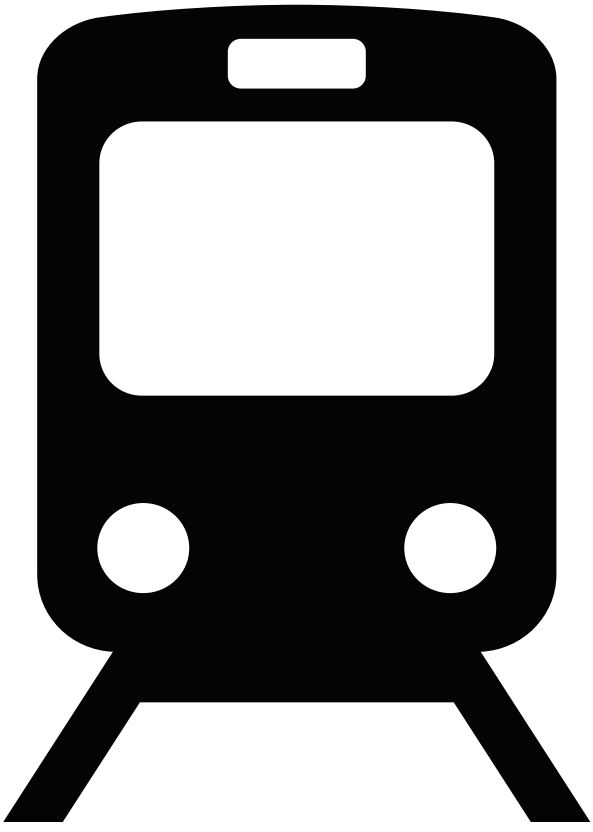
EGLINTON CROSSTOWN WEST EXTENSION

ENVIRONMENTAL PROJECT REPORT – 2020 ADDENDUM

APPENDIX D

NOISE AND VIBRATION IMPACT ASSESSMENT REPORT



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EGLINTON CROSSTOWN WEST EXTENSION

Transit Project Assessment Process
Noise and Vibration Impact Assessment Report

May 2020

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Metrolinx
Eglinton Crosstown West Extension
Contract: TC85-3A

Noise and Vibration Impact Assessment Report

Issue and Revision Record					
Rev	**Date**	**Originator**	**Checker**	**Approver**	**Description**
A	May 29, 2020	Brendan Mahoney	Mervyn Choy	Marianne Alden	For Information

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Acronyms

4T	4Transit
AGT	Automated Guided Transit
CadnaA	Computer Aided Noise Abatement software (Version: 2019; build: 165.4900) used for air-borne noise analysis
CP	Cross Passage
Daytime Adjusted Noise Impact	The difference between the pre-project and post-project daytime (0700-2300h) noise levels
dBA	A-weighted decibel, referencing either sound pressure level or sound power level depending on context
DZOI	Damage Zone of Influence
ECLRT	Eglinton Crosstown Light Rail Transit
ECWE	Eglinton Crosstown West Extension
EEB	Emergency Exit Building
EPR	Environmental Project Report
ES	Extraction Shaft
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information System
GTHA	Greater Toronto and Hamilton Area
HRF	High Resilience Fasteners
L_{PASSBY}	Equivalent sound level of one train passby over the passby time interval
L_{EQ}	Equivalent sound level - logarithmic average of sound level over a specified time period
$L_{EQ,1}$	One-hour equivalent sound level

$L_{EQ,16}$	Daytime (0700-2300h) equivalent sound level
$L_{EQ,8}$	Nighttime (2300-0700h) equivalent sound level
LRT	Light Rail Transit
LRV	Light Rail Vehicle
LS	Launch Shaft
MFR	Multi-Family Residence (e.g., apartment)
MOEE	Ministry of Electricity and Energy
MS	Maintenance Shaft
Nighttime Adjusted Noise Impact	The difference between the pre-project and post-project nighttime (2300-0700h) noise levels
NVIA	Noise and Vibration Impact Assessment
PPV	Peak Particle Velocity
RMS	Root-Mean-Square
ROW	Right-of-Way
SFR	Single Family Residence
TBM	Tunnel Boring Machine
TNM	Traffic Noise Model
TPAP	Transit Project Assessment Protocol
TPSS	Traction Power Substation
TTC	Toronto Transit Commission
VdB	Vibration decibel used for defining ground-borne vibrations
VR	Vibratory Roller
ZOI	Zone of Influence

1. Introduction

On May 17, 2010, the Minister of the Environment, Conservation and Parks (previously the Minister of the Environment; the Minister) for the Province of Ontario issued a Notice to Proceed to the Toronto Transit Commission (TTC) and the City of Toronto for the Eglinton Crosstown Light Rail Transit (ECLRT) Project, a 33-kilometre electrically-powered Light Raid Transit (LRT) line extending from the Lester B. Pearson International Airport in the City of Mississauga, to Kennedy Station in the City of Toronto. The basis for that Notice was the Environmental Project Report prepared in 2010 (2010 EPR) as part of the *Transit Project Assessment Process (TPAP)* found in Ontario Regulation (*O. Reg.) 231/08* under the Ontario Environmental Assessment Act.

The 2010 Environmental Project Report (EPR) for the Eglinton Crosstown LRT was undertaken by the City of Toronto and the TTC as co-proponents. Subsequently, in 2012, Metrolinx became the sole proponent for the ECLRT Project and initiated an EPR Addendum for changes to the approved ECLRT Project between Keele Street to Jane Street, as well as the Maintenance and Storage Facility at Black Creek. Assessment of these changes to the 2010 EPR was documented in the 2013 EPR Addendum. After a 30-day public comment period, and the 35-day review by the Minister, the Minister issued a Notice to Allow a Change to the Transit Project in accordance to *O. Reg, 231/08* in December 2013. Construction of the ECLRT Project is currently underway between Kennedy Station and Mount Dennis Station.

In April 2019, the province announced a $28.5 billion expansion to Ontario's transit network in an effort to bring relief and new opportunities to transit users and commuters. This rapid transit project plan includes the new Ontario Line (formerly the Downtown Relief Line), the Yonge North Subway Extension, the three-stop Scarborough Subway Extension, and the extension for Eglinton Crosstown West between Mount Dennis Station and Renforth Drive.

Since the completion of the 2010 EPR and 2013 EPR Addendum, a number of changes have been proposed to the segment of the ECLRT project between Mount Dennis Station in the City of Toronto and Renforth Drive in the City of Mississauga, known as the Eglinton Crosstown West Extension (ECWE) (the Project) shown in Figure 1-1. The changes to the Project, were determined to be inconsistent with a previously approved EPR and requires a reassessment of the impacts associated with the project, the identification of potentially new mitigation measures, and potentially new monitoring systems, in accordance with the addendum process prescribed in *O. Reg. 231/08*.

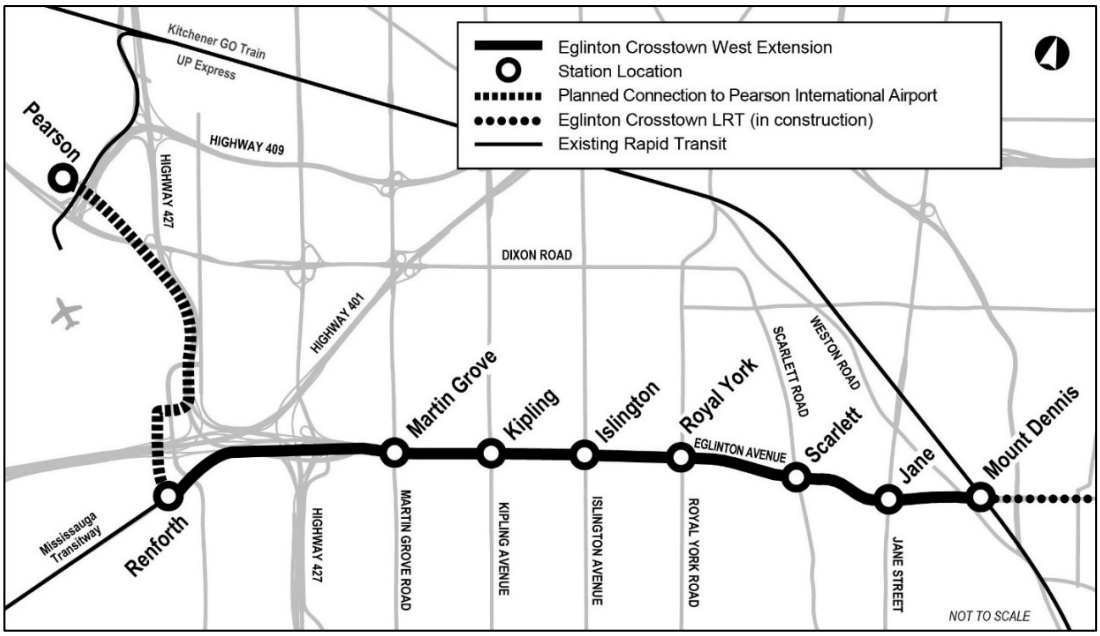

Figure 1-1: Eglinton Crosstown West Extension

A connection to Lester B. Pearson International Airport (as originally part of the 2010 ECLRT Project) is also being considered. This planned connection, between Renforth Drive and Lester B. Pearson International Airport, will be assessed separately in accordance with the addendum process prescribed in *O. Reg. 231/08*.

1.1 Summary of Proposed Design Changes

The proposed design changes currently being assessed in accordance with *O. Reg. 231/08* are as follows:

Vertical Alignment

- The Project alignment (approximately 9.2 km in length) will run mostly underground along Eglinton Avenue West from the future Mount Dennis ECLRT Station in the City of Toronto to Renforth Drive in the City of Mississauga;
- The Project will be underground from Mount Dennis Station to east of Jane Station; elevated east of Jane Street to west of Scarlett Road; underground from west of Scarlett Road to east of the Renforth portal; and transitions to partially at-grade to Renforth Station;
- The Project features three portals, which serve as approach entrances where the alignment transitions between underground and elevated, at the following locations:
  - East of Jane Street;
  - West of Scarlett Station; and
  - West of Renforth Drive.

Stations and Ancillary Features

- There will be a total of seven stations between Mount Dennis Station and Renforth Drive:
  - Scarlett and Jane Stations will be elevated;
  - Martin Grove, Kipling, Islington and Royal York Stations will be below grade and include associated ancillary features (e.g., vent shafts, Traction Power Substations (TPSSs); Emergency Exit Buildings (EEBs), Cross Passages (CPs)); and
  - The new terminal station at Renforth will be partially at-grade.

Emergency Exit Buildings

Six new EEBs are located along the underground portion of the alignment at the following locations:

- EEB-1 - located near 4000 Eglinton Avenue West, east of Royal York Road;
- EEB-2 - located west of Russell Road and Eden Valley Drive;
- EEB-3 - located east of Wincott Drive/Bemersyde Drive;
- EEB-4 - located west of Mimico Creek;
- EEB-5 - located between the on and off ramps of Highway 427; and
- EEB-6 - located immediately west of the hydro corridor at Eglinton Avenue West.

Construction

The underground section will be constructed using a Tunnel Boring Machine (TBM) between stations and a cut and cover method at stations and portal locations. A proposed Extraction Shaft (ES), Maintenance Shaft (MS), and Launch Shaft (LS) for the TBM will be located in the following areas:

- A LS for the TBM will be located adjacent to Renforth Station;
- A MS will be located near the west end of the Islington Station. This will be removed at the end of construction; and
- An ES for the TBM will be located west of Scarlett Road.

A new bridge across the Humber River east of Scarlett Road will be constructed as part of the elevated guideway, including two elevated stations (i.e., Jane Station and Scarlett Station).

Table 1-1 compares the project components, as assessed in the 2010 EPR and 2013 EPR Addendum, against the proposed design changes currently being assessed for this Project and provides a rationale for these changes. These changes to the Project were determined to be inconsistent with the 2010 EPR and 2013 EPR Addendum. As described in Section 15 of *O. Reg. 231/08*, any change that is inconsistent with a previously approved EPR requires a reassessment of the impacts associated with the project, the identification of potentially new mitigation measures, and potentially new monitoring systems in an Addendum to the previously approved EPR. This Noise and Vibration Impact Assessment Report documents the reassessment of the impacts associated with the project, the identification of potentially new mitigation measures, and potentially new monitoring systems.

Table 1-1: Differences between 2010 EPR, 2013 EPR Addendum and 2020 EPR Addendum

Project Component	2010 EPR and 2013 EPR Addendum	2020 EPR Addendum	Rationale for Change
Vertical Alignment	The 2010 EPR proposed: • An at-grade alignment from Lester B. Pearson International Airport to Weston Road with a new bridge over Highway 401 to connect Convair Drive to Commerce Boulevard; and • Operational crossovers and storage (pocket) tracks between Commerce Boulevard and Renforth Drive and east of the Martin Grove Road stop to provide operational flexibility and allow LRT vehicles to change travel directions from one track to another. In the 2013 EPR Addendum, changes to the alignment were proposed including: • Revised LRT alignment between Jane Street and Keelesdale Park from surface alignment with surface stops to a completely grade-separated alignment; • Revised track alignment connecting the mainline and the proposed Black Creek Maintenance and Storage Facility (MSF) from an at-grade connection to a grade-separated connection; and • New passenger tunnel connection under the GO Transit Kitchener Rail and Canadian Pacific Railway corridors.	The 2020 EPR Addendum is proposing: • Below grade alignment from Mount Dennis Station to east of Jane Street; • Elevated guideway from east of Jane Street to west of Scarlett Road; • Below grade alignment from west of Scarlett Road to west of Renforth Drive; • Partially below grade alignment from Renforth Drive to Renforth Station; • Portal located just east of Jane Street when the alignment transitions from underground to the elevated guideway; • Portal for the advanced tunnelled construction located west of Scarlett Station; and • Portal located west of Renforth Drive.	The change in alignment from at-grade to underground and elevated provides: • More reliable service due to full grade separation; • Higher level of protection from severe weather; • Increased number of Greater Toronto and Hamilton Area (GTHA) jobs accessible by transit in 45 minutes; • Greater reduction in Greenhouse Gas emissions; • Greater increase in GTHAs two-hour peak travel time savings; • Larger increase in Transitway and Crosstown weekly boarding's to reduce the connectivity gap; • Reduced property impacts; and • Reduced potential flooding impacts at the Humber River crossing.
Stations and Ancillary Features	The 2010 EPR proposed: • 17 median surface stops at Jane Street, Scarlett Road, Mulham Place, Royal York Road, Russell Road/Eden Valley Drive, Islington Avenue, Wincott Drive/Bemersyde Drive, Kipling Avenue, Widdicombe Hill Boulevard/Lloyd Manor Road, Martin Grove Road, The East Mall,	A total of seven stations between Mount Dennis Station and Renforth Drive: • Scarlett and Jane Stations are elevated; • Martin Grove, Kipling, Islington and Royal York Stations are below-grade with associated ancillary features (e.g., vent shafts, TPSSs, EEBs, CPs);	Change in number of stations provides benefits in terms of: • Construction complexity and cost for below-grade stations; and • Reduced property impacts.

Project Component	2010 EPR and 2013 EPR Addendum	2020 EPR Addendum	Rationale for Change
	Rangoon Road, Renforth Drive, Commerce Boulevard, Convair Drive, Silver Dart Drive, and Lester B. Pearson International Airport. In the 2013 EPR Addendum, considerations to stops and other ancillary features included: • Consolidation of the Weston Stop and the Black Creek Stop into one new underground Mount Dennis Station located at the GO Transit Kitchener Rail corridor; • Addition of the Black Creek MSF site at Mount Dennis; and • Addition 15-bay bus terminal and Passenger Pick Up and Drop off at the Mount Dennis Station.	• New terminal station at Renforth Drive is partially at-grade; and • Stations at Rangoon Road, The East Mall, Widdicombe Hill Boulevard/Lloyd Manor Road, Wincott Drive/Bemersyde Drive, Russell Road/Eden Valley Drive and Mulham Place were removed from the Project.	
Emergency Exit Buildings (EEB)	No emergency exits along this section in either the 2010 EPR or the 2013 EPR Addendum as the alignment was at-grade.	Six EEBs at the following approximate locations: • EEB-1 - near 4000 Eglinton Avenue West, east of Royal York Road; • EEB-2 - west of Russell Road and Eden Valley Drive; • EEB-3 - east of Wincott Drive / Bemersyde Drive; • EEB-4 - west of Mimico Creek; • EEB-5 - between the on and off ramps of Highway 427; and • EEB-6 - immediately west of the hydro corridor at Eglinton Avenue West.	Emergency exits for passengers and emergency access for fire fighters are required for tunnels under the National Fire Protection Agency Standard 130. The distance between EEBs and station platform must not exceed 762 m.
Construction	The 2010 EPR proposed: • At-grade construction between Mount Dennis and Renforth Drive with dedicated runningway along the centre line of Eglinton Avenue West, Commerce Boulevard, and Convair Drive; • Cut and cover method will be used to construct stations, portals, and special track work;	• Elevated guideway from east of Jane Street to west of Scarlett Road; • Two elevated stations (Scarlett and Jane). There is potential for impacts to the pedestrian bridge west of Scarlett Road due to the portal; and	Construction is required to build the alignment and new stations. Refer to the rationale for change listed under Vertical Alignment and Stations and Ancillary Features above.

Project Component	2010 EPR and 2013 EPR Addendum	2020 EPR Addendum	Rationale for Change

	• Road widening, reconstruction of curb lines and associated sidewalk modifications;
	• Relocation of utilities and relocation of traffic signals and provision of temporary traffic signals;
	• Roadway resurfacing following roadway reconstruction;
	• Construct LRT facilities within the LRT Right-of-Way (ROW);
	• Construct streetscaping and urban design elements and provide bicycle lanes on both sides of the roadway;
	• Widening of the existing single span bridge structure over Mimico Creek to accommodate the LRT ROW; and
	• Construction of a multi-span structure over Highway 401.
	
	The 2013 EPR Addendum proposed:
	• Cut and cover construction at Mount Dennis Station and locations of special track work (focused to 150 m long sections at each station), tail tracks and where the LRT emerges through a tunnel portal to match back into grade along the median of Eglinton Avenue West, and in the underground section west of Weston Road.
		• Underground section to be constructed using twin tunnelling method between stations and cut and cover method at stations and at portal locations.
		
		Underground tunnel construction approach:
		• A LS for the TBM will be located adjacent to Renforth Station, a MS will be located at the west end of Islington Station, and an ES for the TBM will be located west of Scarlett Road;
		• Install headwalls, where required, at both ends of EEBs and stations;
		• Tunnel structure constructed using precast concrete tunnel liner segments that are installed as the TBM progresses;
		• Excavated soils will be removed from work site for off-site disposal and
		• EEBs will be constructed once the TBM has completed the tunnelling. Construction is similar to station construction.
		
		As part of the above ground construction:
		• A new bridge across the Humber River east of Scarlett Road will be constructed as part of the elevated guideway, including two elevated stations (i.e., Jane Station and Scarlett Station). Construction of the new bridge will include:
		  • Building foundations for piers;
		  • Constructing piers;
		  • Building and placing bridge sections; and
		  • Installing systems and track.	

2. Purpose/Scope

The purpose of this Noise and Vibration Impact Assessment (NVIA) is to assess the noise and vibration impact of ECWE Project operations on the surrounding community during construction and once fully implemented in 2031. The NVIA is required to support the EPR Addendum as the previous assessment was completed in 2010 [R-1].

The rail alignment follows Eglinton Avenue West, extending 9 km west from Mount. Dennis Station to Renforth Drive, adding seven additional stations. The alignment has been revised to be primarily below-grade (underground) except for the elevated track over the Eglinton Flats and partially at-grade track near the Renforth terminus.

This report assesses the community noise and vibration impact from both construction and post-project (i.e., operational) activity and compares them to the pre-project conditions. Pre-project noise is considered the baseline. The baseline is ambient noise within the study area that does not include noise from the proposed project. Post-project noise sources such as the proposed light rail vehicle and ancillary equipment supporting ECWE operation (TPSS and ventilation for stations and tunnels) are considered new sources. Underground station platform ventilation noise was considered. However, these stations will be fully automated, without the requirement of air conditioned spaces for fare operators. Similarly above ground and elevated stations will be fully automated and will not have a public address system. Therefore, these open air stations will act more like stops and will not have a significant community noise contribution.

Since there are no existing significant vibration sources along the proposed alignment such as existing freight or commuter rail, the absolute community vibration impact from the new light rail vehicle is assessed. For elevated and uncovered segments, air-born noise, ground-borne noise, and ground-borne vibration are considered. For underground segments, ground-borne noise and vibration are considered. Ground-borne noise and vibration are assessed based on the Federal Transit Administration (FTA) General Vibration Assessment [R-2].

For the air-borne noise assessment, all receptors within 300 m of either side of the rail are considered with the worst-case receptors selected for assessment. For stationary sources including construction sites, a 500 m radius study area is selected. For the vibration and ground-borne noise assessment, the study area will span 140 m, 50 m, and 30 m for category I, II, and III respectively as defined in the FTA Transit Noise and Vibration Impact Assessment Manual [R-2].

Stationary sources considered in this study include ventilation systems required for the underground segments and station platforms, and the TPSSs located along the Eglinton corridor.

To evaluate and identify any adverse effects of the noise and vibrations during the construction phase of the project, a construction NVIA is included in this report. The study encompasses the footprints for the construction of the alignment (tunnels and above ground track), stations, portals, TPSSs, and the EEBs. Within the respective sites, sources of noise

and vibration may include installation of new track, road, buildings, new switches, as well as construction of the station itself. Additionally, noise and vibration level of these construction activities may vary depending on the types, quantity of the different construction equipment, different duty cycles of each piece of equipment, and hours of operation per piece of equipment.

3. Applicable Criteria

The noise and vibration metrics applied to this project are defined in Table 3-1.

Table 3-1: Noise and Vibration Metrics

	Metric	Units	Definition
Noise	Daytime Adjusted Noise Impact	dB	The difference between the pre-project and post-project daytime (0700-2300h) noise levels.
	Nighttime Adjusted Noise Impact	dB	The difference between the pre-project and post-project nighttime (2300-0700h) noise levels.
	L_{PASSBY}	dBA	Equivalent sound level of one train passby over the passby time interval.
	$L_{EQ,1}$	dBA	One-hour equivalent sound level.
	$L_{EQ,16}$	dBA	Daytime (0700-2300h) equivalent sound level.
	$L_{EQ,8}$	dBA	Nighttime (2300-0700h) equivalent sound level.
Vibration	RMS Velocity	mm/s	The one-second rolling Root-Mean-Square (RMS) vibration level during a train passby.
	Peak Velocity	mm/s	The one-second rolling Peak Particle Velocity (PPV) read at the nearest building during a construction activity

The limits specified in Table 3-2 and Table 3-3 are applicable to this project for the light rail vehicle and stationary sources, respectively. Ground-borne noise limits resulting from above and underground rail activity are specified in the FTA Manual [R-2]. Mitigation options will be assessed in areas where the specified limits are exceeded. Table 3-4, Table 3-5, and Table 3-6 state the construction noise criteria and vibration limits.

Stationary sources are only assessed with air-borne noise modelling since these sources are not expected to produce significant vibrations.

Receptor locations were identified using MECP Environmental Noise Guideline NPC-300 [R-10]. NPC-300 is the latest provincial protocol that includes noise from Rail activity. Receptor locations assessed in accordance with NPC-300 are discussed further in Section 4.

Table 3-2: LRV Sound and Vibration Level Criteria per [R-2] and [R-9]

Source Type	Noise/Vibration	Metric	Limit	
Light Rail	Air-borne Noise*	Daytime Adjusted Noise Impact $L_{EQ,16}$	5 dB relative to the higher of pre-project sound levels or 55 dBA.	
		Nighttime Adjusted Noise Impact $L_{EQ,8}$	5 dB relative to the higher of pre-project sound levels or 50 dBA.	
		L_{PASSBY}	80 dBA	
	Vibration	Vibration Velocity RMS	0.1 mm/s RMS (absolute)	
	Ground-borne Noise**	Sound pressure level $L_{EQ,1sec}$	Residential	35 dBA
			Institutional	40 dBA

* Applies to exposed (i.e., above-ground and open) segments only.
** Applies to underground segments only.

The Eglinton corridor corresponds with NPC-300's definition of a Class 1 urban environment. The study area is considered a Class 1 area because the Eglinton corridor is dominated by human activity throughout the day and night, particularly from Eglinton Avenue West, Highway 401, and Highway 427.

Table 3-3: Stationary Sound Level Criteria per NPC-300 [R-10]

Source Type	Location	Time	Class 1 - Urban Limits ($L_{EQ,1}$)
Stationary Source	Outdoor	0700 - 1900h	Higher of 50 dBA or ambient
		1900 - 2300h	Higher of 45 dBA or ambient
	Façade	0700 - 1900h	Higher of 50 dBA or ambient
		1900 - 2300h	Higher of 50 dBA or ambient
		2300 - 0700h	Higher of 45 dBA or ambient

Table 3-4: Construction Noise Criteria per Metrolinx Guidelines and Industry Best Practice, [R-11], and [R-12]

Land Use	LEQ (15-h, 9-h) (dBA)		LEQ (15-minute) (dBA)		LMAX (dBA)	
	Day (07:00- 22:00)	Night (22:00- 07:00)	Day (07:00-22:00)	Night (22:00-07:00)	Day (07:00-22:00)	Night (22:00-07:00)
Residential - Weekday	Louder of: 75 or Baseline+5	Louder of: 65 or Baseline+5	85	75	90	80
Residential - Weekend & Holiday	Louder of: 70 or Baseline+5	Louder of: 60 or Baseline+5	75	65	90	80
Institutional	Louder of: 70 or Baseline+5	Louder of: 60 or Baseline+5	75	65	90	80
Commercial	Louder of: 80 or Baseline+5	None	None	None	None	None
Industrial	Louder of: 85 or Baseline+5	None	None	None	None	None

Table 3-5: Construction Vibration Criteria

Target of Guidance/ Criteria	Source of Guidance/ Criteria	Description of Criteria
Public Annoyance	1995 MOEE/GO Transit Protocol	Vibration Velocity not to exceed 0.14 mm/s RMS or current conditions (whichever is higher), evaluated using a crest factor of 4[1].
Building Damage	City of Toronto By-Law 514-2008	PPV to be limited 8-25 mm/s, depending on frequency range of vibration signal.
Zone of Influence	City of Toronto By-Law 514-2008	Zone to be based on a PPV of 5 mm/s.

Table 3-6: FTA Construction Vibration Limits [R-2]

Category	Building Description	Criteria (mm/s)
Construction Vibration Damage Levels (PPV)	Reinforced-concrete, steel or timber (no plaster).	13
	Engineered concrete and masonry (no plaster).	8
	Non-engineered timber and masonry buildings.	5
	Buildings extremely susceptible to vibration damage.	3

3.1 Municipal By-Law Restrictions

Under City of Toronto Municipal Code Chapter 591 dated 2019-09-30, restrictions are put in place for the time of day that construction activity is allowed to occur without permitting. However under Article 3 (591-3.1.D), exemptions are made for 'Government work'. As this project is under taken by Metrolinx, a provincial agency, it is considered 'Government work'. Therefore, the project is lawfully exempt from restrictions under City of Toronto Municipal Code Chapter 591.

Under City of Mississauga Noise Control By-Law 360-79, Noise and Vibration restrictions are put in place for the time of day that construction activity is allowed to occur without permitting. For construction activity planned to occur all day Sundays and statutory holidays, as well as; 19:00 of one day to 07:00 the next day, permits are required according to the bylaw. Since Metrolinx is a provincial agency, it has been argued that it can be considered exempt from municipal bylaws. However by-law and permitting considerations should be discussed with the City of Mississauga for segments of the project that are within this municipality.

[1] The crest factor is the conversion between RMS and Peak velocity. A crest factor of 4 dictates that the peak velocity is 4x the RMS velocity.

4. Points of Reception

4.1 Noise Sensitive Receptors

For this assessment, sensitive receptors to noise and/or vibration are assessed at specific locations. Within the study area of this assessment, the receptors are predominantly residential dwellings. The residential point of reception for noise is considered at two locations: the plane of the dwelling window and the outdoor living area. Outdoor living area receptor location is only considered during daytime hours and is evaluated at 3 m from the most exposed building façade, 1.5 m above grade. During nighttime hours, only the plane of the building façade at a height of 4.5 m is considered. For multi-story buildings, bedroom windows will be assumed on the second floor or higher, with the worst-case receptor selected. Several institutional and commercial receptors are present along the corridor (particularly schools, nursing homes, and places of worship). These receptors are assessed as necessary on an individual basis.

Representative receptors on either side of the above-ground rail are selected for assessment based on the FTA Manual for the air-borne noise assessment [R-2]. Where receptors are adjacent to multiple receptors of similar configuration, worst-case receptors that encompass the range of impacts are selected. For stationary sources, the worst-case receptor in each cardinal direction within the study area is specified. Where necessary, receptors are selected at heights above grade to account for worst-case impacts (e.g., considering geographical contours, tall buildings, ground attenuation, etc.). Pre-project noise at these locations is compared to predicted post-project noise. Appendix B contains figures displaying the location of each receptor, and Table 4-1 lists the representative noise and vibration sensitive receptors along the alignment. Some receptors, as indicated in Table 4-1, are only sensitive receptors to construction noise as a result of their location of building use (i.e., office buildings).

4.2 Vibration Sensitive Receptors

The FTA Manual [R-2] specifies a 450 ft (137 m) screening distance for Category I, high-sensitivity vibration receptors. These receptors include buildings that require additional considerations for vibrations and ground-borne noise (concert halls, TV studios, hospitals with MRIs, etc.). Category I type receptors typically contain vibration sensitive equipment or conduct ground borne noise or vibration sensitive activity where the conventional TTC Protocol ground borne vibration impact criteria would impede commercial activities within these facilities. A desktop review of the Eglinton Corridor concluded no high-sensitivity vibration receptors are present within the 137 m screening distance of the alignment for this project.

For the most part, the nearest vibration sensitive receptors along the alignment are family residential dwellings, institutions, and non-vibration sensitive commercial businesses.

Table 4-1 lists the representative closest receptors along the alignment within the study area.

Table 4-1: Noise and Vibration Sensitive Representative Receptors

	#	ID	Nearest Address	Side	Height (m)	Land Use*
S		**Sensitive Receptor**				
C		**Sensitive Receptor (to construction only)**				
S	1	West-1	1149 Weston Road	South	1.5	Place of Worship
S	2	West-2	11 Hollis Street	North	1.5	Single Family Residence (SFR)
S	3	Jane-1	1156 Weston Road	North	1.5	SFR
S	4	Jane-2	3545 Eglinton Avenue West	South	1.5	SFR
S	5	Jane-3	3559 Eglinton Avenue West	South	19	MFR
S	6	Jane-4	3561 Eglinton Avenue West	South	11	MFR
S	7	Jane-5	3580 Eglinton Avenue West	North	1.5	SFR
S	8	Jane-6	3593 Eglinton Avenue West	South	4.5	SFR
S	9	Jane-7	40 Glenvalley Drive	North	4.5	SFR
S	10	Scar-1	75 Emmett Avenue	North	54	Multi-Family Residence (MFR)
S	11	Scar-2	85 Emmett Avenue	North	60	MFR
S	12	Roya-1	38 Fontenay Court	South	12	MFR
S	13	Roya-2	1 Richview Road	North	14	MFR
S	14	Roya-3	30 Fontenay Court	South	18	MFR
S	15	Roya-4	20 Fontenay Court	South	11	MFR
S	16	Roya-5	25 Richview Road	North	16.5	MFR
S	17	Roya-6	39 Richview Road	North	11	MFR
S	18	Roya-7	55 Lemonwood Drive	South	4.5	SFR
S	19	Roya-8	61 Richview Road	North	17	MFR
S	20	Roya-9	81 Lemonwood Drive	South	7	MFR
S	21	Roya-10	60 Richview Road	North	11	Nursing Home
S	22	Roya-11	87 Lemonwood Drive	South	7	MFR
S	23	Roya-12	4005 Eglinton Avenue West	South	14	Nursing Home
S	24	Roya-13	125 La Rose Avenue	North	40	MFR
S	25	Roya-14	144 La Rose Avenue	North	32	MFR
S	26	Roya-15	35 Swordbill Drive	South	1.5	MFR
S	27	Roya-16	165 La Rose Avenue	North	31	MFR
S	28	Roya-17	1403 Royal York Road	North	21	MFR
S	29	Roya-18	1387 Royal York Road	South	4.5	MFR
S	30	Isli-1	185 La Rose Avenue	North	1.5	MFR
S	31	Isli-2	27 Edenvale Crescent	South	4.5	SFR
S	32	Isli-3	4400 Eglinton Avenue West	North	1.5	SFR
S	33	Isli-4	25 Hamptonbrook Drive	North	4.5	SFR
C	34	Isli-5	118 Poplar Heights Drive	South	4.5	SFR

	#	ID	Nearest Address	Side	Height (m)	Land Use*
S	35	Isli-6	104 Poplar Heights Drive	South	4.5	SFR
S	36	Kipl-1	1738 Islington Avenue	South	1.5	School
S	37	Kipl-2	58 Waterford Drive	North	4.5	MFR
S	38	Kipl-3	6 Evesham Court	South	1.5	SFR
S	39	Kipl-4	79 Waterford Drive	North	1.5	SFR
S	40	Kipl-5	57 Oldham Road	South	4.5	SFR
C	41	Kipl-6	265 Wincott Road	North	1.5	Commercial
C	42	Kipl-7	250 Wincott Road	North	1.5	Commercial
S	43	Kipl-8	7 Winterbourne Court	South	4.5	SFR
S	44	Kipl-9	4650 Eglinton Avenue West	North	7	Nursing Home
C	45	Kipl-10	177 Princess Anne Crescent	South	4.5	SFR
S	46	Kipl-11	4620 Eglinton Avenue West	North	16	MFR
S	47	Kipl-12	5 Cheviot Place	South	1.5	MFR
S	48	Kipl-13	43 Dryden Way	North	7	MFR
S	49	Mart-1	53 Widdicombe Place	North	44	MFR
S	50	Mart-2	57 Widdicombe Place	North	46	MFR
S	51	Mart-3	4704 Eglinton Avenue West	South	17	MFR
S	52	Mart-4	4702 Eglinton Avenue West	South	17	MFR
S	53	Mart-5	4700 Eglinton Avenue West	North	4.5	MFR
C	54	Mart-6	230 Lloyd Manor Road	South	4.5	Commercial
C	55	Mart-7	142 Widdicombe Hill Blvd	North	4.5	MFR
S	56	Mart-8	226 Lloyd Manor Road	South	4.5	SFR
S	57	Mart-9	4679 Eglinton Avenue West	North	7	MFR
S	58	Mart-10	50 Winterton Drive	South	4.5	School
S	59	427-1	620 Martin Grove Road	North	37	MFR
S	60	427-2	99 Dalegrove Crescent	South	1.5	SFR
S	61	427-3	95 Decarie Circle	South	4.5	MFR
S	62	427-4	940 The East Mall	South	1.5	MFR
S	63	Renf-1	151 Rangoon Road	South	1.5	SFR
S	64	Renf-2	132 Rangoon Road	South	1.5	SFR
S	65	Renf-3	27 Hardwick Court	South	1.5	SFR
S	66	Renf-4	36 Sagamore Crescent	South	1.5	SFR
S	67	Comm-1	720 Renforth Drive	South	1.5	School
S	68	Comm-2	71 Bingham Crescent	South	4.5	SFR
S	69	Comm-3	29 Garbutt Crescent	South	4.5	SFR
C	70	Comm-4	5080 Commerce Blvd	South	1.5	Commercial

* SFR - Single Family Residence; MFR - Multi-Family Residence

5. Methodology

The operational noise and vibration assessment approach follows the Ministry of Electricity and Energy (MOEE)/TTC protocol [R-9] by evaluating the change in the noise and vibration environment against the pre-project (ambient levels). Operational vibration levels are compared to TTC draft protocol [R-7] limits due to the similarities in commuter vehicle type. The modeling of operational and construction noise and vibration follow methods outlined in the FTA Transit Noise and Vibration Impact Assessment Manual [R-2].

5.1 Noise Impact Assessment

The Noise Screening Procedure in the FTA manual will be employed to identify areas with noise-sensitive land use. Areas with noise-sensitive land use require further assessment for air-borne noise impact.

Generally, the noise analysis will follow the methodology outlined in the FTA manual [R-2]:

1. Identify Noise-Sensitive Receptors;
2. Determine Project Noise Source Reference Levels;
3. Determine Propagation Characteristics;
4. Combine Noise Exposure from All Sources;
5. Determine Existing Noise Exposure;
6. Assess Noise Impact; and
7. Determine Noise Mitigation Measures.

This assessment employs noise modelling using CadnaA software. The CadnaA software application that will execute:

- The FTA noise propagation model for operational rail activity;
- The ISO 9613 noise propagation model for operational stationary sources (TPSS', ventilation) and worse case construction phases; and
- The Traffic Noise Model (TNM) 2.5 noise propagation model for the baseline existing road traffic noise.

5.1.1 Identify Noise-Sensitive Receptors

The methodology followed to identify receptors is discussed in detail in Section 4 and listed in Table 4-1.

5.1.2 Determine Project Noise Source Reference Levels

In alignment with the 2010 assessment [R-1], the source of pre-project noise is mainly traffic on Eglinton Avenue West. The source of post-project noise is traffic plus noise due to the project, including the light rail vehicle and stationary ancillary sources to support ECWE and its infrastructure. The noise sources used in the pre and post-project operational analysis are summarized in Table 5-1.

Table 5-1: Sources of Noise

Source Type	Source
Rail	Light rail vehicle pass by. Special track work. Wheel Squeal on tight curves.
Road	Road traffic.
Stationary	TPSSs. Tunnel jet ventilation. Station ventilation and air conditioning.

Note: that the LRV is electric, so the predominant source is wheel-rail noise.

