effects:</u> Minor potential visual effects. Negative effects will be limited to the areas of 10-12 m ht. OCS structures. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> None. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> No major adverse effects given the nature of the extensive existing bridge transportation network. <u>Humber River Bridge</u> Will have limited visual effects given the viewing distance from receptors. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> The EMU Maintenance Facility will not adversely affect scenic resources. <u>Mitigation Measures:</u> During detailed design, consider landscaping.
<i>c) Will the proposed infrastructure substantially degrade the existing visual character or quality of the site and</i>	<u>Potential Effects</u> Minor potential visual effects Negative effects will be more pronounced in	<u>Potential Effects</u> None. <u>Mitigation Measures</u> No mitigation measure	<u>Potential Effects</u> No major adverse effects given the nature of the extensive existing bridge transportation network.	<u>Potential Effects</u> Negligible effects due to EMU maintenance facility. <u>Mitigation Measures</u>

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

<i>its surroundings?</i>	the areas of 10-12 m ht. OCS structures <u>Mitigation Measures</u> During detailed design, further review of OCS design by Metrolinx's Design Review Panel in coordination with the City of Toronto.	required.	<u>Humber River Bridge</u> Will have limited visual effects given the viewing distance from receptors. <u>Mitigation Measures</u> No mitigation measures required.	Consider landscaping as part of detailed design.
<i>d) Will the proposed infrastructure create a new source of substantial light or glare which would adversely affect day or night time views in the area?</i>	<u>Potential Effects</u> None. <u>Mitigation Measures</u> No mitigation measures required.	<u>Potential Effects</u> None. <u>Mitigation Measures</u> No mitigation measures required.	<u>Potential Effects</u> None. <u>Mitigation Measures</u> No mitigation measures required.	<u>Potential Effects</u> No effects are anticipated given existing lighting levels associated with the surrounding area (Highway 401 corridor). <u>Mitigation Measures</u> No mitigation measures required.

6.14.5 Section 4 - Highway 427 to UP Express Pearson Station**6.14.5.1 *Potential Effects and Mitigation Measures***

The introduction of electrification (OCS support structures) on the elevated portion of the spur link south from Highway 427 to Terminal 1, Pearson Airport will have a negligible visual effect, given the industrial / business park land uses and greater viewing distances of the elevated guideway.

Table 6-20 provides a summary of potential effects and mitigation measures related to Section 4 of the corridor.

6.14.5.2 *Net Effects*

No net adverse effects are anticipated in this section of the corridor.

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

TABLE 6-20 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES – SECTION 4: HIGHWAY 427 TO UP EXPRESS PEARSON STATION

Criteria	OCS Support Structures (Portals)	Gantries	Bridges
<i>a) Will the proposed infrastructure have a substantial adverse effect on a scenic vista?</i>	<u>Potential Effects:</u> The OCS structures will not have substantial adverse visual effects, given the business park and industrial nature of the corridor. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> None. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> The bridge structures in this section of the corridor are located in extensive transportation and industrial network; therefore negligible visual effects are anticipated. <u>Mitigation Measures:</u> No mitigation measures required.
<i>b) Will the proposed infrastructure substantially damage scenic resources, including, but not limited to: trees, rock outcroppings, and historic buildings/bridges?</i>	<u>Potential Effects:</u> None. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> None. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> None. <u>Mitigation Measures:</u> No mitigation measures required.
<i>c) Will the proposed infrastructure substantially degrade the existing visual character or quality of the site and its surroundings?</i>	<u>Potential Effects:</u> The OCS structures will not have substantial adverse visual effects, given the business park and industrial nature of the corridor. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> None. <u>Mitigation Measures:</u> n/a	<u>Potential Effects:</u> The bridge structures in this section of the corridor are located in extensive transportation and industrial network; therefore negligible visual effects are anticipated. <u>Mitigation Measures:</u>

**UP Express Electrification
Transit Project Assessment
Environmental Project Report**

			No mitigation measures required.
<i>d) Will the proposed infrastructure create a new source of substantial light or glare which would adversely affect day or night time views in the area?</i>	<u>Potential Effects:</u> None. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> None. <u>Mitigation Measures:</u> No mitigation measures required.	<u>Potential Effects:</u> None. <u>Mitigation Measures:</u> No mitigation measures required.

6.15 Traffic

A traffic impact study (see Appendix I) for the proposed maintenance facility at 50 Resources Road was carried out as part of the EA. As outlined in Chapter 5, the proposed site will provide a facility for inspecting, servicing, maintaining and storing the new 21-car fleet of Electric Multiple Units (EMU's) to be used for the Union Pearson Express service. It is anticipated that the maintenance facility will operate 24/7 throughout the year.

The scope and methodology of the traffic study included:

- Reviewing relevant background reports and related material;
- Collecting and reviewing existing site information and existing traffic data of the intersections in the vicinity of the site;
- Preparing a forecast of site traffic;
- Liaising with City of Toronto staff to confirm the need for and scope of a traffic impact study for the site development;
- Completing an operational analysis of existing traffic conditions;
- Preparing a forecast and completing an operational analysis for future background traffic conditions using a 2020 horizon year;
- Conducting an operational analysis for total future conditions and identifying any remedial measures that may be needed to accommodate background and site traffic;
- Reviewing the proposed site concept plan and providing advice on the number and location of accesses, and site circulation (pedestrian, cyclist and auto) and identifying any improvements to the concept plan;
- Evaluating the adequacy of the proposed on-site parking.

Resources Road is located immediately south of Highway 401 and terminates approximately 1 km east of Islington Avenue. Resource Road carries traffic volumes from/to the north on Islington Avenue via a grade separation located south of the Highway 401/East Bound (EB) On-ramp intersection. Movement from Resources Road to the south on Islington Avenue is also provided via this grade separated roadway connection to Islington Avenue. From the south, Resources Road is accessible via an off-ramp from Islington Avenue located approximately 70 m south of the Highway 401 EB On-ramp.

Baseline conditions for existing intersection traffic counts for the weekday morning/afternoon peak hours and weekend mid-day peak hours were collected by Pyramid Traffic Inc. in late November 2013 and early December 2013. A comparison of these counts with existing weekday intersection counts available from the City of Toronto dated May 2011 was also undertaken. The comparison between the May, 2011 and December, 2013 for the weekday a.m. and p.m. peak hour volumes for the Islington Avenue and Highway 401 EB On-ramp intersection indicated that the December, 2013 collected volumes are significantly higher than the May, 2011 volumes along Islington Avenue and Highway 401 On/Off ramps. Therefore, no seasonal adjustment to the December 2013 counts was considered necessary.

The following assumptions were made in order to estimate the site peak hour traffic volumes and trips to and from the Resources Rd. site, based on the proposed shift timing:

- Typically, employees will arrive within the 30 minutes before the beginning of a shift and leave within the 30 minutes after the end of the shift.
- It is assumed that 25% of the total anticipated visitors will arrive within the peak hour and the rest will arrive within the remaining seven (7) hours of the shift.
- Delivery truck arrivals will be uniformly distributed throughout the 8-hour shifts.
- A.M. Peak Hour: Shift 2 trips will be traveling (inbound) to the facility and Shift 1 trips will be leaving (outbound) the facility within the morning site peak hour.
- P.M. Peak Hour: Shift 3 trips will be traveling (inbound) to the facility and Shift 2 trips will be leaving (outbound) the facility within the site afternoon peak hour.
- Saturday Mid-day Peak Hour: Shift 3 trips will be traveling (inbound) to the facility and Shift 2 trips will be leaving (outbound) the facility within the site afternoon peak hour.