Sound power levels are input into CadnaA for each source at all proposed locations. The FTA LRV commuter vehicle selected within CadnaA was a steel-wheeled Automated Guided Transit (AGT) which has a Sound Level of 78 dBA at 15 m travelling at 80 kph [R-2]. This Sound Level is conservatively higher than the project specified vehicle with a required Sound Level of 82 dBA at 7.5 m, travelling at 80 kph. It is noted that 82 dBA at 7.5 m is equivalent to 76 dBA at 15 m as shown in the following calculation:

$$L_{15m} = L_{7.5m} + C_{distance}$$
$$C_{distance} = -20 \log\left(\frac{15m}{7.5m}\right) = -6\ dB$$
$$L_{15m} = L_{7.5m} + C_{distance} = 82\ dBA - 6\ dB = 76\ dBA$$

Average annual daily traffic counts with appropriate day-night splits, posted speeds, etc. are input into CadnaA using the Federal Highway Administration's (FHWA) TNM 2.5 to evaluate the existing road traffic dominated noise environment. The inputs are available in Table 6-1 and Appendix C.

5.1.3 Determine Propagation Characteristics

CadnaA calculates the noise propagation characteristics within the study area using the following inputs:

- Geographic Information System (GIS) shapefiles for rail alignment data;
- GIS shapefiles for road location data;
- GIS shapefiles for building location data; and
- GIS shapefiles for geographic topography.

5.1.4 Combine Noise Exposure from All Sources

CadnaA is capable of combining the noise exposure from all sources to predict total noise impact at each sensitive noise receptor.

5.1.5 Determine Existing Noise Exposure

The ambient noise based on road traffic activity has been modelled to evaluate background levels. Ambient noise includes input only from existing road traffic. Existing road traffic data is projected by 2% each year from the year of measurement to 2031. The FHWA TNM model is employed within CadnaA to model road traffic noise.

To validate the ambient noise model, traffic data is projected to the year 2019 and compared to baseline measurements taken along the Eglinton west corridor in December 2019. This process is discussed further in Section 7.2.

5.1.6 Assess Noise Impact

Noise impact results are tabulated in Section 7 for pre-project results and post-project results. The noise impact is assessed against criteria in Table 3-2. Additionally, noise contour plots predicting construction and post-project noise along the alignment are presented in Appendix D.

5.1.7 Determine Noise Mitigation Measures

At receptors that experience post-project noise beyond the allowable criteria (outlined in Table 3-2), options to mitigate the noise are assessed on a case-by-case basis depending on the source, severity, and receptor(s) affected. Mitigation measures, documented in Section 8, are employed to reduce noise impact to levels below the allowable limits.

5.2 Vibration Impact Assessment

The light rail vehicle is assessed for expected vibration impact in accordance with the General Vibration Assessment in the FTA Manual [R-2]. The General Vibration Assessment involves the following steps:

1. Select base curve for ground near-surface vibration level (note: the vibration decay with distance has not been established for the selected ECWE vehicle. Therefore the FTA proposed Light Rail Transit decay curve has been selected as a basis);
2. Apply adjustments;
3. Inventory vibration impact identifying locations that are predicted to exceed 0.1 mm/s RMS; and
4. Re-apply adjustments in the form of track level controls and re-inventory vibration impact ensuring no-overlap of surrounding structures having vibration sensitive receptors.

Vibrations from rail transit are assessed against an absolute limit (shown in Table 3-2). Baseline vibration measurements were deemed not be required as there are no existing significant ground borne vibration sources within the study area (existing rail or heavy industry). Vibration due to existing street and highway traffic is likely to be well below the 0.1 mm/s RMS at the vibration sensitive receptors.

5.2.1 Ground-Borne Noise

The FTA General Vibration Assessment also addresses ground-borne noise, which is expected to be a significant source of noise for underground segments. Vibration levels evaluated though the General Vibration Assessment will be used to determine the ground-borne noise. Any buildings within the ground-borne noise impact distance will therefore experience noise above the allowable limit, so considerations for vibration mitigation will be anticipated.

5.3 Construction Noise and Vibration Impact Assessment

5.3.1 Construction Noise Assessment

The approach to characterize the construction noise impact on surrounding communities was to evaluate the loudest construction phase at each site along the alignment. All construction equipment was assumed to be operating simultaneously at their duty rating. The sound power of all equipment was averaged over an area source positioned at the height of 1.5 m. The resulting cumulative impact of the construction noise was evaluated using the CadnaA software application employing the ISO 9613 model. Noise impact at the nearest representative sensitive receptor to each construction site is compared to the recommended limits outlined in Table 3-4. Where recommended levels are exceeded, temporary mitigation measures are implemented to mitigate levels below the proposed limits as much as reasonably practical.

5.3.2 Construction Vibration Assessment

The approach to addressing ground borne vibration caused by construction activity shall employ the FTA approach for construction vibration propagation. Using the FTA construction vibration ground propagation approach, the distance at which 5 mm/s peak (City of Toronto Zone of Influence (ZOI)) from the highest emitting source operating at the construction zone boundary is evaluated. When the ZOI overlaps the property boundary but not the footprint of a structure, pre-construction structural and cosmetic inspections are designated for the structure. When the ZOI overlaps the footprint of the building, seismic monitors are recommended to be positioned at the construction zone boundary nearest to the structure. Vibration levels are to be continuously monitored throughout the construction period at the site and alarms are to be set when levels exceed limits noted in the city of Toronto By-Law 514-2008.

6. Key Inputs & Data

This section contains key inputs for this NVIA. Additional data, tables, and maps are in Appendix B: Project Alignment, Appendix C: Traffic Data, Appendix G and Appendix H: Construction Drawings.

6.1 Traffic Data

As discussed in Section 5, existing traffic noise modelled along Eglinton was used to predict the baseline noise environment along the west corridor. Traffic noise was modelled in CadnaA using the FHWAs TNM 2.5. Traffic data used to establish baseline data is listed in Table 6-1. Raw traffic data, recorded between 2013 and 2019, is presented in Appendix C and was projected to 2031 at a rate of 2% per annum as is industry standard.

Table 6-1: Hourly Traffic Data along Eglinton Corridor, Projected to 2031

Section		Day (Veh/hr)	Night (Veh/hr)	Heavy (% of Veh/hr)
From	To			
Weston	Jane	1693	187	5.2
Jane	Emmett	2340	258	12.5
Emmett	Scarlett	2538	280	4.4
Scarlett	Royal York	2871	317	4.3
Royal York	Islington	2855	496	4.7
Islington	Wincott	2914	321	4.3
Wincott	Kipling	3290	363	5.2
Kipling	Lloyd Manor	3051	337	4.1
Lloyd Manor	Martin Grove	3448	600	5.0
Martin Grove	401/427 Ramp	4498	496	3.5
401/427 Ramp	The East Mall	1583	175	3.8
The East Mall	Matheson	2027	224	2.9
Matheson	Renforth	1701	188	4.7
Renforth	Commerce	2158	238	3.9

6.2 Light Rail Vehicle Data

The Light Rail Vehicle (LRV) used the LRV Technical Specification [R-7]. Volumes are not expected to change since 2010 Report [R-1], light rail vehicle input for the FTA assessment are listed in Table 6-2. The rail alignment is shown in Appendix B.

Table 6-2: Light Rail Vehicle Data

Property	Data	Source	Justification
Transit Noise Source	Automated Guideway Transit	FTA Manual [R-2]	Per FTA Manual, LRT projects include AGTs. However, FTA provides noise data for AGT but not LRT, thus AGT data is used.
Transit Vibration Source	Light Rail Transit	FTA Manual [R-2]	FTA provides vibration data for LRVs.
Number of Trains	448 per day 40 per night	2010 Assessment [R-1]	Most recent available data.
Train Length	96 m	LRV Technical Specification [R-7]	Three-car consist length was used as this is the largest expected consist, which is conservative compared to shorter train lengths.
Max. Speed	80 km/h	LRV Technical Specification [R-7]	Maximum operating speed specified.

6.3 Stationary Operational Source Data

Stationary operational sources which are expected to produce significant noise are TPSS, station platform ventilation, and tunnel ventilation at tunnel portals. Substation and ventilation specifications are not yet established for this project, so typical values were chosen and applied to conservatively model stationary sources. The location of TPSS', station platform

ventilation, and the Jane Portal are subject to change in detailed design. Any significant changes will be reassessed as deemed necessary.

The data for a typical TPSS for other transit projects in Ontario containing one 3 MW (~75 kVA) transformer plus auxiliary building ventilation were applied to model the project substations. The sound level spectrum for the TPSS is listed in Table 6-3. This spectrum is considered conservative given that each of the projects' TPSS' is expected to be between 1.5 MW to 2 MW. Furthermore, the FTA guideline sets a TPSS reference noise level of 63 dBA at 50 ft, whereas the TPSS modelled produces an equivalent 75 dBA at 50 ft.

Table 6-3: TPSS Power Level Data (dB)

	Frequency (Hz)								Overall
	63	125	250	500	1000	2000	4000	8000	
3 MW TPSS	90	88	91	96	94	90	86	81	108

TPSS locations are based on locations recommended in the Conceptual Design Report [R-5]. However, the locations have been adjusted to accommodate the latest alignment. The substation locations modelled are shown in Table 6-4 and Appendix B.

Table 6-4: Expected TPSS Locations

TPSS	Nearby Intersection	Chainage
1	Emmett/Eglinton	104+100
2	Royal York/Eglinton	102+350
3	Islington/Eglinton	101+050
4	Martin Grove/Eglinton	99+550
5	401/427 Interchange	98+200
6	Commerce/Eglinton	96+600

The project will employ four 41 kW supply air jet fans located near the tunnel portals to ventilate the underground infrastructure. The predictable worse case condition is to have all four fans operating simultaneously during an emergency event. Though emergency scenarios should not be considered for a community noise impact assessment, the operation of all four fans were conservatively modelled under a rare case that all four fans could be operated to ventilate downstream stations or tested simultaneously. The sound power of the four ventilation fans are combined to develop the sound power at the tunnel portals listed in Table 6-5.

Table 6-5: Tunnel Ventilation Sound Power Level Data (dB)

	Frequency (Hz)								Overall
	63	125	250	500	1000	2000	4000	8000	
Tunnel Ventilation	97	96	85	77	90	90	86	85	101

Since the ventilation fans are predominantly underground, the only sources of community impacting noise is at the tunnel portals. Three tunnel portals are present in the ECWE, between Jane Street and Weston Road, between Royal York and Scarlett Road, and at Renforth Drive.

The project plan is to include four underground stations. Though the underground platform public address system will be inaudible at the surface, noise from the platform ventilation fans will have a community noise contribution from the ground-level intake and exhaust. Additional noise from air conditioning units necessary for fare operator workstations are not applicable, since underground stations are fully automated and are not manned. Table 6-6 lists the sound power of 1 of the 4, 62" diameter, 56 kW type axial jet fans commonly installed to extract and supply air to each underground platform.

Table 6-6: Platform Ventilation Fan Sound Power Level Data (dB)

	Frequency (Hz)								Overall
	63	125	250	500	1000	2000	4000	8000	
Platform Vent.	89	90	94	90	93	92	85	82	100

6.4 Construction Data

The source and intensity of construction noise depends on the type of the construction site and the required construction work. Construction sites that support track construction include station construction, EEB construction, TPSS construction, and portal construction. The expected construction site locations are shown in Table 6-7.

Table 6-7: Expected Locations Of Construction Sites

Construction Zone	Nearby Intersection	Chainage	Loudest Activity
EEB-1	Royal York/Eglinton	102+640	Clearing
EEB-2	Russell/Eglinton	101+670	Clearing
EEB-3	Bemersyde/Eglinton	100+920	Clearing
EEB-4	Martin Grove/Eglinton	98+740	Clearing
EEB-5	401/427 Interchange	98+080	Clearing
EEB-6	Matheson/Eglinton	97+340	Clearing
TPSS-1	Emmett/Eglinton	104+100	Clearing
TPSS-2	Royal York/Eglinton	102+350	Clearing
TPSS-3	Islington/Eglinton	101+050	Clearing
TPSS-4	Martin Grove/Eglinton	99+550	Clearing
TPSS-5	401/427 Interchange	98+200	Clearing
TPSS-6	Commerce/Eglinton	96+600	Clearing
Station - Jane	Jane/Eglinton	104+650	Lifting
Station - Scarlett	Scarlett/Jane	103+650	Lifting
Station - Royal York	Royal York/Eglinton	102+300	Clearing
Station - Islington	Islington/Eglinton	101+300	Clearing
Station - Kipling	Kipling/Eglinton	100+250	Clearing
Station - Martin Grove	Martin Grove/Eglinton	99+400	Clearing
Station - Renforth	Renforth/Eglinton	96+700	Clearing

Construction Zone	Nearby Intersection	Chainage	Loudest Activity
Jane Portal	Jane/Eglinton	105+000	Clearing
Scarlett Portal	Scarlett/Eglinton	103+300	Clearing
Renforth Portal	Renforth/Eglinton	96+900	Clearing
Laydown Area - Renforth	Renforth/Eglinton	96+900	Lifting

It is assumed that the worst case for all at-grade and underground construction is the “clearing" activity, and the worst case activity for all elevated construction is the “lifting” activity. Similarly, for at-grade track construction, the construction activity “clearing” is assumed to be the worst case scenario. “Lifting” is assumed to be the worst case scenario for elevated track construction. Finally, the worst case construction activity for the Laydown Area at Renforth is the “lifting” activity, as this construction site is expected to support LS activities for tunnel boring. The sound power spectrum for lifting and clearing activities are listed in Table 6-8.

“Clearing” consists of simultaneous operation of equipment including: a hydraulic hammer, a large hydraulic excavator, a dump truck, and a backhoe loader. “Lifting” consists of simultaneous operation of equipment including: all “clearing” equipment and a crane.

Table 6-8: Construction Activity Power Level Data (dB)

	Frequency (Hz)								
	63	125	250	500	1000	2000	4000	8000	Overall
Lifting	115	115	112	108	107	109	112	105	121
Clearing	114	115	109	105	107	109	112	105	120

7. Modelling Results

Operational and construction air-borne noise were modelled in CadnaA Version 2019 (build: 165.4900), employing the TNM model for background traffic noise, the FTA model for rail, and the ISO 9613 model for stationary sources. Operational related ground-borne noise and vibrations were modelled using the FTA Manual [R-2]. Construction air-borne noise was modelled as stationary area sources in CadnaA, while construction ground borne vibration was calculated using the FTA method.

7.1 Overview of Assumptions

Key assumptions for this assessment are outlined below. Model-specific assumptions are listed throughout this section as relevant. A full list of assumptions is available in Appendix A.

1. The track alignment is based on a design frozen on April 1, 2020. It is assumed that any future changes to the layout which could have significant impact on this assessment will be investigated as needed.

2. The Eglinton West corridor prior to this project does not have an active rail line, and other vibration sources, such as road traffic are not considered significant. For this reason, baseline vibration measurements are not considered necessary.

3. Typical offices are not considered sensitive receptors to operational noise in accordance with the FTA Manual [R-2].
4. The track, wheels, and vehicle suspension are assumed to be well-maintained. Therefore, the additional noise and vibration from track corrugations, track gaps, and wheel flats are not considered.
5. Station, EEBs, TPSS, and Portal locations are unconfirmed at this time. It is assumed that any future changes to the layout which could have significant impact on this assessment will be investigated as needed.

7.2 Ambient Noise and Vibration Conditions

To determine the impact of the project on noise and vibrations in the community, pre-project levels have been evaluated through modelling and validated against baseline measurements. Baseline measurements were taken at locations listed in Table 7-1. The most significant source of ambient noise and vibration is from road traffic on Eglinton Avenue West and the 401/427 interchange.

The noise data was filtered to include only data acquired during the moderate weather conditions (i.e., no precipitation or high winds). At least 48-hours of data was collected at each noise monitor. From the collected data, the 16-hr daytime equivalent noise level, $L_{eq(16hr)}$ and 8-hr nighttime equivalent noise level, $L_{eq(8hr)}$, are determined. The one-hour minimum equivalent noise level, $L_{eq(1hr)}$ at both daytime and nighttime are also determined. Appendix B shows the noise monitor locations on a map of the study area and Appendix F contains reports for each noise monitor.

Table 7-1: Noise Monitor Locations

Monitored Location ID	Address Nearest to Monitor
NM-01	30 Somerville Avenue
NM-02	120 Emmett Avenue
NM-03	SE Scarlett Heights Park
NM-04	39 Richview Road
NM-05	62 Lemonwood Drive
NM-06	26 Swordbill Drive
NM-07	25 Crestridge Heights Road
NM-08	102 Poplar Heights Drive
NM-09	58 Waterford Drive
NM-10	46 Oldham Road
NM-11	43 Dryden Way
NM-12	18 Dewsbury Crescent
NM-13	134 Widdicombe Hill Blvd.
NM-14	9 Courtwright Road
NM-15	71 Bingham Crescent

Table 7-2 compares the CadnaA model results over the daytime and nighttime periods to the one-hour minimum equivalent measured noise level at each noise monitor. The measured 1-hr L_{eq} is selected for comparison as it tends to better represent the background traffic noise when aligning with the model. The modelled versus measured night-time levels tend match better than daytime levels since the night time noise environment tends to be more constant with less intrusions from other sources other than traffic. The deviation between measured data and modelled results are as follows:

- 3 dB or less = Good
- 3-5 dB = Fair
- >5 dB = Poor

Table 7-2: Measured Values For Model Validation

Monitored Location ID	Noise Level (dBA)					
	Baseline Measurements		Modelled Results		Difference	
	Day ($L_{eq(1hr)}$)	Night ($L_{eq(1hr)}$)	Day ($L_{eq(1hr)}$)	Night ($L_{eq(1hr)}$)	Day ($L_{eq(1hr)}$)	Night ($L_{eq(1hr)}$)
NM-01	50.3	42.8	50.8	41.1	0.4	-1.8
NM-02	51.4	42.9	52.8	43.2	1.4	0.3
NM-03	59.9	49.7	56.6	47.0	-3.3	-2.7
NM-04	55.8	46.6	52.4	42.6	-3.4	-4.0
NM-05	52.2	42.1	50.7	40.8	-1.5	-1.3
NM-06	49.4	42.2	48.7	39.3	-0.6	-2.8
NM-07	46.6	36.6	46.9	39.0	0.3	2.4
NM-08	53.6	39.9	48.5	39.7	-5.1	-0.2
NM-09	55.7	39.8	53.6	44.0	-2.1	4.2
NM-10	51.4	42.7	49.7	40.3	-1.7	-2.4
NM-11	53.8	43.3	48.2	38.6	-5.6	-4.7
NM-12	38.2	39.9	44.3	36.4	6.1	-3.5
NM-13	51.9	43.0	52.9	44.5	1.1	1.5
NM-14	54.7	47.5	54.7	46.9	-0.3	-0.8
NM-15	49.1	41.5	45.1	36.8	-3.8	-4.5

With each monitor having recorded day and night levels, a total of 30 comparisons were made between the modelled and measured levels. As highlighted in Table 7-2, 19 of the 30 are “good”, 8 of the 30 had are “ fair”, and 3 of the 30 are “poor” correlations. All three poor correlations are close to the “fair” condition; near 5 and 6 dB. They also occur during the day time. This deviation is likely a result of traffic variation during the measurement period that was not consistent with the data used in the model. More variation in the lowest $L_{eq(1hr)}$ is commonly observed during the daytime, when more activity and un-predictable events are anticipated to occur.

The modelled results had the general tendency to underpredict the measured noise level. This is expected, as the model only predicts noise from traffic. Whereas, measured levels include a variety of sources, which cannot be separated from the traffic noise. This is particularly true in the daytime.

Overall, the model matches well with measured levels and is therefore considered acceptable for the purpose of this analysis.

7.2.1 Predicted Baseline Vibrations

Since no existing rail operations are present, no significant sources of pre-project vibrations are present. In addition, no highly sensitive receptors were identified within 132 m of the proposed alignment (132 m is the FTA screening distance for Category I vibration sensitive receptors). Therefore, baseline vibration is assumed to be negligible so measurements were not taken to validate the vibration model nor establish a background vibration level that is higher than the guideline limits.

7.3 Operational Noise Assessment

7.3.1 Operational Noise Assessment Assumptions

1. All assumptions listed in Section 7.1;
2. Special trackwork locations were taken from a preliminary document are may be subject to change. The locations of special trackwork were all in underground segments, so special trackwork is not included in the air-borne noise assessment. Special trackwork is a substantial source of noise so reassessment is recommended if final special trackwork locations are changed significantly;
3. No at-grade crossings have been designed at this stage. Therefore noise emissions from LRV horns and bells are not modelled;
4. Locations with no air-borne noise path (e.g., underground segments) are not assessed for air-borne noise;
5. Train volumes are the same as the 2010 Report [R-1]: 228 each direction during the day, 20 each direction during the night;
6. Rail speed is conservatively modelled at the design maximum speed of 80 km/h at all above-ground segments for conservatism, with consideration for slowing near stations;
7. The train is modelled as a steel-wheeled AGT type system per the FTA Manual [R-2];
8. Road traffic available was recorded between 2014 to 2019. A traffic growth rate of 2% per year is assumed as is industry standard to establish the future background noise level in 2031;
9. TPSS, station ventilation, and the Jane Portal locations are not finalized. Any significant changes to the these layouts are to be re-assessed as required;

10. TPSS and ventilation specifications are not available at this time. For this reason, typical TPSS and ventilation acoustic emissions have been assumed based on similar transit system designs. The selected TPSS noise emission is conservatively louder than the FTA-recommended noise level. Additionally, the ventilation noise emission conservatively assumes the simultaneous operation of all ventilation fans, which typically only occurs under emergency scenarios; and

11. Noise radiation off the elevated guideway is considered negligible given that the guideway is a complete concrete structure which is sufficiently well damped.

7.3.2 Operational Noise Assessment Results

The predicted post-project noise levels and the resultant increase in noise from ambient levels are listed in Table 7-3, with the full receptor data and noise contour plots available in Appendix D. Receptors that fail are highlighted in red. Any receptors that fail operational noise criteria will have mitigation investigated as discussed in Section 8 of this report. The post-project levels include noise from the light rail vehicle, substations, and system ventilation, and is compared to criteria in Table 3-2. The criteria for daytime and nighttime noise vary depending on pre-project sound levels. For this reason, the pass/fail conditions in Table 7-3 are designated numbers (e.g., “Pass (1)”, “Fail (2)”, etc.) based on the following as applicable to the receptor:

Pass	(1)	Noise level passes based on limit:	Ambient +5 dB
Fail	(1)	Noise level fails based on limit:	Ambient +5 dB
Pass	(2)	Noise level passes based on limit:	55 dBA + 5 dBA (daytime) 50 dBA + 5 dBA (nighttime)
Fail	(2)	Noise level fails based on limit:	55 dBA + 5 dBA (daytime) 50 dBA + 5 dBA (nighttime)

Stationary sources present during operations for this project include TPSSs and ventilation at underground stations and tunnel portals. Stationary sources have more stringent criteria since they constantly operate in a single location. For this reason, stationary sources are evaluated independently of LRV operations against criteria in Table 3-3. Since stationary sources generate constant noise for daytime and nighttime, the evening (1900h - 2300h) criteria in Table 3-3 is bounded by nighttime (2300h - 0700h) criteria, which has a stricter lower limit and lower ambient levels. For this reason, only day and night are assessed.

Similarly to the LRV assessment, pass/fail conditions in Table 7-3 are designated numbers (e.g. “Pass (1)”, “Fail (2)”, etc.) based on the following as applicable to the receptor:

Pass	(1)	Noise level passes based on limit:	Ambient
Fail	(1)	Noise level fails based on limit:	Ambient
Pass	(2)	Noise level passes based on limit:	50 dBA (daytime) 45 dBA (nighttime)
Fail	(2)	Noise level fails based on limit:	50 dBA (daytime) 45 dBA (nighttime)

N/A — Indicated there is no applicable limit for that time of day, therefore all levels pass

- No (0) receptors were predicted to fail post-project noise criteria due to LRV passbys; and
- Eleven receptors were predicted to fail due to stationary source noise.

Eight fail receptors (Scar-1, Scar-2, Roya-17, Isli-1, Isli-2, Kipl-3, Kipl-5, and Mart-9) are within close proximity to TPSSs, which is the apparent cause of elevated noise resulting in failure.

- Scar-1 and Scar-2 are 190 m and 200 m from TPSS-06, separated by open space;
- Roya-17 is 85 m, Isli-1 is 48 m, and Isli-2 is 90 m from TPSS-05;
- Kipl-3 is approximately 215 m from TPSS-04, separated by open space;
- Kipl-5 is approximately 34 from TPSS-04; and
- Receptor Mart-9 is approximately 32 m from TPSS-03.

The remaining three fail receptors (Kipl-2, Kipl-13, Mart-1) are within close proximity to underground station ventilation, which is the apparent cause of elevated noise resulting in failure.

- Kipl-2 is 60 m from Islington Station ventilation; and
- Kipl-13 and Mart-1 are 50 m and 120 m from Kipling Station ventilation.

For receptors that do not meet the operational noise criteria, mitigation is explored in Section 8 of this report.

7.3.2.1 New Development

A new development is planned near 1 Richview Road as shown in Figure 7-1. Figure 7-1 looks over the intersection of Eglinton Avenue West and Scarlett Road, and shows a rendering of Scarlett Station and the new development. Given the proximity of this receptor to the alignment a detailed assessment is shown in Appendix D. The assessment found that the maximum project impact at this receptor approximately 4 dB above ambient levels; an ambient noise level of 65 dBA and a project noise level of 69 dBA. This impact is within acceptable criteria and does not require mitigation.

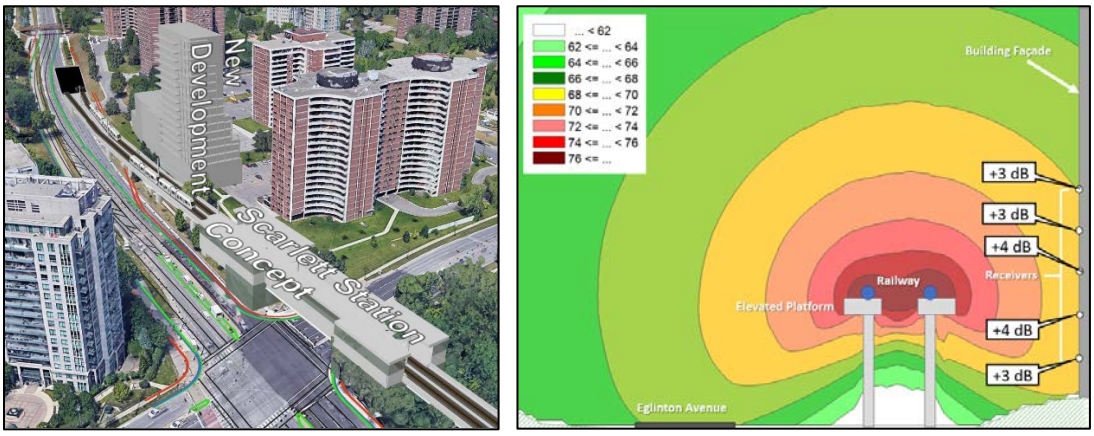

Figure 7-1: Artist's Rendition of New Development near 1 Richview Road and Noise Profile Cross-Section Showing Impact at Building Façade

Table 7-3: Predicted Operational Air-Borne Noise before Mitigation

Receptor ID	Nearest Address	Ambient Noise (dBA)		LRV Only, Unmitigated (dBA)		Pass based on Criteria: (1) Ambient +5 dB (2) 60 dB day/55 dB Night		Stationary Sources Only (dBA)		Pass based on Criteria: (1) Ambient (2) 50 dB day/45 dB Night	
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
West-1	1149 Weston Road	65	56	35	26	Pass (1)	n/a	23	23	Pass (1)	n/a
West-2	11 Hollis Street	52	42	32	23	Pass (2)	Pass (2)	23	23	Pass (1)	Pass (2)
Jane-1	1156 Weston Road	67	58	34	26	Pass (1)	Pass (1)	18	18	Pass (1)	Pass (1)
Jane-2	3545 Eglinton Avenue West	64	55	44	36	Pass (1)	Pass (1)	25	25	Pass (1)	Pass (1)
Jane-3	3559 Eglinton Avenue West	59	49	35	27	Pass (1)	Pass (2)	11	11	Pass (1)	Pass (1)
Jane-4	3561 Eglinton Avenue West	63	54	50	42	Pass (1)	Pass (1)	29	29	Pass (1)	Pass (1)
Jane-5	3580 Eglinton Avenue West	69	59	52	43	Pass (1)	Pass (1)	22	22	Pass (1)	Pass (1)
Jane-6	3593 Eglinton Avenue West	66	56	53	45	Pass (1)	Pass (1)	30	30	Pass (1)	Pass (1)
Jane-7	40 Glenvalley Drive	56	47	53	45	Pass (1)	Pass (2)	31	31	Pass (1)	Pass (1)
Scar-1	75 Emmett Avenue	55	45	55	47	Pass (1)	Pass (2)	46	46	Pass (1)	Fail (1)
Scar-2	85 Emmett Avenue	56	47	55	47	Pass (1)	Pass (2)	47	47	Pass (1)	Fail (1)
Roya-1	38 Fontenay Court	67	57	62	54	Pass (1)	Pass (1)	39	39	Pass (1)	Pass (1)
Roya-2	1 Richview Road	62	53	64	56	Pass (1)	Pass (1)	37	37	Pass (1)	Pass (1)
Roya-3	30 Fontenay Court	65	55	61	53	Pass (1)	Pass (1)	38	38	Pass (1)	Pass (1)
Roya-4	20 Fontenay Court	58	49	57	49	Pass (1)	Pass (2)	34	34	Pass (1)	Pass (1)
Roya-5	25 Richview Road	59	50	59	51	Pass (1)	Pass (2)	27	27	Pass (1)	Pass (1)
Roya-6	39 Richview Road	62	52	60	51	Pass (1)	Pass (1)	39	39	Pass (1)	Pass (1)
Roya-7	55 Lemonwood Drive	63	53	57	49	Pass (1)	Pass (1)	39	39	Pass (1)	Pass (1)
Roya-8	61 Richview Road	64	54	55	46	Pass (1)	Pass (1)	34	34	Pass (1)	Pass (1)
Roya-9	81 Lemonwood Drive	66	57	53	45	Pass (1)	Pass (1)	32	32	Pass (1)	Pass (1)
Roya-10	60 Richview Road	59	50	36	27	Pass (1)	Pass (2)	33	33	Pass (1)	Pass (1)
Roya-11	87 Lemonwood Drive	66	57	50	42	Pass (1)	Pass (1)	35	35	Pass (1)	Pass (1)
Roya-12	4005 Eglinton Avenue West	65	55	41	33	Pass (1)	Pass (1)	37	37	Pass (1)	Pass (1)
Roya-13	125 La Rose Avenue	57	47	37	29	Pass (1)	Pass (2)	28	28	Pass (1)	Pass (1)
Roya-14	144 La Rose Avenue	58	48	39	31	Pass (1)	Pass (2)	27	27	Pass (1)	Pass (1)

Receptor ID	Nearest Address	Ambient Noise (dBA)		LRV Only, Unmitigated (dBA)		Pass based on Criteria: (1) Ambient +5 dB (2) 60 dB day/55 dB Night		Stationary Sources Only (dBA)		Pass based on Criteria: (1) Ambient (2) 50 dB day/45 dB Night	
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Roya-15	35 Swordbill Drive	62	53	32	24	Pass (1)	Pass (1)	38	38	Pass (1)	Pass (1)
Roya-16	165 La Rose Avenue	60	51	41	33	Pass (1)	Pass (1)	32	32	Pass (1)	Pass (1)
Roya-17	1403 Royal York Road	65	56	29	21	Pass (1)	Pass (1)	56	56	Pass (1)	Fail (1)
Roya-18	1387 Royal York Road	64	55	29	21	Pass (1)	Pass (1)	52	52	Pass (1)	Pass (1)
Isli-1	185 La Rose Avenue	63	54	29	21	Pass (1)	Pass (1)	61	61	Pass (1)	Fail (1)
Isli-2	27 Edenvale Crescent	63	54	28	20	Pass (1)	Pass (1)	57	57	Pass (1)	Fail (1)
Isli-3	4400 Eglinton Avenue West	63	56	26	18	Pass (1)	Pass (1)	40	40	Pass (1)	Pass (1)
Isli-4	25 Hamptonbrook Drive	62	54	29	21	Pass (1)	Pass (1)	42	42	Pass (1)	Pass (1)
Isli-6	104 Poplar Heights Drive	61	54	19	11	Pass (1)	Pass (1)	46	46	Pass (1)	Pass (1)
Kipl-1	1738 Islington Avenue	59	49	-	-	Pass (1)	n/a	56	56	Pass (1)	n/a
Kipl-2	58 Waterford Drive	60	51	-	-	Pass (1)	Pass (1)	57	57	Pass (1)	Fail (1)
Kipl-3	6 Evesham Court	51	42	-	-	Pass (2)	Pass (2)	45	45	Pass (1)	Fail (2)
Kipl-4	79 Waterford Drive	60	50	-	-	Pass (1)	Pass (1)	50	50	Pass (1)	Pass (1)
Kipl-5	57 Oldham Road	61	51	-	-	Pass (1)	Pass (1)	63	63	Fail (1)	Fail (1)
Kipl-8	7 Winterbourne Court	69	59	-	-	Pass (1)	Pass (1)	45	45	Pass (1)	Pass (1)
Kipl-9	46 Eglinton Avenue West	66	57	-	-	Pass (1)	Pass (1)	42	42	Pass (1)	Pass (1)
Kipl-11	46 Eglinton Avenue West	66	56	-	-	Pass (1)	Pass (1)	42	42	Pass (1)	Pass (1)
Kipl-12	33 Cheviot Place	66	57	-	-	Pass (1)	Pass (1)	55	55	Pass (1)	Pass (1)
Kipl-13	43 Dryden Way	67	57	-	-	Pass (1)	Pass (1)	60	60	Pass (1)	Fail (1)
Mart-1	53 Widdicombe Place	61	51	-	-	Pass (1)	Pass (1)	51	51	Pass (1)	Fail (1)
Mart-2	57 Widdicombe Place	60	50	-	-	Pass (1)	Pass (1)	47	47	Pass (1)	Pass (1)
Mart-3	4704 Eglinton Avenue West	63	53	-	-	Pass (1)	Pass (1)	51	51	Pass (1)	Pass (1)
Mart-4	4702 Eglinton Avenue West	64	54	-	-	Pass (1)	Pass (1)	47	47	Pass (1)	Pass (1)
Mart-5	4700 Eglinton Avenue West	67	57	-	-	Pass (1)	Pass (1)	43	43	Pass (1)	Pass (1)
Mart-8	226 Lloyd Manor Road	59	51	-	-	Pass (1)	Pass (1)	49	49	Pass (1)	Pass (1)
Mart-9	4679 Eglinton Avenue West	63	55	-	-	Pass (1)	Pass (1)	62	62	Pass (1)	Fail (1)
Mart-10	50 Winterton Drive	60	52	-	-	Pass (1)	n/a	52	52	Pass (1)	n/a

Receptor ID	Nearest Address	Ambient Noise (dBA)		LRV Only, Unmitigated (dBA)		Pass based on Criteria: (1) Ambient +5 dB (2) 60 dB day/55 dB Night		Stationary Sources Only (dBA)		Pass based on Criteria: (1) Ambient (2) 50 dB day/45 dB Night	
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
427-1	620 Martin Grove Road	65	56	-	-	Pass (1)	Pass (1)	45	45	Pass (1)	Pass (1)
427-2	99 Dalegrove Crescent	65	55	-	-	Pass (1)	Pass (1)	38	38	Pass (1)	Pass (1)
427-3	95 Decarie Circle	64	56	17	9	Pass (1)	Pass (1)	35	35	Pass (1)	Pass (1)
427-4	940 The East Mall	67	58	20	12	Pass (1)	Pass (1)	38	38	Pass (1)	Pass (1)
Renf-1	151 Rangoon Road	61	52	22	14	Pass (1)	Pass (1)	48	48	Pass (1)	Pass (1)
Renf-2	132 Rangoon Road	64	55	23	15	Pass (1)	Pass (1)	40	40	Pass (1)	Pass (1)
Renf-3	27 Hardwick Court	65	56	26	18	Pass (1)	Pass (1)	33	33	Pass (1)	Pass (1)
Renf-4	36 Sagamore Crescent	64	55	44	36	Pass (1)	Pass (1)	28	28	Pass (1)	Pass (1)
Comm-1	720 Renforth Drive	58	49	41	33	Pass (1)	n/a	30	30	Pass (1)	n/a
Comm-2	71 Bingham Crescent	56	49	40	31	Pass (1)	Pass (2)	31	31	Pass (1)	Pass (1)
Comm-3	29 Garbutt Crescent	54	46	35	26	Pass (2)	Pass (2)	44	44	Pass (1)	Pass (1)

"-" levels lower than 0 dB and considered in-audible.

7.3.3 Passby Noise

The specification for Transit City LRV limits exterior noise to 82 dBA measured at a distance of 7.5 m from the track centerline, travelling at the design maximum speed of 80 km/hr. The maximum allowable passby level, from Table 3-2, is 80 dBA at the nearest receptor.

Given the following equations, interpreted from the FTA Manual [R-2], the distance at which the exterior noise is 80 dBA can be determined, conservatively assuming no ground attenuation.

$$L_{distance} = L_{7.5m} + C_{distance}$$
$$80\ dBA = 82\ dBA + C_{distance}$$
$$C_{distance} = -2\ dBA = -20\log\left(\frac{D}{7.5}\right)$$
$$D = 9.4\ m$$

Therefore, the distance at which the passby level is 80 dBA is 9.4 m. The closest receptor to the above-ground segment of the alignment is the new development near 1 Richview Road (see Section 7.3.2.1), which is approximately 15 m from the westbound track. Therefore, no sensitive receptors are expected to experience a passby noise level greater than 80 dBA.

7.4 Operational Vibration Assessment Results

7.4.1 Operational Vibration Assessment Assumptions

1. All assumptions listed in Section 7.1;
2. Preliminary bedrock data and alignment information was used to determine areas of the tunnel that are encased in bedrock. For these sections, a propagation curve was used based on FTA information to predict bedrock vibration propagation. Bedrock-encased tunnels have significantly different vibration properties so significant alignment changes that alter which sections are/are not placed in bedrock should be assessed accordingly;
3. The FTA general vibration assessment was completed for every 100 m chainage length. For each 100 m segment, the closest receptor was chosen to represent the entire 100 m segment. Therefore, if vibration controls were deemed required to mitigate levels at the closest receptor representing the 100 m segment, the control is applied throughout the 100 m span; and
4. The current Eglinton Crosstown central segment uses monoblock frogs, which allow for a smoother transition through the rail gap in a crossover. For this reason, a +5 dB adjustment is applied for special trackwork, instead of a +10 dB adjustment recommended by the FTA Manual [R-2].

7.4.2 Operational Vibration Assessment Results

Operational vibration was assessed from the LRV applying the FTA General Assessment method. Contours were calculated to display the area surrounding the tracks which experiences vibrations above the specified limit of 0.1 mm/s RMS. To align with FTA, vibration velocity was converted to VdB (re: 1 µin/sec), such that 72 VdB equals 0.1 mm/s RMS. The vibration calculation spreadsheet and contour plots are presented in Appendix E.

The ECWE line can, for the purpose of the general vibration assessment, be described as four distinct segments described in Table 7-4.

Table 7-4: General Segments of the ECWE Alignment

Segment Description	Typical Vibration Properties	FTA Modifications*
Elevated Structure	Lower vibration levels are expected because of the mass and damping of the structure.	-10 VdB
Portal Trench	Similar to at grade track which is used as the basis for the FTA general assessment.	+0 VdB
Underground, in Soil	A bored subway tunnel in soil is used as the basis for the FTA general assessment.	+0 VdB
Underground, in Bedrock	A bored subway tunnel in bedrock will generate higher frequency vibrations with lower attenuation over distance than soil.	-15 VdB Lower attenuation over distance Higher ground-borne noise

* Relative to at-grade track and bored subway tunnel.

The ECWE alignment was assessed at 100 m intervals following the designated chainage markers accounting for each segment type listed in Table 7-4. Much of the ECWE corridor is dense residential space including both single family homes and multi-family homes (e.g., apartments). There are four sections of the alignment where vibrations are expected surpass allowable limits, primarily due to the alignment's proximity to residences. The specific sections of the alignment that surpass the limits are outlined in Table 7-5. The table compares two criteria:

- The source-receptor distance: the distance between project tracks and the closest sensitive receptor within the given chainage; and
- The 0.1 mm/s vibration/noise contours: the distance at which the vibration has attenuated to 0.1 mm/s.

By these criteria, if the source-receptor distance is less than the 0.1 mm/s noise contour distance, then the receptor is within the 0.1 mm/s noise contour. In this case, the receptor experiences vibrations greater than 0.1 mm/s RMS and is therefore out of compliance specified in Table 3-2. These cases require mitigation and are shown in Table 8-4. All chainage segments are listed in Appendix E.

Mitigation is explored in Section 8 for these sections. Additionally, Figure 7-2 thru Figure 7-5 show images of the vibration sensitive receptors that surpass allowable limits.

Table 7-5: Chainage Sections that Surpass Vibration Limits of 72 VdB (0.1 mm/s RMS)

Chainage*	Segment Description	Vibration Limit (VdB)	Noise Limit (VdB)	Source-Receptor Distance** (m)	0.1mm/s Vibration Contour (m)	0.1mm/s Noise Contour (m)
105+500	Underground, in soil	72	35	13	18	23
105+400	Underground, in soil	72	35	13	18	23
105+300	Underground, in soil	72	35	15	18	23
105+200	Underground, in soil	72	35	14	18	23
102+400	Underground, in soil	72	35	28	25	31
100+900	Underground, in soil	72	35	26	25	31
100+800	Underground, in soil	72	35	25	25	31
99+800	Underground, in soil	72	35	22	17	22
99+700	Underground, in soil	72	35	19	17	22

* Indicates upper-bound chainage (e.g., chainage 99+700 indicates the section between 99+600 and 99+700).
** Considers depth of track, assuming 3 m depth for receptor basements.

Figure 7-2: Alignment Showing 105+200 to 105+500 with nearby Receptors Circled

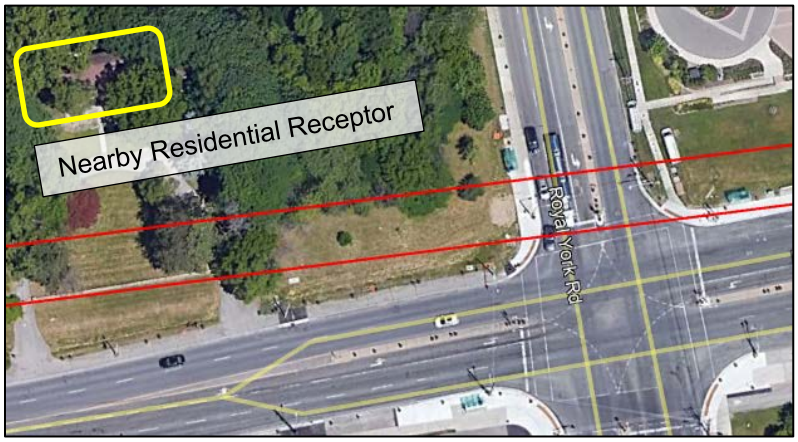

Figure 7-3: Alignment Showing 102+400 with the nearby Receptor Circled

Figure 7-4: Alignment Showing 100+800 to 100+900 with nearby Receptors Circled

Figure 7-5: Alignment Showing 99+700 and 99+800 with nearby Receptors Circled

7.5 Construction Noise Assessment Results

7.5.1 Construction Noise Assessment Assumptions

1. All assumptions listed in Section 7.1;
2. Construction areas are based off of preliminary information and may be subject to change. It is assumed any future changes to construction areas which may result in significant changes to anticipated construction noise and vibrations are reassessed as deemed necessary;
3. To conservatively model the worst case scenario, all construction equipment was assumed to be operating simultaneously; and

4. Construction site perimeters used in this assessment do not account for most laydown areas, with the exception of the Renforth Laydown Area, as they are not available at this time. It is assumed any future addition of laydown areas which may result in significant changes to anticipated construction noise and vibrations are reassessed as deemed necessary.

7.5.2 Construction Noise Assessment Results

The noise impact of the construction was based off of the worst case construction phases for each site. As discussed in Section 5.3.1, the “clearing” activity is considered to be the loudest case for at-grade and underground construction sites. “Lifting” activities are expected to be the loudest for elevated construction sites.

The modelled ambient noise and the construction noise is listed in Table 7-6 through Table 7-10. A contour plot of the alignment showing all construction activities acting simultaneously is shown in Appendix D. The noise controls for receptors that have failed are discussed in Section 8. Metrolinx recommends that construction take place during the day on weekdays. Therefore, the stricter nighttime and weekend criteria is shown but nighttime construction is only anticipated for the Renforth Laydown Area (see Section 7.5.2.1).

The following pass/fail criteria has been developed. Failure requires that both these conditions are not met.

Pass (1)	Noise level passes based on limit:	Ambient +5 dB
Fail (1)	Noise level fails based on limit:	Ambient +5 dB
Pass (2)	Noise level passes based on limit:	Minimum limit per Table 3-4
Fail (2)	Noise level fails based on limit:	Minimum limit per Table 3-4
Fail	A Yellow Fail highlight indicates a failure, but likely not applicable given the closest construction site will only operate during the daytime.	
n/a	Indicates there is no applicable limit for that time of day, therefore all levels pass.	

No receptors were predicted to fail in the daytime as their construction levels were predicted to be under the daytime construction noise criteria.

Twenty-two receptors failed nighttime criteria. However, all receptors that failed the night-criteria are located at construction sites that are not expected to experience nighttime construction. Therefore, night-time failure conditions do not apply to these receptors. If nighttime construction is pursued for these construction sites, general acoustic mitigation is recommended in Section 8.

7.5.2.1 *Nighttime Construction*

The Renforth Laydown Area is expected to support LS activities near the Renforth Portal. LS activities supporting tunnel boring are expected to take place at all times including nighttime and weekends. Additional laydown areas that support tunnel boring efforts (e.g., launch, extraction, and maintenance shafts) are expected but will be defined later in this project, and are therefore not assessed in this report.

Figure 7-6 shows a contour plot of the Renforth Laydown Area conservatively assuming worst-case lifting operations are taking place at nighttime. All buildings immediately surrounding the construction site are commercial buildings and thus are not subject to nighttime noise criteria. These buildings are instead subject to the standard 80 dBA criteria listed in Table 3-4. All commercial buildings pass this criteria and do not require mitigation.

Since construction is taking place on weekends and at nighttime, this construction site is assigned stricter daytime/nighttime residential criteria of 70/60 dBA per Table 3-4. The highest impact on a residential receptor is at Renf-4, which experiences 48 dBA as shown in Figure 7-6. This is lower than the 60 dBA nighttime limit and therefore does not require mitigation. See Table 7-9 for a full list of impacted receptors.

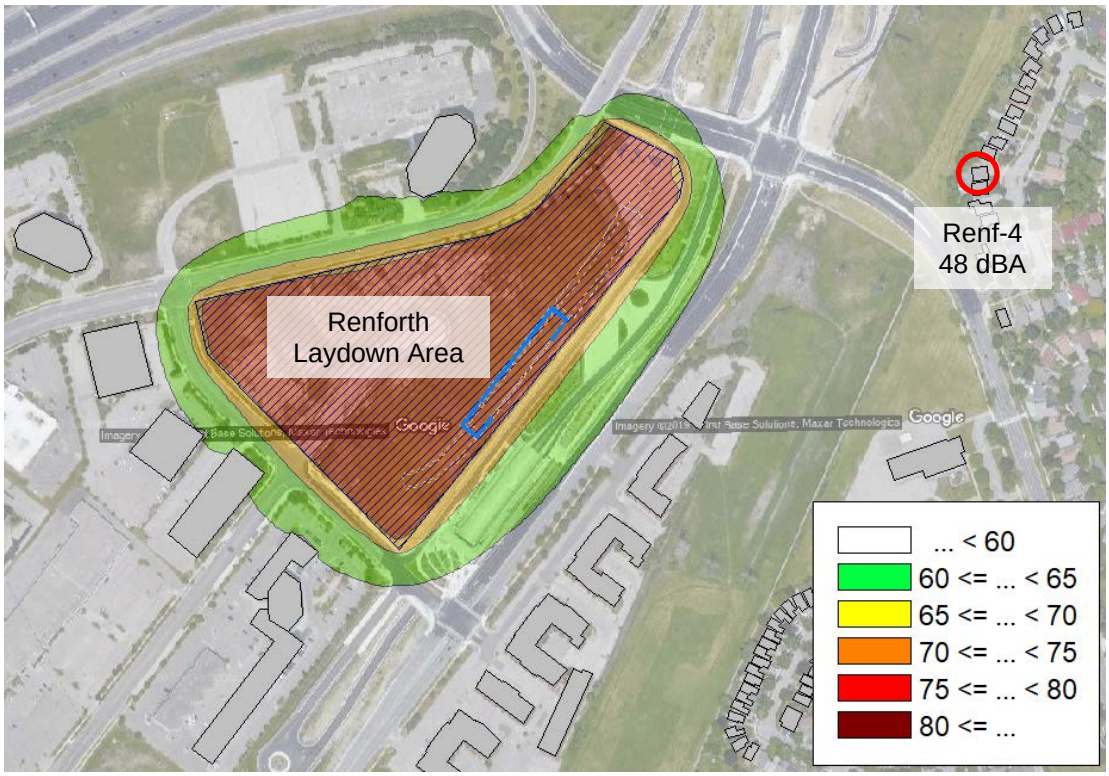

Figure 7-6: Nighttime Construction at Renforth Laydown Area

Table 7-6: TPSS Construction Noise At Nearby Receptors

Receptor ID	Nearest Address	Ambient Noise (dBA)		Construction (dBA)		Pass based on Criteria: (1) Ambient +5 dB (2) Minimum Limit	
		Day	Night	Day	Night	Day	Night
Kipl-6	265 Wincott Road	62	53	55	55	Pass (2)	n/a
Kipl-7	250 Wincott Road	56	46	48	48	Pass (2)	n/a
Scar-1	75 Emmett Avenue	55	45	56	56	Pass (2)	Pass (2)
Scar-2	85 Emmett Avenue	56	47	55	55	Pass (2)	Pass (2)
Roya-17	1403 Royal York Road	65	56	67	67	Pass (2)	Fail (2)
Roya-18	1387 Royal York Road	64	55	64	64	Pass (2)	Pass (2)
Isli-1	185 La Rose Avenue	63	54	69	69	Pass (2)	Fail (2)
Isli-2	27 Edenvale Crescent	63	54	66	66	Pass (2)	Fail (2)
Isli-5	118 Poplar Heights Drive	61	53	45	45	Pass (2)	Pass (2)
Kipl-1	1738 Islington Avenue	59	49	56	56	Pass (2)	Pass (2)
Kipl-2	58 Waterford Drive	60	51	58	58	Pass (2)	Pass (2)
Kipl-3	6 Evesham Court	51	42	54	54	Pass (2)	Pass (2)
Kipl-4	79 Waterford Drive	60	50	58	58	Pass (2)	Pass (2)
Kipl-5	57 Oldham Road	61	51	75	75	Pass (2)	Fail (2)
Kipl-8	7 Winterbourne Court	69	59	55	55	Pass (2)	Pass (2)
Mart-6	230 Lloyd Manor Road	65	58	60	60	Pass (2)	n/a
Mart-7	142 Widdicombe Hill Blvd	67	60	58	58	Pass (2)	Pass (2)
Mart-8	226 Lloyd Manor Road	59	51	58	58	Pass (2)	Pass (2)
Mart-9	4679 Eglinton Avenue West	63	55	73	73	Pass (2)	Fail (2)
Mart-10	50 Winterton Drive	60	52	58	58	Pass (2)	Pass (2)
Renf-1	151 Rangoon Road	61	52	60	60	Pass (2)	Pass (2)
Renf-2	132 Rangoon Road	64	55	47	47	Pass (2)	Pass (2)
Comm-3	29 Garbutt Crescent	54	46	53	53	Pass (2)	Pass (2)
Comm-4	5080 Commerce Blvd	63	54	46	46	Pass (2)	n/a

Table 7-7: EEB Construction Noise At Nearby Receptors

Receptor ID	Nearest Address	Ambient Noise (dBA)		Construction (dBA)		Pass based on Criteria: (1) Ambient +5 dB (2) Minimum Limit	
		Day	Night	Day	Night	Day	Night
Roya_10	60 Richview Road	59	50	50	50	Pass (2)	Pass (2)
Roya_11	87 Lemonwood Drive	66	57	47	47	Pass (2)	Pass (2)
Roya_12	4005 Eglinton Avenue West	65	55	56	56	Pass (2)	Pass (2)
Roya_13	125 La Rose Avenue	57	47	53	53	Pass (2)	Pass (2)
Roya_14	144 La Rose Avenue	58	48	60	60	Pass (2)	Pass (2)
Roya_15	35 Swordbill Drive	62	53	63	63	Pass (2)	Pass (2)
Roya_16	165 La Rose Avenue	60	51	65	65	Pass (2)	Fail (2)
Roya_17	1403 Royal York Road	65	56	48	48	Pass (2)	Pass (2)
Roya_18	1387 Royal York Road	64	55	56	56	Pass (2)	Pass (2)
Isli-1	185 La Rose Avenue	63	54	42	42	Pass (2)	Pass (2)
Isli-2	27 Edenvale Crescent	63	54	51	51	Pass (2)	Pass (2)
Isli-3	4400 Eglinton Avenue West	63	56	46	46	Pass (2)	Pass (2)
Isli-4	25 Hamptonbrook Drive	62	54	72	72	Pass (2)	Fail (2)
Isli-5	118 Poplar Heights Drive	61	53	68	68	Pass (2)	Fail (2)
Isli-6	104 Poplar Heights Drive	61	54	55	55	Pass (2)	Pass (2)
Kipl_1	1738 Islington Avenue	59	49	48	48	Pass (2)	Pass (2)
Kipl_2	58 Waterford Drive	60	51	52	52	Pass (2)	Pass (2)
Kipl_3	6 Evesham Court	51	42	44	44	Pass (2)	Pass (2)
Kipl_4	79 Waterford Drive	60	50	56	56	Pass (2)	Pass (2)
Kipl_5	57 Oldham Road	61	51	74	74	Pass (2)	Fail (2)
Kipl_6	265 Wincott Road	62	53	68	68	Pass (2)	n/a
Kipl_7	250 Wincott Road	56	46	56	56	Pass (2)	n/a
Kipl_8	7 Winterbourne Court	69	59	61	61	Pass (2)	Pass (2)
427-3	95 Decarie Circle	64	56	51	51	Pass (2)	Pass (2)
Renf-1	151 Rangoon Road	61	52	51	51	Pass (2)	Pass (2)

Table 7-8: Track Construction Noise At Nearby Receptors

Receptor ID	Nearest Address	Ambient Noise (dBA)		Construction (dBA)		Pass based on Criteria: (1) Ambient +5 dB (2) Minimum Limit	
		Day	Night	Day	Night	Day	Night
West-2	11 Hollis Street	52	42	40	40	Pass (2)	Pass (2)
West-1	1149 Weston Road	65	56	44	44	Pass (2)	Pass (2)
Jane-1	1156 Weston Road	67	58	47	47	Pass (2)	Pass (2)
Jane-2	3545 Eglinton Avenue West	64	55	49	49	Pass (2)	Pass (2)
Jane-3	3559 Eglinton Avenue West	59	49	40	40	Pass (2)	Pass (2)
Jane-4	3561 Eglinton Avenue West	63	54	55	55	Pass (2)	Pass (2)
Jane-5	3580 Eglinton Avenue West	69	59	54	54	Pass (2)	Pass (2)
Jane-6	3593 Eglinton Avenue West	66	56	63	63	Pass (2)	Pass (2)
Jane-7	40 Glenvalley Drive	56	46	65	65	Pass (2)	Pass (2)
Scar-1	75 Emmett Avenue	55	45	62	62	Pass (2)	Pass (2)
Scar-2	85 Emmett Avenue	56	46	63	63	Pass (2)	Pass (2)
Roya-1	38 Fontenay Court	67	57	70	70	Pass (2)	Fail (2)
Roya-2	1 Richview Road	62	53	74	74	Pass (2)	Fail (2)
Roya-3	30 Fontenay Court	65	55	70	70	Pass (2)	Fail (2)
Roya-4	20 Fontenay Court	58	49	68	68	Pass (2)	Fail (2)
Roya-5	25 Richview Road	59	50	69	69	Pass (2)	Fail (2)
Roya-6	39 Richview Road	62	52	73	73	Pass (2)	Fail (2)
Roya-7	55 Lemonwood Drive	63	53	72	72	Pass (2)	Fail (2)
Roya-8	61 Richview Road	64	54	69	69	Pass (2)	Fail (2)
Roya-9	81 Lemonwood Drive	66	57	64	64	Pass (2)	Pass (2)
Roya-10	60 Richview Road	59	50	51	51	Pass (2)	Pass (2)
Roya-11	87 Lemonwood Drive	66	57	58	58	Pass (2)	Pass (2)
Roya-12	4005 Eglinton Avenue West	65	55	48	48	Pass (2)	Pass (2)
Renf-4	36 Sagamore Crescent	64	55	51	51	Pass (2)	Pass (2)
Comm-1	720 Renforth Drive	58	49	55	55	Pass (2)	Pass (2)
Comm-2	71 Bingham Crescent	56	49	49	49	Pass (2)	Pass (2)
Comm-3	29 Garbutt Crescent	54	46	45	45	Pass (2)	Pass (2)
Comm-4	5080 Commerce Blvd	63	54	59	59	Pass (2)	n/a

Table 7-9: Renforth Laydown Area Construction Noise At Nearby Receptors

Receptor ID	Nearest Address	Ambient Noise (dBA)		Construction (dBA)		Pass based on Criteria: (1) Ambient +5 dB (2) Minimum Limit	
		Day	Night	Day	Night	Day	Night
Renf-4	3561 Eglinton Avenue West	64	55	48	48	Pass (2)	Pass (2)
Comm-1	3580 Eglinton Avenue West	54	46	49	49	Pass (2)	Pass (2)
Comm-2	3593 Eglinton Avenue West	56	49	44	44	Pass (2)	Pass (2)
Comm-3	40 Glenvalley Drive	58	49	40	40	Pass (2)	Pass (2)
Comm-4	55 Lemonwood Drive	63	54	62	62	Pass (2)	n/a

Table 7-10: Station Construction Noise at Nearby Receptors

Receptor ID	Nearest Address	Ambient Noise (dBA)		Construction (dBA)		Pass based on Criteria: (1) Ambient +5 dB (2) Minimum Limit	
		Day	Night	Day	Night	Day	Night
Roya-1	38 Fontenay Court	67	57	69	69	Pass (2)	Fail (2)
Roya-2	1 Richview Road	62	53	66	66	Pass (2)	Fail (2)
Roya-3	30 Fontenay Court	65	55	65	65	Pass (2)	Pass (2)
Roya-17	1403 Royal York Road	65	56	63	63	Pass (2)	Pass (2)
Roya-18	1387 Royal York Road	64	55	60	60	Pass (2)	Pass (2)
Isli-1	185 La Rose Avenue	63	54	68	68	Pass (2)	Fail (2)
Isli-2	27 Edenvale Crescent	63	54	63	63	Pass (2)	Pass (2)
Isli-6	104 Poplar Heights Drive	61	54	55	55	Pass (2)	Pass (2)
Kipl-1	1738 Islington Avenue	59	49	54	54	Pass (2)	Pass (2)
Kipl-2	58 Waterford Drive	60	51	64	64	Pass (2)	Pass (2)
Kipl-12	5 Cheviot Place	66	57	61	61	Pass (2)	Pass (2)
Kipl-13	43 Dryden Way	67	57	67	67	Pass (2)	Fail (2)
Mart-1	53 Widdicombe Place	61	51	63	63	Pass (2)	Pass (2)
Mart-2	57 Widdicombe Place	60	50	61	61	Pass (2)	Pass (2)
Mart-3	4704 Eglinton Avenue West	63	53	68	68	Pass (2)	Fail (2)
Mart-4	4702 Eglinton Avenue West	64	54	61	61	Pass (2)	Pass (2)

Receptor ID	Nearest Address	Ambient Noise (dBA)		Construction (dBA)		Pass based on Criteria: (1) Ambient +5 dB (2) Minimum Limit	
		Day	Night	Day	Night	Day	Night
Mart-5	4700 Eglinton Avenue West	67	57	54	54	Pass (2)	Pass (2)
Mart-8	226 Lloyd Manor Road	59	51	50	50	Pass (2)	Pass (2)
Mart-9	4679 Eglinton Avenue West	63	55	58	58	Pass (2)	Pass (2)
Mart-10	50 Winterton Drive	60	52	57	57	Pass (2)	Pass (2)
427-1	620 Martin Grove Road	65	56	54	54	Pass (2)	Pass (2)

7.6 Construction Vibration Assessment Results

7.6.1 Construction Vibration Assessment Assumptions

1. All assumptions listed in Section 7.1;
2. Construction vibration ZOI was calculated based on the equipment that produces the most vibration at it's 5 mm/sec peak for conservatism;
3. Preliminary data is used to locate construction sites. It is assumed that any significant changes to construction sites will be reassessed accordingly; and
4. Construction site perimeters used in this assessment do not account for most laydown areas, with the exception of the Renforth Laydown Area, as they are not available at this time. It is assumed any future addition of laydown areas which may result in significant changes to anticipated construction noise and vibrations are reassessed as deemed necessary.

7.6.2 Construction Vibration Damage Assessment Results

The vibration ZOI is calculated based on the equipment that is anticipated to produce the highest vibration level operating near the perimeter of each construction site. Table 7-11 summarizes all of the equipment anticipated to be operating at each site and their Damage ZOI (DZOI) from reference distance and PPV_{ref}.

Table 7-11: Construction Equipment ZOI

Equipment	Activity	Reference Distance (m)	PPV_{ref} (mm/s)	DZOI (m)
Demolition Hydraulic Excavator	Demolition	1.0	21.0	2.6
Medium Bulldozer	Demolition	7.6	2.3	4.5
Hydraulic Hammer	Demolition/ Excavating	1.0	49.0	4.6
Medium Wheel Loader	Demolition	1.0	21.0	2.6
Medium Hydraulic Excavator	Grading	1.0	21.0	2.6
Large Hydraulic Excavator	Grading	1.0	21.0	2.6
Mini Hydraulic Excavator	Grading	1.0	21.0	2.6
Small Bulldozer	Grading	7.6	0.1	0.5
M Series Motor Grader	Grading	7.6	2.3	4.5
Vibratory Roller	Compacting	7.6	5.3	8.0
Vibratory Plate Compactor	Compacting	1.0	26.0	3.0
Cement Mixer	Slab Pouring	1.0	30.0	3.3
Concrete Pump	Slab Pouring	7.6	1.9	4.0
Vibratory Hammer	Pile Driving	1.0	49.0	4.6
Rotary Drilling Rig	Pile Driving	1.0	40.0	4.0
Crane	Pile Driving	1.0	15.0	2.1
Horizontal Direction Drill	Drilling	7.6	2.3	4.5
Mud Reclaimer	Drilling	7.6	1.9	4.0
Mini Hydraulic Excavator	Drilling	1.0	21.0	2.6
Backhoe Loader	Excavating	7.6	0.1	0.5
Dump Truck	All	1.0	30.0	3.3

Equipment	Activity	Reference Distance (m)	PPV_{ref} (mm/s)	DZOI (m)
Wheel Asphalt Paver	-	1.0	2.0	0.5
Tunnel Boring Machine	Tunnelling	2.0	29.5	6.5

The vibratory roller will be the highest emitting vibration source at all surface or above surface construction sites and the TBM for the underground alignment.

With the ZOI defined at 5 mm/sec PPV, and a vibratory roller reference PPV of 5.3 mm/sec at 7.6 m, the ZOI distance for the vibratory roller becomes 8 m [R-2]. The methodology used to calculate the ZOI distance for the vibratory roller is included in Appendix E and the resulting plots overlaying the ZOI over property boundaries and building footprints is in Appendix G.

Tunnel boring activity is determined to have ZOI of 6.5 m. Since the below grade foundations of all buildings surrounding the underground alignment are greater than 6.5 m away from the outer circumference of the tunnel. The tunnelling activity will not require building inspections or monitoring.

The surface ZOI from the vibratory roller overlaps the footprint of no surrounding structures for the construction sites assessed in this report. As a result, no properties currently require continuous vibration monitoring at the construction boundary. Note that laydown areas that will be defined in the future may extend the barriers to these construction sites such that vibration monitoring may be required. Refer to Section 8.4 for controls to implement if vibration monitors measure levels that exceed limits.

Table 7-12 lists three properties where the surface ZOI from the vibratory roller overlaps the property boundary. These properties will require pre-construction inspections to document the existing state of the structure prior to construction.

Cultural heritage buildings were conservatively assumed to be “extremely susceptible to vibration damage”, and were assigned vibration criteria of 3 mm/s per Table 3-6. Using the same methodology as above, the damage ZOI for a vibratory roller with a 3 mm/s limit is 11.2 m. The closest cultural heritage receptor to a project construction site is the Mary Reid House, 4200 Eglinton Avenue West, which is approximately 20 m from the perimeter of the Royal York Station construction site, a distance greater than the 11.2 m vibration damage ZOI. Therefore, cultural heritage buildings within the study area are not considered at risk of construction vibration damage given construction data assessed in this report.

Table 7-12: Properties Requiring Pre-Construction Inspections

Construction Zone	Intersection	Property Address
Scarlett Station	Scarlett Road	1 Richview Road
Royal York Station	Royal York Road	4200 Eglinton Avenue West
TPSS-3	Islington Avenue	57 Oldham Road

7.6.3 Construction Vibration Annoyance Assessment Results

The ZOI for construction annoyance is defined as the distance to reach a level of 0.14 mm/s RMS, the criteria for vibration annoyance according to the 1995 MOEE/GO Transit Protocol. To appropriately convert construction equipment reference PPV levels to RMS levels, a crest factor of 4 is applied. Therefore the Vibratory Roller (VR) reference RMS level is 1.32 mm/sec RMS at 7.6 m and the TBM is 7.38 mm/sec RMS at 2.0 m. To minimize ground borne vibration annoyance during construction, Table 7-13 outlines temporary vibration control measures to be applied at each construction site and along specific sections of the tunnel alignment. The construction vibration annoyance ZOIs are shown in Appendix H.

Table 7-13: Construction Temporary Vibration Control Measures

Intersection/Chainage	Intersection/Chainage	Controls
Underground tunnel	105+100 to 105+500	Lower vehicle speed, maintain temporary construction tracks, weld tracks.
	103+500 to 103+600	
	103+150 to 103+250	
	102+400 to 102+550	
	101+950 to 102+050	
	100+500 to 101+000	
	99+600 to 99+900	
Royal York Station	Royal York Road	Operate VR 1 m from northern border. Operate VR 33 m from 4200 Eglinton Avenue West.
TPSS-2	Royal York Road	Operate VR 33 m from 4200 Eglinton Avenue West.
TPSS-3	Islington Avenue	Operate VR 1 m from south-western corner of site.

8. Mitigation Assessment

8.1 Operational Noise Mitigation

Predicted operational air-borne noise was assessed in Section 7.3 and seven receptors were identified to surpass allowable operational limits. Substations and underground station ventilation were identified as the dominant source of noise at these receptors. For this reason, mitigation is applied to substations and ventilation intakes as necessary to ensure all receptors pass all operational noise criteria.

The TPSS and ventilation configurations are not specified at this point in the project, and individual noise sources within the substations are not defined (e.g., transformers, ventilation units, etc.). Normally, attenuation is applied to individual sources such as silencers and local acoustic barriers. However, since individual components are yet to be specified, a general spectral attenuation was applied to the entire substation. Spectral attenuation was investigated in three different tiers listed in Table 8-1. With each increasing tier, the level of attenuation becomes more involved. A tier 1 may require minimal roof top noise control or a light barrier around transformers. Tier 2 may require more robust attenuation of roof top units, a roof top barrier, or an acoustic fence around transformers. A tier 3 will likely be a combination of robust noise controls for rooftop equipment and acoustic barriers around transformers.

Table 8-1: Substation Spectral Power Level Attenuation Tiers (dB)

Attenuation Tiers	Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Tier 1	0	0	2	2	5	5	10	10
Tier 2	2	2	5	5	10	10	15	15
Tier 3	5	5	10	10	15	15	20	20

TPSSs are to be attenuated as shown in Table 8-2.

Table 8-2: Stationary Source Attenuation Required For Mitigation

Source	Attenuation Applied
TPSS-01	Tier 1 Attenuation
TPSS-02	Tier 2 Attenuation
TPSS-03	Tier 3 Attenuation
TPSS-04	Tier 2 Attenuation
TPSS-05	No Attenuation Required
TPSS-06	No Attenuation Required
Royal York Station Ventilation	Tier 2 Attenuation
Islington Station Ventilation	Tier 2 Attenuation
Kipling Station Ventilation	Tier 1 Attenuation
Martin Grove Station Ventilation	Tier 1 Attenuation

Noise contour plots showing the effect of stationary source mitigation are shown in Figure 8-1 thru Figure 8-5. Upon applying the attenuation proposed in Table 8-2, receptors previously exceeding the criteria shall achieve compliance as summarized in Table 3-3.

Note that the receptors near some TPSS and station ventilation sources surpass the nighttime criteria for stationary sources of 45 dBA. For example, the nearest receptor to TPSS-04 in Figure 8-5 (Mart-9 in Table 8-3) experiences 55 dBA due to nearby stationary sources. Although this is above the 45 dBA limit, the receptor also experiences a nighttime baseline noise of 55 dBA due to it's proximity to Eglinton Avenue West. For this reason, the receptor passes stationary criteria.

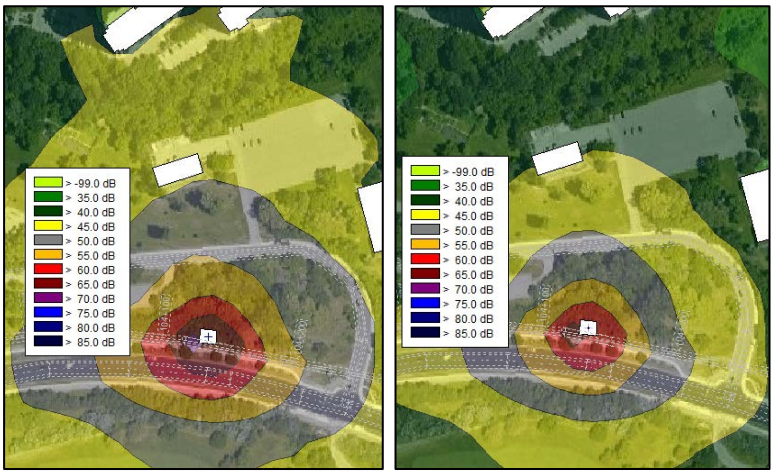

Figure 8-1: (Left) TPSS-1 unmitigated (Right) TPSS-1 Mitigated

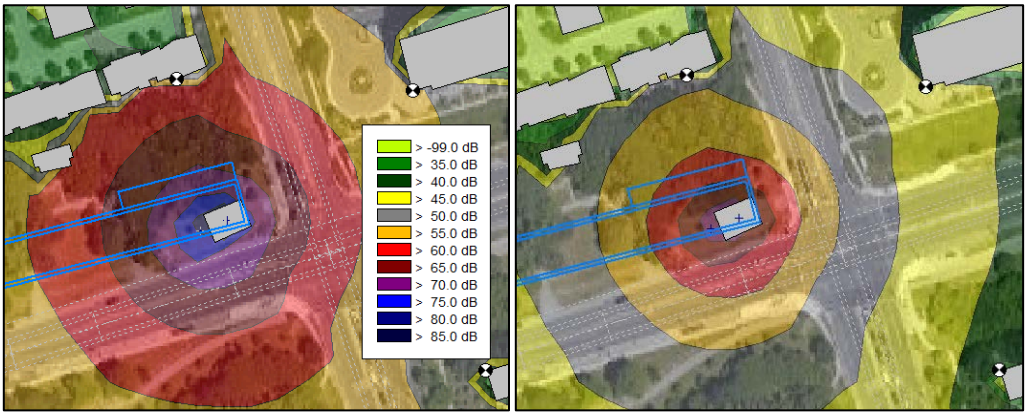

Figure 8-2: TPSS-2 & Royal York Ventilation: (Left) Unmitigated (Right) Mitigated

Figure 8-3: TPSS-3 & Islington Ventilation: (Left) Unmitigated (Right) Mitigated

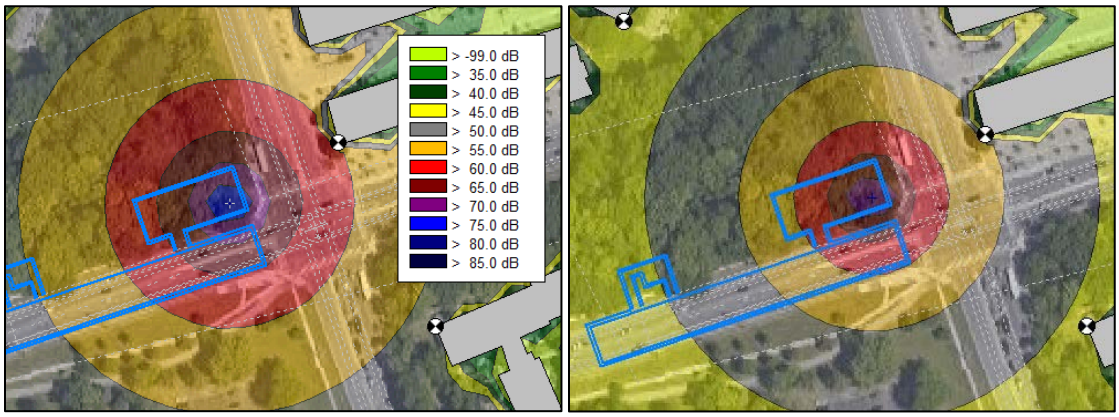

Figure 8-4: Kipling Station Ventilation: (Left) Unmitigated (Right) Mitigated

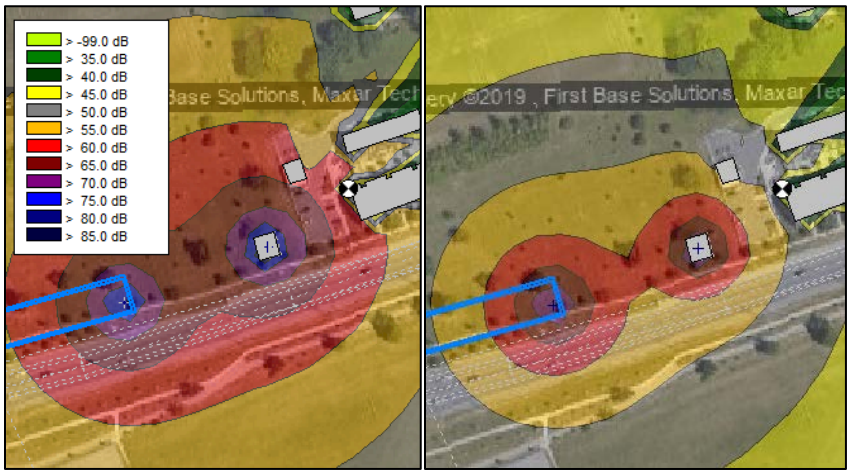

Figure 8-5: TPSS-4 & Martin Grove Ventilation: (Left) Unmitigated (Right) Mitigated

Table 8-3: Predicted Operational Air-borne Noise after Application of Operational Mitigation

Receptor ID	Nearest Address	Ambient Noise (dBA)		LRV Only, Unmitigated (dBA)		LRV Pass based on Criteria: (1) Ambient +5 dB (2) 60 dB day/55 dB ight		Stationary Sources Only, Mitigated (dBA)		Stationary Source Pass based on Criteria: (1) Ambient (2) 50 dB day/45 dB night	
		Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Scar-1	75 Emmett Avenue	55	45	55	47	Pass (1)	Pass (1)	43	43	Pass (1)	Pass (1)
Scar-2	85 Emmett Avenue	56	46	55	47	Pass (1)	Pass (1)	43	43	Pass (1)	Pass (1)
Roya-17	1403 Royal York Road	65	56	29	21	Pass (1)	Pass (1)	48	48	Pass (1)	Pass (1)
Isli-1	185 La Rose Avenue	63	54	29	21	Pass (1)	Pass (1)	53	53	Pass (1)	Pass (1)
Isli-2	27 Edenvale Crescent	63	54	28	20	Pass (1)	Pass (1)	49	49	Pass (1)	Pass (1)
Kipl-1	1738 Islington Avenue	59	49	-	-	Pass (1)	Pass (2)	46	46	Pass (1)	Pass (1)
Kipl-2	58 Waterford Drive	60	51	-	-	Pass (1)	Pass (1)	47	47	Pass (1)	Pass (1)
Kipl-3	6 Evesham Court	51	42	-	-	Pass (2)	Pass (2)	34	34	Pass (1)	Pass (2)
Kipl-5	57 Oldham Road	61	51	-	-	Pass (1)	Pass (1)	49	49	Pass (1)	Pass (1)
Kipl-13	43 Dryden Way	67	57	-	-	Pass (1)	Pass (1)	55	55	Pass (1)	Pass (1)
Mart-1	53 Widdicombe Place	61	51	-	-	Pass (1)	Pass (1)	47	47	Pass (1)	Pass (1)
Mart-9	4679 Eglinton Avenue West	63	55	-	-	Pass (1)	Pass (1)	55	55	Pass (1)	Pass (1)
Mart-10	50 Winterton Drive	60	52	-	-	Pass (1)	Pass (1)	47	47	Pass (1)	Pass (1)

Green indicates criteria that was met as a result of mitigation.