The traffic study concluded that the proposed EMU Maintenance Facility development at 50 Resources Rd. will not have significant negative impacts on the adjacent road network since the total site volumes to be generated will be less than 100 trips per peak direction. The analysis results noted the following:

- It is estimated that the proposed Metrolinx Maintenance Facility will generate a maximum of approximately 77 peak direction vehicle trips.
- The estimated total trips generated from the site are less than the 100-trip threshold for the requirement for a traffic impact study identified in the *Guideline for the Preparation of Transportation Impact Studies, 2013* published by the City of Toronto.
- The peak hours of the proposed site will not coincide with the peak hours of the traffic on adjacent roads.
- The proposed development will not have direct access to either a major or minor arterial road.
- The proposed development will not affect the operation of adjacent roads or intersections significantly and that a detailed traffic analysis of this development does not appear necessary.
- It is estimated that “Street A” (unnamed street bordering the 50 Resources Rd. site to the north) will have an estimated average daily traffic (ADT) volume of approximately 3,000 vehicles per day immediately east of the roundabout. This ADT volume will decrease to approximately 950 veh/d east of the site West Entrance.
- The traffic generated by the site can be accommodated adequately by the three proposed driveways, operating under stop control to “Street A” (unnamed street bordering the 50 Resources Rd. site to the north). No additional auxiliary traffic lanes are necessary.
- All the proposed driveway corner clearances meet or exceed the minimum requirements specified in guidelines published by the Transportation Association of Canada.
- The proposed 16 visitor’s parking spaces are sufficient to accommodate projected visitor demand.

The traffic impact study also made the following recommendations that will be further considered by Metrolinx during preliminary design:

- The proposed 20 m width for the East Entrance be reduced to not more than 15 m.
- The requirements for truck circulation in the area of the frontage at the main building including the turnaround should be identified / confirmed through a design review using the truck turning templates.
- It is suggested that the proposed sidewalk between the West Entrance and main building adjacent to the visitor parking lot be made as continuous as possible by adding sidewalk sections across the parking modules.
- Conflicting movements will occur at the West Entrance, the entrance to the employee parking lot and the internal driveway. It is suggested that the layout of the west parking area and entrance to this lot be revised to eliminate the access to the north parking module from the internal roadway and to increase the separation between the internal driveway and entrance to the parking lot;
- The proposed number of parking spaces in the employee parking lot exceeds the estimated parking spaces based on the employee shift overlap strategy. It is recommended that an additional three (3) accessible parking spaces be provided in the employee only parking lot by converting the regular parking spaces into the accessible parking spaces along the easterly parking aisle.

6.16 Utilities

An overview of known utilities was previously provided in Chapter 4. Based on background review, the following utilities were identified:

- City of Toronto Sewer
- City of Toronto Water Main
- City of Toronto Gas
- City of Toronto Other
- Toronto Hydro Overhead Lines
- Toronto Hydro Underground Conduits
- Enbridge Gas
- Enbridge Oil
- Enbridge Other
- Bell Canada Underground Conduit
- Bell Canada Buried Duct Bank
- Bell Canada Overhead Line
- Hydro One Oil Filled Pipe
- Hydro One Overhead Line
- Rogers Underground Conduit
- Rogers Buried Duct Bank
- Rogers Overhead Line
- TTC Underground Conduit
- TTC Overhead Line
- Canada Packers Underground Conduit
- Canada Packers Water Main
- Canada Packers Hydrogen/Steam Pipeline
- Woodbine Water Main
- Allstream Underground Conduit
- Allstream Duct Bank
- Interprovincial Pipelines Oil Pipeline
- Canada Gypsum Co Ditch Culvert
- Private Owner Storm Main
- Sun Canadian Oil Pipeline
- Telus Duct Bank

As part of the impact assessment phase, potential effects on known utilities due to electrification of the UP Express were considered, and mitigation measures identified as appropriate.

As previously mentioned, there are a significant number of utilities being relocated as part of the Georgetown South Project construction work that is currently ongoing along the corridor. As a result, the assessment of additional utility conflicts (that may require relocation) due to the proposed UP Express Electrification infrastructure will need to be reviewed by Metrolinx as part of the Detailed Design phase.

Due to the linear nature of utilities, the four study area sections as referred to in previous sections above have not been applied within this particular section.

6.16.1.1 Utility Categories

The first step in identifying potential electrification effects on utilities (i.e., determination of grounding

requirements) was to categorize them as either: non-metal, reinforced concrete, metal, overhead, or copper communications wires. Following this, potential impacts due to electrification were identified and mitigation measures were developed for each, as summarized in Table 6-17:

TABLE 6-21 SUMMARY OF POTENTIAL IMPACTS UTILITIES AND MITIGATION MEASURES

Category #	Utility Category	Potential Impact(s)	Mitigation Measures
1	Buried Non-metal	None.	No mitigation required.
2	Buried Reinforced Concrete	Due to the metal in this utility, there is a potential for unsafe step and touch potential.	Provide two grounding connections between the utility and the static wire, one at either edge of the rail ROW. Each connection shall consist of a stranded copper wire (min. 25 mm ²) exothermically welded to the embedded rebar or via heavy duty rebar clamps, and a pole to connect to the static wire.
3	Buried Metal	Due to the metal in this utility, there is a potential for an unsafe step and touch potential.	Provide two grounding connections between the utility and the static wire, one at either edge of the rail ROW. Each connection shall consist of a stranded copper wire (min. 25 mm ²) exothermically welded to the metal pipe or via grounding clamps, and a pole to connect to the static wire. Also replace two 2m sections of the pipe at the edge of the rail ROW beyond the ground connection with insulated joints (non-metal pipe).
4	Overhead with Adequate Clearance	None.	No mitigation required.
5	Overhead with Inadequate Clearance	Code ¹⁹ required clearances would not be met, which could result in unsafe conditions.	Raise wires and associated supporting structure to provide adequate clearance.
6	Copper Communications	Electromagnetic interference could result in	Replace copper wires with fibre optic lines within 10m of Electrified

¹⁹ CSA C22.3 No. 1-06, as well as specific utility owner standards/requirements.

	wires	interference of communications.	Tracks.
--	-------	---------------------------------	---------

6.16.1.2 Net Effects

Based on implementation of the mitigation measures listed above, there will be no net adverse effects on known utilities due to electrification of the UP Express.

6.17 Electromagnetic Fields (EMF)

6.17.1 Approach

As outlined in Chapter 4, the assessment of potential EMF effects was based on the following steps:

1. Based on the results of the EMF survey (as outlined in **Chapter 4 – Baseline Conditions**), the maximum EMF levels at the railway right of way for the electrified UP Express²⁰ were estimated;
2. The maximum EMF levels were compared to international industry standard limits for human exposure to EMF; and
3. Establish mitigation measures (as required, where limits are exceeded).

6.17.1.1 International Industry Standards (EMF)

Recognizing that the electrified UP Express railway will contribute to the electromagnetic ‘noise’ within the local environment, the system will be designed and commissioned to conform to the relevant international standards (see list below) to ensure that EMF ‘noise’ in the surrounding commercial and residential areas along the corridor is within the prescribed limits established by these standards.

Human exposure to electromagnetic fields can be divided into exposure to radio frequency (RF) and extremely low frequency (ELF). RF covers an approximate frequency range of 3 kHz to 300 GHz. ELF covers the frequency range from dc to 400 Hz, which is the predominant OCS power line frequency (i.e., 60 Hz) for the UP Express system, and the associated harmonics (normally 10% of the fundamental frequency).

Radio Frequency EMF

Licensed radio sources for the UP Express railway system will have emission limits as per Industry Canada and Health Canada’s *Safety Code 6: Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz*. The limits will ensure human exposure to these fields does not pose a threat to human health.

The UP Express railway transient RF EMF emanation occurring for the duration of train passage and overhead contact system (OCS) interaction does not pose a human health risk since it is not a permanent field (i.e., the field only occupies the electromagnetic environment for the duration of the train passage). Thus, this field is localized, transient in nature, and only occurs for the duration of the train’s passage. Non-permanent fields do not cause significant thermal effects on human body tissue.

²⁰ 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.

Extremely Low Frequency EMF

The UP Express railway ELF EMF will be permanent since the OCS will always be energized under normal operating conditions. There are currently no Canadian-specific standards that regulate power line frequency EMF limits. However, there are three main organizations in North America that have established standards that limit power line frequency electromagnetic field exposures from a human health risk perspective, as follows:

- **The International Commission on Non-Ionizing Radiation Protection (ICNIRP)** through their Guidelines for limiting exposure to time-varying electric and magnetic fields, 1 Hz to 100 kHz
- **Institute of Electrical and Electronics Engineers (IEEE)** through IEEE C95.1 Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields 0 to 3 kHz, and
- **International Commission on Non-Ionizing Radiation Protection (ACGIH)** through their “Guidelines for limiting exposure to time-varying electric and magnetic fields, 1 Hz to 100 kHz, and the American Conference of Governmental Industrial Hygienists (ACGIH).