"-" levels lower than 0 dB and considered in-audible.

8.2 Operational Vibration Mitigation

Section 7.4 examined sections of the EWCE alignment where groundborne noise and vibration receptors were found to surpass allowable limits. The assessment identified:

- A total of 900 m of track require mitigation to ensure vibration sensitive receptors are within allowable limits. A -5 VdB mitigation is considered sufficient and can be accomplished using High Resilience Fasteners (HRF). Mitigation recommended for each 100 m section is shown in Table 8-4.

Table 8-4 compares two criteria:

- The source-receptor distance: the distance between project tracks and the closest sensitive receptor within the given chainage, and
- The 0.1 mm/s vibration/noise contours: the distance at which the vibration has attenuated to 0.1 mm/s.

By these criteria, if the source-receptor distance is less than the 0.1 mm/s noise contour distance, then the receptor is within the 0.1 mm/s noise contour. In this case, the receptor experiences vibrations greater than 0.1 mm/s RMS and is therefore out of compliance. These cases require mitigation and are shown in Table 8-4. All chainage segments are listed in Appendix E.

According to the FTA Manual [R-2], a -5 VdB reduction can be accomplished with HRF, and a -10 VdB reduction can be accomplished with ballast or under slab mats (BM) or low-vibration tracks (LVT)..

Table 8-4: Chainage Sections that surpass Vibration Limits of 0.1 mm/s RMS

Chainage*	Source-Receptor Distance (m)	Unmitigated		Mitigated		Mitigation Applied (VdB)	Treatments
		0.1 mm/s Vibration Contour (m)	0.1 mm/s Noise Contour (m)	0.1 mm/s Vibration Contour (m)	0.1 mm/s Noise Contour (m)		
105+500	13	18	23	9	12	-5	HRF
105+400	13	18	23	9	12	-5	HRF
105+300	15	18	23	9	12	-5	HRF
105+200	14	18	23	9	12	-5	HRF
102+400	28	25	31	13	17	-5	HRF
100+900	26	25	31	13	17	-5	HRF
100+800	25	25	31	13	17	-5	HRF
99+800	22	17	22	8	11	-5	HRF
99+700	19	17	22	8	11	-5	HRF

* Indicates upper-bound chainage (i.e., chainage 99+700 indicates the section between 99+600 and 99+700).
** Considers depth of underground track, assuming 3 m depth for receptor basements.

Properties between 105+200 and 105+500 are present within 15 m of the project alignment as shown in Table 8-4. This is less than the assessment distance indicated within the MOEE/TTC Protocol, so a commissioning vibration measurement is recommended during operations to ensure mitigation is sufficient to reduce vibration levels to acceptable levels. The properties affected by this are 3543-3597 Eglinton Avenue West, 1151-1156 Weston Road, and 139 Guestville Avenue.

The ground-borne noise and vibration contours at receptors near the mitigated areas are shown in Figure 8-6 to Figure 8-9. Note that contours are projected vertically from the plan of the tracks. Consideration was made for the depth of track in the assessment to ensure contours that appear underneath buildings do not reach the basements of sensitive receptors.

Ground-borne noise and vibration contour maps along the alignment are shown in Appendix E.

Figure 8-6: Alignment Centreline showing Ground-borne Vibration and Noise Contours near 105+500 to 105+200 with Mitigation

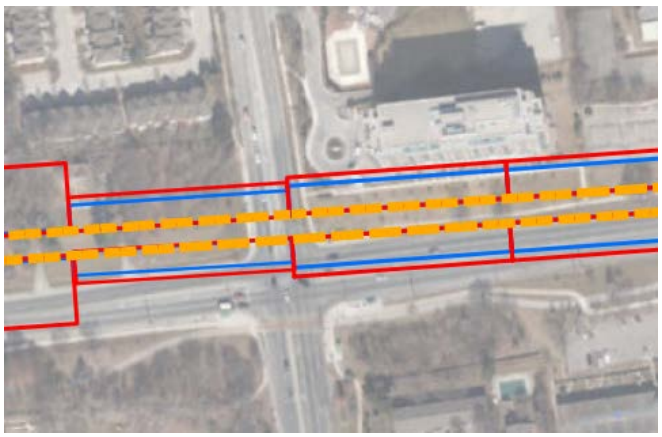

Figure 8-7: Alignment Centreline showing Ground-borne Vibration and Noise Contours near 102+500 with Mitigation

Figure 8-8: Alignment Centreline showing Ground-borne Vibration and Noise Contours 100+800 and 100+900 with Mitigation

Figure 8-9: Alignment Centreline showing Ground-borne Vibration (blue) and Noise (red) Contours near 99+800 and 99+700 with Mitigation

8.3 Construction Noise Mitigation

As shown in Section 7.5.2, no mitigation is required for daytime construction. Nighttime construction is only anticipated at the Renforth Laydown Area which does not require mitigation. As discussed in Section 7.5.1, future developments for construction sites and laydown areas, and/or the addition of nighttime construction, will require further assessment and possibly mitigation. If mitigation is required based on future construction noise assessments, refer to Sections 8.3.1 and 8.3.2.

8.3.1 Site Based Controls

Site based controls are noise controls and methods that can be applied to the construction site to further improve noise emitted to the surrounding community from construction activity. These controls can be applied in addition to temporary acoustic barriers. Examples of these controls include:

- Limiting nighttime activity and scheduling quieter tasks such as welding, inventory, site re-arrangement, etc., to occur at night;

- Ensuring newer construction equipment is used and the equipment achieves more stringent North American standards such as those outlined Table 2 of the Commonwealth of Massachusetts, Construction Noise Control Specification [R-8]. Caution should be considered if including European noise certified equipment (CE marked) as this equipment may not be readily available in North America;
- Employing broadband back-up beepers. Designing construction sites to optimize driving in and driving out, to reduce the need to back-up;
- Prohibition of engine idling;
- Minimize metal to metal impacts such as dump truck gate slamming, percussion piling, using the bucket of excavators to pile shore panels and alike;
- Minimize drop heights for material handling; and
- Continuous noise monitoring of the site. The monitoring system should be capable of alarming the site foreman on high levels sustained over a maximum 5-minute period. The foreman must investigate resolve, and document the source of high noise levels where applicable. As well, the monitoring equipment must be meet the requirements of NPC-300 and applicable Ministry of the Environment Conservation and Parks guidance [R-10].

8.3.2 Temporary Acoustic Barriers

Significant levels of noise can be reduced by erecting a continuous temporary solid hoarding at specific locations around the site. Pre-fabricated temporary acoustic barriers erected atop concrete jersey barriers for stable-temporary foundation can be applied along roads and level ground around the site. Pre-fabricated temporary acoustic steel barrier or on-site built plywood hoarding with internal mineral wool can be applied on property line for the cases where noise source is moving and source height is lower than the barrier height. Temporary barrier height should be limited to 4 m in height, above which wind loading becomes a factor.

A cost trade-off study for the acoustic barriers should be completed which includes the cost performances of different factors related with using the barriers. These factors may include degradation/replacement, disposal, graffiti removal, barrier movements to accommodate various construction phases, and its re-usability.

8.4 Construction Vibration Mitigation

Once construction sites are fully defined, including laydown areas, vibration monitoring should be implemented during the construction phase at sites where the damage ZOI overlaps a building property. Vibration monitoring is not required at the construction sites assessed in this report. However, the addition of laydown areas at a future phase of this project may extend construction area boundaries such that vibration monitoring is necessary. Where this applies, each vibration monitor shall be capable of frequency based alarm limits and placed at the construction boundary closest to the nearest structure. If these limits are to be exceed, then the construction activity must stop and the source of vibration is to be identified. The source of vibration must be addressed before the construction activity resumes to ensure that the criteria is met. The limits follow the City of Toronto Municipal Code Chapter

363 and are summarized in Table 8-5. Minimum requirements for construction vibration monitoring are outlined in City of Toronto Municipal Code Chapter 363.

Table 8-5: Construction Vibration Limits

Frequency (Hz)	Vibration (mm/sec peak)
Less than 4	8
4 to 10	15
Greater than 10	25

8.4.1 Construction Vibration Annoyance

To achieve construction vibration annoyance compliance for surface construction sites, equipment shall not be operated within the distances listed in Section 7.6.3. To ensure tunneling vibration annoyance is kept to a minimum, temporary track shall be maintained and reduced shuttle locomotive speeds should be considered for chainage segments listed in Section 7.6.3.

In addition to the temporary construction vibration controls listed in Section 7.6.3, the following should be considered to be included with the construction management plan:

- Limiting the activity to periods when less people are home (e.g., mid-day on week days);
- Extending the operation distance of heavy vibratory equipment away from the complaint location and using smaller vibratory equipment in closer proximity; and
- Regular maintenance of temporary track used for tunneling (welding sections, minimizing gaps, reduced locomotive speeds) in areas close to anticipated complaint locations.

9. Conclusions and Recommendations

Community noise and vibration modelling has been completed for the construction and operational phases of the ECWE project.

9.1 Model Accuracy and Validity

For the noise model, the substations and platform ventilation were the main sources requiring mitigation. However, substation, ventilation, and construction site configurations and locations have not been finalized. For this reason, changes to configurations and locations assumed in this report may have a significant impact on required mitigation. Additionally, no special trackwork was specified for above-ground segments of the alignment near sensitive receptors. If special trackwork is added to above-ground segments in a later phase, local mitigation of the LRV track may be required. Similarly, most laydown areas have not been included in the construction model and are expected to be substantial sources of construction noise. Lastly, from the list of construction activities, the most noise emitting activity depending on the anticipated construction equipment was chosen to model the worst-case scenario for the construction sites.

The day and night measurements in the fifteen monitored locations were compared to the modelled results for a total of thirty measurements. Of the measurements, 19 of the 30 had “good”, 8 of the 30 had “ fair” and 3 of the 30 had “poor” correlations respectively. The deviation of the poor correlations is likely a result of traffic variation during the measurement period that was not consistent with the data used in the model. Overall, the noise model demonstrated good correlation with measured levels supporting model validation. For this reason, there is a good level of confidence that the model is capable of accurately predicting post-project and construction noise levels based on the configurations used in the model.

For the vibration model, the FTA General Vibration Assessment procedure was applied to predict areas surrounding the track which are above the 0.1 mm/s RMS criteria for operations. The FTA vibration prediction model is known to be conservative, and efficient vibration propagation in soil was assumed to add further conservatism. As a result of this conservatism, the model likely overpredicts vibration levels and thus mitigation required. Depending on the cost of mitigation, transfer mobility tests may be warranted to validate soil propagation characteristics to reduce conservatism at a later phase in this project. This conservatism holds for construction vibration ZOI development where the most vibration emitting equipment was chosen from the list of the equipment to be used on site as a reference when determining the ZOI. This ensures that all equipment is bounded by the assessed ZOI ensuring no equipment will operate in such a way that structures can be damaged. Additional conservative measures have been taken to reduce construction vibration annoyance by recommending limitations to construction activities near sensitive receptors.

9.2 Operational Noise and Vibrations

The noise anticipated from operations of the ECWE are found to pass assigned criteria given the following mitigation measures are deployed:

- Level 1 spectral attenuation per Table 8-1 applied to TPSS-1;
- Level 2 spectral attenuation per Table 8-1 applied to TPSS-2;
- Level 3 spectral attenuation per Table 8-1 applied to TPSS-3;
- Level 2 spectral attenuation per Table 8-1 applied to TPSS-4;
- Level 2 spectral attenuation per Table 8-1 applied to Royal York Station Ventilation;
- Level 2 spectral attenuation per Table 8-1 applied to Islington Station Ventilation;
- Level 1 spectral attenuation per Table 8-1 applied to Kipling Station Ventilation; and
- Level 1 spectral attenuation per Table 8-1 applied to Martin Grove Station Ventilation.

Exact configurations of the substations have not been established at this point in the project, so source-specific mitigation should be specified at a later phase of this project.

Noise controls are not required for airborne noise produced by the LRV movement along the alignment.

The vibration anticipated from operations of the LRV are found to pass assigned criteria given mitigation is applied to three segments of the alignment. The vibration mitigation requires a total of 900 m of -5 VdB mitigation that can be accomplished by applying high-resilience fasteners at segments listed in Table 8-4.

9.3 Construction Noise and Vibrations

Noise controls are not necessary for the construction sites assessed in this report as construction noise levels do not exceed specified criteria at sensitive receptors during the daytime. Nighttime construction is only anticipated at the Renforth Laydown Area, and nighttime noise at this site does not require mitigation.

The highest building damage ZOI from the on-site construction equipment is expected from vibratory rollers. To prevent building damage resulting from construction, pre-construction inspections are recommended at affected receptors listed in Table 7-12.

To avoid vibration annoyance during construction, restrictions are recommended to the construction shuttle locomotive and construction zone dimensions listed in Section 8.4.1.

10. References

[R-1] J.E. Coulter Associates Ltd. Noise and Vibration Impact Assessment Proposed Eglinton Crosstown Light Rail Transit, February 26, 2010.

[R-2] FTA Report No. 0123, Transit Noise and Vibration Impact Assessment Manual, September 2018.

[R-3] Metrolinx Environmental Guide for Noise and Vibration Impact Assessment Rev. 6, September, 2019.

[R-4] Coffey Geotechnics Eglinton Crosstown Light Rail Transit (ECLRT) Geotechnical Investigation.

[R-5] AECOM Report, Eglinton West LRT - Toronto Segment Conceptual Design and Cost Estimate Final Report, March 2019.

[R-6] City of Toronto, Municipal Code Chapter 363 Building Construction and Demolition, 2014.

[R-7] Toronto Transit Commission (TTC) & Metrolinx Document, Technical Specification for Transit City Light Rail Vehicles.

[R-8] Commonwealth of Massachusetts, Section 721.560 - Construction Noise Control.

[R-9] MOEE/GO Protocol for Noise and Vibration Assessment for the Proposed Eglinton West Rapid Transit Line (1993).

[R-10] Ontario MECP, NPC-300, Environmental Noise Guideline - Stationary and Transportation Sources - Approval and Planning.

[R-11] U.S. Federal Transit Administration, FTA-VA-90-1003-06, Transit Noise and Vibration Impact Assessment.

[R-12] U.S. Federal Highway Administration, FHWA-HEP-06-015, Construction Noise Handbook.

Appendix A

List of Assumptions

Assumptions listed throughout the report body are consolidated into this Appendix.

A.1 Key Assumptions

1. The track alignment is based on a design frozen on April 1, 2020. It is assumed that any future changes to the layout which could have significant impact on this assessment will be investigated as needed;
2. The Eglinton West corridor prior to this project does not have an active rail line, and other vibration sources, such as road traffic are not considered significant. For this reason, baseline vibration measurements are not considered necessary;
3. Typical offices are not considered sensitive receptors to operational noise in accordance with the FTA Manual [R-2];
4. The track, wheels, and vehicle suspension are assumed to be well-maintained. Therefore, the additional noise and vibration from track corrugations, track gaps, and wheel flats are not considered; and
5. Station, EEBs, TPSS, and Portal locations are unconfirmed at this time. It is assumed that any future changes to the layout which could have significant impact on this assessment will be investigated as needed.

A.2 Operational Noise Assessment Assumptions

1. All assumptions listed in Section A.1;
2. Special trackwork locations were taken from a preliminary document are may be subject to change. The locations of special trackwork were all in underground segments, so special trackwork is not included in the air-borne noise assessment. Special trackwork is a substantial source of noise so reassessment is recommended if final special trackwork locations are changed significantly;
3. No at-grade crossings have been designed at this stage. Therefore noise emissions from LRV horns and bells are not modelled;
4. Locations with no air-borne noise path (e.g., underground segments) are not assessed for air-borne noise;
5. Train volumes are the same as the 2010 Report [R-1]: 228 each direction during the day, 20 each direction during the night;
6. Rail speed is conservatively modelled at the design maximum speed of 80 km/h at all above-ground segments for conservatism, with consideration for slowing near stations;
7. The train is modelled as a steel-wheeled AGT type system per the FTA Manual [R-2];
8. Road traffic available was recorded between 2014 to 2019. A traffic growth rate of 2% per year is assumed as is industry standard to establish the future background noise level in 2031;

9. TPSS and station ventilation locations are not finalized. Any significant changes to the substation or ventilation layouts are to be re-assessed as required;
10. TPSS and ventilation specifications are not available at this time. For this reason, typical TPSS and ventilation acoustic emissions have been assumed based on similar transit system designs. The selected TPSS noise emission is conservatively louder than the FTA-recommended noise level. Additionally, the ventilation noise emission conservatively assumes the simultaneous operation of all ventilation fans, which typically only occurs under emergency scenarios; and
11. Noise radiation off the elevated guideway is considered negligible given that the guideway is a complete concrete structure which is sufficiently well damped.

A.3 Operational Vibration Assessment Assumptions

1. All assumptions listed in Section A.1;
2. Preliminary bedrock data and alignment information was used to determine areas of the tunnel that are encased in bedrock. For these sections, a propagation curve was used based on FTA information to predict bedrock vibration propagation. Bedrock-encased tunnels have significantly different vibration properties so significant alignment changes that alter which sections are/are not placed in bedrock should be assessed accordingly;
3. The FTA general vibration assessment was completed for every 100 m chainage length. For each 100 m segment, the closest receptor was chosen to represent the entire 100 m segment. Therefore, if vibration controls were deemed required to mitigate levels at the closest receptor representing the 100 m segment, the control is applied throughout the 100 m span; and
4. The current Eglinton Crosstown central segment uses monoblock frogs, which allow for a smoother transition through the rail gap in a crossover. For this reason, a +5 dB adjustment is applied for special trackwork, instead of a +10 dB adjustment recommended by the FTA Manual [R-2].

A.4 Construction Noise Assessment Assumptions

1. All assumptions listed in Section A.1;
2. Construction areas are based off of preliminary information and may be subject to change. It is assumed any future changes to construction areas which may result in significant changes to anticipated construction noise and vibrations are reassessed as deemed necessary;
3. To conservatively model the worst case scenario, all construction equipment was assumed to be operating simultaneously; and
4. Construction site perimeters used in this assessment do not account for most laydown areas, with the exception of the Renforth Laydown Area, as they are not available at this time. It is assumed any future addition of laydown areas which may result in significant

changes to anticipated construction noise and vibrations are reassessed as deemed necessary.

A.5 Construction Vibration Assessment Assumptions

1. All assumptions listed in Section A.1;
2. Construction vibration ZOI was calculated based on the equipment that produces the most vibration at it's 5 mm/sec peak for conservatism;
3. Preliminary data is used to locate construction sites. It is assumed that any significant changes to construction sites will be reassessed accordingly; and
4. Construction site perimeters used in this assessment do not account for most laydown areas, with the exception of the Renforth Laydown Area, as they are not available at this time. It is assumed any future addition of laydown areas which may result in significant changes to anticipated construction noise and vibrations are reassessed as deemed necessary.

Appendix B

Project Alignment

Legend

- Receivers
- Noise Monitors

Alignment

- Elevated
- Transition to at-grade
- Underground
- Study Area - 300m
- Renforth Laydown Area – approximate; subject to change

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Vertical grade is approximate.
2. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment Noise Receivers and Monitors (1 of 4)**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 0	**Review:**		**Page:** 1 of 4

User Name: DOAM96940

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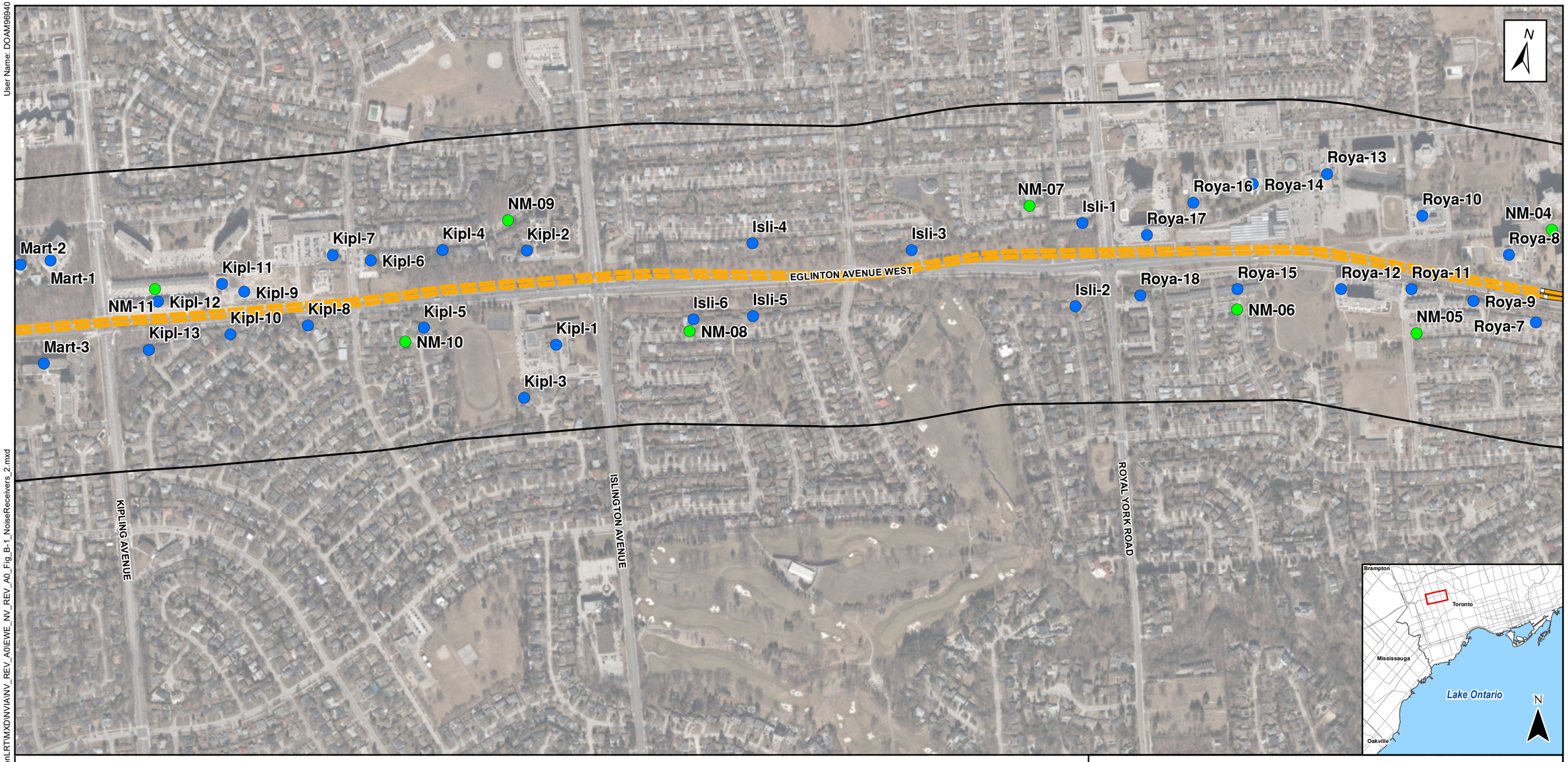


Legend

- Receivers
- Noise Monitors

Alignment

- Elevated
- Transition to at-grade
- Underground

- Study Area - 300m
- Renforth Laydown Area – approximate; subject to change

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

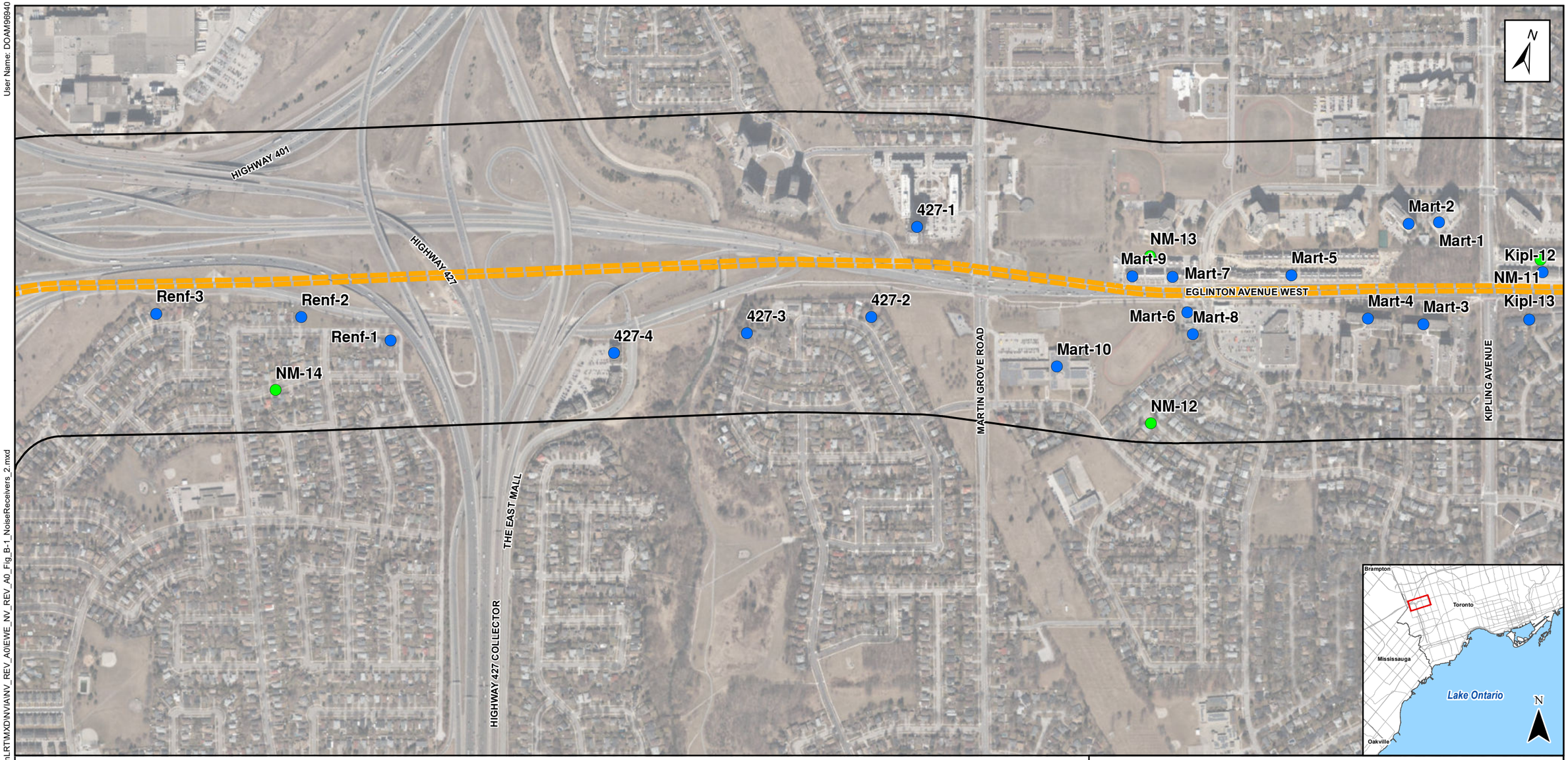
1. Vertical grade is approximate.
2. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment Noise Receivers and Monitors (2 of 4)**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 0	**Review:**		**Page:** 2 of 4

User Name: DOAM96940



Legend

- Receivers
- Noise Monitors

Alignment

- Elevated
- Transition to at-grade
- Underground

- Study Area - 300m
- Renforth Laydown Area – approximate; subject to change

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Vertical grade is approximate.
2. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment** **Noise Receivers and Monitors (3 of 4)**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 0	**Review:**		**Page:** 3 of 4

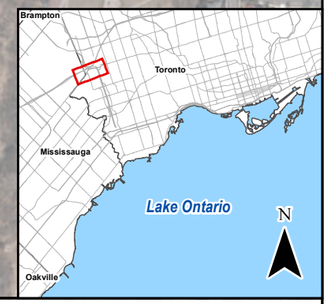
Document Path: T:\Maps\GIS_Data\Metrolinx\EglintonLRT\MXD\NV\ANV_REV_A0\EWE_NV_REV_A0_Fig_B-1_NoiseReceivers_2.mxd

User Name: DOAM96940

CONVAIR DRIVE
RENFORTH DRIVE
HIGHWAY 401
HIGHWAY 427
HIGHWAY 401 COLLECTOR
MATHESON BOULEVARD
EGLINTON AVENUE WEST
EGLINTON AVENUE EAST
CITATION PLACE
THE EAST MALL
HIGHWAY 427 COLLECTOR

Renf-3
Renf-2
Renf-1
Renf-4
NM-14
427-4
427-3
427-2
Comm-4
Comm-1
Comm-2
NM-15
Comm-3

N



Legend

- Receivers
- Noise Monitors

Alignment

- Elevated
- Transition to at-grade
- Underground

- Study Area - 300m
- Renforth Laydown Area – approximate; subject to change

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Vertical grade is approximate.
2. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters
1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment Noise Receivers and Monitors (4 of 4)**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 0	**Review:**		**Page:** 4 of 4

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Appendix C

Traffic Data

Alignment Corridor

From	To	Count Year	Vehicles 8 Hr Sum	Heavy 8 Hr Sum	Heavy [%]	Vehicles 24 Hr	Vehicles Day	Vehicles Night	Vehicles Day (veh/hr)	Vehicles Night (veh/hr)	Vehicles Heavy [%]	Projected - 2019 (2%/year) Day (veh/hr)	Projected - 2019 (2%/year) Night (veh/hr)	Projected - 2019 (2%/year) Heavy [%]	Projected - 2031 (2%/year) Day (veh/hr)	Projected - 2031 (2%/year) Night (veh/hr)	Projected - 2031 (2%/year) Heavy [%]
MATHESON BLVD	EGLINTON AVE	2018	3322	112	3.4%	6256	5929	327	371	41	3.4%	378	42	3.4%	479	53	3.4%
COMMERCE BLVD	RENFORTH DR	2018	14953	588	3.9%	28159	26687	1472	1668	184	3.9%	1701	188	3.9%	2158	238	3.9%
RENFORTH DR	MATHESON BLVD	2017	11558	546	4.7%	21765	20628	1138	1289	142	4.7%	1341	148	4.7%	1701	188	4.7%
MATHESON BLVD	THE EAST MALL	2018	14046	414	2.9%	26451	25068	1383	1567	173	2.9%	1598	176	2.9%	2027	224	2.9%
THE EAST MALL	401 427 RAMP	2018	10968	422	3.8%	20654	19575	1080	1223	135	3.8%	1248	138	3.8%	1583	175	3.8%
401 427 RAMP	MARTIN GROVE RD	2018	31171	1099	3.5%	58700	55631	3068	3477	384	3.5%	3546	391	3.5%	4498	496	3.5%
MARTIN GROVE RD	LLOYD MANOR RD	2016	23661	1179	5.0%	44557	40993	3565	2562	446	5.0%	2719	473	5.0%	3448	600	5.0%
LLOYD MANOR RD	KIPLING AVE	2018	21144	862	4.1%	39817	37736	2081	2358	260	4.1%	2406	265	4.1%	3051	337	4.1%
KIPLING AVE	WINCOTT DR	2015	21483	1123	5.2%	40456	38341	2115	2396	264	5.2%	2594	286	5.2%	3290	363	5.2%
WINCOTT DR	ISLINGTON AVE	2018	20192	863	4.3%	38025	36037	1988	2252	248	4.3%	2297	253	4.3%	2914	321	4.3%
ISLINGTON AVE	ROYAL YORK RD	2014	18829	890	4.7%	35458	32621	2837	2039	355	4.7%	2251	391	4.7%	2855	496	4.7%
ROYAL YORK RD	SCARLETT RD	2015	18752	807	4.3%	35313	33467	1846	2092	231	4.3%	2264	250	4.3%	2871	317	4.3%
SCARLETT RD	EMMETT AVE	2016	16908	743	4.4%	31840	30176	1664	1886	208	4.4%	2001	221	4.4%	2538	280	4.4%
EMMETT AVE	JANE ST	2019	16544	2070	12.5%	31155	29526	1629	1845	204	12.5%	1845	204	12.5%	2340	258	12.5%
JANE ST	WESTON RD	2018	11735	614	5.2%	22099	20944	1155	1309	144	5.2%	1335	147	5.2%	1693	187	5.2%

Other Roads

Road	Count Year	Heavy		Vehicles			Vehicles			Projected - 2019 (2%/year)			Projected - 2031 (2%/year)		
		8 Hr Sum	Percentage	24 Hr	Day	Night	Day (veh/hr)	Night (veh/hr)	Heavy [%]	Day (veh/hr)	Night (veh/hr)	Heavy [%]	Day (veh/hr)	Night (veh/hr)	Heavy [%]
401	2013		10.0%	325500	299460	26040	18716	3255	10.0%	21078	3666	10.0%	26731	4649	10.0%
Islington North	2014	451	3.3%	25837	24486	1351	1530	169	3.3%	1690	186	3.3%	2143	236	3.3%
Islington South	2014	495	3.5%	26733	25336	1397	1583	175	3.5%	1748	193	3.5%	2217	245	3.5%
Scarlett North	2016	369	3.7%	18568	17597	971	1100	121	3.7%	1167	129	3.7%	1480	163	3.7%
Scarlett South	2016	359	3.0%	22472	21297	1175	1331	147	3.0%	1413	156	3.0%	1791	198	3.0%
Emmett	2019	274	11.0%	4687	4442	245	278	31	11.0%	278	31	11.0%	352	39	11.0%
Kipling North	2015	638	6.7%	17946	17008	938	1063	117	6.7%	1151	127	6.7%	1459	161	6.7%
Kipling South	2015	890	8.6%	19410	18395	1015	1150	127	8.6%	1244	137	8.6%	1578	174	8.6%
Renforth West	2017	582	3.9%	27878	26421	1457	1651	182	3.9%	1718	190	3.9%	2179	240	3.9%
Renforth East	2017	546	4.7%	21765	20628	1138	1289	142	4.7%	1341	148	4.7%	1701	188	4.7%
Martin North	2016	481	4.4%	20790	19703	1087	1231	136	4.4%	1307	144	4.4%	1657	183	4.4%
Martin South	2016	228	2.9%	14941	14160	781	885	98	2.9%	939	104	2.9%	1191	131	2.9%
Royal North	2016	335	3.3%	19082	18084	997	1130	125	3.3%	1199	132	3.3%	1521	168	3.3%
Royal South	2016	342	2.3%	28240	26763	1476	1673	185	2.3%	1775	196	2.3%	2251	248	2.3%
427	2013		10.0%	310600	285752	24848	17860	3106	10.0%	20113	3498	10.0%	25508	4436	10.0%
Wincott North	2018	31	0.9%	2076	1967	109	123	14	0.9%	125	14	0.9%	159	18	0.9%
Russell South	2006	15	8.3%	169	161	9	10	1	8.3%	13	1	8.3%	16	2	8.3%
401 to Ramp	2018	795	3.2%	47265	44794	2471	2800	309	3.2%	2856	315	3.2%	3622	400	3.2%

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

COMMERCE BLVD AT EGLINTON AVE (PX 1481)

Survey Date: 2018-Dec-18 (Tuesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:15-09:15	CAR	341	5	2	8	15	663	29	583	20	632	180	72	14	32	118	1,303	146	1,266	310	1,722	N	42	0	0
	TRK	1	0	0	1	1	30	0	28	0	28	1	1	0	1	2	23	1	22	1	24	S	2	0	0
AM PEAK	BUS	0	0	0	0	0	17	0	8	0	8	0	9	0	0	9	6	0	6	0	6	E	25	1	0
																						W	13	0	0
	TOTAL:	**342**	**5**	**2**	**9**	**16**	**710**	**29**	**619**	**20**	**668**	**181**	**82**	**14**	**33**	**129**	**1,332**	**147**	**1,294**	**311**	**1,752**				
16:30-17:30	CAR	64	34	5	92	131	1,879	14	1,227	5	1,246	58	560	32	49	641	705	21	622	45	688	N	38	1	0
	TRK	0	2	0	0	2	20	0	19	0	19	2	1	2	0	3	14	0	12	0	12	S	7	0	0
PM PEAK	BUS	0	0	0	0	0	15	0	7	0	7	0	8	0	0	8	6	0	6	0	6	E	55	0	0
																						W	8	4	0
	TOTAL:	**64**	**36**	**5**	**92**	**133**	**1,914**	**14**	**1,253**	**5**	**1,272**	**60**	**569**	**34**	**49**	**652**	**725**	**21**	**640**	**45**	**706**				
OFF HR AVG	CAR	128	19	13	20	52	752	28	608	17	653	76	124	13	41	178	596	46	536	87	669	N	8	0	0
	TRK	3	1	1	0	2	43	1	38	1	40	3	5	1	1	7	22	1	20	1	22	S	4	0	0
	BUS	0	0	0	0	0	11	0	4	0	4	0	7	0	1	8	5	0	4	0	4	E	11	0	0
																						W	4	0	0
	TOTAL:	**131**	**20**	**14**	**20**	**54**	**806**	**29**	**650**	**18**	**697**	**79**	**136**	**14**	**43**	**193**	**623**	**47**	**560**	**88**	**695**				
07:30-09:30	CAR	542	8	4	15	27	1,408	54	1,245	27	1,326	245	148	22	69	239	2,351	196	2,274	484	2,954	N	76	0	0
	TRK	2	2	0	1	3	62	0	59	2	61	3	2	0	1	3	43	1	40	2	43	S	4	0	0
2 HR AM	BUS	0	0	0	0	0	35	0	17	0	17	1	18	0	0	18	12	1	12	0	13	E	53	1	0
																						W	17	0	0
	TOTAL:	**544**	**10**	**4**	**16**	**30**	**1,505**	**54**	**1,321**	**29**	**1,404**	**249**	**168**	**22**	**70**	**260**	**2,406**	**198**	**2,326**	**486**	**3,010**				
16:00-18:00	CAR	145	52	9	135	196	3,429	24	2,378	11	2,413	92	916	44	99	1,059	1,479	37	1,328	112	1,477	N	70	1	0
	TRK	1	2	0	0	2	40	0	38	0	38	3	2	2	1	5	34	1	31	1	33	S	13	0	0
2 HR PM	BUS	2	0	0	0	0	30	1	13	0	14	0	17	0	0	17	10	0	10	1	11	E	90	0	0
																						W	18	4	0
	TOTAL:	**148**	**54**	**9**	**135**	**198**	**3,499**	**25**	**2,429**	**11**	**2,465**	**95**	**935**	**46**	**100**	**1,081**	**1,523**	**38**	**1,369**	**114**	**1,521**				
07:30-18:00	CAR	1,199	134	66	231	431	7,846	188	6,054	106	6,348	642	1,561	118	332	2,011	6,210	418	5,744	945	7,107	N	176	2	0
	TRK	12	7	2	2	11	272	2	248	4	254	16	22	5	5	32	164	7	152	8	167	S	33	0	0
8 HR SUM	BUS	3	0	0	0	0	108	2	46	0	48	1	62	0	3	65	42	1	39	1	41	E	188	1	0
																						W	52	5	0
	TOTAL:	**1,214**	**141**	**68**	**233**	**442**	**8,226**	**192**	**6,348**	**110**	**6,650**	**659**	**1,645**	**123**	**340**	**2,108**	**6,416**	**426**	**5,935**	**954**	**7,315**				

Total 8 Hour Vehicle Volume: 16,515

Total 8 Hour Bicycle Volume: 8

Total 8 Hour Intersection Volume: 16,523

Comment:

Printed On: 28 Nov, 2019 10:30:42AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE W AT RENFORTH DR (PX 926)

Survey Date: 2017-Jan-19 (Thursday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:00-09:00	CAR	1,345	217	671	184	1,072	531	361	300	91	752	362	47	192	648	887	1,629	79	764	313	1,156	N	0	0	0
	TRK	33	2	2	1	5	8	15	2	3	20	7	5	4	6	15	16	0	8	16	24	S	94	6	0
AM PEAK	BUS	22	4	5	2	11	13	1	11	4	16	8	0	4	0	4	12	0	8	16	24	E	136	5	0
																						W	0	0	0
	TOTAL:	**1,400**	**223**	**678**	**187**	**1,088**	**552**	**377**	**313**	**98**	**788**	**377**	**52**	**200**	**654**	**906**	**1,657**	**79**	**780**	**345**	**1,204**				
16:30-17:30	CAR	1,834	57	245	32	334	855	784	696	631	2,111	1,457	127	773	145	1,045	517	53	315	805	1,173	N	0	0	0
	TRK	21	1	4	0	5	3	10	3	5	18	8	0	3	1	4	24	0	22	7	29	S	19	0	0
PM PEAK	BUS	18	4	4	0	8	7	1	7	4	12	7	0	3	2	5	13	0	7	13	20	E	11	0	0
																						W	0	4	0
	TOTAL:	**1,873**	**62**	**253**	**32**	**347**	**865**	**795**	**706**	**640**	**2,141**	**1,472**	**127**	**779**	**148**	**1,054**	**554**	**53**	**344**	**825**	**1,222**				
OFF HR AVG	CAR	852	82	194	58	334	298	301	200	122	623	298	40	139	161	340	554	37	311	357	705	N	0	0	0
	TRK	48	2	4	1	7	14	23	9	3	35	8	4	4	6	14	19	1	11	21	33	S	6	2	0
	BUS	12	3	3	1	7	8	1	7	3	11	7	0	3	1	4	10	1	6	8	15	E	7	0	0
																						W	1	1	0
	TOTAL:	**912**	**87**	**201**	**60**	**348**	**320**	**325**	**216**	**128**	**669**	**313**	**44**	**146**	**168**	**358**	**583**	**39**	**328**	**386**	**753**				
07:30-09:30	CAR	2,340	370	1,087	261	1,718	916	661	559	180	1,400	620	96	324	1,236	1,656	3,091	116	1,485	592	2,193	N	0	0	0
	TRK	55	2	2	3	7	15	30	6	5	41	15	6	10	17	33	44	0	25	23	48	S	143	8	0
2 HR AM	BUS	39	8	7	2	17	24	4	22	9	35	17	0	8	0	8	29	0	21	28	49	E	241	5	0
																						W	13	0	0
	TOTAL:	**2,434**	**380**	**1,096**	**266**	**1,742**	**955**	**695**	**587**	**194**	**1,476**	**652**	**102**	**342**	**1,253**	**1,697**	**3,164**	**116**	**1,531**	**643**	**2,290**				
16:00-18:00	CAR	3,620	137	462	85	684	1,611	1,601	1,280	1,098	3,979	2,563	246	1,363	287	1,896	1,045	102	621	1,557	2,280	N	0	0	0
	TRK	40	1	5	0	6	14	21	14	6	41	11	0	5	3	8	59	0	55	14	69	S	32	0	0
2 HR PM	BUS	32	7	7	0	14	15	1	15	7	23	16	0	9	2	11	24	0	15	24	39	E	27	0	0
																						W	3	4	0
	TOTAL:	**3,692**	**145**	**474**	**85**	**704**	**1,640**	**1,623**	**1,309**	**1,111**	**4,043**	**2,590**	**246**	**1,377**	**292**	**1,915**	**1,128**	**102**	**691**	**1,595**	**2,388**				
07:30-18:00	CAR	9,366	834	2,323	578	3,735	3,720	3,467	2,639	1,765	7,871	4,372	503	2,242	2,166	4,911	6,351	365	3,351	3,576	7,292	N	0	0	0
	TRK	286	11	24	8	43	82	141	54	21	216	53	20	29	42	91	177	3	124	121	248	S	200	15	0
8 HR SUM	BUS	117	26	26	5	57	69	7	64	27	98	57	0	28	4	32	91	2	61	84	147	E	296	5	0
																						W	18	6	0
	TOTAL:	**9,769**	**871**	**2,373**	**591**	**3,835**	**3,871**	**3,615**	**2,757**	**1,813**	**8,185**	**4,482**	**523**	**2,299**	**2,212**	**5,034**	**6,619**	**370**	**3,536**	**3,781**	**7,687**				

Total 8 Hour Vehicle Volume: 24,741

Total 8 Hour Bicycle Volume: 26

Total 8 Hour Intersection Volume: 24,767

Comment:

Printed On: 28 Nov, 2019 10:38:10AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT MATHESON BLVD (PX 1730)

Survey Date: 2018-Dec-18 (Tuesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:00-09:00	CAR	1,208	0	0	0	0	583	15	477	0	492	0	106	0	172	278	1,199	0	1,027	1,193	2,220	N	0	0	0
	TRK	10	0	0	0	0	19	0	14	0	14	0	5	0	7	12	22	0	15	10	25	S	0	0	0
AM PEAK	BUS	0	0	0	0	0	8	0	8	0	8	0	0	0	2	2	12	0	10	0	10	E	0	0	0
																						W	2	0	0
	TOTAL:	**1,218**	**0**	**0**	**0**	**0**	**610**	**15**	**499**	**0**	**514**	**0**	**111**	**0**	**181**	**292**	**1,233**	**0**	**1,052**	**1,203**	**2,255**				
16:00-17:00	CAR	170	0	0	0	0	1,224	4	783	0	787	0	441	0	843	1,284	1,311	0	468	166	634	N	0	0	0
	TRK	17	0	0	0	0	7	0	6	0	6	0	1	0	10	11	28	0	18	17	35	S	0	0	0
PM PEAK	BUS	1	0	0	0	0	7	0	7	0	7	0	0	0	2	2	9	0	7	1	8	E	0	0	0
																						W	0	0	0
	TOTAL:	**188**	**0**	**0**	**0**	**0**	**1,238**	**4**	**796**	**0**	**800**	**0**	**442**	**0**	**855**	**1,297**	**1,348**	**0**	**493**	**184**	**677**				
OFF HR AVG	CAR	274	0	0	0	0	490	9	373	0	382	0	117	0	319	436	799	0	480	265	745	N	0	0	0
	TRK	9	0	0	0	0	11	0	8	0	8	0	3	0	12	15	27	0	15	9	24	S	0	0	0
	BUS	0	0	0	0	0	5	0	5	0	5	0	0	0	0	0	6	0	6	0	6	E	0	0	0
																						W	0	0	0
	TOTAL:	**283**	**0**	**0**	**0**	**0**	**506**	**9**	**386**	**0**	**395**	**0**	**120**	**0**	**331**	**451**	**832**	**0**	**501**	**274**	**775**				
07:30-09:30	CAR	2,158	0	0	0	0	1,073	22	875	0	897	0	198	0	303	501	2,115	0	1,812	2,136	3,948	N	0	0	0
	TRK	22	0	0	0	0	38	0	28	0	28	0	10	0	22	32	50	0	28	22	50	S	0	0	0
2 HR AM	BUS	2	0	0	0	0	16	0	15	0	15	0	1	0	5	6	23	0	18	2	20	E	0	0	0
																						W	2	0	0
	TOTAL:	**2,182**	**0**	**0**	**0**	**0**	**1,127**	**22**	**918**	**0**	**940**	**0**	**209**	**0**	**330**	**539**	**2,188**	**0**	**1,858**	**2,160**	**4,018**				
16:00-18:00	CAR	314	0	0	0	0	2,409	7	1,569	0	1,576	0	840	0	1,628	2,468	2,583	0	955	307	1,262	N	0	0	0
	TRK	30	0	0	0	0	16	0	13	0	13	0	3	0	15	18	43	0	28	30	58	S	0	0	0
2 HR PM	BUS	1	0	0	0	0	15	0	15	0	15	0	0	0	4	4	19	0	15	1	16	E	0	0	0
																						W	0	0	0
	TOTAL:	**345**	**0**	**0**	**0**	**0**	**2,440**	**7**	**1,597**	**0**	**1,604**	**0**	**843**	**0**	**1,647**	**2,490**	**2,645**	**0**	**998**	**338**	**1,336**				
07:30-18:00	CAR	3,568	0	0	0	0	5,442	64	3,935	0	3,999	0	1,507	0	3,207	4,714	7,893	0	4,686	3,504	8,190	N	0	0	0
	TRK	89	0	0	0	0	98	0	73	0	73	0	25	0	86	111	203	0	117	89	206	S	0	0	0
8 HR SUM	BUS	4	0	0	0	0	49	0	48	0	48	0	1	0	10	11	67	0	57	4	61	E	0	0	0
																						W	2	0	0
	TOTAL:	**3,661**	**0**	**0**	**0**	**0**	**5,589**	**64**	**4,056**	**0**	**4,120**	**0**	**1,533**	**0**	**3,303**	**4,836**	**8,163**	**0**	**4,860**	**3,597**	**8,457**				

Total 8 Hour Vehicle Volume: 17,413

Total 8 Hour Bicycle Volume: 0

Total 8 Hour Intersection Volume: 17,413

Comment:

Printed On: 28 Nov, 2019 10:39:47AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT THE EAST MALL & HWY 427 NB OFF RAMP (PX 907)

Survey Date: 2018-Dec-20 (Thursday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:00-09:00	CAR	0	189	0	80	269	538	0	452	87	539	235	6	4	786	796	2,086	144	1,111	0	1,255	N	8	0	0
	TRK	0	0	0	0	0	10	0	10	3	13	8	0	0	10	10	25	5	15	0	20	S	15	0	0
AM PEAK	BUS	0	0	0	7	7	20	0	13	0	13	6	0	0	15	15	26	6	11	0	17	E	8	0	0
																						W	0	0	0
	TOTAL:	**0**	**189**	**0**	**87**	**276**	**568**	**0**	**475**	**90**	**565**	**249**	**6**	**4**	**811**	**821**	**2,137**	**155**	**1,137**	**0**	**1,292**				
16:15-17:15	CAR	0	50	0	69	119	940	0	861	236	1,097	482	10	3	151	164	579	243	378	0	621	N	0	0	0
	TRK	0	1	0	0	1	10	0	10	1	11	1	0	0	22	22	28	0	5	0	5	S	3	0	0
PM PEAK	BUS	0	0	0	6	6	12	0	6	1	7	7	0	0	19	19	25	6	6	0	12	E	0	0	0
																						W	0	8	0
	TOTAL:	**0**	**51**	**0**	**75**	**126**	**962**	**0**	**877**	**238**	**1,115**	**490**	**10**	**3**	**192**	**205**	**632**	**249**	**389**	**0**	**638**				
OFF HR AVG	CAR	0	51	0	79	130	515	0	423	61	484	186	13	9	294	316	785	116	440	0	556	N	1	0	0
	TRK	0	1	0	2	3	12	0	9	0	9	2	1	0	15	16	31	2	15	0	17	S	8	0	0
	BUS	0	0	0	5	5	13	0	8	0	8	5	0	0	11	11	19	5	8	0	13	E	1	0	0
																						W	0	1	0
	TOTAL:	**0**	**52**	**0**	**86**	**138**	**540**	**0**	**440**	**61**	**501**	**193**	**14**	**9**	**320**	**343**	**835**	**123**	**463**	**0**	**586**				
07:30-09:30	CAR	0	312	0	130	442	1,028	0	885	143	1,028	422	13	10	1,394	1,417	3,697	269	1,991	0	2,260	N	11	0	0
	TRK	0	1	0	0	1	19	0	19	3	22	12	0	1	19	20	51	8	31	0	39	S	25	1	0
2 HR AM	BUS	0	0	0	12	12	36	0	24	1	25	12	0	0	30	30	54	11	24	0	35	E	14	1	0
																						W	0	1	0
	TOTAL:	**0**	**313**	**0**	**142**	**455**	**1,083**	**0**	**928**	**147**	**1,075**	**446**	**13**	**11**	**1,443**	**1,467**	**3,802**	**288**	**2,046**	**0**	**2,334**				
16:00-18:00	CAR	0	96	0	112	208	1,650	0	1,520	491	2,011	1,063	18	8	325	351	1,185	564	764	0	1,328	N	1	0	0
	TRK	0	4	0	3	7	15	0	12	3	15	5	0	0	72	72	87	2	11	0	13	S	13	1	0
2 HR PM	BUS	0	0	0	12	12	24	0	12	2	14	15	0	0	36	36	49	13	13	0	26	E	4	0	0
																						W	0	12	0
	TOTAL:	**0**	**100**	**0**	**127**	**227**	**1,689**	**0**	**1,544**	**496**	**2,040**	**1,083**	**18**	**8**	**433**	**459**	**1,321**	**579**	**788**	**0**	**1,367**				
07:30-18:00	CAR	0	612	0	556	1,168	4,735	0	4,098	877	4,975	2,227	81	52	2,895	3,028	8,020	1,298	4,513	0	5,811	N	17	0	0
	TRK	0	10	0	10	20	81	0	68	7	75	27	3	1	150	154	260	19	100	0	119	S	69	3	0
8 HR SUM	BUS	0	0	0	44	44	111	0	67	4	71	48	0	0	108	108	175	44	67	0	111	E	22	1	0
																						W	1	17	0
	TOTAL:	**0**	**622**	**0**	**610**	**1,232**	**4,927**	**0**	**4,233**	**888**	**5,121**	**2,302**	**84**	**53**	**3,153**	**3,290**	**8,455**	**1,361**	**4,680**	**0**	**6,041**				

Total 8 Hour Vehicle Volume: 15,684

Total 8 Hour Bicycle Volume: 21

Total 8 Hour Intersection Volume: 15,705

Comment:

Printed On: 28 Nov, 2019 10:51:48AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT HIGHWAY 401/427 TCS (PX 954)

Survey Date: 2018-Dec-20 (Thursday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
07:30-08:30	CAR	0	0	0	570	570	2,130	0	1,560	665	2,225	1,281	0	0	0	0	1,972	616	1,972	0	2,588	N	0	0	0
	TRK	0	0	0	21	21	75	0	54	12	66	20	0	0	0	0	32	8	32	0	40	S	0	0	0
AM PEAK	BUS	0	0	0	17	17	18	0	1	0	1	16	0	0	0	0	2	16	2	0	18	E	0	0	0
																						W	0	0	0
	TOTAL:	**0**	**0**	**0**	**608**	**608**	**2,223**	**0**	**1,615**	**677**	**2,292**	**1,317**	**0**	**0**	**0**	**0**	**2,006**	**640**	**2,006**	**0**	**2,646**				
16:45-17:45	CAR	0	0	0	976	976	2,523	0	1,547	256	1,803	669	0	0	0	0	1,688	413	1,688	0	2,101	N	0	0	0
	TRK	0	0	0	11	11	26	0	15	4	19	8	0	0	0	0	32	4	32	0	36	S	0	0	0
PM PEAK	BUS	0	0	0	12	12	12	0	0	0	0	10	0	0	0	0	0	10	0	0	10	E	0	0	0
																						W	0	0	0
	TOTAL:	**0**	**0**	**0**	**999**	**999**	**2,561**	**0**	**1,562**	**260**	**1,822**	**687**	**0**	**0**	**0**	**0**	**1,720**	**427**	**1,720**	**0**	**2,147**				
OFF HR AVG	CAR	0	0	0	504	504	1,662	0	1,158	175	1,333	511	0	0	0	0	1,131	336	1,131	0	1,467	N	0	0	0
	TRK	0	0	0	14	14	65	0	51	7	58	13	0	0	0	0	57	6	57	0	63	S	0	0	0
	BUS	0	0	0	13	13	16	0	3	0	3	12	0	0	0	0	2	12	2	0	14	E	0	0	0
																						W	0	0	0
	TOTAL:	**0**	**0**	**0**	**531**	**531**	**1,743**	**0**	**1,212**	**182**	**1,394**	**536**	**0**	**0**	**0**	**0**	**1,190**	**354**	**1,190**	**0**	**1,544**				
07:30-09:30	CAR	0	0	0	1,054	1,054	3,650	0	2,596	1,350	3,946	2,482	0	0	0	0	3,622	1,132	3,622	0	4,754	N	0	0	0
	TRK	0	0	0	35	35	136	0	101	21	122	35	0	0	0	0	63	14	63	0	77	S	0	0	0
2 HR AM	BUS	0	0	0	35	35	36	0	1	2	3	32	0	0	0	0	7	30	7	0	37	E	0	0	0
																						W	0	0	0
	TOTAL:	**0**	**0**	**0**	**1,124**	**1,124**	**3,822**	**0**	**2,698**	**1,373**	**4,071**	**2,549**	**0**	**0**	**0**	**0**	**3,692**	**1,176**	**3,692**	**0**	**4,868**				
16:00-18:00	CAR	0	0	0	1,934	1,934	5,098	0	3,164	466	3,630	1,270	0	0	0	0	3,256	804	3,256	0	4,060	N	0	0	0
	TRK	0	0	0	22	22	55	0	33	16	49	28	0	0	0	0	70	12	70	0	82	S	0	0	0
2 HR PM	BUS	0	0	0	23	23	23	0	0	0	0	26	0	0	0	0	2	26	2	0	28	E	0	0	0
																						W	0	0	0
	TOTAL:	**0**	**0**	**0**	**1,979**	**1,979**	**5,176**	**0**	**3,197**	**482**	**3,679**	**1,324**	**0**	**0**	**0**	**0**	**3,328**	**842**	**3,328**	**0**	**4,170**				
07:30-18:00	CAR	0	0	0	5,004	5,004	15,394	0	10,390	2,514	12,904	5,792	0	0	0	0	11,400	3,278	11,400	0	14,678	N	0	0	0
	TRK	0	0	0	112	112	448	0	336	66	402	116	0	0	0	0	362	50	362	0	412	S	0	0	0
8 HR SUM	BUS	0	0	0	109	109	121	0	12	3	15	105	0	0	0	0	16	102	16	0	118	E	0	0	0
																						W	0	0	0
	TOTAL:	**0**	**0**	**0**	**5,225**	**5,225**	**15,963**	**0**	**10,738**	**2,583**	**13,321**	**6,013**	**0**	**0**	**0**	**0**	**11,778**	**3,430**	**11,778**	**0**	**15,208**				

Total 8 Hour Vehicle Volume: 33,754

Total 8 Hour Bicycle Volume: 0

Total 8 Hour Intersection Volume: 33,754

Comment:

Printed On: 28 Nov, 2019 11:41:49AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE W AT MARTIN GROVE RD (PX 786)

Survey Date: 2016-Apr-18 (Monday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
07:45-08:45	CAR	1,039	294	628	28	950	2,085	371	1,966	216	2,553	668	91	444	396	931	1,996	8	1,306	40	1,354	N	265	4	0
	TRK	24	4	12	1	17	73	11	68	3	82	9	4	5	8	17	42	1	30	1	32	S	56	3	0
AM PEAK	BUS	16	0	9	0	9	18	7	12	1	20	10	6	9	6	21	17	0	11	0	11	E	264	10	0
																						W	72	3	0
	TOTAL:	**1,079**	**298**	**649**	**29**	**976**	**2,176**	**389**	**2,046**	**220**	**2,655**	**687**	**101**	**458**	**410**	**969**	**2,055**	**9**	**1,347**	**41**	**1,397**				
16:15-17:15	CAR	1,050	152	412	22	586	2,311	526	2,197	486	3,209	946	92	437	235	764	1,762	23	1,375	112	1,510	N	13	1	0
	TRK	12	0	4	0	4	35	6	34	5	45	11	1	6	5	12	48	0	43	2	45	S	20	1	0
PM PEAK	BUS	11	0	7	0	7	11	4	8	0	12	7	3	7	5	15	15	0	10	0	10	E	63	10	0
																						W	22	28	0
	TOTAL:	**1,073**	**152**	**423**	**22**	**597**	**2,357**	**536**	**2,239**	**491**	**3,266**	**964**	**96**	**450**	**245**	**791**	**1,825**	**23**	**1,428**	**114**	**1,565**				
OFF HR AVG	CAR	533	93	151	9	253	1,149	309	1,055	101	1,465	283	85	154	135	374	1,121	28	893	73	994	N	21	2	0
	TRK	22	3	3	0	6	63	16	58	2	76	7	5	4	4	13	69	1	62	3	66	S	20	1	0
	BUS	10	0	4	0	4	14	6	11	0	17	5	3	5	4	12	12	0	8	0	8	E	40	3	0
																						W	24	5	0
	TOTAL:	**565**	**96**	**158**	**9**	**263**	**1,226**	**331**	**1,124**	**103**	**1,558**	**295**	**93**	**163**	**143**	**399**	**1,202**	**29**	**963**	**76**	**1,068**				
07:30-09:30	CAR	1,847	532	1,001	52	1,585	3,774	751	3,524	328	4,603	1,058	198	704	727	1,629	3,843	26	2,584	95	2,705	N	333	7	0
	TRK	50	7	25	1	33	230	20	218	6	244	17	11	8	10	29	95	3	78	5	86	S	84	3	0
2 HR AM	BUS	40	0	24	0	24	46	16	35	1	52	21	11	20	13	44	43	0	30	0	30	E	326	20	0
																						W	117	4	0
	TOTAL:	**1,937**	**539**	**1,050**	**53**	**1,642**	**4,050**	**787**	**3,777**	**335**	**4,899**	**1,096**	**220**	**732**	**750**	**1,702**	**3,981**	**29**	**2,692**	**100**	**2,821**				
16:00-18:00	CAR	2,069	300	822	34	1,156	4,564	1,013	4,353	917	6,283	1,768	177	808	411	1,396	3,309	43	2,598	234	2,875	N	30	2	0
	TRK	21	1	6	0	7	67	11	61	9	81	17	6	8	8	22	86	0	77	4	81	S	46	4	0
2 HR PM	BUS	24	0	13	0	13	23	10	17	0	27	15	6	15	9	30	26	0	17	1	18	E	117	26	0
																						W	35	46	0
	TOTAL:	**2,114**	**301**	**841**	**34**	**1,176**	**4,654**	**1,034**	**4,431**	**926**	**6,391**	**1,800**	**189**	**831**	**428**	**1,448**	**3,421**	**43**	**2,692**	**239**	**2,974**				
07:30-18:00	CAR	6,042	1,203	2,425	123	3,751	12,931	2,998	12,095	1,648	16,741	3,955	713	2,128	1,676	4,517	11,632	179	8,753	619	9,551	N	447	18	0
	TRK	158	18	43	1	62	548	93	512	23	628	58	35	30	35	100	454	5	401	22	428	S	209	9	0
8 HR SUM	BUS	103	1	52	0	53	123	50	94	1	145	55	29	54	37	120	117	0	79	1	80	E	601	59	0
																						W	247	70	0
	TOTAL:	**6,303**	**1,222**	**2,520**	**124**	**3,866**	**13,602**	**3,141**	**12,701**	**1,672**	**17,514**	**4,068**	**777**	**2,212**	**1,748**	**4,737**	**12,203**	**184**	**9,233**	**642**	**10,059**				

Total 8 Hour Vehicle Volume: 36,176

Total 8 Hour Bicycle Volume: 156

Total 8 Hour Intersection Volume: 36,332

Comment:

Printed On: 28 Nov, 2019 10:56:28AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE W AT MARTIN GROVE RD (PX 786)

Survey Date: 2016-May-07 (Saturday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:30-09:30	CAR	398	117	137	42	296	955	192	829	80	1,101	227	84	119	239	442	1,362	28	1,006	69	1,103	N	33	0	0
	TRK	2	0	1	0	1	12	1	12	0	13	2	0	1	4	5	25	1	21	0	22	S	8	0	0
AM PEAK	BUS	8	0	4	0	4	6	4	6	1	11	4	0	3	5	8	10	0	5	0	5	E	31	0	0
																						W	8	0	0
	TOTAL:	**408**	**117**	**142**	**42**	**301**	**973**	**197**	**847**	**81**	**1,125**	**233**	**84**	**123**	**248**	**455**	**1,397**	**29**	**1,032**	**69**	**1,130**				
16:00-17:00	CAR	669	138	218	52	408	1,772	331	1,601	159	2,091	382	119	190	245	554	1,815	33	1,432	120	1,585	N	43	2	0
	TRK	5	0	1	0	1	8	3	8	0	11	2	0	1	0	1	11	1	11	1	13	S	16	0	0
PM PEAK	BUS	7	0	2	0	2	7	5	7	0	12	4	0	4	6	10	13	0	7	0	7	E	32	0	0
																						W	19	0	0
	TOTAL:	**681**	**138**	**221**	**52**	**411**	**1,787**	**339**	**1,616**	**159**	**2,114**	**388**	**119**	**195**	**251**	**565**	**1,839**	**34**	**1,450**	**121**	**1,605**				
OFF HR AVG	CAR	582	112	181	51	344	1,474	306	1,312	135	1,753	343	111	172	290	573	1,689	36	1,287	95	1,418	N	32	0	0
	TRK	4	1	2	1	4	20	2	19	0	21	2	0	1	1	2	19	1	17	0	18	S	18	0	0
	BUS	9	0	4	0	4	8	5	8	1	14	5	0	4	4	8	10	0	6	0	6	E	26	0	0
																						W	18	0	0
	TOTAL:	**595**	**113**	**187**	**52**	**352**	**1,502**	**313**	**1,339**	**136**	**1,788**	**350**	**111**	**177**	**295**	**583**	**1,718**	**37**	**1,310**	**95**	**1,442**				
07:30-09:30	CAR	684	188	243	75	506	1,694	306	1,472	109	1,887	334	147	186	423	756	2,401	39	1,790	135	1,964	N	52	0	0
	TRK	4	0	2	1	3	39	2	36	0	38	2	2	1	5	8	36	1	31	0	32	S	11	0	0
2 HR AM	BUS	14	0	7	0	7	12	7	12	2	21	8	0	6	6	12	17	0	11	0	11	E	48	1	0
																						W	15	0	0
	TOTAL:	**702**	**188**	**252**	**76**	**516**	**1,745**	**315**	**1,520**	**111**	**1,946**	**344**	**149**	**193**	**434**	**776**	**2,454**	**40**	**1,832**	**135**	**2,007**				
16:00-18:00	CAR	1,281	244	378	97	719	3,464	687	3,157	299	4,143	723	210	357	535	1,102	3,404	67	2,625	216	2,908	N	77	2	0
	TRK	8	0	1	0	1	13	4	13	0	17	2	0	1	1	2	22	1	21	3	25	S	35	0	0
2 HR PM	BUS	15	0	6	0	6	13	9	13	0	22	7	0	7	12	19	25	0	13	0	13	E	57	0	0
																						W	38	0	0
	TOTAL:	**1,304**	**244**	**385**	**97**	**726**	**3,490**	**700**	**3,183**	**299**	**4,182**	**732**	**210**	**365**	**548**	**1,123**	**3,451**	**68**	**2,659**	**219**	**2,946**				
07:30-18:00	CAR	4,288	881	1,343	375	2,599	11,053	2,215	9,877	947	13,039	2,428	801	1,231	2,117	4,149	12,559	250	9,561	730	10,541	N	256	2	0
	TRK	27	5	10	4	19	132	14	125	0	139	11	3	7	11	21	135	4	119	3	126	S	116	0	0
8 HR SUM	BUS	63	0	27	0	27	55	36	55	7	98	36	0	29	34	63	83	0	49	0	49	E	207	2	0
																						W	126	1	0
	TOTAL:	**4,378**	**886**	**1,380**	**379**	**2,645**	**11,240**	**2,265**	**10,057**	**954**	**13,276**	**2,475**	**804**	**1,267**	**2,162**	**4,233**	**12,777**	**254**	**9,729**	**733**	**10,716**				

Total 8 Hour Vehicle Volume: 30,870

Total 8 Hour Bicycle Volume: 5

Total 8 Hour Intersection Volume: 30,875

Comment: SATURDAY COUNT

Printed On: 28 Nov, 2019 10:56:28AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT LLOYD MANOR RD & WIDDICOMBE HILL BLVD (PX 127

Survey Date: 2018-Dec-18 (Tuesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
07:30-08:30	CAR	143	194	58	40	292	1,582	80	1,519	47	1,646	187	23	85	187	295	1,486	55	1,105	5	1,165	N	19	1	0
	TRK	2	2	1	2	5	60	1	58	2	61	4	0	0	0	0	37	2	35	0	37	S	15	3	0
AM PEAK	BUS	3	0	0	0	0	13	3	13	0	16	1	0	1	0	1	12	0	12	0	12	E	1	0	0
																						W	33	0	0
	TOTAL:	**148**	**196**	**59**	**42**	**297**	**1,655**	**84**	**1,590**	**49**	**1,723**	**192**	**23**	**86**	**187**	**296**	**1,535**	**57**	**1,152**	**5**	**1,214**				
17:00-18:00	CAR	270	117	139	95	351	1,785	115	1,683	149	1,947	374	7	113	63	183	1,415	112	1,235	16	1,363	N	17	0	0
	TRK	1	1	0	0	1	20	1	20	0	21	1	0	1	1	2	25	0	23	0	23	S	37	0	0
PM PEAK	BUS	0	0	0	0	0	6	0	5	0	5	0	1	0	0	1	8	0	8	0	8	E	19	0	0
																						W	27	0	0
	TOTAL:	**271**	**118**	**139**	**95**	**352**	**1,811**	**116**	**1,708**	**149**	**1,973**	**375**	**8**	**114**	**64**	**186**	**1,448**	**112**	**1,266**	**16**	**1,394**				
OFF HR AVG	CAR	149	135	80	99	314	1,251	61	1,143	113	1,317	281	9	71	75	155	1,143	97	933	8	1,038	N	11	0	0
	TRK	2	5	1	3	9	53	0	49	5	54	10	1	1	1	3	57	4	51	1	56	S	27	0	0
	BUS	1	0	0	0	0	9	1	9	0	10	0	0	0	0	0	9	0	9	0	9	E	26	0	0
																						W	30	0	0
	TOTAL:	**152**	**140**	**81**	**102**	**323**	**1,313**	**62**	**1,201**	**118**	**1,381**	**291**	**10**	**72**	**76**	**158**	**1,209**	**101**	**993**	**9**	**1,103**				
07:30-09:30	CAR	284	354	139	113	606	2,784	130	2,640	132	2,902	475	31	218	332	581	2,758	125	2,072	15	2,212	N	35	1	0
	TRK	3	9	2	5	16	110	1	105	7	113	10	0	0	0	0	70	3	61	0	64	S	36	3	0
2 HR AM	BUS	4	0	0	0	0	24	4	24	0	28	1	0	1	0	1	26	0	26	0	26	E	16	0	0
																						W	66	0	0
	TOTAL:	**291**	**363**	**141**	**118**	**622**	**2,918**	**135**	**2,769**	**139**	**3,043**	**486**	**31**	**219**	**332**	**582**	**2,854**	**128**	**2,159**	**15**	**2,302**				
16:00-18:00	CAR	576	229	299	204	732	3,499	236	3,281	295	3,812	732	14	232	136	382	2,751	205	2,386	41	2,632	N	28	0	0
	TRK	1	1	0	0	1	45	1	45	2	48	5	0	2	2	4	71	1	68	0	69	S	74	0	0
2 HR PM	BUS	0	0	0	0	0	13	0	12	0	12	0	1	0	0	1	15	0	15	0	15	E	35	0	0
																						W	54	1	0
	TOTAL:	**577**	**230**	**299**	**204**	**733**	**3,557**	**237**	**3,338**	**297**	**3,872**	**737**	**15**	**234**	**138**	**387**	**2,837**	**206**	**2,469**	**41**	**2,716**				
07:30-18:00	CAR	1,458	1,124	759	712	2,595	11,288	610	10,494	877	11,981	2,327	82	734	769	1,585	10,082	716	8,189	89	8,994	N	106	2	0
	TRK	9	29	4	15	48	362	3	345	28	376	51	2	5	6	13	368	18	333	2	353	S	216	3	0
8 HR SUM	BUS	9	0	1	0	1	72	8	71	0	79	1	1	1	0	2	75	0	75	0	75	E	156	0	0
																						W	238	2	0
	TOTAL:	**1,476**	**1,153**	**764**	**727**	**2,644**	**11,722**	**621**	**10,910**	**905**	**12,436**	**2,379**	**85**	**740**	**775**	**1,600**	**10,525**	**734**	**8,597**	**91**	**9,422**				

Total 8 Hour Vehicle Volume: 26,102

Total 8 Hour Bicycle Volume: 7

Total 8 Hour Intersection Volume: 26,109

Comment:

Printed On: 28 Nov, 2019 10:58:30AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT KIPLING AVE (PX 729)

Survey Date: 2015-Sep-15 (Tuesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:00-09:00	CAR	967	118	664	143	925	1,515	179	1,314	50	1,543	632	58	442	36	536	1,366	140	1,212	124	1,476	N	50	2	0
	TRK	26	1	15	8	24	82	5	68	7	80	26	6	14	1	21	33	5	31	6	42	S	40	5	0
AM PEAK	BUS	38	0	26	1	27	21	1	16	1	18	30	4	25	0	29	22	4	22	11	37	E	48	21	0
																						W	107	4	0
	TOTAL:	**1,031**	**119**	**705**	**152**	**976**	**1,618**	**185**	**1,398**	**58**	**1,641**	**688**	**68**	**481**	**37**	**586**	**1,421**	**149**	**1,265**	**141**	**1,555**				
16:45-17:45	CAR	959	124	710	130	964	1,694	184	1,510	83	1,777	705	54	497	56	607	1,676	125	1,496	65	1,686	N	20	0	0
	TRK	18	2	10	3	15	35	4	29	2	35	13	3	7	0	10	41	4	39	4	47	S	82	3	0
PM PEAK	BUS	22	0	20	0	20	12	1	11	0	12	18	1	18	1	20	10	0	9	1	10	E	40	16	0
																						W	58	25	0
	TOTAL:	**999**	**126**	**740**	**133**	**999**	**1,741**	**189**	**1,550**	**85**	**1,824**	**736**	**58**	**522**	**57**	**637**	**1,727**	**129**	**1,544**	**70**	**1,743**				
OFF HR AVG	CAR	419	80	298	94	472	942	65	792	70	927	425	56	266	45	367	997	89	872	56	1,017	N	14	2	0
	TRK	25	6	16	4	26	51	2	43	5	50	21	4	13	2	19	53	3	45	7	55	S	33	1	0
	BUS	15	1	13	1	15	17	0	15	0	15	13	1	12	1	14	14	1	12	2	15	E	13	6	0
																						W	28	4	0
	TOTAL:	**459**	**87**	**327**	**99**	**513**	**1,010**	**67**	**850**	**75**	**992**	**459**	**61**	**291**	**48**	**400**	**1,064**	**93**	**929**	**65**	**1,087**				
07:30-09:30	CAR	1,734	216	1,207	252	1,675	2,947	340	2,569	128	3,037	1,155	126	786	81	993	2,752	241	2,455	187	2,883	N	103	2	0
	TRK	42	5	21	16	42	158	11	125	17	153	59	17	33	5	55	77	9	67	10	86	S	77	7	0
2 HR AM	BUS	69	1	51	4	56	49	3	40	1	44	54	5	48	0	53	40	5	39	15	59	E	82	31	0
																						W	186	9	0
	TOTAL:	**1,845**	**222**	**1,279**	**272**	**1,773**	**3,154**	**354**	**2,734**	**146**	**3,234**	**1,268**	**148**	**867**	**86**	**1,101**	**2,869**	**255**	**2,561**	**212**	**3,028**				
16:00-18:00	CAR	1,866	242	1,359	289	1,890	3,400	362	2,977	176	3,515	1,346	134	915	107	1,156	3,240	255	2,891	145	3,291	N	35	3	0
	TRK	35	7	22	13	42	82	8	62	3	73	23	7	12	0	19	84	8	77	5	90	S	151	5	0
2 HR PM	BUS	44	0	41	5	46	26	1	20	0	21	38	1	37	1	39	27	1	26	2	29	E	86	30	0
																						W	104	35	0
	TOTAL:	**1,945**	**249**	**1,422**	**307**	**1,978**	**3,508**	**371**	**3,059**	**179**	**3,609**	**1,407**	**142**	**964**	**108**	**1,214**	**3,351**	**264**	**2,994**	**152**	**3,410**				
07:30-18:00	CAR	5,277	779	3,757	918	5,454	10,117	963	8,714	583	10,260	4,199	485	2,764	366	3,615	9,979	852	8,834	557	10,243	N	194	11	0
	TRK	175	37	108	46	191	444	26	360	38	424	162	38	96	14	148	375	28	324	41	393	S	360	15	0
8 HR SUM	BUS	170	3	142	12	157	140	5	119	2	126	144	9	132	4	145	120	10	113	23	146	E	219	85	0
																						W	403	59	0
	TOTAL:	**5,622**	**819**	**4,007**	**976**	**5,802**	**10,701**	**994**	**9,193**	**623**	**10,810**	**4,505**	**532**	**2,992**	**384**	**3,908**	**10,474**	**890**	**9,271**	**621**	**10,782**				