In combination, these standards set limits for occupational and public settings as well as for workers who have pacemakers. From a health risk perspective, the 60 Hz fundamental frequency electric and magnetic field exposure limits are as outlined per **Tables 6-22**, and **6-23** below.

TABLE 6-22 EXPOSURE LIMITS FOR FUNDAMENTAL FREQUENCY ELECTRIC FIELDS

	ICNIRP (kV/m)	IEEE (kV/m)	ACGIH (kV/m)
Occupational	8.3	20	25
Public	4.2	5 ²¹	
Workers with Medical Implants	N/A	N/A	1

TABLE 6-23 EXPOSURE LIMITS FOR FUNDAMENTAL FREQUENCY MAGNETIC FIELDS

	ICNIRP (mG)	IEEE (mG)	ACGIH (mG)
Occupational	10,000	27,100	10,000
Public	2,000	9,040	
Workers with Medical Implants	N/A	N/A	1,000

²¹ Maximum permitted: 10 kV/m under overhead lines.

6.17.2 EMF Assessment Results

For the purpose of assessment of human exposure to 60 Hz electric and magnetic fields, magnetic field levels were measured along the UP Express corridor and are summarized in the EMC Report contained in Appendix G. Subsequently, the maximum estimated 60 Hz electric and magnetic field emanation from the UP Express railway (specifically, 1 kV/m and 160 mG, respectively) was superimposed on the measured background EMF to arrive at the worst-case (highest anticipated EMF) public exposure. This section will discuss these estimates for the corridor and the traction power facilities (TPFs), passenger stations, and the maintenance facility.

6.17.2.1 Rail Corridor

Table 6-24 provides the maximum conservative estimate for the fundamental frequency (60 Hz) electric and magnetic field level on the UP Express corridor.

TABLE 6-24 MAGNETIC AND ELECTRIC FIELD STRENGTH LIMITS ESTABLISHED FOR UP EXPRESS

	Electric Field Limit		Magnetic Field Limit (at max load)	
	Within the Right-of-Way	Edge of Right-of-Way	Within the Right-of-Way	Edge of Right-of-Way
UP Express	9 kV/m	9 kV/m	250 mG	250 mG

The values in Table 6-24 were estimated by adding the highest EMF level measured/estimated on site (specifically, at areas in the vicinity of high voltage transmission lines) with the maximum expected EMF emanation from the railway system. Since this estimate is conservative, the actual field levels are expected to be much lower. The values in **Table 6-24** are below IEEE requirements for public exposure to power line frequency EMF. As such, human health effects due to EMF are not expected.

6.17.2.2 Vicinity of Traction Power Facilities

In general, the strongest EMF at a substation, paralleling station, passenger station or maintenance facility comes from the OCS power lines entering and leaving the facility.

The OCS power lines entering the 175 City View TPS are within the jurisdiction of Hydro One, and the typical electric and magnetic field emanations from those lines are 2 kV/m electric and 57.5 mG magnetic directly under the high voltage transmission lines at peak, which is below industry standards for human exposure.

There will also be underground ducts exiting the TPS and paralleling stations feeding the OCS, with peak fields directly above the feeder at 40 mG and 200 V/m. The strength of the EMF from equipment within

the TPF such as transformers, reactors, and capacitor banks, decreases rapidly with increasing distance. Beyond the substation fence or wall, the EMF produced by the substation equipment is typically indistinguishable from background levels.

The area within the TPS and paralleling station sites is considered an occupational setting (i.e., workplace). The occupationally exposed population consists of adults who are generally exposed under known conditions and are trained to be aware of potential risks and to take appropriate precautions. In contrast, the general public is comprised of individuals of all ages and of varying health status, and may include particularly susceptible groups or individuals. Moreover, individual members of the public cannot reasonably be expected to take precautions to minimize or avoid exposure. These considerations underlie the adoption of more stringent exposure restrictions for the public than for the occupationally exposed population.

6.17.2.3 Passenger Stations & EMU Maintenance Facility

Weston, Bloor and Union Stations and the EMU maintenance facility are expected to be exposed to the same maximum EMF as the rail corridor (see **Table 6-24**), which are below industry standard human exposure limits.

6.17.2.4 Mitigation Measures

Additional EMF Studies/Testing

Based on the results of the EMF survey, and estimation of the maximum EMF levels at the railway right of way for the electrified UP Express railway (i.e., 1 kV/m), it is anticipated that EMF levels for human exposure will be within the industry limits as outlined in Tables 6.22 and 6.23 once the UP Express is electrified.

Notwithstanding this, additional analysis during the detailed design phase will be required to verify the results of this initial EMF assessment, and will include consideration of electrified rolling stock specifications.

The plans developed during the detail design phase will also specify the verification method for the commissioning phase in order to ensure the emissions of the deployed UP Express system are within limits permitted by the above listed standards.

6.17.2.5 Net Effects

Based on the results of the EMF survey, and estimation of the maximum EMF levels at the railway right of way for the electrified UP Express railway (i.e., 1 kV/m), it is anticipated that EMF levels for human exposure will be within the industry limits. Therefore no net adverse effects related to EMF exposure are anticipated. Notwithstanding this, further analysis will be undertaken during detailed design to

confirm that the EMFs emitted from the electrified UP Express will be within applicable permissible limits. This additional analysis will take into consideration the specifications of the electrified rolling stock.

6.18 Electromagnetic Interference

Electromagnetic interference is defined as the degradation of performance of a device, equipment or system caused by an electromagnetic disturbance. Sources of electromagnetic interference include:

- The propulsion system's high voltage and high current operational mode emissions
- Train signalling systems and their associated computer operating codes
- Train control system emissions
- Track to train control circuits
- Right-of-way electromagnetic field emission sources.

Electromagnetic interference involves three elements:

- **Sources** generate electromagnetic fields or energy such as the overhead contact system and the electric multiple unit (EMU)
- These sources may interfere with electrical **receptors** such as railway and substation electrical components or third party devices such as electron microscopes, magnetic resonant imaging devices or antennas
- Potential interference is transmitted through a **coupling path** through a conductor such as an electric power line or ground wire, or through the air by induction or radiation (often referred to simply as radiation). Coupling paths can be complex, involving both conducted and radiated elements.

These disturbances can be mitigated through various technical measures to achieve electromagnetic compatibility to ensure that all electrical and electronic devices can co-exist and function satisfactorily.

6.18.1 Approach

Based on the inventory of potentially EMI-susceptible equipment prepared as part of baseline data collection, potential EMI effects due to the electrified UP Express were determined through an electromagnetic compatibility (EMC) analysis. The EMC analysis involved determining whether the field levels caused by the electrified UP Express railway are likely to adversely affect proper operation of the identified EMI-susceptible equipment, and whether the existing EMI shielding and immunization is sufficient.

6.18.1.1 Study Limitations

As the specifications for the rolling stock for the electrified UP Express have not yet been determined, it is noted that the preliminary assessment of potential EMI effects related to implementation of the electrified UP Express is limited to consideration of the electrification infrastructure.

Accordingly, this preliminary EMI assessment includes the provision of recommendations for future EMI studies/investigations that may be required in order to confirm potential EMI effects and establish

mitigation measures, if required. It is anticipated that these additional studies/investigations would need to be carried out as part of the future detailed design phase of the project, once additional more detailed information is available, especially with respect to the electric rolling stock.

6.18.1.2 Industry Standards (EMI)

Manufacturers of traction electrification railway equipment must comply with the following international standards, which cover emission and immunity limits, and test methodologies for measuring electromagnetic emissions.

American Railway Engineering and Maintenance (AREMA)

AREMA Committee 38 – Part 11.5.2 addresses electromagnetic immunity and emissions standards for Signalling Equipment.

American Public Transportation Association (APTA)

The APTA electromagnetic compatibility program addresses the requirements for the development of a program for all rail equipment and track sided equipment delivered to the railroad to achieve safe operations.

Canadian Standard Association (CSA)

These standards covers design considerations in various areas of railway electrification including interference with railway signalling circuits and communication circuits.

Federal Communications Commission (FCC) (United States)

FCC electromagnetic compatibility standards address how to control EMI interference outlined in Part 15 of the FCC rules, which specifies that any spurious signal greater than 10 kHz is subject to regulation.

Industry Canada

Electromagnetic Compatibility Standards from Industry Canada cover the Canadian requirements for electromagnetic field emission limits, spectrum allocations and measurements. All intentional radiators used in Canada should comply with Industry Canada requirements.

European Standards (EN)

Since electrified railways are typical in the European Union, there are well-developed design standards that are followed in North American electrified railways. The *EN50121* series of standards were produced by CENELEC (European Committee for Electro-technical Standardization) as a means of managing EMC across the whole railway industry. These standards provide a management framework,

product standards and best practice to cover all aspects of EMC within a large distributed installation. The basic emission levels were set from emission measurements made across a number of railways and defined the accepted state. Recent reviews of these standards have confirmed their validity to reflect best practice within the railway industry. Compliance with these standards will ensure that UP Express electrification meets best practice guidelines for general emissions and immunity of equipment and systems within the traction electrification design/build project.

Health Canada

Safety Code 6 – Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz.

Institute of Electrical and Electronic Engineers (IEEE)

IEEE electromagnetic compatibility standards define the unintentional generation, propagation, and reception of electromagnetic energy, the associated unwanted effects, and the correct operation of different equipment involving electromagnetic phenomena in their operation.

International Electro-technical Commission (IEC)

IEC electromagnetic compatibility standards define the terminology and description of the electromagnetic phenomena, the electromagnetic environment, measurement and testing techniques, and guidelines for installation and mitigation.

With this in mind, Table 6-24 (above) provides the calculated maximum conservative electric and magnetic field limits (for the fundamental frequency 60 Hz electric and magnetic field level) associated with the electrified UP Express corridor.

6.18.2 EMI Assessment Results

The electrified UP Express railway emission is expected to emit less than 160 mG and 1 kV/m of maximum fundamental frequency EMF into the existing electromagnetic environment. With this in mind, the following section summarizes the results of the EMC analysis carried out to assess potential adverse EMI effects on potentially susceptible equipment.

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

6.18.2.1 Potential EMI Effects and Mitigation Measures - Rail Corridor

The estimated electric and magnetic fields along the UP Express corridor are not expected to interfere with electrical and electronic equipment in the vicinity of the corridor.

6.18.2.2 Net Effects

No adverse effects due to EMI along the corridor are anticipated. Future analysis during detailed design will be undertaken as outlined in Section 6.18.3 below.

6.18.2.3 Potential EMI Effects - Extremely Low Frequency

60 Hz magnetic fields are normally a concern for sensitive research, scientific and medical equipment that operate on electromagnetic waves, such as electron microscopes in laboratories and MRI scanners.

It should be noted that this sensitive equipment is already shielded and immunized from ELF EMF. For example, MRI systems in hospitals are placed in a shielded room to prevent EMF from entering and interfering with their proper operation. This is due to the fact that there are overhead lines already existing near EMI sensitive sites that emanate ELF EMF as well as the fields produced by the electrical wiring of the EMI sensitive site itself. As such, provisions for immunity against these fields have already been considered during their engineering design.

However, some of the existing immunizations may not be adequate. EMI sensitive sites have been detailed in Section 10 of the EMC Report contained in Appendix H, along with the necessary steps to evaluate and mitigate EMI effects (if necessary).

6.18.2.4 Net Effects

Based on the implementation of the mitigation measures as outlined in Section 10 of the EMC Report contained in Appendix H, no adverse net effects due to ELF EMI are anticipated. Future analysis during detailed design will be undertaken as outlined in Section 6.18.3 below.

6.18.2.5 Potential EMI Effects - Radio Frequency

The radios in the electrified railway system are in compliance with Industry Canada's frequency allocation plan and emission limits. All other licensed RF devices, intentional radiators and receivers are also Industry Canada-compliant. Compliance with Industry Canada frequency allocation and emission limits ensures that there is no frequency overlap between radio applications used in Canada. It should be noted that all off the shelf licensed radios in Canada comply with Industry Canada requirements and will not use the radio operating frequencies assigned to the railway system.

Furthermore, the transitory RF emission from the OCS and pantograph interaction is below the *EN 50121* limits and will be perceived as background characteristic noise for the RF receivers in the vicinity

of the railway (i.e., the railway RF emission will not degrade the performance of nearby RF receivers).

This RF noise is, however, a concern for the navigational aid and communication receivers at Toronto Pearson International Airport. Further analysis and field testing is needed during the detailed design stage (as outlined in Section 6.18.3 below) to ensure that the railway system does not interfere with the aforementioned airport equipment and to determine whether immunization measures are required to mitigate EMI.

6.18.2.1 Net Effects

Based on compliance with Industry Canada's frequency allocation plan and emission limits for radios along the electrified UP Express corridor, no adverse net effects due to RF EMI are anticipated. Future analysis during detailed design will be undertaken as outlined in Section 6.18.3 below, including further assessment of the EMI susceptible equipment at Toronto Pearson International Airport.

6.18.3 Future Work (EMI/EMF)

In addition to the specific EMI mitigation measures detailed in Section 10 of the EMC Report (Appendix H), the following future work and analysis will be undertaken by Metrolinx during subsequent project phases (detailed design, testing/commissioning).

6.18.3.1 Prepare EMC Analysis Report

Further analysis and measurements will be carried once the electric rolling stock specifications are known in order to confirm the initial results of the EMC Report (see Appendix H) completed as part of the EA and to ensure no adverse effects related EMF or EMI will occur due to the electrified UP Express railway.

Specifically, an EMC System Analysis Report will be developed as part of the detailed design phase to ensure EMI immunity and emissions compliance for the electrified UP Express System. This will include further analysis of the identified EMI-susceptible equipment, i.e., NavCan equipment identified through the EMI inventory completed as part of the EA.

For NavCan equipment, this will involve obtaining detailed information on the EMI susceptible equipment (i.e., CPM, security scanners, communication systems and Mlat RU equipment) and carrying out theoretical assessments to assess the potential EMI caused by the UP Express traction electrical system and rolling stock operations under normal and peak operating scenarios.

6.18.3.2 Frequency Management Plan (Detailed Design)

A frequency management plan will be developed and implemented by Metrolinx during the EMC intersystem analysis as part of detailed design phase. This plan is needed to capture the operating frequencies at the system engineering level from all intentional radiators in the vicinity of the railway.

The frequency management plan will cover both railway emissions and background emissions. The plan will identify and avoid any frequency overlap between radio applications, any misallocations with respect to the national radio frequency allocation plan (Industry Canada), and the major EMI risks related to an excessive characteristic noise in the reception band of the communication system. Mitigation measures will be implemented by Metrolinx as needed, and as per the frequency management plan recommendations.

6.18.3.3 Construction Phase

Compliance requirements with *EN 50121*, *IEEE C63.12*, *AREMA Signalling and Control Manual 11.5.2*, *IEC 61000* and other relevant EMC standards will be specified to product manufacturers. The manufacturers are to provide compliance test results and supporting documentation to Metrolinx during the project construction phase.

6.18.3.4 Commissioning Phase

During the UP Express electrification commissioning phase, overall ELF and RF emissions emanating from the UP Express electrified railway system as a whole (including emissions from all the electrified tracks, OCS, paralleling stations, EMU maintenance facility, and EMU trains) will be field tested and verified to ensure EMFs are within the limits of applicable industry standards.

6.18.3.5 Operations/Maintenance Phase

The following tests and maintenance procedures will be implemented in order to mitigate EMI to track circuits and increase personnel safety due to EMI induced common mode voltage:

Common mode voltage control for personnel safety as follows:

- Maximum rail to ground voltages should be measured periodically. Excessive values per each section of the track (between insulated joints) should be investigated and mitigated as needed.

Differential mode voltage control to reduce interference to track circuits as follows:

- Rail to rail voltages should be measured periodically. Values are not to exceed track circuit manufacturer recommended maximum voltage level per each section of the track (between insulated joints). Deviations should be investigated and corrective measures undertaken as needed.
- Insulated joints to be tested as per product manufacturer recommendations. Defective insulated joints to be replaced or repaired.
- Surge (lightning) arresters to be tested as per product manufacturer recommendations. Defective arresters to be replaced or repaired.
- Proper ballast maintenance to be performed per the supplier's recommendation.