Total 8 Hour Vehicle Volume: 31,302

Total 8 Hour Bicycle Volume: 170

Total 8 Hour Intersection Volume: 31,472

Comment:

Printed On: 28 Nov, 2019 11:01:38AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

BEMERSYDE DR AT EGLINTON AVE W & WINCOTT DR (PX 974)

Survey Date: 2018-Dec-18 (Tuesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
07:30-08:30	CAR	172	11	79	32	122	1,449	50	1,368	11	1,429	106	49	87	44	180	1,174	8	1,119	43	1,170	N	4	0	0
	TRK	0	0	0	1	1	44	0	43	0	43	0	0	0	0	0	37	0	37	0	37	S	4	0	0
AM PEAK	BUS	1	0	1	0	1	13	0	13	0	13	1	0	0	0	0	12	1	12	0	13	E	13	1	0
																						W	6	0	0
	TOTAL:	**173**	**11**	**80**	**33**	**124**	**1,506**	**50**	**1,424**	**11**	**1,485**	**107**	**49**	**87**	**44**	**180**	**1,223**	**9**	**1,168**	**43**	**1,220**				
17:00-18:00	CAR	204	6	83	6	95	1,606	57	1,530	13	1,600	136	70	107	52	229	1,358	16	1,300	64	1,380	N	5	0	0
	TRK	0	0	0	0	0	20	0	20	0	20	0	0	0	0	0	32	0	32	0	32	S	3	0	0
PM PEAK	BUS	0	0	0	0	0	6	0	6	0	6	0	0	0	0	0	6	0	6	0	6	E	7	0	0
																						W	14	0	0
	TOTAL:	**204**	**6**	**83**	**6**	**95**	**1,632**	**57**	**1,556**	**13**	**1,626**	**136**	**70**	**107**	**52**	**229**	**1,396**	**16**	**1,338**	**64**	**1,418**				
OFF HR AVG	CAR	198	16	52	12	80	1,138	57	1,047	13	1,117	81	79	56	69	204	1,011	12	926	89	1,027	N	8	0	0
	TRK	3	0	0	0	0	48	1	47	0	48	0	1	0	2	3	55	0	53	2	55	S	20	0	0
	BUS	0	0	0	0	0	9	0	9	0	9	0	0	0	0	0	9	0	9	0	9	E	24	0	0
																						W	26	0	0
	TOTAL:	**201**	**16**	**52**	**12**	**80**	**1,195**	**58**	**1,103**	**13**	**1,174**	**81**	**80**	**56**	**71**	**207**	**1,075**	**12**	**988**	**91**	**1,091**				
07:30-09:30	CAR	403	33	178	74	285	2,531	104	2,341	24	2,469	228	116	183	101	400	2,242	21	2,108	121	2,250	N	15	0	0
	TRK	2	1	0	2	3	92	0	87	0	87	0	3	0	1	4	72	0	70	2	72	S	19	0	0
2 HR AM	BUS	1	0	1	0	1	26	0	26	0	26	1	0	0	0	0	26	1	26	0	27	E	32	3	0
																						W	15	1	0
	TOTAL:	**406**	**34**	**179**	**76**	**289**	**2,649**	**104**	**2,454**	**24**	**2,582**	**229**	**119**	**183**	**102**	**404**	**2,340**	**22**	**2,204**	**123**	**2,349**				
16:00-18:00	CAR	422	16	164	26	206	3,139	117	2,977	24	3,118	264	136	204	111	451	2,705	36	2,578	141	2,755	N	17	1	0
	TRK	0	0	0	0	0	51	0	51	0	51	1	0	0	0	0	74	1	74	0	75	S	23	1	0
2 HR PM	BUS	0	0	0	0	0	15	0	15	0	15	0	0	0	0	0	18	0	18	0	18	E	31	1	0
																						W	46	0	0
	TOTAL:	**422**	**16**	**164**	**26**	**206**	**3,205**	**117**	**3,043**	**24**	**3,184**	**265**	**136**	**204**	**111**	**451**	**2,797**	**37**	**2,670**	**141**	**2,848**				
07:30-18:00	CAR	1,611	113	548	148	809	10,219	447	9,504	100	10,051	814	567	609	489	1,665	8,991	105	8,389	616	9,110	N	63	2	0
	TRK	13	1	0	3	4	337	3	326	0	329	3	8	1	8	17	365	2	356	10	368	S	120	1	0
8 HR SUM	BUS	1	0	1	0	1	78	0	78	0	78	1	0	0	0	0	79	1	79	0	80	E	160	5	0
																						W	165	1	0
	TOTAL:	**1,625**	**114**	**549**	**151**	**814**	**10,634**	**450**	**9,908**	**100**	**10,458**	**818**	**575**	**610**	**497**	**1,682**	**9,435**	**108**	**8,824**	**626**	**9,558**				

Total 8 Hour Vehicle Volume: 22,512

Total 8 Hour Bicycle Volume: 9

Total 8 Hour Intersection Volume: 22,521

Comment:

Printed On: 28 Nov, 2019 11:04:08AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT ISLINGTON AVE (PX 709)

Survey Date: 2014-Apr-29 (Tuesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
07:30-08:30	CAR	1,144	52	908	175	1,135	1,492	184	1,272	54	1,510	1,092	45	888	50	983	1,174	150	1,072	52	1,274	N	46	0	0
	TRK	8	3	6	5	14	66	1	57	7	65	40	4	28	0	32	36	5	33	1	39	S	64	0	0
AM PEAK	BUS	19	0	18	1	19	14	1	13	0	14	17	0	15	0	15	13	2	13	0	15	E	37	0	0
																						W	23	0	0
	TOTAL:	**1,171**	**55**	**932**	**181**	**1,168**	**1,572**	**186**	**1,342**	**61**	**1,589**	**1,149**	**49**	**931**	**50**	**1,030**	**1,223**	**157**	**1,118**	**53**	**1,328**				
16:45-17:45	CAR	1,261	64	982	163	1,209	1,556	223	1,323	63	1,609	1,003	70	810	84	964	1,180	130	1,032	56	1,218	N	18	0	0
	TRK	10	1	5	0	6	24	4	24	0	28	8	0	5	0	5	30	3	29	1	33	S	45	0	0
PM PEAK	BUS	9	0	8	0	8	4	1	4	0	5	11	0	11	0	11	9	0	9	0	9	E	25	0	0
																						W	36	0	0
	TOTAL:	**1,280**	**65**	**995**	**163**	**1,223**	**1,584**	**228**	**1,351**	**63**	**1,642**	**1,022**	**70**	**826**	**84**	**980**	**1,219**	**133**	**1,070**	**57**	**1,260**				
OFF HR AVG	CAR	648	71	493	103	667	964	107	810	56	973	627	51	466	57	574	818	105	690	48	843	N	9	0	0
	TRK	20	4	16	4	24	57	3	51	3	57	21	2	14	2	18	48	4	42	1	47	S	21	0	0
	BUS	9	0	9	0	9	8	0	8	0	8	8	0	8	0	8	7	0	7	0	7	E	14	0	0
																						W	20	0	0
	TOTAL:	**677**	**75**	**518**	**107**	**700**	**1,029**	**110**	**869**	**59**	**1,038**	**656**	**53**	**488**	**59**	**600**	**873**	**109**	**739**	**49**	**897**				
07:30-09:30	CAR	2,149	110	1,675	326	2,111	2,799	370	2,368	102	2,840	2,141	105	1,732	107	1,944	2,158	307	1,941	104	2,352	N	98	0	0
	TRK	38	5	29	7	41	122	5	111	8	124	55	4	36	3	43	80	11	72	4	87	S	194	0	0
2 HR AM	BUS	37	0	36	3	39	35	1	32	1	34	34	0	31	0	31	25	2	25	0	27	E	86	0	0
																						W	129	0	0
	TOTAL:	**2,224**	**115**	**1,740**	**336**	**2,191**	**2,956**	**376**	**2,511**	**111**	**2,998**	**2,230**	**109**	**1,799**	**110**	**2,018**	**2,263**	**320**	**2,038**	**108**	**2,466**				
16:00-18:00	CAR	2,419	133	1,831	306	2,270	3,028	451	2,592	120	3,163	2,005	130	1,591	145	1,866	2,382	294	2,104	137	2,535	N	25	0	0
	TRK	22	2	13	0	15	50	8	49	1	58	20	1	14	0	15	55	5	53	1	59	S	85	0	0
2 HR PM	BUS	22	1	21	0	22	14	1	14	0	15	25	0	25	0	25	21	0	20	0	20	E	38	0	0
																						W	76	0	0
	TOTAL:	**2,463**	**136**	**1,865**	**306**	**2,307**	**3,092**	**460**	**2,655**	**121**	**3,236**	**2,050**	**131**	**1,630**	**145**	**1,906**	**2,458**	**299**	**2,177**	**138**	**2,614**				
07:30-18:00	CAR	7,160	526	5,479	1,042	7,047	9,680	1,248	8,198	445	9,891	6,654	440	5,188	481	6,109	7,812	1,021	6,805	433	8,259	N	157	0	0
	TRK	141	22	106	21	149	398	25	365	21	411	160	12	106	11	129	326	33	293	10	336	S	361	0	0
8 HR SUM	BUS	93	1	91	4	96	81	2	76	1	79	90	1	87	0	88	74	2	73	0	75	E	181	0	0
																						W	286	0	0
	TOTAL:	**7,394**	**549**	**5,676**	**1,067**	**7,292**	**10,159**	**1,275**	**8,639**	**467**	**10,381**	**6,904**	**453**	**5,381**	**492**	**6,326**	**8,212**	**1,056**	**7,171**	**443**	**8,670**				

Total 8 Hour Vehicle Volume: 32,669

Total 8 Hour Bicycle Volume: 0

Total 8 Hour Intersection Volume: 32,669

Comment:

Printed On: 28 Nov, 2019 11:17:42AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT RUSSELL HILL RD

Survey Date: 2006-Jun-06 (Tuesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:00-09:00	CAR	0	5	0	13	18	964	0	951	4	955	9	0	0	0	0	718	5	713	0	718	N	0	0	0
	TRK	0	0	0	0	0	33	0	33	0	33	0	0	0	0	0	19	0	19	0	19	S	28	0	0
AM PEAK	BUS	0	0	0	0	0	25	0	25	0	25	0	0	0	0	0	25	0	25	0	25	E	4	0	0
																						W	2	0	0
	TOTAL:	**0**	**5**	**0**	**13**	**18**	**1,022**	**0**	**1,009**	**4**	**1,013**	**9**	**0**	**0**	**0**	**0**	**762**	**5**	**757**	**0**	**762**				
16:00-17:00	CAR	0	5	0	1	6	808	0	807	9	816	13	0	0	0	0	811	4	806	0	810	N	0	0	0
	TRK	0	0	0	0	0	23	0	23	0	23	1	0	0	0	0	24	1	24	0	25	S	16	0	0
PM PEAK	BUS	0	2	0	0	2	19	0	19	0	19	0	0	0	0	0	17	0	15	0	15	E	1	0	0
																						W	3	0	0
	TOTAL:	**0**	**7**	**0**	**1**	**8**	**850**	**0**	**849**	**9**	**858**	**14**	**0**	**0**	**0**	**0**	**852**	**5**	**845**	**0**	**850**				
OFF HR AVG	CAR	0	3	0	7	10	697	0	690	6	696	12	0	0	0	0	658	6	655	0	661	N	0	0	0
	TRK	0	0	0	0	0	35	0	35	0	35	1	0	0	0	0	38	1	38	0	39	S	14	0	0
	BUS	0	0	0	0	0	13	0	13	0	13	0	0	0	0	0	14	0	14	0	14	E	4	0	0
																						W	2	0	0
	TOTAL:	**0**	**3**	**0**	**7**	**10**	**745**	**0**	**738**	**6**	**744**	**13**	**0**	**0**	**0**	**0**	**710**	**7**	**707**	**0**	**714**				
07:30-09:30	CAR	0	6	0	19	25	1,774	0	1,755	8	1,763	17	0	0	0	0	1,356	9	1,350	0	1,359	N	0	0	0
	TRK	0	0	0	0	0	62	0	62	0	62	1	0	0	0	0	44	1	44	0	45	S	59	0	0
2 HR AM	BUS	0	0	0	0	0	49	0	49	0	49	0	0	0	0	0	43	0	43	0	43	E	6	0	0
																						W	10	0	0
	TOTAL:	**0**	**6**	**0**	**19**	**25**	**1,885**	**0**	**1,866**	**8**	**1,874**	**18**	**0**	**0**	**0**	**0**	**1,443**	**10**	**1,437**	**0**	**1,447**				
16:00-18:00	CAR	0	5	0	9	14	1,689	0	1,680	17	1,697	22	0	0	0	0	1,557	5	1,552	0	1,557	N	0	0	0
	TRK	0	0	0	0	0	38	0	38	0	38	1	0	0	0	0	46	1	46	0	47	S	34	0	0
2 HR PM	BUS	0	9	0	0	9	32	0	32	0	32	0	0	0	0	0	37	0	28	0	28	E	2	0	0
																						W	6	0	0
	TOTAL:	**0**	**14**	**0**	**9**	**23**	**1,759**	**0**	**1,750**	**17**	**1,767**	**23**	**0**	**0**	**0**	**0**	**1,640**	**6**	**1,626**	**0**	**1,632**				
07:30-18:00	CAR	0	23	0	57	80	6,253	0	6,196	48	6,244	85	0	0	0	0	5,546	37	5,523	0	5,560	N	0	0	0
	TRK	0	1	0	1	2	240	0	239	0	239	4	0	0	0	0	243	4	242	0	246	S	147	0	0
8 HR SUM	BUS	0	9	0	0	9	132	0	132	0	132	0	0	0	0	0	134	0	125	0	125	E	23	0	0
																						W	25	0	0
	TOTAL:	**0**	**33**	**0**	**58**	**91**	**6,625**	**0**	**6,567**	**48**	**6,615**	**89**	**0**	**0**	**0**	**0**	**5,923**	**41**	**5,890**	**0**	**5,931**				

Total 8 Hour Vehicle Volume: 12,637

Total 8 Hour Bicycle Volume: 0

Total 8 Hour Intersection Volume: 12,637

Comment:

Printed On: 28 Nov, 2019 11:20:46AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT ROYAL YORK RD (PX 781)

Survey Date: 2015-Jun-04 (Thursday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
07:30-08:30	CAR	698	133	556	97	786	1,322	103	1,166	91	1,360	618	59	431	82	572	1,318	96	1,103	39	1,238	N	66	7	0
	TRK	11	11	4	0	15	46	7	42	3	52	14	4	8	5	17	47	3	31	0	34	S	13	3	0
AM PEAK	BUS	12	0	12	0	12	15	0	15	0	15	12	0	10	0	10	11	2	11	0	13	E	44	0	0
																						W	21	0	0
	TOTAL:	**721**	**144**	**572**	**97**	**813**	**1,383**	**110**	**1,223**	**94**	**1,427**	**644**	**63**	**449**	**87**	**599**	**1,376**	**101**	**1,145**	**39**	**1,285**				
16:45-17:45	CAR	692	105	601	86	792	1,350	4	1,224	118	1,346	867	40	609	88	737	1,240	140	1,047	87	1,274	N	19	2	0
	TRK	12	3	7	1	11	28	4	27	1	32	9	0	2	1	3	24	6	20	1	27	S	10	1	0
PM PEAK	BUS	8	0	8	0	8	5	0	5	1	6	8	0	5	0	5	7	2	7	0	9	E	23	0	0
																						W	11	0	0
	TOTAL:	**712**	**108**	**616**	**87**	**811**	**1,383**	**8**	**1,256**	**120**	**1,384**	**884**	**40**	**616**	**89**	**745**	**1,271**	**148**	**1,074**	**88**	**1,310**				
OFF HR AVG	CAR	581	98	393	83	574	1,029	126	878	93	1,097	553	68	362	122	552	992	98	772	62	932	N	11	1	0
	TRK	17	5	8	2	15	51	7	46	7	60	16	3	7	6	16	50	2	39	2	43	S	11	1	0
	BUS	6	0	6	0	6	7	0	7	0	7	6	0	4	0	4	6	2	6	0	8	E	20	1	0
																						W	13	0	0
	TOTAL:	**604**	**103**	**407**	**85**	**595**	**1,087**	**133**	**931**	**100**	**1,164**	**575**	**71**	**373**	**128**	**572**	**1,048**	**102**	**817**	**64**	**983**				
07:30-09:30	CAR	1,362	246	1,054	182	1,482	2,534	208	2,233	186	2,627	1,229	119	834	212	1,165	2,436	209	1,978	100	2,287	N	96	8	0
	TRK	24	13	11	1	25	101	12	96	6	114	29	4	17	9	30	91	6	69	1	76	S	18	6	0
2 HR AM	BUS	20	0	19	0	19	26	0	26	0	26	22	0	18	1	19	24	4	23	1	28	E	67	0	0
																						W	34	1	0
	TOTAL:	**1,406**	**259**	**1,084**	**183**	**1,526**	**2,661**	**220**	**2,355**	**192**	**2,767**	**1,280**	**123**	**869**	**222**	**1,214**	**2,551**	**219**	**2,070**	**102**	**2,391**				
16:00-18:00	CAR	1,317	209	1,126	182	1,517	2,635	9	2,365	264	2,638	1,679	88	1,130	205	1,423	2,597	285	2,183	182	2,650	N	36	3	0
	TRK	27	6	13	3	22	55	9	50	2	61	16	2	5	5	12	60	9	49	5	63	S	28	5	0
2 HR PM	BUS	18	0	18	0	18	11	0	9	1	10	17	2	12	0	14	14	4	14	0	18	E	45	0	0
																						W	24	0	0
	TOTAL:	**1,362**	**215**	**1,157**	**185**	**1,557**	**2,701**	**18**	**2,424**	**267**	**2,709**	**1,712**	**92**	**1,147**	**210**	**1,449**	**2,671**	**298**	**2,246**	**187**	**2,731**				
07:30-18:00	CAR	5,000	847	3,751	694	5,292	9,284	721	8,110	820	9,651	5,117	480	3,412	906	4,798	9,001	885	7,248	528	8,661	N	175	15	0
	TRK	116	40	57	12	109	358	47	328	37	412	108	18	50	38	106	350	21	272	12	305	S	90	16	0
8 HR SUM	BUS	63	0	61	0	61	65	1	63	1	65	64	2	46	2	50	63	17	61	1	79	E	190	2	0
																						W	109	1	0
	TOTAL:	**5,179**	**887**	**3,869**	**706**	**5,462**	**9,707**	**769**	**8,501**	**858**	**10,128**	**5,289**	**500**	**3,508**	**946**	**4,954**	**9,414**	**923**	**7,581**	**541**	**9,045**				

Total 8 Hour Vehicle Volume: 29,589

Total 8 Hour Bicycle Volume: 34

Total 8 Hour Intersection Volume: 29,623

Comment:

Printed On: 28 Nov, 2019 11:24:51AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT ROYAL YORK RD (PX 781)

Survey Date: 2016-Apr-16 (Saturday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:30-09:30	CAR	488	105	327	69	501	744	100	614	73	787	459	61	306	114	481	889	80	670	61	811	N	8	4	0
	TRK	5	1	4	1	6	14	0	13	1	14	7	0	5	0	5	13	1	12	1	14	S	12	3	0
AM PEAK	BUS	6	0	6	0	6	6	0	6	0	6	7	0	4	0	4	7	3	7	0	10	E	19	1	0
																						W	5	0	0
	TOTAL:	**499**	**106**	**337**	**70**	**513**	**764**	**100**	**633**	**74**	**807**	**473**	**61**	**315**	**114**	**490**	**909**	**84**	**689**	**62**	**835**				
16:00-17:00	CAR	701	139	452	77	668	1,471	163	1,310	136	1,609	676	84	437	119	640	1,359	103	1,101	86	1,290	N	9	7	0
	TRK	3	0	1	0	1	11	2	11	1	14	1	0	0	2	2	11	0	9	0	9	S	15	2	0
PM PEAK	BUS	7	0	7	0	7	7	0	7	0	7	7	0	5	0	5	7	2	7	0	9	E	23	0	0
																						W	9	0	0
	TOTAL:	**711**	**139**	**460**	**77**	**676**	**1,489**	**165**	**1,328**	**137**	**1,630**	**684**	**84**	**442**	**121**	**647**	**1,377**	**105**	**1,117**	**86**	**1,308**				
OFF HR AVG	CAR	652	101	420	87	608	1,121	142	949	112	1,203	619	85	402	130	617	1,140	105	909	90	1,104	N	14	6	0
	TRK	4	2	3	2	7	15	1	12	2	15	6	1	2	2	5	15	2	11	0	13	S	11	3	0
	BUS	7	0	7	0	7	8	0	8	0	8	7	0	5	0	5	7	2	7	0	9	E	26	0	0
																						W	11	0	0
	TOTAL:	**663**	**103**	**430**	**89**	**622**	**1,144**	**143**	**969**	**114**	**1,226**	**632**	**86**	**409**	**132**	**627**	**1,162**	**109**	**927**	**90**	**1,126**				
07:30-09:30	CAR	848	171	577	109	857	1,269	163	1,063	128	1,354	726	97	476	176	749	1,507	122	1,160	108	1,390	N	17	5	0
	TRK	6	2	4	1	7	28	1	26	2	29	10	1	6	0	7	26	2	24	1	27	S	16	18	0
2 HR AM	BUS	12	0	12	0	12	12	0	12	0	12	12	0	8	0	8	12	4	12	0	16	E	34	2	0
																						W	11	1	0
	TOTAL:	**866**	**173**	**593**	**110**	**876**	**1,309**	**164**	**1,101**	**130**	**1,395**	**748**	**98**	**490**	**176**	**764**	**1,545**	**128**	**1,196**	**109**	**1,433**				
16:00-18:00	CAR	1,391	254	909	152	1,315	2,715	307	2,413	259	2,979	1,333	150	863	235	1,248	2,731	211	2,242	175	2,628	N	17	11	0
	TRK	5	1	3	0	4	19	2	19	2	23	2	0	0	3	3	22	0	18	0	18	S	37	4	0
2 HR PM	BUS	12	0	12	0	12	13	0	13	0	13	12	0	9	0	9	16	3	16	0	19	E	57	0	0
																						W	15	0	0
	TOTAL:	**1,408**	**255**	**924**	**152**	**1,331**	**2,747**	**309**	**2,445**	**261**	**3,015**	**1,347**	**150**	**872**	**238**	**1,260**	**2,769**	**214**	**2,276**	**175**	**2,665**				
07:30-18:00	CAR	4,843	827	3,164	610	4,601	8,469	1,038	7,272	836	9,146	4,534	587	2,945	929	4,461	8,792	753	7,036	641	8,430	N	91	39	0
	TRK	25	9	19	7	35	102	5	92	10	107	33	3	13	9	25	102	10	84	1	95	S	95	33	0
8 HR SUM	BUS	51	0	51	1	52	56	0	55	0	55	50	0	37	0	37	55	13	55	0	68	E	195	2	0
																						W	68	1	0
	TOTAL:	**4,919**	**836**	**3,234**	**618**	**4,688**	**8,627**	**1,043**	**7,419**	**846**	**9,308**	**4,617**	**590**	**2,995**	**938**	**4,523**	**8,949**	**776**	**7,175**	**642**	**8,593**				

Total 8 Hour Vehicle Volume: 27,112

Total 8 Hour Bicycle Volume: 75

Total 8 Hour Intersection Volume: 27,187

Comment: SATURDAY COUNT

Printed On: 28 Nov, 2019 11:24:51AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT SCARLETT RD (PX 784)

Survey Date: 2016-Dec-05 (Monday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
07:45-08:45	CAR	686	209	530	235	974	1,491	23	1,031	227	1,281	922	225	625	66	916	993	70	718	133	921	N	85	2	0
	TRK	8	3	4	1	8	60	1	46	5	52	29	13	22	0	35	25	2	22	3	27	S	24	2	0
AM PEAK	BUS	17	0	15	1	16	15	0	13	0	13	18	1	17	6	24	19	1	13	2	16	E	34	2	0
																						W	63	2	0
	TOTAL:	**711**	**212**	**549**	**237**	**998**	**1,566**	**24**	**1,090**	**232**	**1,346**	**969**	**239**	**664**	**72**	**975**	**1,037**	**73**	**753**	**138**	**964**				
17:00-18:00	CAR	732	229	479	163	871	1,411	35	999	263	1,297	1,067	249	660	64	973	1,276	144	983	218	1,345	N	13	1	0
	TRK	6	2	4	2	8	21	0	18	3	21	4	1	1	0	2	18	0	16	2	18	S	50	0	0
PM PEAK	BUS	7	0	7	0	7	13	0	13	0	13	10	0	10	0	10	9	0	9	0	9	E	25	0	0
																						W	43	1	0
	TOTAL:	**745**	**231**	**490**	**165**	**886**	**1,445**	**35**	**1,030**	**266**	**1,331**	**1,081**	**250**	**671**	**64**	**985**	**1,303**	**144**	**1,008**	**220**	**1,372**				
OFF HR AVG	CAR	414	188	268	100	556	772	36	553	172	761	546	119	280	44	443	796	94	564	110	768	N	14	1	0
	TRK	15	6	7	1	14	34	2	29	6	37	14	4	5	3	12	43	3	34	6	43	S	19	1	0
	BUS	5	0	5	0	5	10	0	9	0	9	5	1	5	2	8	12	0	10	0	10	E	15	1	0
																						W	29	1	0
	TOTAL:	**434**	**194**	**280**	**101**	**575**	**816**	**38**	**591**	**178**	**807**	**565**	**124**	**290**	**49**	**463**	**851**	**97**	**608**	**116**	**821**				
07:30-09:30	CAR	1,249	453	938	393	1,784	2,785	46	1,978	427	2,451	1,666	414	1,070	118	1,602	2,015	169	1,444	265	1,878	N	110	2	0
	TRK	11	8	5	7	20	116	1	81	16	98	53	28	31	1	60	48	6	39	5	50	S	45	5	0
2 HR AM	BUS	33	0	28	1	29	32	1	29	0	30	35	2	32	9	43	32	3	23	4	30	E	54	4	0
																						W	106	5	0
	TOTAL:	**1,293**	**461**	**971**	**401**	**1,833**	**2,933**	**48**	**2,088**	**443**	**2,579**	**1,754**	**444**	**1,133**	**128**	**1,705**	**2,095**	**178**	**1,506**	**274**	**1,958**				
16:00-18:00	CAR	1,458	469	968	318	1,755	2,726	73	1,941	489	2,503	1,963	467	1,168	120	1,755	2,490	306	1,901	417	2,624	N	48	4	0
	TRK	12	8	7	4	19	46	0	36	5	41	11	6	5	0	11	42	1	34	5	40	S	95	1	0
2 HR PM	BUS	18	2	18	0	20	21	0	19	0	19	18	2	18	3	23	27	0	22	0	22	E	59	1	0
																						W	109	2	0
	TOTAL:	**1,488**	**479**	**993**	**322**	**1,794**	**2,793**	**73**	**1,996**	**494**	**2,563**	**1,992**	**475**	**1,191**	**123**	**1,789**	**2,559**	**307**	**1,957**	**422**	**2,686**				
07:30-18:00	CAR	4,362	1,675	2,979	1,109	5,763	8,595	263	6,129	1,602	7,994	5,811	1,357	3,358	414	5,129	7,688	851	5,599	1,120	7,570	N	214	10	0
	TRK	81	40	38	15	93	295	8	231	46	285	121	49	57	11	117	261	18	210	35	263	S	215	10	0
8 HR SUM	BUS	72	2	66	1	69	91	1	82	1	84	76	8	71	20	99	107	4	85	5	94	E	171	9	0
																						W	331	10	0
	TOTAL:	**4,515**	**1,717**	**3,083**	**1,125**	**5,925**	**8,981**	**272**	**6,442**	**1,649**	**8,363**	**6,008**	**1,414**	**3,486**	**445**	**5,345**	**8,056**	**873**	**5,894**	**1,160**	**7,927**				

Total 8 Hour Vehicle Volume: 27,560

Total 8 Hour Bicycle Volume: 39

Total 8 Hour Intersection Volume: 27,599

Comment:

Printed On: 28 Nov, 2019 11:26:44AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT EMMETT AVE

Survey Date: 2019-Jun-19 (Wednesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:00-09:00	CAR	200	3	1	2	6	1,195	157	1,157	13	1,327	23	36	1	115	152	949	9	831	42	882	N	3	0	0
	TRK	25	0	0	0	0	151	16	139	0	155	0	12	0	15	27	116	0	101	9	110	S	2	0	0
AM PEAK	BUS	7	0	0	0	0	14	0	13	0	13	0	1	0	1	2	11	0	10	7	17	E	3	7	0
																						W	1	4	0
	TOTAL:	**232**	**3**	**1**	**2**	**6**	**1,360**	**173**	**1,309**	**13**	**1,495**	**23**	**49**	**1**	**131**	**181**	**1,076**	**9**	**942**	**58**	**1,009**				
16:30-17:30	CAR	212	5	1	9	15	1,200	156	1,170	14	1,340	23	21	0	120	141	1,303	9	1,178	55	1,242	N	2	1	0
	TRK	10	0	0	0	0	121	7	116	0	123	0	5	0	4	9	107	0	103	3	106	S	7	0	0
PM PEAK	BUS	9	0	0	0	0	8	0	8	0	8	0	0	0	0	0	6	0	6	9	15	E	4	4	0
																						W	2	5	0
	TOTAL:	**231**	**5**	**1**	**9**	**15**	**1,329**	**163**	**1,294**	**14**	**1,471**	**23**	**26**	**0**	**124**	**150**	**1,416**	**9**	**1,287**	**67**	**1,363**				
OFF HR AVG	CAR	124	8	1	9	18	757	91	733	5	829	15	15	1	84	100	744	9	652	32	693	N	3	1	0
	TRK	15	0	0	0	0	113	9	110	1	120	1	3	0	6	9	103	0	97	6	103	S	5	0	0
	BUS	6	0	0	0	0	7	0	7	0	7	0	0	0	0	0	9	0	9	6	15	E	1	4	0
																						W	1	5	0
	TOTAL:	**145**	**8**	**1**	**9**	**18**	**877**	**100**	**850**	**6**	**956**	**16**	**18**	**1**	**90**	**109**	**856**	**9**	**758**	**44**	**811**				
07:30-09:30	CAR	334	6	3	6	15	2,260	265	2,207	27	2,499	49	47	4	224	275	1,774	18	1,544	66	1,628	N	5	0	0
	TRK	42	0	0	1	1	317	25	299	1	325	2	17	0	24	41	244	1	220	17	238	S	8	0	0
2 HR AM	BUS	13	0	0	0	0	25	1	24	0	25	0	1	0	2	3	26	0	24	12	36	E	3	13	0
																						W	2	11	0
	TOTAL:	**389**	**6**	**3**	**7**	**16**	**2,602**	**291**	**2,530**	**28**	**2,849**	**51**	**65**	**4**	**250**	**319**	**2,044**	**19**	**1,788**	**95**	**1,902**				
16:00-18:00	CAR	415	6	1	16	23	2,395	310	2,339	23	2,672	37	40	0	255	295	2,533	14	2,272	104	2,390	N	5	3	0
	TRK	23	1	0	0	1	241	16	232	0	248	0	9	0	9	18	218	0	208	7	215	S	12	0	0
2 HR PM	BUS	16	0	0	0	0	15	0	15	0	15	0	0	0	0	0	17	0	17	16	33	E	8	8	0
																						W	3	8	0
	TOTAL:	**454**	**7**	**1**	**16**	**24**	**2,651**	**326**	**2,586**	**23**	**2,935**	**37**	**49**	**0**	**264**	**313**	**2,768**	**14**	**2,497**	**127**	**2,638**				
07:30-18:00	CAR	1,245	45	7	58	110	7,684	939	7,479	68	8,486	142	147	8	815	970	7,285	66	6,425	299	6,790	N	21	5	0
	TRK	124	1	0	2	3	1,010	78	970	4	1,052	5	38	0	55	93	873	1	817	46	864	S	39	1	0
8 HR SUM	BUS	52	0	0	0	0	69	2	67	0	69	0	2	0	3	5	80	0	77	50	127	E	14	37	0
																						W	7	38	0
	TOTAL:	**1,421**	**46**	**7**	**60**	**113**	**8,763**	**1,019**	**8,516**	**72**	**9,607**	**147**	**187**	**8**	**873**	**1,068**	**8,238**	**67**	**7,319**	**395**	**7,781**				

Total 8 Hour Vehicle Volume: 18,569

Total 8 Hour Bicycle Volume: 81

Total 8 Hour Intersection Volume: 18,650

Comment:

Printed On: 28 Nov, 2019 11:30:10AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT JANE ST (PX 905)

Survey Date: 2018-Apr-05 (Thursday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:00-09:00	CAR	929	199	686	50	935	846	233	778	205	1,216	1,073	18	810	192	1,020	987	58	596	10	664	N	19	0	0
	TRK	15	8	12	4	24	32	3	28	6	37	26	0	17	9	26	35	3	18	0	21	S	50	0	0
AM PEAK	BUS	20	2	20	2	24	14	0	8	2	10	17	4	15	1	20	15	0	12	0	12	E	29	0	0
																						W	34	0	0
	TOTAL:	**964**	**209**	**718**	**56**	**983**	**892**	**236**	**814**	**213**	**1,263**	**1,116**	**22**	**842**	**202**	**1,066**	**1,037**	**61**	**626**	**10**	**697**				
16:45-17:45	CAR	944	203	742	79	1,024	1,016	186	917	189	1,292	1,041	20	762	187	969	1,180	90	790	16	896	N	45	0	0
	TRK	14	4	9	1	14	21	5	20	6	31	15	0	8	5	13	25	1	16	0	17	S	50	0	0
PM PEAK	BUS	19	1	19	0	20	17	0	9	0	9	19	8	19	0	27	18	0	17	0	17	E	41	0	0
																						W	62	0	0
	TOTAL:	**977**	**208**	**770**	**80**	**1,058**	**1,054**	**191**	**946**	**195**	**1,332**	**1,075**	**28**	**789**	**192**	**1,009**	**1,223**	**91**	**823**	**16**	**930**				
OFF HR AVG	CAR	606	166	479	72	717	585	109	489	128	726	619	24	438	133	595	765	53	466	18	537	N	21	0	0
	TRK	26	7	20	3	30	28	5	24	9	38	25	1	13	7	21	36	3	22	1	26	S	31	0	0
	BUS	16	0	16	0	16	11	0	7	0	7	19	4	18	1	23	14	1	13	0	14	E	31	0	0
																						W	22	0	0
	TOTAL:	**648**	**173**	**515**	**75**	**763**	**624**	**114**	**520**	**137**	**771**	**663**	**29**	**469**	**141**	**639**	**815**	**57**	**501**	**19**	**577**				
07:30-09:30	CAR	1,807	365	1,358	102	1,825	1,660	431	1,521	386	2,338	2,000	37	1,501	361	1,899	1,814	113	1,088	18	1,219	N	32	0	0
	TRK	35	19	27	8	54	63	8	54	14	76	63	1	42	15	58	71	7	37	0	44	S	99	0	0
2 HR AM	BUS	41	2	41	3	46	25	0	14	3	17	37	8	34	2	44	35	0	31	0	31	E	74	0	0
																						W	51	0	0
	TOTAL:	**1,883**	**386**	**1,426**	**113**	**1,925**	**1,748**	**439**	**1,589**	**403**	**2,431**	**2,100**	**46**	**1,577**	**378**	**2,001**	**1,920**	**120**	**1,156**	**18**	**1,294**				
16:00-18:00	CAR	1,796	438	1,408	187	2,033	1,974	356	1,743	375	2,474	1,992	44	1,423	387	1,854	2,379	194	1,554	32	1,780	N	57	0	0
	TRK	37	10	28	2	40	34	9	32	12	53	31	0	16	9	25	55	3	36	0	39	S	104	0	0
2 HR PM	BUS	39	1	39	0	40	30	0	14	0	14	37	16	37	3	56	38	0	34	0	34	E	104	0	0
																						W	82	1	0
	TOTAL:	**1,872**	**449**	**1,475**	**189**	**2,113**	**2,038**	**365**	**1,789**	**387**	**2,541**	**2,060**	**60**	**1,476**	**399**	**1,935**	**2,472**	**197**	**1,624**	**32**	**1,853**				
07:30-18:00	CAR	6,029	1,468	4,682	577	6,727	5,971	1,224	5,219	1,273	7,716	6,470	175	4,677	1,278	6,130	7,253	520	4,507	123	5,150	N	174	0	0
	TRK	172	57	134	21	212	207	35	183	62	280	194	3	111	50	164	269	21	162	3	186	S	328	1	0
8 HR SUM	BUS	144	4	144	3	151	101	0	57	3	60	146	41	141	9	191	131	2	118	0	120	E	302	0	0
																						W	222	1	0
	TOTAL:	**6,345**	**1,529**	**4,960**	**601**	**7,090**	**6,279**	**1,259**	**5,459**	**1,338**	**8,056**	**6,810**	**219**	**4,929**	**1,337**	**6,485**	**7,653**	**543**	**4,787**	**126**	**5,456**				