6.19 Stray Current

In DC electric traction systems, if there are buried metallic object, such as pipes, conduits, steel rebar etc., in the path of DC stray return current, the current flows through the metallic objects (because metallic bodies have better electrical conductivity than ground) and then through the ground back to the traction power substation. When DC current emerges from the metallic object to the ground, it causes ionic corrosion of the metallic object.

However, in the case of AC traction electrification (which will be implemented for UP Express Electrification), AC current reverses its direction 60 times in a second and the earth (ground) is a part of the intended return current path for AC traction. Therefore, since the AC current profile is uniform and sinusoidal and there is a change in the polarity 60 times a second, there will be no noticeable corrosion impact on buried metallic objects located along the path of AC current flowing through the ground.

6.20 Summary of Mitigation and Monitoring

Table 6-25 provides a summary of the potential environmental effects, mitigation measures, and proposed monitoring activities/commitments to future work associated with the UP Express Electrification undertaking.

TABLE 6-25 SUMMARY OF POTENTIAL EFFECTS, MITIGATION AND MONITORING/COMMITMENTS

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
Natural Environment – Terrestrial Features	Removal of vegetation	- Prepare a Restoration and Enhancement Plan - Vegetation clearing zones and vegetation retention zones will be delineated in Contract documents. - Adhere to relevant guidelines and OPSS for clearing and grubbing, site preparation and tree protection - Erect and maintain a temporary fence for tree protection - Time pruning of trees outside of Spring - Metrolinx will consider developing a restoration plan as part of the detailed design phase that entails vegetation planting at other viable locations in the vicinity of the corridor to offset vegetation loss to the extent possible.	An Environmental Inspector will be present during construction activities associated with UP Express Electrification project. The role of the Environmental Inspector will be to ensure that all environmental mitigation measures are properly installed, implemented and maintained during construction of the UP Express Electrification project components.
	Contamination of soil caused by accidental spills	- The paralleling station will be fully equipped with spill containment and oil/water separation facilities. In the event on an equipment failure, oily water will not escape from the site. - An Emergency Preparedness and Response Plan will govern spill response. - Spill cleanup and response equipment will be located on site. - Fuel transport will be conducted in compliance with the Transportation of Dangerous Goods Act. - Spill decks will be used for transferring products to smaller containers. - Fire extinguishers will be located near petroleum, oil and lubricants storage areas. - Carry out routine inspections for paralleling station facility, including transformer oil - All necessary precautions will be implanted to prevent the spillage and release of hazardous materials to the environment. - All leaks or spills will be immediately reported to the Ministry of the Environment, Spills Action Centre at 1-800-268-6060.	
	- Erosion/siltation from excavation activities - Establishment of invasive and disturbance-tolerant species - Potential spread of Emerald ash borer	Adhere to relevant guidelines and Ontario Provincial Standard Specifications, including consideration of TRCA²² Erosion and Sediment Control Guidelines to Urban Construction) and Ontario Provincial Standards Specifications (OPSS) – OPSS 577 (Erosion and Sediment Control Measures).	

²² As a Crown Agency, GO/Metrolinx is exempt from the Conservation Authorities Act and as such does not have a requirement to apply for and obtain permits from conservation authorities. Wherever possible, GO/Metrolinx will engage the conservation authority on specific projects (or components thereof) and will adhere to requirements when and where possible.

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
		- Where temporary storage of the soil is required, the soil will be stored immediately adjacent to the excavation site. - Topsoil and subsoil will not be mixed nor will topsoil be contaminated with any other material. - Silt fencing will be installed around all designated work areas to prevent any offsite transport of sediment. - Exposed soils will be hydroseeded within 45 days, both for temporary work areas and final grades. - Existing vegetation on embankments shall be maintained as long as possible and new slopes shall be stabilized as soon as possible by seeding and mulching. - Where possible, excavated soils should be stored for a period of less than 45 days. - Where excavated soils must be stored for a period longer than 45 days, they should be covered or seeded with a cover crop, such as annual oats or annual rye. - Once soils are replaced, they should be re-seeded with a native seed mix suited to the site conditions based on consideration of TRCA²³ seed mix guidelines (TRCA 2004). - Equipment should be cleaned between sites to prevent the spread of invasive species. - Vegetation removals must be carried out in a manner in compliant with the Ministerial Order issued by the Federal Government which identifies prohibitions and restrictions of movement on trees, leaves, logs, lumber, wood/wood chips from all ash species.	
	Temporary construction related impacts(disturbance/displacement) to vegetation and wildlife caused by dust, noise and light	- Dust should be controlled as much as possible by watering of appropriate surfaces. The contractor shall adhere to relevant guidelines and Ontario Provincial Standard Specifications, including OPSS 506 (Dust Control). - Appropriate lengths of silt fencing will be installed along the perimeter of minimized, designated work areas to limit construction impacts. - All construction equipment and vehicles will yield the right-of-way to wildlife, if it is safe to do so. - Advise workers to perform visual survey of machinery and work area prior to commencing work since wildlife may be found basking or hiding on or under equipment, rocks, debris piles etc. - Do not allow construction debris to accumulate on-site and on the soils surface but regularly clean up the site to reduce the possibility of wildlife using debris piles for	

²³ As a Crown Agency, GO/Metrolinx is exempt from the Conservation Authorities Act and as such does not have a requirement to apply for and obtain permits from conservation authorities. Wherever possible, GO/Metrolinx will engage the conservation authority on specific projects (or components thereof) and will adhere to requirements when and where possible.

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
		shelter. - Clean up all litter daily and provide waste disposal containers so wildlife does not ingest indigestible materials or become entangled in debris. - Any wildlife incidentally encountered during construction will be protected and will not be knowingly harmed. - Advise workers to perform a visual survey of machinery and work area prior to commencing work since wildlife may be found hiding in or under equipment, rocks, debris piles, etc. and any individuals found shall be left to move on their own or moved properly out of harm's way in the direction they were heading. - Advise workers to stop work and inform the Contract Administrator if any snakes, turtles or other potential Species at Risk are encountered. - Report all Species at Risk sightings and encounters to the MNR Aurora District office using the appropriate reporting form within two business days. - If a nesting snake or turtle is found the MNR shall be notified immediately and a 10m buffer zone shall be flagged around the site and that area protected from harm during the nesting season.	
	Wildlife injury or mortality caused by collision or electrocution	- Rail corridor will be regularly cleared of any vegetation, wildlife carcasses or debris - For OCS wires of different electrical potential, conductors will be spaced 1.5m apart or greater whenever possible to reduce the risk of bird electrocution. For UP Express, a minimum clearance of approximately 2.75m is to be achieved between two different OCS wires which have different electrical potentials.. Where this clearance is not possible, the neutral cable may be made clearly visible with suitable markers, such as anti-bird flash. - For OCS wires of the same electrical potential (such as situations where there are intersecting wires), the electrical clearance can be reduced to a minimum of 600mm, regardless of whether live or grounded. If this electrical clearance cannot be achieved, insulation or suitable covering of wires may be provided. - Any bird or other wildlife mortality will be documented - Provide perching opportunities away from the OCS - Perform monthly inspections during the breeding bird season for nests on OCS structures.	
	Potential damage to nest of a migratory bird or a Species at Risk	- The Contractor shall inspect structures for nests and eggs and advise the Contract Administrator - The Contractor shall not destroy nests or eggs of protected	

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
		migratory bird species or Species at Risk If a nest is removed from a structure, the structure will be netted outside of the breeding bird season to prevent the recurrent of nesting activity. The Contractor shall monitor the area daily for the recurrence of nesting activity upon removal of nests.	
	Potential damage to nest of a migratory bird or a Species at Risk	- The contractor shall inspect the structure (bridge/station) for nests and eggs and advise the Contract Administrator of any locations of nests and eggs immediately. - The contractor shall not destroy nests and eggs of protected migratory birds during migratory bird nesting season (April 1 to July 15). - The contractor shall not destroy nests and eggs of protected Species at Risk birds. - If a nest is removed from a structure (bridge/overhead structure/station), the structure will be netted outside of the breeding bird season to prevent the recurrence of nesting activity. The contractor shall monitor the area daily for the recurrence of nesting activity upon removal of nests and notify the Contract Administrator immediately if a nest reappears.	
Natural Environment – Aquatic Features	Potential indirect effects to watercourses under bridges (e.g., siltation, introduction of contaminants, construction debris)	- Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment to the waterbody, and ensure site is stabilized prior to removal following construction; - Stabilize and re-vegetate all areas of disturbed/exposed soil following construction; - Stockpiles will be located at a minimum of 30m from the watercourse and isolated to ensure material will not enter any watercourse or ditchline. All stockpiles will be removed upon completion of the works and the site restored, as appropriate; - Ensure Spills Management Plan and spill kits are on-site at all times for implementation in the event of an accidental spill during construction; - Operate, store and maintain all equipment and associated materials in a manner that prevents the entry of any deleterious substance to the waterbody; - All mobile equipment will have drip pans installed and refueling will take place no closer than 30m to any study area watercourses or ditchlines in order to prevent water contamination due to accidental fuel spills; - All construction debris and litter will be removed frequently; - Limit access to waterbody and banks to protect riparian	