Total 8 Hour Vehicle Volume: 27,087

Total 8 Hour Bicycle Volume: 2

Total 8 Hour Intersection Volume: 27,089

Comment:

Printed On: 28 Nov, 2019 11:32:21AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT JANE ST (PX 905)

Survey Date: 2018-Apr-07 (Saturday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
08:30-09:30	CAR	431	121	331	48	500	456	83	392	125	600	592	16	429	115	560	533	38	297	17	352	N	9	0	0
	TRK	5	3	4	0	7	8	1	8	1	10	9	0	5	4	9	15	3	8	0	11	S	20	0	0
AM PEAK	BUS	12	0	12	0	12	8	0	5	0	5	14	3	14	1	18	10	0	9	0	9	E	23	0	0
																						W	8	0	0
	TOTAL:	**448**	**124**	**347**	**48**	**519**	**472**	**84**	**405**	**126**	**615**	**615**	**19**	**448**	**120**	**587**	**558**	**41**	**314**	**17**	**372**				
16:00-17:00	CAR	788	213	643	89	945	714	123	589	155	867	831	36	584	137	757	963	92	613	22	727	N	14	2	0
	TRK	7	1	6	1	8	4	1	3	0	4	2	0	2	1	3	6	0	4	0	4	S	34	0	0
PM PEAK	BUS	14	0	14	0	14	9	0	7	0	7	14	2	14	0	16	11	0	11	0	11	E	29	0	0
																						W	20	1	0
	TOTAL:	**809**	**214**	**663**	**90**	**967**	**727**	**124**	**599**	**155**	**878**	**847**	**38**	**600**	**138**	**776**	**980**	**92**	**628**	**22**	**742**				
OFF HR AVG	CAR	719	181	567	94	842	674	133	556	164	853	773	24	535	143	702	823	74	499	19	592	N	19	0	0
	TRK	10	2	6	1	9	8	3	6	2	11	7	1	4	3	8	11	1	6	1	8	S	22	1	0
	BUS	14	0	14	0	14	9	0	6	0	6	15	3	15	0	18	10	0	10	0	10	E	22	0	0
																						W	22	1	0
	TOTAL:	**743**	**183**	**587**	**95**	**865**	**691**	**136**	**568**	**166**	**870**	**795**	**28**	**554**	**146**	**728**	**844**	**75**	**515**	**20**	**610**				
07:30-09:30	CAR	752	210	583	58	851	756	145	672	213	1,030	995	26	716	203	945	939	66	526	24	616	N	26	0	0
	TRK	17	7	12	1	20	12	5	10	4	19	18	1	7	5	13	23	7	11	0	18	S	29	0	0
2 HR AM	BUS	25	0	25	0	25	16	0	11	0	11	27	5	27	1	33	17	0	16	0	16	E	24	0	0
																						W	22	0	0
	TOTAL:	**794**	**217**	**620**	**59**	**896**	**784**	**150**	**693**	**217**	**1,060**	**1,040**	**32**	**750**	**209**	**991**	**979**	**73**	**553**	**24**	**650**				
16:00-18:00	CAR	1,495	409	1,217	173	1,799	1,400	224	1,150	307	1,681	1,657	77	1,184	288	1,549	1,883	166	1,186	54	1,406	N	43	2	0
	TRK	13	2	11	2	15	7	2	5	3	10	9	0	6	2	8	10	0	6	0	6	S	65	0	0
2 HR PM	BUS	31	0	31	0	31	20	0	16	0	16	30	4	30	0	34	21	0	21	0	21	E	51	0	0
																						W	50	1	0
	TOTAL:	**1,539**	**411**	**1,259**	**175**	**1,845**	**1,427**	**226**	**1,171**	**310**	**1,707**	**1,696**	**81**	**1,220**	**290**	**1,591**	**1,914**	**166**	**1,213**	**54**	**1,433**				
07:30-18:00	CAR	5,122	1,343	4,066	608	6,017	4,850	901	4,045	1,174	6,120	5,743	197	4,041	1,064	5,302	6,116	528	3,709	155	4,392	N	143	3	0
	TRK	65	15	45	6	66	47	18	38	15	71	56	3	29	18	50	75	12	42	2	56	S	180	2	0
8 HR SUM	BUS	113	0	112	0	112	70	1	51	1	53	118	19	117	1	137	76	0	75	0	75	E	161	0	0
																						W	159	4	0
	TOTAL:	**5,300**	**1,358**	**4,223**	**614**	**6,195**	**4,967**	**920**	**4,134**	**1,190**	**6,244**	**5,917**	**219**	**4,187**	**1,083**	**5,489**	**6,267**	**540**	**3,826**	**157**	**4,523**				

Total 8 Hour Vehicle Volume: 22,451

Total 8 Hour Bicycle Volume: 9

Total 8 Hour Intersection Volume: 22,460

Comment:

Printed On: 28 Nov, 2019 11:32:21AM

City of Toronto - Traffic Safety Unit

Turning Movement Count Summary Report

EGLINTON AVE AT WESTON RD (PX 468)

Survey Date: 2019-Jun-19 (Wednesday)

Survey Type: Routine Hours

Time Period	Vehicle Type	NORTHBOUND Exits	Left	Thru	Right	Total	EASTBOUND Exits	Left	Thru	Right	Total	SOUTHBOUND Exits	Left	Thru	Right	Total	WESTBOUND Exits	Left	Thru	Right	Total		Peds	Bike	Other
07:30-08:30	CAR	369	167	236	37	440	611	105	542	186	833	675	32	451	60	543	594	38	367	28	433	N	39	1	0
	TRK	41	27	21	1	49	63	10	55	38	103	75	7	31	5	43	72	6	40	10	56	S	53	4	0
AM PEAK	BUS	25	0	22	0	22	15	1	15	0	16	24	0	19	2	21	16	5	14	2	21	E	44	5	0
																						W	118	2	0
	TOTAL:	**435**	**194**	**279**	**38**	**511**	**689**	**116**	**612**	**224**	**952**	**774**	**39**	**501**	**67**	**607**	**682**	**49**	**421**	**40**	**510**				
16:45-17:45	CAR	565	211	431	19	661	563	80	508	236	824	679	36	354	136	526	991	89	644	54	787	N	62	6	0
	TRK	62	21	47	0	68	53	11	48	30	89	60	5	26	8	39	73	4	44	4	52	S	87	3	0
PM PEAK	BUS	21	0	17	0	17	14	0	14	0	14	17	0	13	0	13	15	4	15	4	23	E	84	0	0
																						W	125	2	0
	TOTAL:	**648**	**232**	**495**	**19**	**746**	**630**	**91**	**570**	**266**	**927**	**756**	**41**	**393**	**144**	**578**	**1,079**	**97**	**703**	**62**	**862**				
OFF HR AVG	CAR	343	160	224	19	403	446	70	378	160	608	415	49	239	69	357	510	16	281	49	346	N	45	2	0
	TRK	36	26	24	3	53	57	7	48	25	80	57	6	29	4	39	63	3	33	5	41	S	59	2	0
	BUS	15	0	11	0	11	12	1	12	1	14	17	0	12	2	14	14	4	12	3	19	E	65	2	0
																						W	69	1	0
	TOTAL:	**394**	**186**	**259**	**22**	**467**	**515**	**78**	**438**	**186**	**702**	**489**	**55**	**280**	**75**	**410**	**587**	**23**	**326**	**57**	**406**				
07:30-09:30	CAR	818	341	529	58	928	1,156	223	1,023	362	1,608	1,212	75	791	113	979	1,150	59	696	66	821	N	87	4	0
	TRK	73	41	36	2	79	119	20	105	65	190	133	12	57	6	75	116	11	69	17	97	S	123	10	0
2 HR AM	BUS	61	1	51	0	52	29	4	28	1	33	45	1	36	3	40	34	8	30	6	44	E	108	5	0
																						W	210	6	0
	TOTAL:	**952**	**383**	**616**	**60**	**1,059**	**1,304**	**247**	**1,156**	**428**	**1,831**	**1,390**	**88**	**884**	**122**	**1,094**	**1,300**	**78**	**795**	**89**	**962**				
16:00-18:00	CAR	1,110	405	831	34	1,270	1,124	163	1,005	457	1,625	1,246	85	659	258	1,002	1,928	130	1,265	116	1,511	N	132	13	0
	TRK	123	42	88	0	130	102	25	91	46	162	101	11	48	11	70	152	7	99	10	116	S	196	4	0
2 HR PM	BUS	35	0	28	0	28	28	0	28	0	28	34	0	27	1	28	29	7	28	7	42	E	192	0	0
																						W	226	5	0
	TOTAL:	**1,268**	**447**	**947**	**34**	**1,428**	**1,254**	**188**	**1,124**	**503**	**1,815**	**1,381**	**96**	**734**	**270**	**1,100**	**2,109**	**144**	**1,392**	**133**	**1,669**				
07:30-18:00	CAR	3,300	1,386	2,254	168	3,808	4,063	667	3,539	1,459	5,665	4,116	356	2,404	647	3,407	5,119	253	3,086	379	3,718	N	397	26	0
	TRK	341	186	221	15	422	449	74	389	210	673	459	45	219	31	295	518	30	301	46	377	S	554	20	0
8 HR SUM	BUS	156	1	122	0	123	106	9	105	3	117	141	1	109	13	123	119	29	105	25	159	E	558	11	0
																						W	712	14	0
	TOTAL:	**3,797**	**1,573**	**2,597**	**183**	**4,353**	**4,618**	**750**	**4,033**	**1,672**	**6,455**	**4,716**	**402**	**2,732**	**691**	**3,825**	**5,756**	**312**	**3,492**	**450**	**4,254**				

Total 8 Hour Vehicle Volume: 18,887

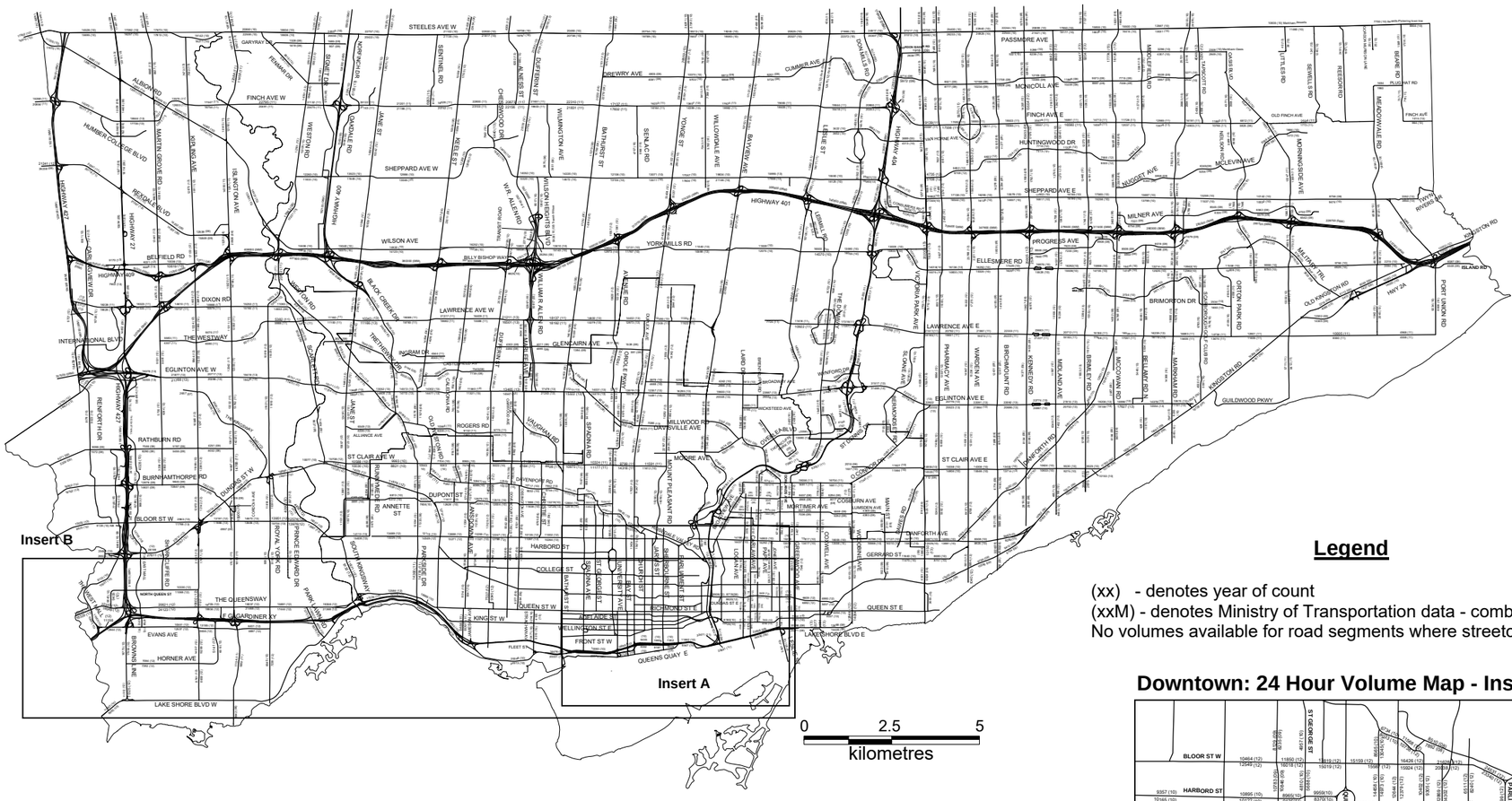
Total 8 Hour Bicycle Volume: 71

Total 8 Hour Intersection Volume: 18,958

Comment:

Printed On: 28 Nov, 2019 11:34:04AM

Average Weekday , 24 Hour Traffic Volume, (Most Recent Counts from 2005-2013)

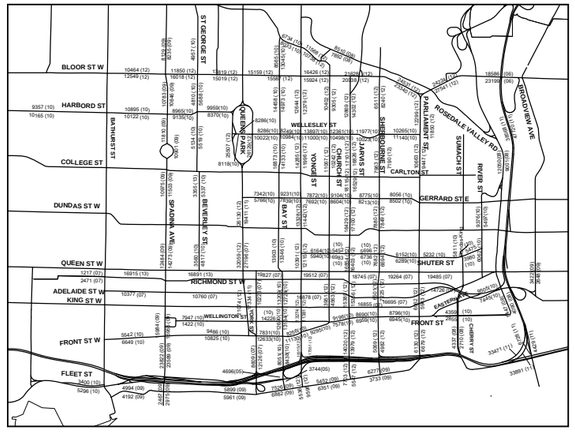


F.G. Gardiner Expressway: 24 Hour Volume 2005- 2013 - Insert B

Legend

(xx) - denotes year of count
(xxM) - denotes Ministry of Transportation data - combined directional volume
No volumes available for road segments where streetcars exist

Downtown: 24 Hour Volume Map - Insert A

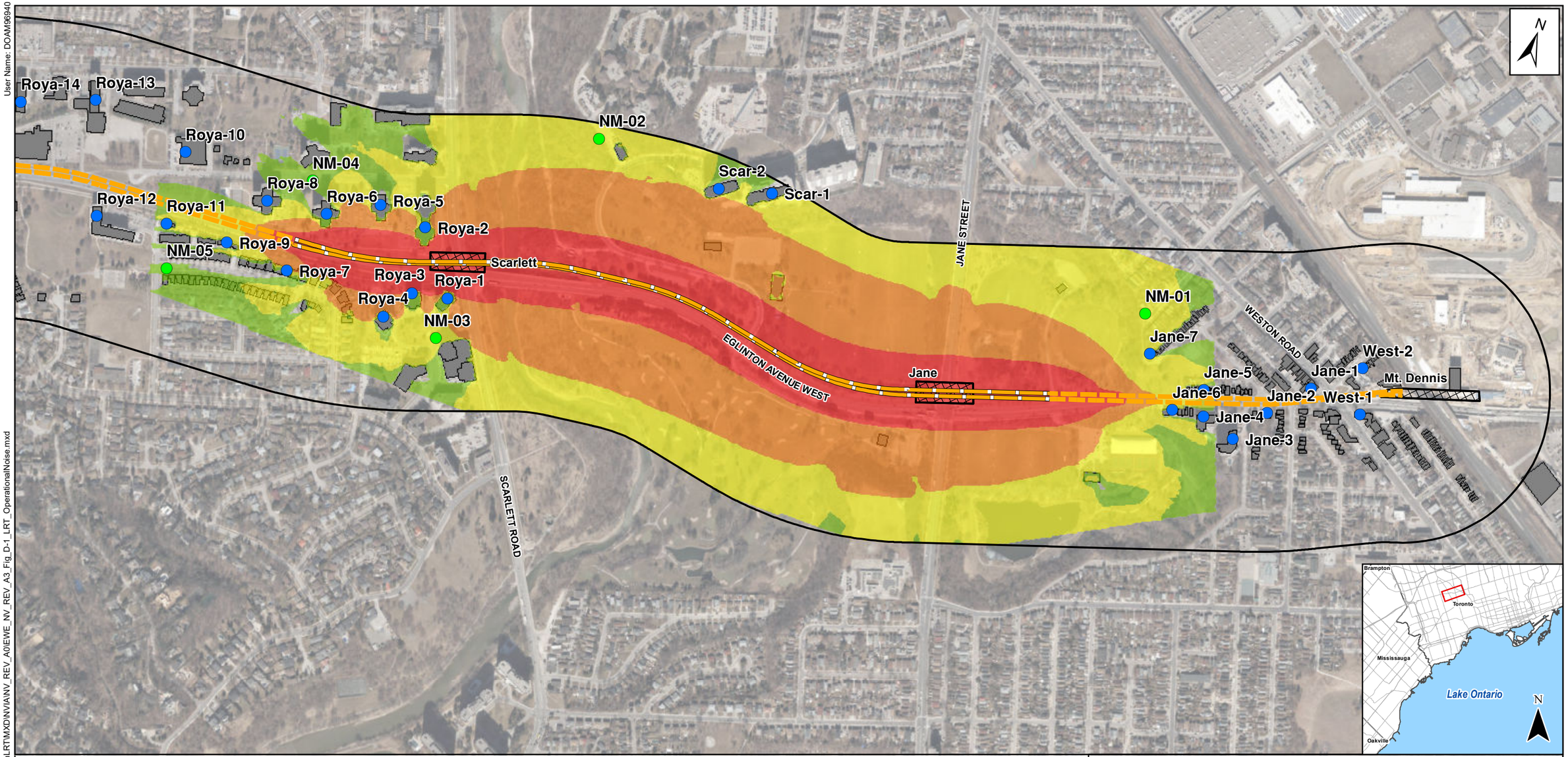


TORONTO

Transportation Services
Traffic Safety Unit
2013-9-30

Appendix D

Noise Models



Legend

- Receivers
- Noise Monitors
- **Alignment**
- Above ground
- Underground
- Station Site
- Study Area - 300m
- Buildings

LRT Daytime Noise Contours (dBA)

<45 | 45 - 50 | 50 - 55 | 55 - 60 | >60

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Noise Contours show anticipated LRT noise during daytime operations.
2. Contours plot height 4.5-meters relative to ground.
3 Vertical grade is approximate.
4. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment LRT Daytime Noise Contours**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 0	**Review:**	**Figure:** D-1	**Page:** 1 of 2

User Name: DOAM96940

Document Path: T:\Maps\GIS_Data\Metrolinx\EglintonLRT\MXD\NV\ANV_REV_A0\EWE_NV_REV_A3_Fig_D-1_LRT_OperationalNoise.mxd

User Name: DOAM96940

CONVAIR DRIVE

HIGHWAY 401

HIGHWAY 401 COLLECTOR

HIGHWAY 427

MATHESON BOULEVARD

CITATION PLACE

Renforth

EGLINTON AVENUE EAST

EGLINTON AVENUE WEST

RENFORTH DRIVE

THE EAST MALL

Renf-3

Renf-2

Renf-1

427-4

NM-14

Renf-4

Comm-4

Comm-1

Comm-2

NM-15

Comm-3

Brampton

Toronto

Mississauga

Lake Ontario

Oakville

N

Legend

- Receivers
- Noise Monitors
- Station Site
- Study Area - 300m
- Buildings

Alignment

- Above ground
- Underground

LRT Daytime Noise Contours (dBA)

<45 | 45 - 50 | 50 - 55 | 55 - 60 | >60

DATA SOURCES:

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2. ESRI - Basemap.

NOTES:

1. Noise Contours show anticipated LRT noise during daytime operations.
2. Contours plot height 4.5-meters relative to ground.
3 Vertical grade is approximate.
4. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment LRT Daytime Noise Contours**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 0	**Review:**	**Figure:** D-1	**Page:** 2 of 2

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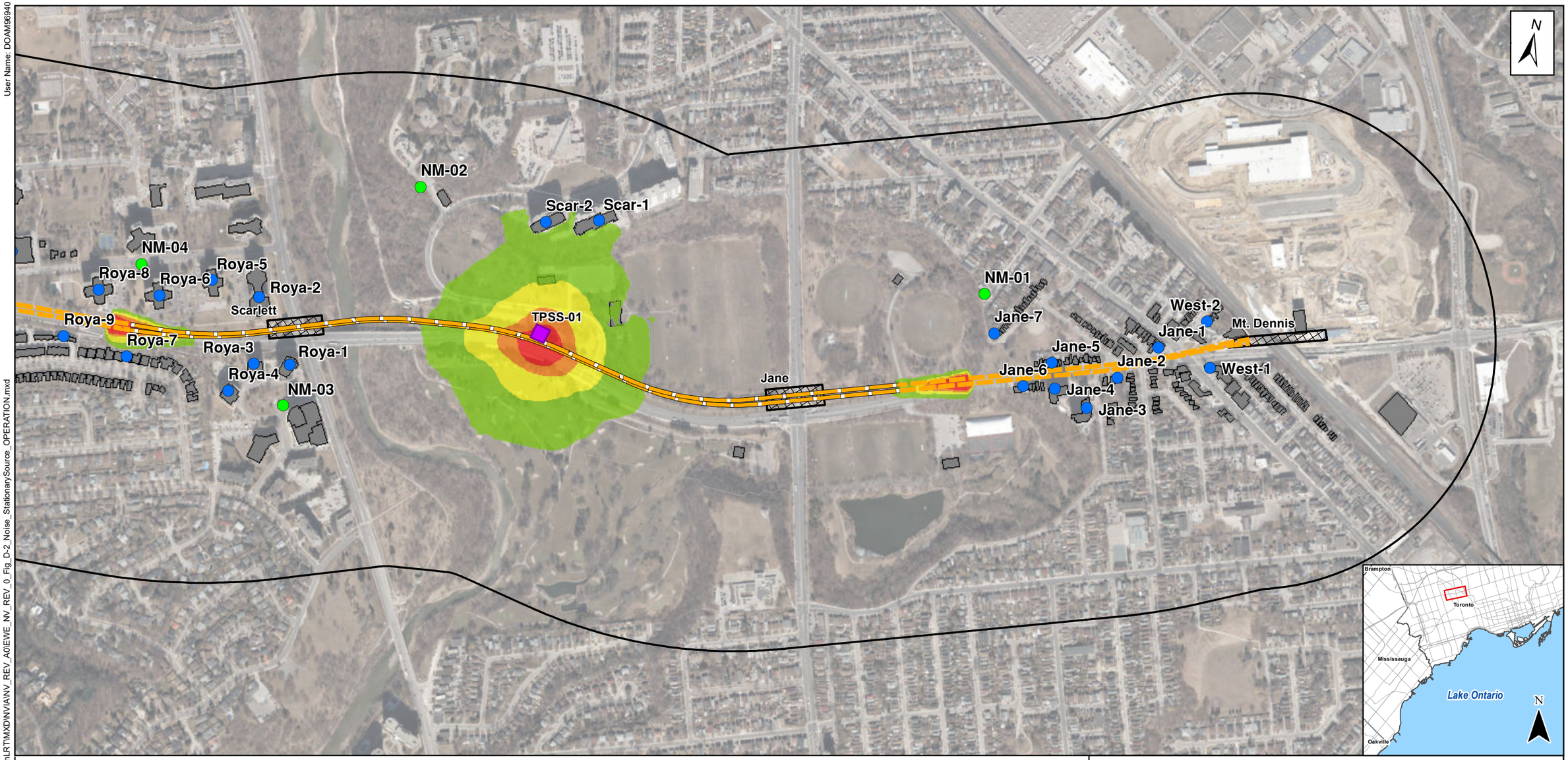

Legend

- Receivers
- Noise Monitors

Alignment

- Above Ground
- Underground

- Study Area - 500 m
- Station Site
- Buildings
- TPSS

Stationary Source Noise contours - Mitigated (dBA)

<40 | 40 - 45 | 45 - 50 | 50 - 55 | >55

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Noise Contours show anticipated stationary noise during daytime operations.
2. Contours plot height 4.5-meters relative to ground.
3 Vertical grade is approximate.
4. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment Stationary Source Noise Contours**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 0	**Review:**	**Figure:** D-2	**Page:** 1 of 4

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User Name: DOAM96940

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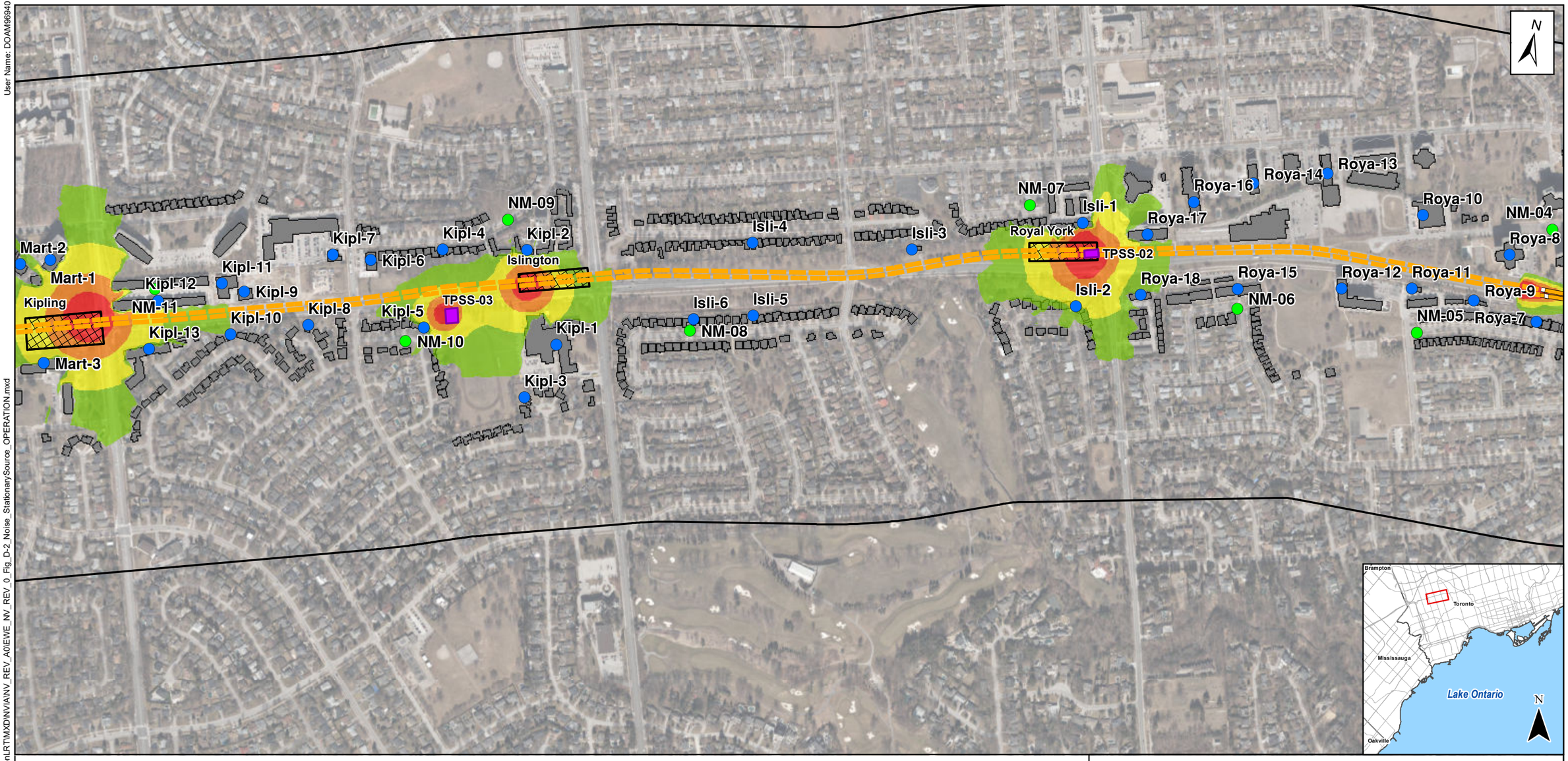

Legend

- Receivers
- Noise Monitors
- **Alignment**
  - Above Ground
  - Underground
- Study Area - 500 m
- Station Site
- Buildings
- TPSS

Stationary Source Noise contours - Mitigated (dBA)

<40 | 40 - 45 | 45 - 50 | 50 - 55 | >55

DATA SOURCES:

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2. ESRI - Basemap.

NOTES:

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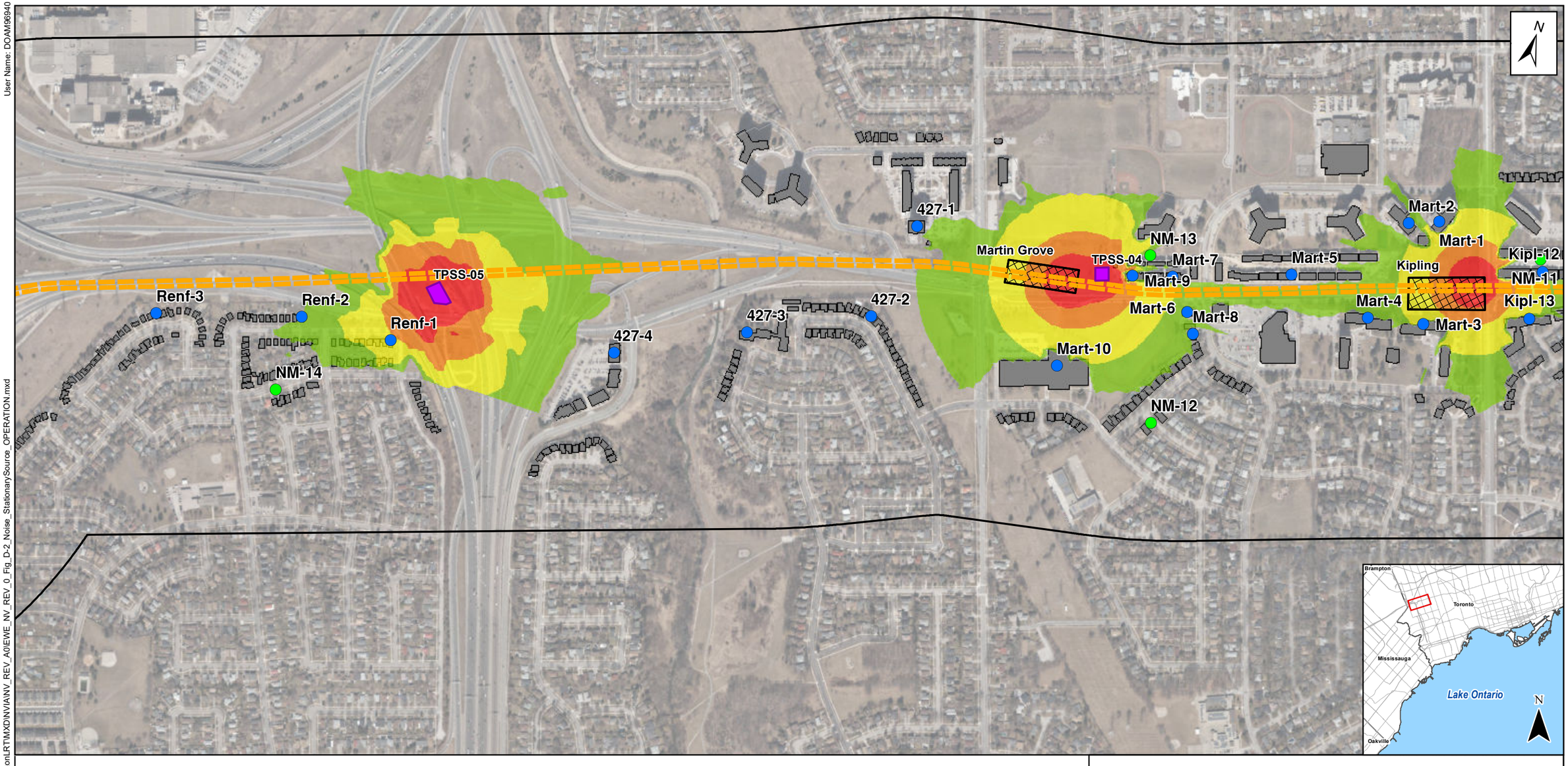
4. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment Stationary Source Noise Contours**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 0	**Review:**	**Figure:** D-2	**Page:** 2 of 4



Legend

- Receivers
- Noise Monitors

Alignment

- Above Ground
- Underground
- Study Area - 500 m
- Station Site
- Buildings
- TPSS

Stationary Source Noise contours - Mitigated (dBA)

<40 | 40 - 45 | 45 - 50 | 50 - 55 | >55

DATA SOURCES:

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4. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment Stationary Source Noise Contours**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 0	**Review:**	**Figure:** D-2	**Page:** 3 of 4

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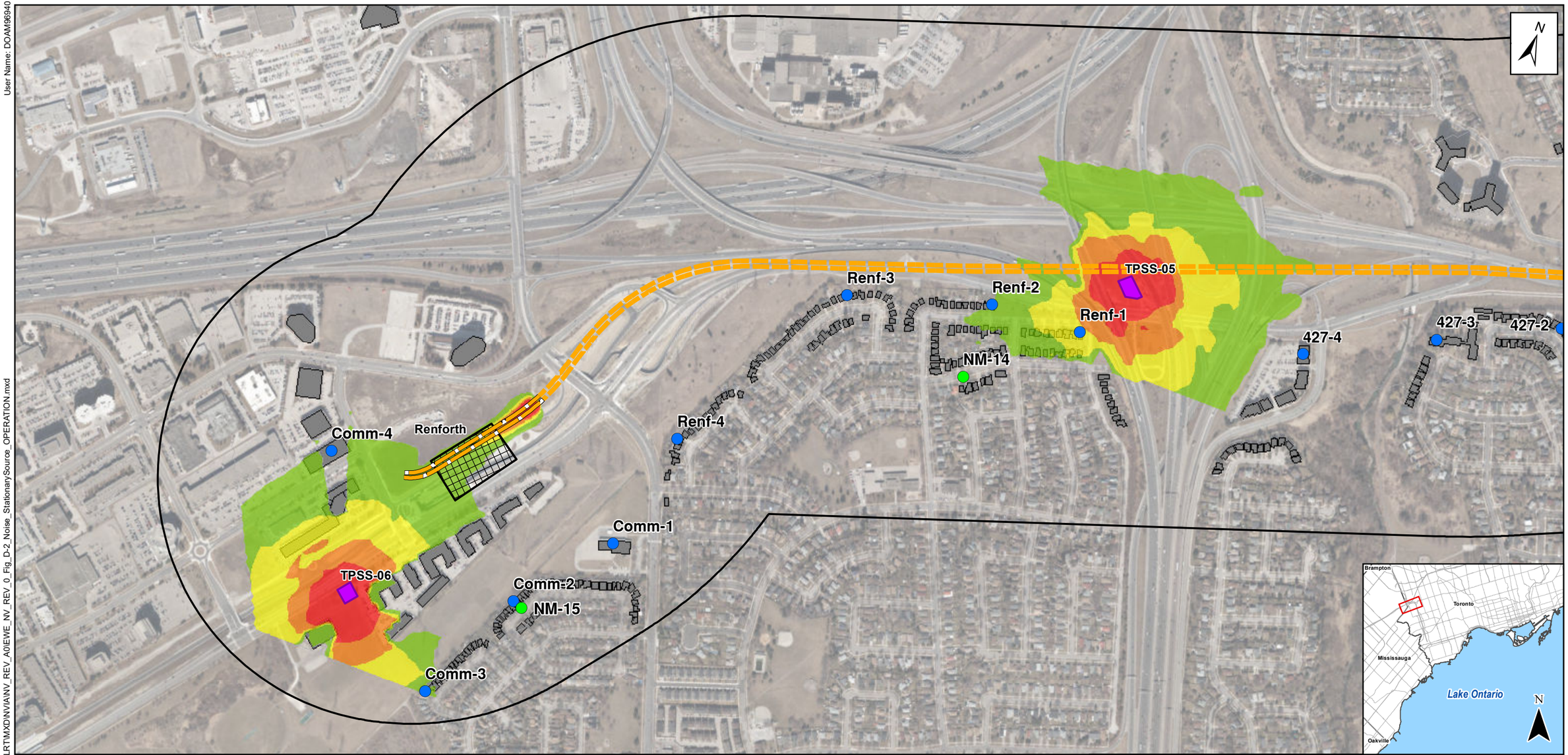

Legend

- Receivers
- Noise Monitors

Alignment

- Above Ground
- Underground
- Study Area - 500 m
- Station Site
- Buildings
- TPSS

Stationary Source Noise contours - Mitigated (dBA)

<40 | 40 - 45 | 45 - 50 | 50 - 55 | >55

DATA SOURCES:

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2. ESRI - Basemap.