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
		vegetation and minimize bank erosion; and Use shrouding to trap and prevent concrete and other bridge materials from entering the watercourse.	
Natural Environment – Hydrogeological Features	Potential reduction in baseflow at nearby Humber River (in vicinity of EMU Maintenance Facility on Resources Rd.)	Design of adjacent storm water management pond to achieve zero-met reduction in groundwater recharge.	Review that SWM pond design to ensure that zero-met reduction in groundwater recharge will be achieved.
	Accidental spills during vehicle refuelling during construction with potential to cause groundwater contamination.	- Vehicle refueling will be carried out in designated areas only, preferably situated on a paved, impermeable surface; - An emergency response plan will be prepared by the contractor to establish methods to clean up accidental spills.	Ensure emergency response plan will is developed, and implemented by the contractor.
	N/A	N/A	The need for dewatering will be confirmed during detailed design, as will the requirement for a Permit to Take Water (PTTW) from Ministry of the Environment (if more than 50,000 litres per day of groundwater is to be pumped). Specifically, impacts will be assessed and strategies for mitigation will be proposed as required as part of the PTTW application process.
Natural Environment – Contaminated Sites	- Disturbance of contaminated soils and/or groundwater during construction - Improperly handled excess contaminated soil/groundwater pumped during dewatering (if any) has the potential to contaminate property and surface water, respectively. - Worker health/safety: without appropriate preventative measures, workers can be exposed to unacceptable levels of contamination during construction.	The following mitigation measures, based on best management practices, will be implemented to manage contamination at the Ordnance site: - A health and safety plan be developed and implemented for construction workers; - Contaminated soils and groundwater will be managed in accordance with provincial legislation and regulations (i.e., Ontario Environmental Protection Act, Ontario Regulation 347, Transportation of Dangerous Goods Act and Regulations, Ontario Regulation 153/04). - An excess materials management plan will be developed and implemented; - Pumped groundwater (if required) will be treated such that discharge considers TRCA²⁴ and City of Toronto water guidelines and requirements; - Dust control will be practiced during construction.	General: - Develop and implement an excess materials management plan - Develop and implement a health and safety plan be developed for construction workers For the 3500 Eglinton Avenue West property: - In accordance with Ontario Regulation 153/04 a Risk Assessment (RA) approach is proposed as part of the Eglinton Crosstown MSF project to protect human health and the environment during and following construction. A CPU will be issued for the site and must be followed with respect to risk management measures employed at the site. - The RA approach to be carried out for redevelopment of the 3500 Eglinton Avenue West site may formalize the requirements for protection of workers during construction. For the Ordnance property: - Ensure that the recommendations contained in the 2010 Phase 1 and Phase 2 ESAs for management of

²⁴ As a Crown Agency, GO/Metrolinx is exempt from the Conservation Authorities Act and as such does not have a requirement to apply for and obtain permits from conservation authorities. Wherever possible, GO/Metrolinx will engage the conservation authority on specific projects (or components thereof) and will adhere to requirements when and where possible.

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
			contaminated material at the Ordnance St. site are followed during the detailed design phase and construction phases.
Natural Environment – Stormwater Management	- The conceptual design plan for the new EMU maintenance facility at 50 Resources Rd. indicates that tracks from the site may be in a crossing conflict with the existing stormwater management (SWM) pond (adjacent to the site)serving the immediately adjacent industrial/commercial sites. - The change in the ground surface at the Ordnance paralleling station facility location from current conditions may result in alterations to the current storm water drainage patterns.	- If deemed necessary during preliminary and/or detailed design, the recommended option for altering/modifying/relocating the existing SWM pond will be confirmed prior to operation of the proposed EMU Maintenance Facility. - During detailed design, a stormwater management plan/design for the Ordnance site will be carried out,	50 Resources Rd. site: - If deemed necessary during preliminary and/or detailed design, the recommended option for altering/modifying/relocating the existing SWM pond will be confirmed prior to operation of the proposed EMU Maintenance Facility. Ordnance site: - During detailed design, a stormwater management plan/design will be carried out by Metrolinx and will address: quantity control, erosion control, and quality control. - To control both water quality and quantity of stormwater discharge, stormwater management measures will be defined as part of the detailed design phase of the project in accordance with the Ministry of the Environment’s Stormwater Management Planning and Design Manual (2003). - The stormwater management plan/design will be developed in consultation with MOE, City of Toronto, and the Toronto and Region Conservation Authority (TRCA)²⁵, as appropriate.

²⁵ As a Crown Agency, GO/Metrolinx is exempt from the Conservation Authorities Act and as such does not have a requirement to apply for and obtain permits from conservation authorities. Wherever possible, GO/Metrolinx will engage the conservation authority on specific projects (or components thereof) and will adhere to requirements when and where possible.

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
Cultural Heritage	- Potential displacement of heritage attributes and/or disruption of setting due to: attachment of OCS structure(s), and/or addition of a bridge protection barrier, and/or attachment of a grounding grid, and/or potential alteration of the bridge deck at the following bridges (CHRs): - Bathurst Street Bridge (CHR 1) - King Street Bridge (CHR 3) - Fort York Heritage Conservation District (CHR 35) - Wallace Avenue Pedestrian Bridge (CHR 7) - Rogers Road Bridge (CHR B5) - Jane Street Bridge (CHR B8) - Humber River bridge (CHR 13)	- Carry out further studies during detailed design, including CHERs and HIAs, as appropriate for each potentially affected bridge. - Implement the recommendations of HIAs (i.e., heritage attributes to be conserved) as appropriate in the final design plans. - Follow Metrolinx Interim Cultural Heritage Management Process (2013) for managing heritage assets.	- Carry out a Cultural Heritage Evaluation Recommendation Report (CHER) to identify heritage value and attributes (during detailed design); - If found to have cultural heritage value in accordance with the Metrolinx Interim Cultural Heritage Management Process (2013), a Heritage Impact Assessment (HIA) will be conducted (during detailed design) in consultation with the Ministry of Tourism, Culture and Sport and City of Toronto Heritage Preservation Services to further identify potential impacts and appropriate mitigation measures; - Undertake final design of the bridge following the recommendations (e.g., heritage attributes to be conserved) outlined in the HIA; - Follow Metrolinx Interim Cultural Heritage Management Process (2013) for managing heritage assets.
	The construction activities associated with installing bridge protection barriers, OCS attachments, and grounding grids to bridges/rail overpasses will have potential short-term disruption effects (e.g., introduction of physical, visual, noise-related, and atmospheric elements that are not in keeping with the character of the bridge) to the setting of those bridges that have been identified as CHRs.	- To minimize these potential temporary effects, staging areas (if required) should be carefully selected so that they are non-invasive and avoid all heritage attributes. In addition, pre-construction vibration studies may be required to mitigate any potential vibration related impacts (to be determined during detailed design). For Humber River Bridge specifically: - The mitigation measures as outlined above are to be implemented. - In addition, post-construction rehabilitation of the Humber River bridge piers should be carried out (should they be adversely affected during construction activities).	N/A
	- Potential effects on the heritage attributes within the Fort York Precinct including potential displacement and/or disruption of the original alignment of Garrison Creek, obstruction/disruption of identified/protected views (Viewpoints 4, 9e, and 20), and/or disruption of setting through the introduction of light sources (required for safety/security). - The construction activities associated with installing the paralleling station components have the potential to disturb/displace the original alignment of Garrison Creek and the original topography of Garrison Creek Ravine through the removal of soil. - In addition, construction activities will have	- A Visual Impact Assessment (VIA) should be carried out to determine the impact of the Paralleling Station on identified viewpoints to and from Fort York - To minimize potential temporary construction effects, staging areas (if required) should be carefully selected so that they are non-invasive and avoid all heritage attributes. - Pre-construction vibration studies may be required to mitigate any potential vibration related impacts (to be determined during detailed design). - Pre-construction conditions should be re-established through post-construction landscape treatments, where appropriate. - If possible, construction activities should avoid the removal of soil in the vicinity of Garrison Creek and the	- During detailed design, lighting (required for safety/security) within the Paralleling Station should be designed to have minimal impact to the darkness of Fort York - The detail design plans for the Paralleling Station should be submitted to Heritage Preservation Services at the City of Toronto and to the Friends of Fort York for review and comment prior to construction.

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
	potential short-term disruption effects (e.g., introduction of physical, visual, noise-related, and atmospheric elements) that are not in keeping with the character of the of Fort York Precinct	former Garrison Creek Ravine.	
Archaeology	As per the Stage 1 Archaeological Assessment, there is potential for archaeological remains to be encountered at the east end of the Ordnance paralleling station location.	Carry out a Stage 2 Archaeological Assessment prior to construction at the Ordnance Paralleling Station location).	- Carry out a Stage 2 archaeological assessment for the paralleling station site (including the proposed underground duct bank route) during detailed design. - Should additional property be required outside of the current plan, further archaeological assessment will be required. - Should previously unknown or unassessed deeply buried archaeological resources be uncovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the Ontario Heritage Act. Any person discovering human remains must immediately notify the police or coroner and the Registrar of Cemeteries, Ministry of Government Services. - Consultation with relevant Aboriginal communities will be initiated in the event that archaeological resources or human remains are discovered.
Land Use/Social Features	With respect to current land use zoning on the Resources Rd. site, land at the site is zoned as <i>Class 1 Industrial (I.C1)</i> 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.	N/A	As a Crown Agency, Metrolinx is not bound by zoning by-laws passed by municipalities under s.34 of the Planning Act and as such does not have a requirement to apply for and obtain zoning amendments. Metrolinx will consult with, and have regard for, the City of Toronto's planning policies with regard to specific projects (or components thereof) and will comply with the City's requests when and where reasonable.
	There is potential for temporary effects due to traffic disruption and nuisance effects (dust, noise) on land use and local residents during construction activities associated with installing the duct banks/feeders under Industry Rd. and Ray Ave. in this particular area.	The duration of required road closures during construction will be minimized to the extent possible and temporary traffic detours will be implemented in order to mitigate temporary effects related to access.	N/A
Property	Potential need to obtain property easements from public/private property owners in certain locations along the corridor where there is not sufficient horizontal clearance within the	During detailed design, further advancements to the OCS design will be made to determine whether the location of OCS portal structures can be refined in such a way that avoids the need for property acquisition/easements.	During the detailed design phase, requirements for any additional contractor storage areas, equipment maintenance areas, material laydown areas, areas required to obtain access for construction activities, etc.

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
	Metrolinx-owned rail ROW to accommodate OCS structure foundations, or where there is a need to install OCS structures attachments (e.g., retaining wall attachments).	Where this is not possible, Metrolinx will proceed with acquiring property easements in accordance with standard Metrolinx procedures and policies.	will be confirmed. These locations may require temporary property easement agreements with private and/or public property owners (i.e., City of Toronto). Therefore, Metrolinx will negotiate temporary construction easements with property owners on a case-by-case basis in accordance with standard Metrolinx procedures and policies. Following construction, Metrolinx will reinstate lands to pre-construction conditions.
Air Quality	Air emissions associated with UP Express electrification construction activities (as outlined in Section 5.13) will include dust (including PM2.5) and typical combustion emissions, which include PM2.5, NO2 and SO2, from construction equipment. These emissions are expected to be of relatively short duration and are unlikely to have any long term adverse effects on the surrounding area/environment.	Implement the following mitigation measures: - periodic watering of unpaved (non-vegetated) areas; - seed/re-vegetate all exposed soil as soon as possible; - periodic watering of any stockpiles; - limiting the speed of construction vehicular travel; - cover all trucks hauling excess material; - use of water sprays during the loading, unloading of any aggregate materials; - sweeping and/or water flushing of the entrances to the construction zones; and - install silt fences around site perimeter to prevent dust migration.	N/A
Noise	Temporary increase in sound levels above ambient conditions at nearby receptor locations during UP Express Electrification construction activities	- Metrolinx will engage relevant municipalities (City of Toronto, City of Mississauga) during construction planning to ensure that municipal concerns are addressed as much as possible in the construction plans prior to commencement of construction activities. - For work that is to occur outside of regular hours, the Contractor will be responsible for identifying the implications of noise generated, and to make construction work plans available to Metrolinx, in advance, for its review; - For work that has a high potential for noise impacts, the Contractor will be responsible for identifying the implications of the noise generated, and to make construction work plans available to Metrolinx, in advance, for its review; - Contracts shall include explicit indication that all construction equipment used on the project is to meet the sound level criteria from NPC-115 and be well maintained and operating with effective muffling devices	In the presence of persistent noise complaints, Metrolinx will consider undertaking confirmatory monitoring. In addition, noise monitoring may be required during the construction phase in the event that complaints are received in order to confirm that the construction equipment sound levels meet the criteria from MOE publication NPC-115.

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
		that are in good working order; - The separation distance between construction staging areas and nearby sensitive receptors is to be maximized to the extent possible to reduce noise impacts; - Any temporary roads for construction vehicle access are to be well maintained and free of pot-holes and ruts to avoid excessive noise from heavy vehicles travelling on uneven surfaces; - Metrolinx Community Relations staff will communicate construction work and respond to inquiries from residents - A Communications Protocol is to be established by Metrolinx for receiving, investigating and addressing construction noise inquiries from the public. - Upon receipt of a noise complaint, the Contractor will investigate (as required) to verify whether the established noise mitigation measures have been implemented appropriately, including verification of construction equipment sound levels per NPC-115; - In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures will be considered by Metrolinx. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives.	
	Potential for EMU Maintenance Facility operations (i.e., idling engines on the storage track) to cause sound level increase beyond the allowable limits as per NPC-300 at x receptor location.	A 5 m barrier adjacent to the storage track is proposed on the south side of the proposed maintenance facility.	It is recommended that the results of the noise modeling assessment carried out as part of the EA for the EMU Maintenance Facility be verified based on the subsequent Preliminary Design to be undertaken for the facility, in order to confirm that no additional noise mitigation measures are required in to achieve compliance with NPC-300.
Vibration	Temporary increase in vibration levels above ambient conditions at nearby receptor locations during construction activities	- For work that is to occur outside of regular hours, the Contractor will be responsible for identifying the implications of the vibration generated, and to make construction work plans available to Metrolinx, in advance, for its review; - For work that has a high potential for vibration impacts (e.g., installation of foundation), the Contractor will be	In the presence of persistent vibration complaints, Metrolinx will consider implementing a measurement program to evaluate vibration impacts

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
		responsible for identifying the implications of the vibration generated, and to make construction work plans available to Metrolinx, in advance, for its review; - Construction equipment with potential to cause off-site vibrations will be operated as far away from vibration-sensitive sites as possible; - Where possible, activities that have potential to cause off-site vibrations will be phased such that as few as possible are occurring simultaneously; - Construction activities that have potential to cause off-site vibration during the night-time hours will be avoided wherever possible; - Metrolinx Community Relations staff will communicate construction work and respond to inquiries from residents - A Communications Protocol is to be established by Metrolinx for receiving, investigating and addressing construction vibration inquiries from the public. - The Contract documents shall contain a provision that any initial vibration complaint will trigger verification that the general vibration control measures as agreed to are in effect - In the presence of persistent vibration complaints, Metrolinx will consider implementing a measurement program to evaluate the vibration impacts - In the presence of persistent complaints and subject to the results of a field investigation, alternative vibration control measures may be considered as required, where reasonably available. In selecting appropriate vibration control measures, consideration will be given to the technical, administrative and economic feasibility of the various alternatives.	
Visual	Visual effects associated with gantries (including on scenic resources of park and residential areas).	- Implement screening measures where feasible to screen views of the gantry structures. - Undertake further review (during detailed design) of gantry design by Metrolinx Design Review Panel, in consultation with the City of Toronto to identify potential visual enhancements.	Undertake further review (during detailed design) of gantry design by Metrolinx Design Review Panel, in consultation with the City of Toronto to identify potential visual enhancements and mitigation measures for the gantries.

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
	Visual effects associated with OCS components and/or bridge barrier on/attached to bridges/rail overpasses	- Locate OCS structures away from existing bridge structures, where possible, to limit visibility to public viewing areas traversing corridor. - Undertake further review (during detailed design) of OCS on/attached to bridges, and bridge barriers by Metrolinx Design Review Panel, in consultation with the City of Toronto to identify potential visual enhancements.	Undertake further review (during detailed design) of gantry design by Metrolinx Design Review Panel, in consultation with the City of Toronto to identify potential visual enhancements and mitigation measures for the OCS on/attached to bridges, and proposed bridge barriers.
	Visual effects associated with external elements (including transformers) of paralleling stations	- Implement screening and innovative site planning for the paralleling stations, where feasible, to ensure external yard and transformers are hidden. - Undertake further review (during detailed design) of paralleling station designs by Metrolinx Design Review Panel, in consultation with the City of Toronto to identify potential visual enhancements.	Undertake further review (during detailed design) of gantry design by Metrolinx Design Review Panel, in consultation with the City of Toronto to identify potential visual enhancements and mitigation measures for the paralleling stations.
	Visual effects associated with OCS support structures (portals) placed approximately every 50-65 metres along the corridor at heights between 8 to 12 meters.	Undertake further review (during detailed design) of the OCS by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design to identify potential visual enhancements to OCS structures.	Undertake further review (during detailed design) of gantry design by Metrolinx Design Review Panel, in consultation with the City of Toronto to identify potential visual enhancements and mitigation measures for the OCS design.
	- Visual effects (lighting) associated with the Fort York Heritage District - since security lighting will be required at the Ordnance paralleling station, this will represent a new light source that may have minor effects on the Fort York area at night. - Visual effects (lighting) related to security lighting required at the 3500 Eglinton Avenue West paralleling station	- With respect to the Ordnance paralleling station, ensure lighting design adheres to 'Dark Sky' policy to reduce impact. - With respect to the 3500 Eglinton Avenue West paralleling station, lighting should be sensitively designed due to historic and adjacent land use surroundings.	- During detailed design, ensure that lighting design for the to the Ordnance paralleling station adheres to 'Dark Sky' policy - During detailed design, ensure that lighting is sensitively designed for the 3500 Eglinton Avenue West paralleling station
	- Visual effects on views of nearby Weston Heritage Conservation District (HCD) due to the introduction of the paralleling station at 3500 Eglinton Avenue West (former Kodak site). - Visual effects due to implementation of 3500 Eglinton Ave. W. paralleling station on nearby residents	- During detailed design, consider options for situating the paralleling station in a location on the 3500 Eglinton Avenue West site that is screened from existing 'Building 9' (heritage feature), Mount Dennis Mobility Hub, and Industry St. (if possible). - Consideration of screening options by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design.	- During detailed design, consider options for situating the paralleling station in a location on the 3500 Eglinton Avenue West site that is screened from existing 'Building 9' (heritage feature), Mount Dennis Mobility Hub, and Industry St. (if possible). - Consideration of screening options by Metrolinx's Design Review Panel in coordination with the City of Toronto during detailed design.

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
	The EMU Maintenance Facility at Resources Road is well-sited with respect to minimizing visual effects.	Consider enhancement measures as part of detailed design (e.g., landscaping)	Consider enhancement measures as part of detailed design (e.g., landscaping) of the EMU Maintenance Facility
Traffic	The traffic study concluded that the proposed EMU Maintenance Facility development at 50 Resources Rd. will not have significant negative impacts on the adjacent road network since the total site volumes to be generated will be less than 100 trips per peak direction.	N/A	The following recommendations will be further considered by Metrolinx during preliminary and/or detailed design: - The proposed 20 m width for the East Entrance be reduced to not more than 15 m. - The requirements for truck circulation in the area of the frontage at the main building including the turnaround should be identified/confirmed through a design review using the truck turning templates. - It is suggested that the proposed sidewalk between the West Entrance and main building adjacent to the visitor parking lot be made as continuous as possible by adding sidewalk sections across the parking modules. - Conflicting movements will occur at the West Entrance, the entrance to the employee parking lot and the internal driveway. It is suggested that the layout of the west parking area and entrance to this lot be revised to eliminate the access to the north parking module from the internal roadway and to increase the separation between the internal driveway and entrance to the parking lot; - The proposed number of parking spaces in the employee parking lot exceeds the estimated parking spaces based on the employee shift overlap strategy. It is recommended that an additional three (3) accessible parking spaces be provided in the employee only parking lot by converting the regular parking spaces into the accessible parking spaces along the easterly parking aisle.
Utilities (General)	Potential to encounter utility conflicts during construction of UP Express Electrification project components.	Avoid conflicts to the extents possible through further assessment based on detailed design plans.	During the Detailed Design phase, a detailed assessment of additional utility conflicts due to the proposed UP Express Electrification infrastructure will be undertaken by Metrolinx to identify requirements for relocating utilities.

Environmental Factor	Potential Effects	Mitigation Measures	Monitoring/Commitments to Future Work
Utilities (Buried Reinforced Concrete)	Due to the metal in this utility, there is a potential for unsafe step and touch potential.	Provide two grounding connections between the utility and the static wire, one at either edge of the rail ROW. Each connection shall consist of a stranded copper wire (min. 25 mm²) exothermically welded to the embedded rebar or via heavy duty rebar clamps, and a pole to connect to the static wire.	N/A
Utilities (Buried Metal)	Due to the metal in this utility, there is a potential for an unsafe step and touch potential.	Provide two grounding connections between the utility and the static wire, one at either edge of the rail ROW. Each connection shall consist of a stranded copper wire (min. 25 mm²) exothermically welded to the metal pipe or via grounding clamps, and a pole to connect to the static wire. Also replace two 2m sections of the pipe at the edge of the rail ROW beyond the ground connection with insulated joints (non-metal pipe).	N/A
Utilities (Overhead with Inadequate Clearance)	Code²⁶ required clearances would not be met, which could result in unsafe conditions.	Raise wires and associated supporting structure to provide adequate clearance.	N/A
Utilities (Copper Communications wires)	Electromagnetic interference could result in interference of communications.	Replace copper wires with fibre optic lines within 10m of Electrified Tracks.	N/A
Electromagnetic Fields	Based on the results of the EMF survey, and estimation of the maximum EMF levels at the railway right of way for the electrified UP Express railway (i.e., 1 kV/m), it is anticipated that EMF levels for human exposure will be within the industry limits as outlined in Tables 6.22 and 6.23 once the UP Express is electrified. No potential adverse EMF effects identified.	N/A	Undertake Additional EMF Studies/Testing: - Additional analysis during the detailed design phase will be required to verify the results of this EMF assessment, and will include consideration of electrified rolling stock specifications. - The plans developed during the detail design phase will also specify the verification method for the commissioning phase in order to ensure the emissions of the deployed UP Express system are within limits permitted by the above listed standards.
Electromagnetic Interference	- Based on the implementation of the mitigation measures as outlined in Section 10 of the EMC Report contained in Appendix H, no adverse net effects due to ELF EMI are anticipated. - Based on compliance with Industry Canada's frequency allocation plan and emission limits for radios along the electrified UP Express corridor, no adverse net effects due to RF EMI are anticipated.	Carry out additional analysis during detailed design to review/confirm the results of the EMF/EMI assessment.	The following additional analysis/measures will be implemented/carried out during detailed design/construction/operations phase: - Prepare EMC Analysis Report (Detailed Design) - Frequency Management Plan (Detailed Design) - Compliance testing during Construction Phase - Implement tests and maintenance procedures during operations phase
Stray Current	No potential effects identified.	N/A	N/A

²⁶ CSA C22.3 No. 1-06, as well as specific utility owner standards/requirements.

*N/A = Not applicable