NOTES:

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2. Contours plot height 4.5-meters relative to ground.
3 Vertical grade is approximate.
4. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**
Figure Title:	**Noise Impact Assessment Stationary Source Noise Contours**
Prepared By:	4TRANSIT PARSONS HATCH WSP
Date:	**April 13, 2020**
Version: 0	**Review:**
Figure:	**D-2**
Page:	**4 of 4**

User Name: DOAM96940

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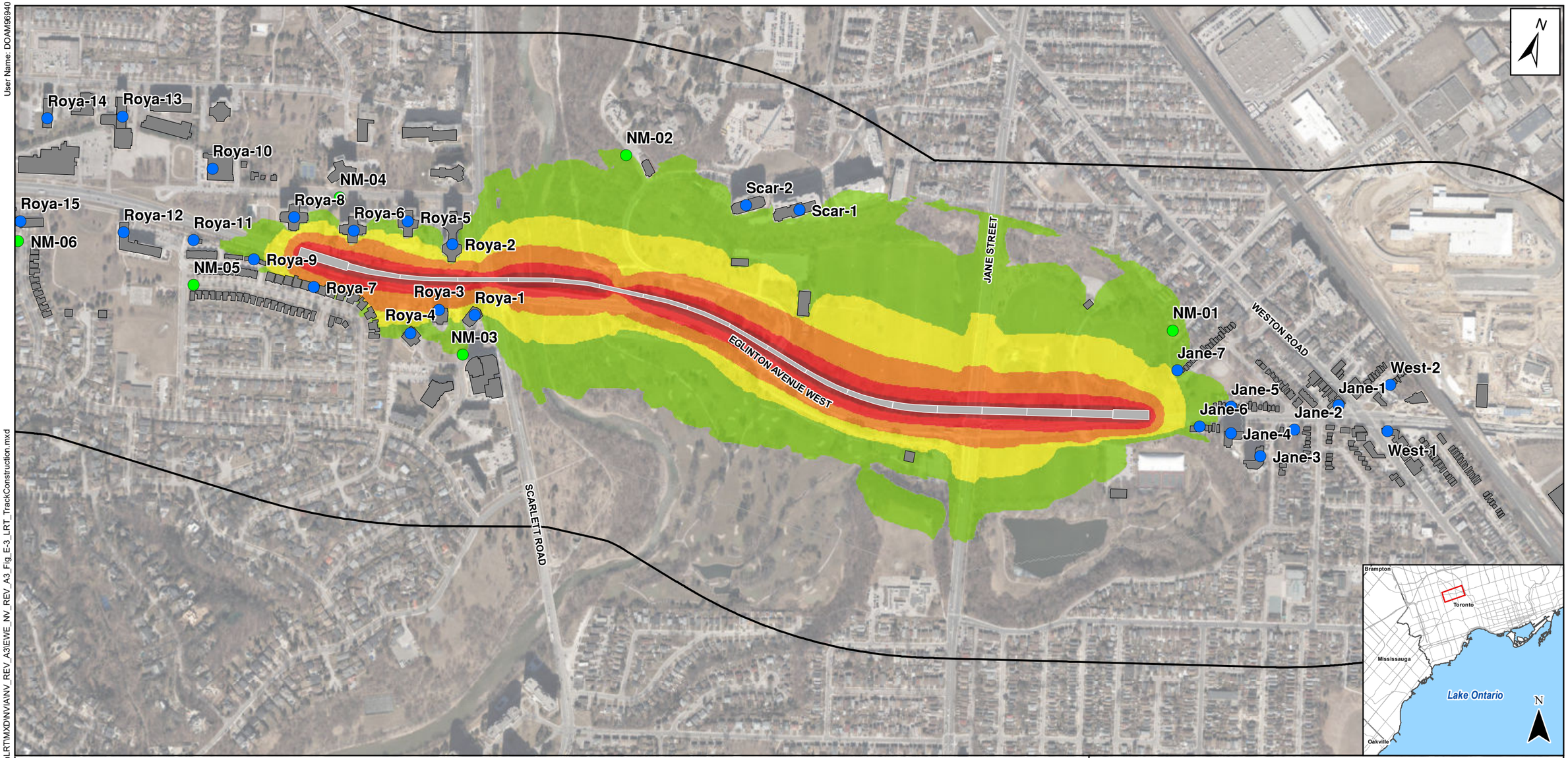

Legend

- Receivers
- Noise Monitors
- Track Construction Areas
- Buildings
- Study Area - 500 m

Construction Contours (dBA)

<60 | 60 - 65 | 65 - 70 | 70 - 75 | 75 - 80 | >80

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Contours plot height 4.5-meters relative to ground.
2. Vertical grade is approximate.
3. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment Track Construction**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**March 30, 2020**
Version: 1-1	**Review:**	**Figure:** D-3	**Page:** 1 of 2

User Name: DOAM96940

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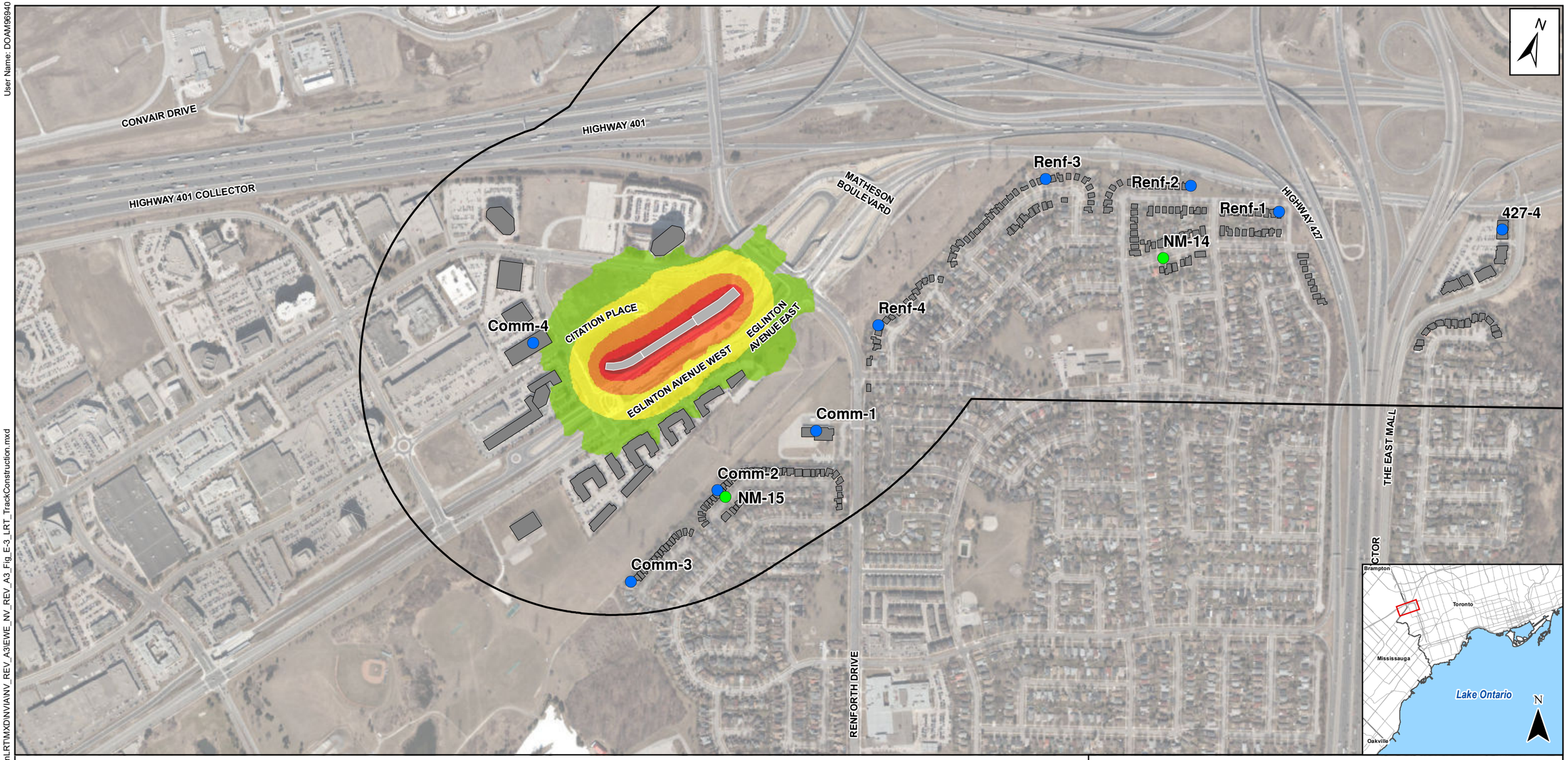


Legend

- Receivers
- Noise Monitors
- Track Construction Areas
- Buildings
- Study Area - 500 m

Construction Contours (dBA)

<60 | 60 - 65 | 65 - 70 | 70 - 75 | 75 - 80 | >80

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

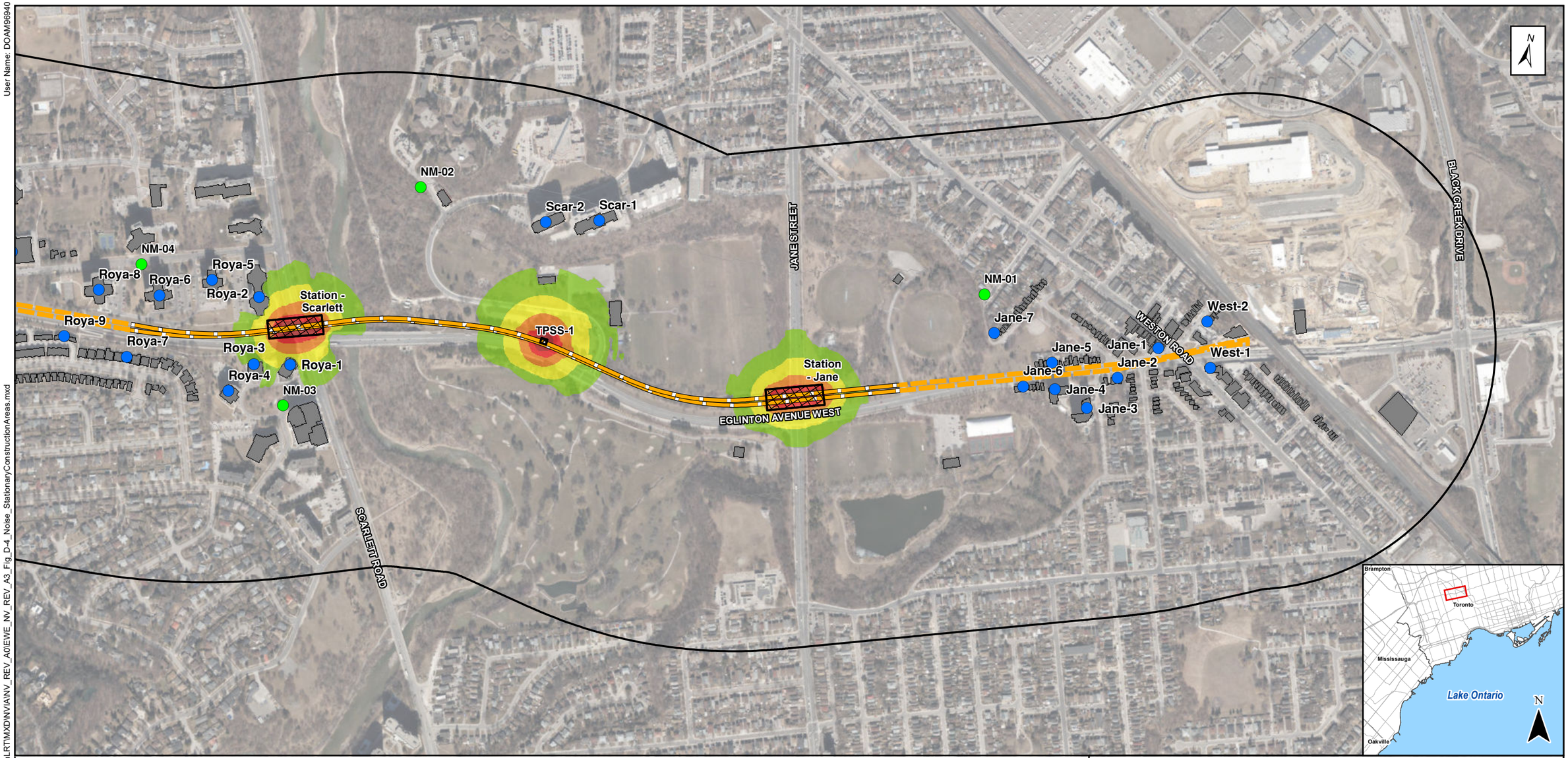
NOTES:

1. Contours plot height 4.5-meters relative to ground.
2. Vertical grade is approximate.
3. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment Track Construction**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**March 30, 2020**
Version: 1-1	**Review:**	**Figure:** D-3	**Page:** 2 of 2



Legend

- Receivers
- Noise Monitors

Alignment

- Above ground
- Underground
- Study Area - 500m
- Construction Sites
- Buildings

Stationary Construction Contours (dBA)

<60 | 60 - 65 | 65 - 70 | 70 - 75 | 75 - 80 | >80

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Contours plot height 4.5-meters relative to ground.
2. Vertical grade is approximate.
3. Datum: NAD83 CSRS; Projeciton: MTM 10.

0 100 200 400 Meters

1:8,000

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Noise Impact Assessment Stationary Source Construction**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** D-4	**Page:** 1 of 4

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Legend

- Receivers
- Noise Monitors

Alignment

- Above ground
- Underground
- Study Area - 500m
- Construction Sites
- Buildings

Stationary Construction Contours (dBA)

<60 | 60 - 65 | 65 - 70 | 70 - 75 | 75 - 80 | >80

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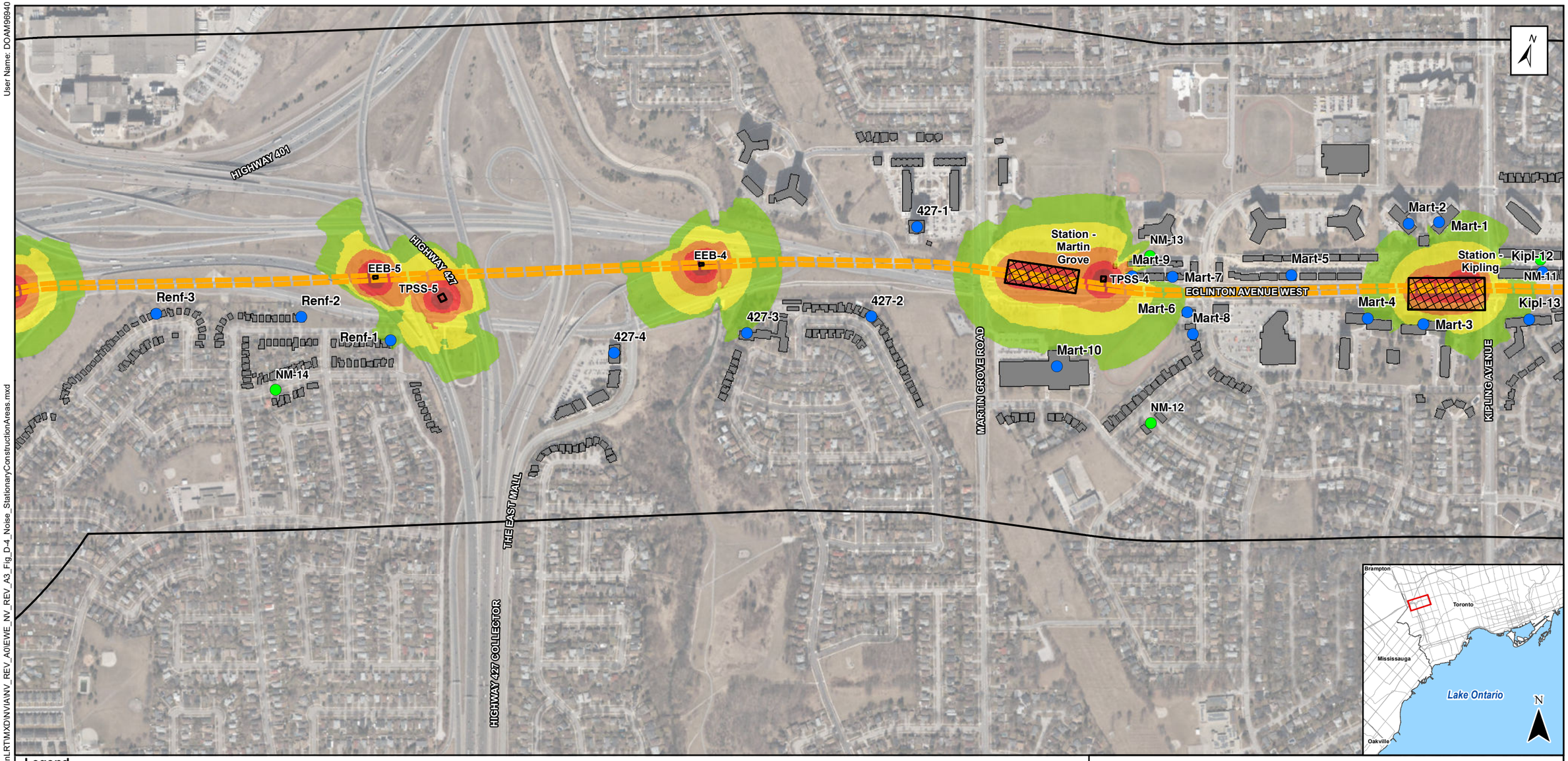

Legend

- Receivers
- Noise Monitors

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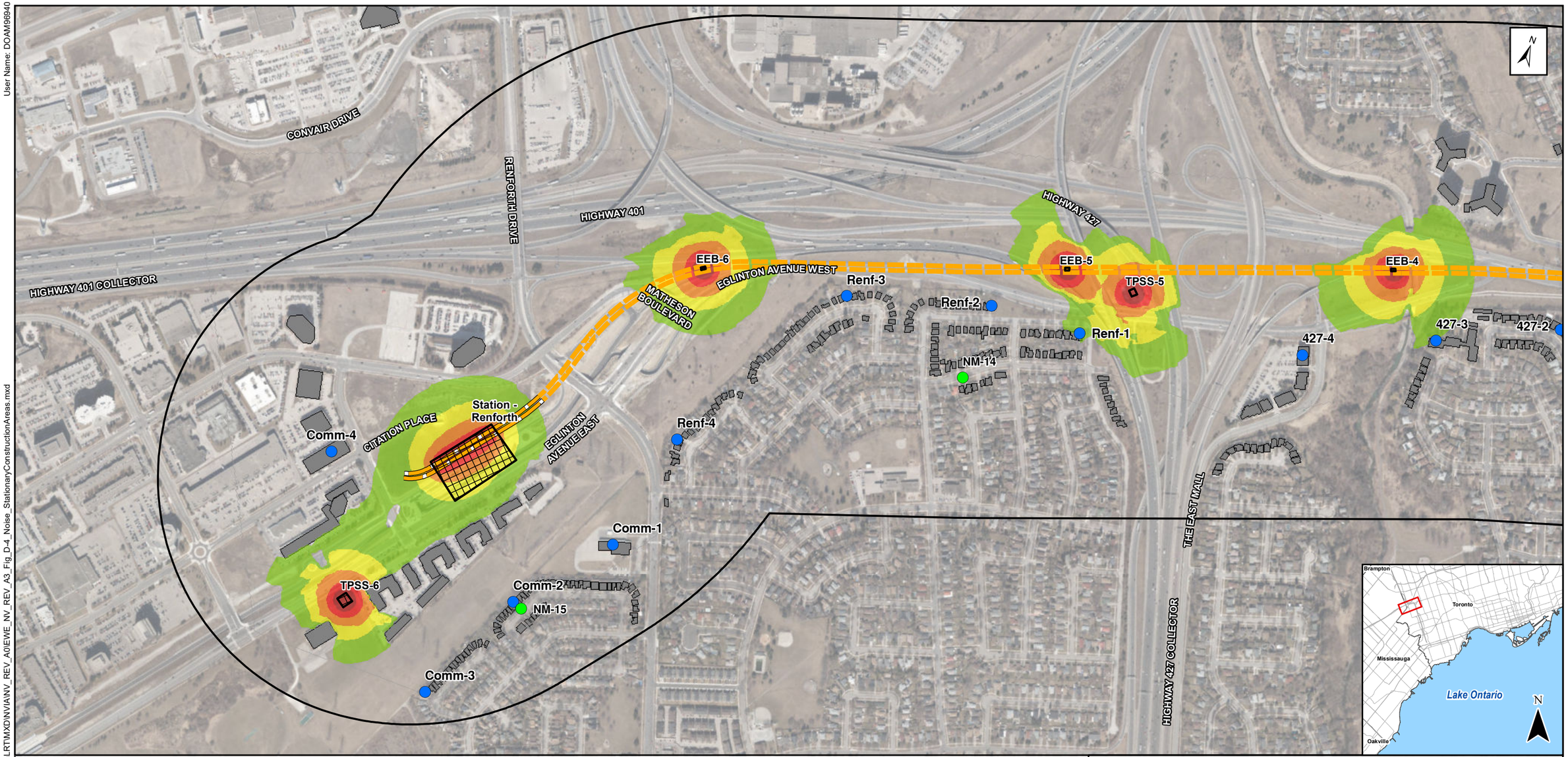

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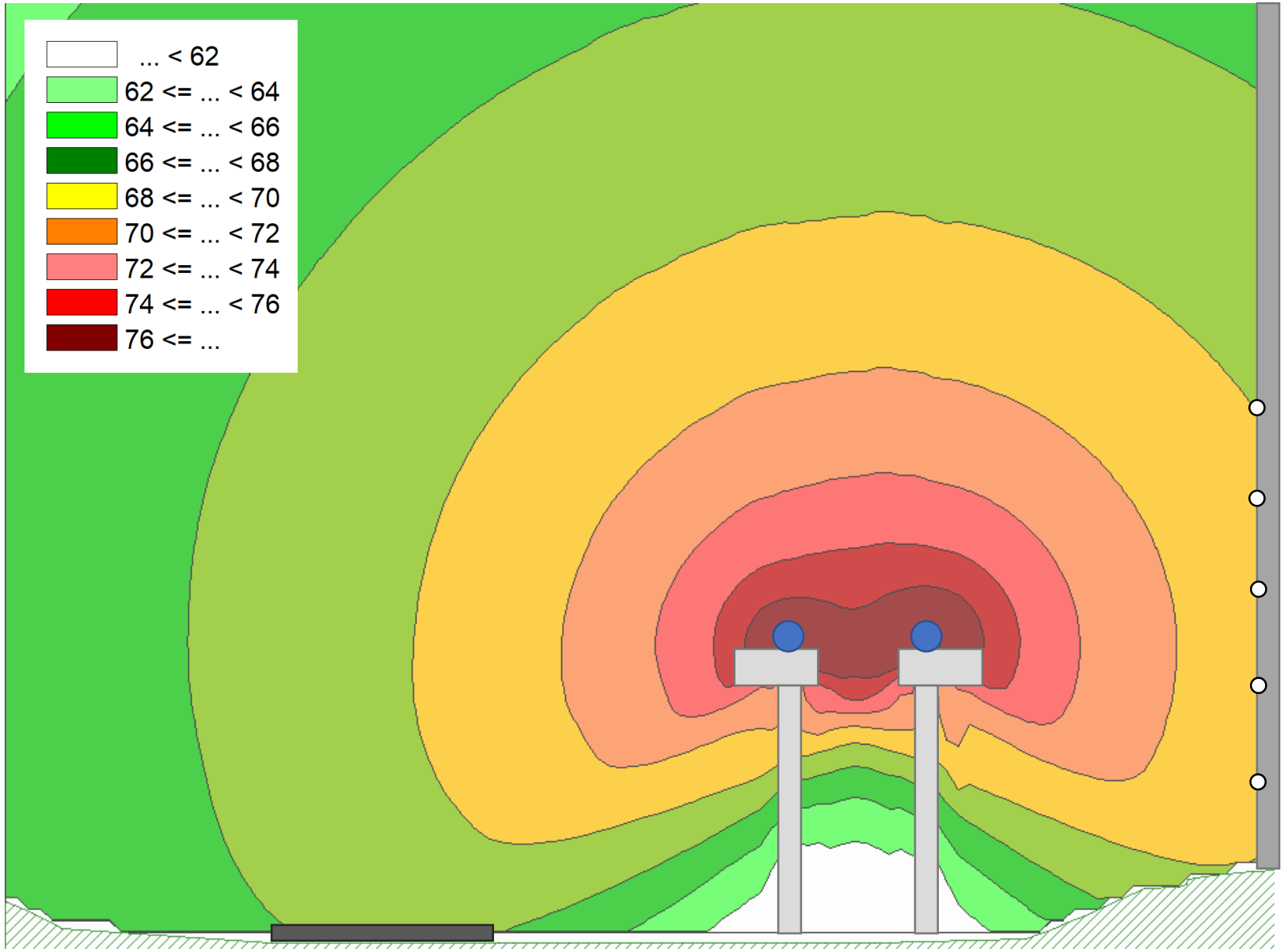


2031 Noise Levels (dBA)

	Day	Night
Ambient	65.4	57.6
Project	68.0	59.7
Ambient	65.4	57.6
Project	68.4	60.1
Ambient	65.4	57.6
Project	68.6	60.3
Ambient	65.4	57.6
Project	68.6	60.3
Ambient	65.4	57.6
Project	68.3	60.1

General Noise Assement

CALCULATION

Input Data

Number of train passbys during the day (7am to 11 pm) and night (11 pm to 7am)

Daytime_number_of_trains := 448 Nighttime_number_of_trains := 40

Daytime_hours := 16 Nighttime_hours := 8

Number of vehicles per train (daily average if this number varies)

Cars_Per_Train := 3

Sound Elevation Level References for Train (Table D-1)

$SEL_{LRT} := 80$

Speed of Trains (mph)

Speed := 50

Track Adjustment, +4 for aerial structure

$Adj_{track} := 4$

Determination of Noise Exposure at 50 feet from Track

1. Determine average hourly daytime and nighttime volumes of train traffic.
   Daytime (7am - 11pm)

$$V_d := \frac{Daytime\_number\_of\_trains}{Daytime\_hours} = 28 \qquad V_n := \frac{Nighttime\_number\_of\_trains}{Nighttime\_hours} = 5$$

2. Calculate Leq(day) and Leq(night)

Equation for locomotive Leq changes depending on presence of warning horns. See Table D-3

$$L_{eqLRTDay.50} := SEL_{LRT} + 10\log(Cars\_Per\_Train) + 20\cdot\log\left(\frac{Speed}{50}\right) + 10\log(V_d) - 35.6 + Adj_{track} = 67.6$$

$$L_{eqLRTNight.50} := SEL_{LRT} + 10\log(Cars\_Per\_Train) + 20\cdot\log\left(\frac{Speed}{50}\right) + 10\log(V_n) - 35.6 + Adj_{track} = 60.2$$

COMPUTATION OF NOISE EXPOSURE-VS.-DISTANCE CURVES

Select the appropriate distance correctionequation from Table D-2
and apply Distance Corrections to the noise exposure at 50 feet.

Correction Curve Amount, dB, from Table D-2

$D_{SourceReceptor} := 100ft$

$$C_{value} := -15 \cdot \log\left(\frac{D_{SourceReceptor}}{50 \cdot ft}\right)$$

$L_{eqLRTDay.100} := L_{eqLRTDay.50} + C_{value} = 63.1$

$L_{eqLRTNight.100} := L_{eqLRTNight.50} + C_{value} = 55.6$

COMPARISON TO CADNAA RESULTS

Name	ID	Level Lr	
		Day	Night
		(dBA)	(dBA)
Check (50 ft)	Check (50 ft)	67.6	59.4
Check (100 ft)	Check (100 ft)	63.4	55.1

$L_{eqLRTDay.50} = 67.6$ $L_{eqLRTNight.50} = 60.2$

$L_{eqLRTDay.100} = 63.1$ $L_{eqLRTNight.100} = 55.6$

All CadnaA model values are within 1 dB of hand-calculated values which is considered acceptable.

Appendix

Table D-1: Reference Sound Exposure Level's at 50 feet from Track and 50 mph

Source / Type		Reference Conditions	Reference SEL (SEL_{ref}), dBA
Commuter Rail, At-Grade	Locomotives	Diesel-electric, 3000 hp, throttle 5	92
		Electric	90
	Diesel Multiple Unit (DMU)	Diesel-powered, 1200 hp	85
	Horns	Within ¼ mile of grade crossing	110
	Cars	Ballast, welded rail	82
Rail Transit		At-grade, ballast, welded rail	82
Transit whistles / warning devices		Within 1/8 mile of grade crossing	93
AGT	Steel wheel	Aerial, concrete, welded rail	80
	Rubber Tire	Aerial, concrete guideway	78
Monorail		Aerial straddle beam	82
Maglev		Aerial, open guideway	72

Figure D-2: Correction Factor for distances greater than 50 ft

Source	Equation	
Stationary Sources	$C_{distance} = -25\log(\frac{D}{50})$	**Eq. 4-18**
Fixed-guideway and Highway	$C_{distance} = -15\log(\frac{D}{50})$	**Eq. 4-19**
D = distance, ft		

Table D-3 Computation of Existing Noise Exposure at 50 feet for Fixed-Gideway General Assessment

LOCOMOTIVES† Hourly L_{eq} at 50 ft:	$L_{eqL}(h) = SEL_{ref} + 10\log(N_{locos}) + K\log\left(\frac{S}{50}\right) + 10\log(V) - 35.6$ Where K = -10 for passenger diesel; = 0 for DMU; = +10 for electric
LOCOMOTIVE WARNING HORNS††† Hourly L_{eq} at 50 ft:	$L_{eqH}(h) = SEL_{ref} + 10\log(V) - 35.6$
RAIL VEHICLES†† Hourly L_{eq} at 50 ft:	$L_{eqC}(h) = SEL_{ref} + 10\log(N_{cars}) + 20\log\left(\frac{S}{50}\right) + 10\log(V) - 35.6$ use the following adjustments as applicable: + 5 → JOINTED TRACK + 3 → EMBEDDED TRACK ON GRADE + 4 → AERIAL STRUCTURE WITH SLAB TRACK (except AGT & monorail) - 5 → if a NOISE BARRIER blocks the line of sight
TRANSIT WARNING HORNS††† Hourly L_{eq} at 50 ft:	$L_{eqH}(h) = SEL_{ref} - 10\log\left(\frac{S}{50}\right) + 10\log(V) - 35.6$
COMBINED Hourly L_{eq} at 50 ft:	$L_{eq}(h) = 10\log\left[10^{\left(L_{eqL}/10\right)} + 10^{\left(L_{eqC}/10\right)}\right]$
Daytime L_{eq} at 50 ft:	$L_{eq}(day) = L_{eq}(h)\big\vert\ v = v_d$
Nighttime L_{eq} at 50 ft:	$L_{eq}(night) = L_{eq}(h)\big\vert\ v = v_n$
L_{dn} at 50 ft:	$L_{dn} = 10\log\left[(15)\times10^{\left(L_{eq}(day)/10\right)} + (9)\times10^{\left(L_{eq}(night)+10/10\right)}\right] - 13.8$

N_{locos} = average number of locomotives per train

N_{cars} = average number of cars per train

S = train speed, in miles per hour

V = average hourly volume of train traffic, in trains per hour

V_d = average hourly daytime volume of train traffic, in trains per hour

$= \frac{number\ of\ trains, 7\ am\ to 10\ pm}{15}$

V_n = average hourly nighttime volumes of train traffic, in trains per hour

$= \frac{number\ of\ trains, 10\ pm\ to 7\ am}{9}$

† Assumes a passenger diesel locomotive power rating at approximately 3000 hp
†† Includes all commuter rail cars, transit cars, AGT and monorail
††† Based on FRA's horn noise model (www.fra.dot.gov/downloads/RRDev/hornmodel.xls)

Appendix E

Vibration Models

E.1 Operational Ground-Borne Vibration and Noise Sample Calculation

The vibration limit specified by the TTC Protocol is 0.1 mm/s RMS. However, the FTA Vibration model is employed to assess vibrations, and the FTA Vibration model uses limits with respect to VdB (re: $1x10^{-6}$ in/sec). To maintain consistency with the FTA General Vibration Assessment, the 0.1 mm/s RMS TTC limit is converted to vibration decibel (VdB) units with a reference value of $1x10^{-6}$ in/sec.

$$20\log\left[\frac{(0.1\ \text{mm/sec})}{(10^{-6}\ \text{in/sec})\left(\frac{25.4\ \text{mm}}{1\ \text{in}}\right)}\right] = 72\ \text{VdB}$$

Therefore, the 0.1 mm/s RMS limit is equivalent to 72 VdB (re: $1x10^{-6}$ in/sec). All vibration decibel units presented in this section are referenced to $1x10^{-6}$ in/sec.

A calculation is completed for the 101+700 chainage as a sample. The remaining calculations are completed in a spreadsheet using the same process. Table E-1 contains relevant attributes of the sample chainage section.

Table E-1: Attributes of Sample Chainage Section 101+700

Attribute	Value
Chainage	101+700
Segment	Bored Tunnel
Eastbound Land Use (Southside)	Residential
Westbound Land Use (Northside)	Residential
Ground Level	148 m
Track Level	130 m
Track Adjustments	Welded, no special trackwork
Train speed	80 km/hr (50 mph)

Given the attributes above and conservative assumptions, the source adjustment factors shown in Table E-2 are applied based on Table 6-11 and Table 6-12 in the FTA Manual [R-2]. The same methodology is applied to every chainage along the line considering local conditions and their affect on adjustment factors.

Table E-2: Source Adjustment Factors of Sample Chainage Section 101+700

Adjustment Factor	Value [dB]	Reason
Speed	0	Speed equals reference speed.
Vehicle Parameters	0	Assume no stiff suspension or wheel flats.
Track Conditions	0	Tracks are welded with no special trackwork and adequate maintenance is assumed.
Structure Type	0	Cut and cover tunnel.
Geologic Conditions	+10	Efficient propagation assumed for conservatism.
Coupling	-7	1-2 storey masonry coupling due to nearby residences.

The methodology used in this assessment applies the adjustments to the vibration limit in order to develop a vibration limit contour across the track length.

$$\text{Effective Vibration Limit} = 72\ \text{VdB} - (+10\ \text{dB} - 7\ \text{dB}) = 75\ \text{VdB}$$

The ground-borne vibration at chainage 101+700 is converted to ground-borne noise with a noise limit of 35 dB (re: 20x10^{-6} Pa). An adjustment of 35 dB is applied considering mid-frequency (peak 30 Hz to 60 Hz) for soil with high clay content.

$$\text{Effective Noise Limit } = 35\ \text{dB} - (-35\ \text{dB}) = 70\ \text{dB}$$

Using the FTA base propagation curve (below), the vibration contour distance from the track centreline, D, is determined to be 25 m and the noise contour distance is 31 m.

$$L_v = 85.88 - 1.06\log(D) - 2.32\log(D)^2 - 0.87\log(D)^3 \qquad \text{[R-2]}$$

Where, L_v is the velocity level in VdB and D is distance in feet.

The closest receptor to the track along this chainage section is 54 m, so no receptors surpass the 0.1 mm/s vibration limit or the 35 dB ground-borne noise limit.

E.2 Construction Vibration Sample Calculation

The default vibration limit from the equipment (point of reception) specified by the City of Toronto By-Law 514-2008 is 5 mm/s. As well, Metrolinx suggests using the following equation to calculate the PPV of the equipment:

$$PPV_{point\ of\ reception} = PPV_{Ref} \times \left(\frac{D_{ref}}{D_{point\ of\ reception}}\right)^{1.5} \qquad \text{[R-2]}$$

In the equation above, the PPV $_{\text{point of reception}}$ and PPV $_{\text{ref}}$ refers to the vibration level at the point of reception and reference distance respectively in mm/s. As well, the D point of reception and $D_{\text{point of reception}}$ and D_{ref} refer to straight line distance from the equipment to the point of reception and the reference distance provided for the PPV ref respectively.

For the sample calculation, vibratory roller will be used. Given the limit of 5 mm/s of the equipment, $PPV_{\text{point of reception}}$ is 5 mm/s. With the reference PPV level of vibratory roller being 0.21 ft/in measured at 25 ft if converted to metrics is then 5.33 mm/s measured at a reference distance of 7.6 m [R-2]. Finally, the equation above is rearranged and substituted with the corresponding values the distance of point of reception is determined as shown below.

$$D_{point\ of\ reception} = \sqrt[1.5]{\frac{PPV_{Ref} \times D_{point\ of\ reception}{}^{1.5}}{PPV_{point\ of\ reception}}} = \sqrt[1.5]{\frac{5.334\ mm/s \times 7.62m^{1.5}}{5.00mm/s}} = 7.96m$$

Note that this calculation is done for all of the equipment to determine the ZOI.

E.2.1 Construction Vibration Annoyance ZOI

Construction vibration near residential buildings is limited to reduce annoying to the general public. The potential annoyance vibration level is 0.14 mm/s RMS per the 1995 MOEE/GO Transit Protocol.

In alignment with the construction vibration damage assessment, vibratory rollers are considered the worst case vibration source during construction. Additionally, tunnel shuttle

locomotive operations are considered a significant source of vibration annoyance during construction. For conservatism, the shuttle locomotive is modelled as a TBM, which is expected to produce higher vibrations. Vibration data is summarized in Table E-3 for this assessment is in Construction equipment RMS vibration levels are predicted by assuming a crest factor of four between the RMS and PPV.

Table E-3: Construction Vibration Levels for Annoyance

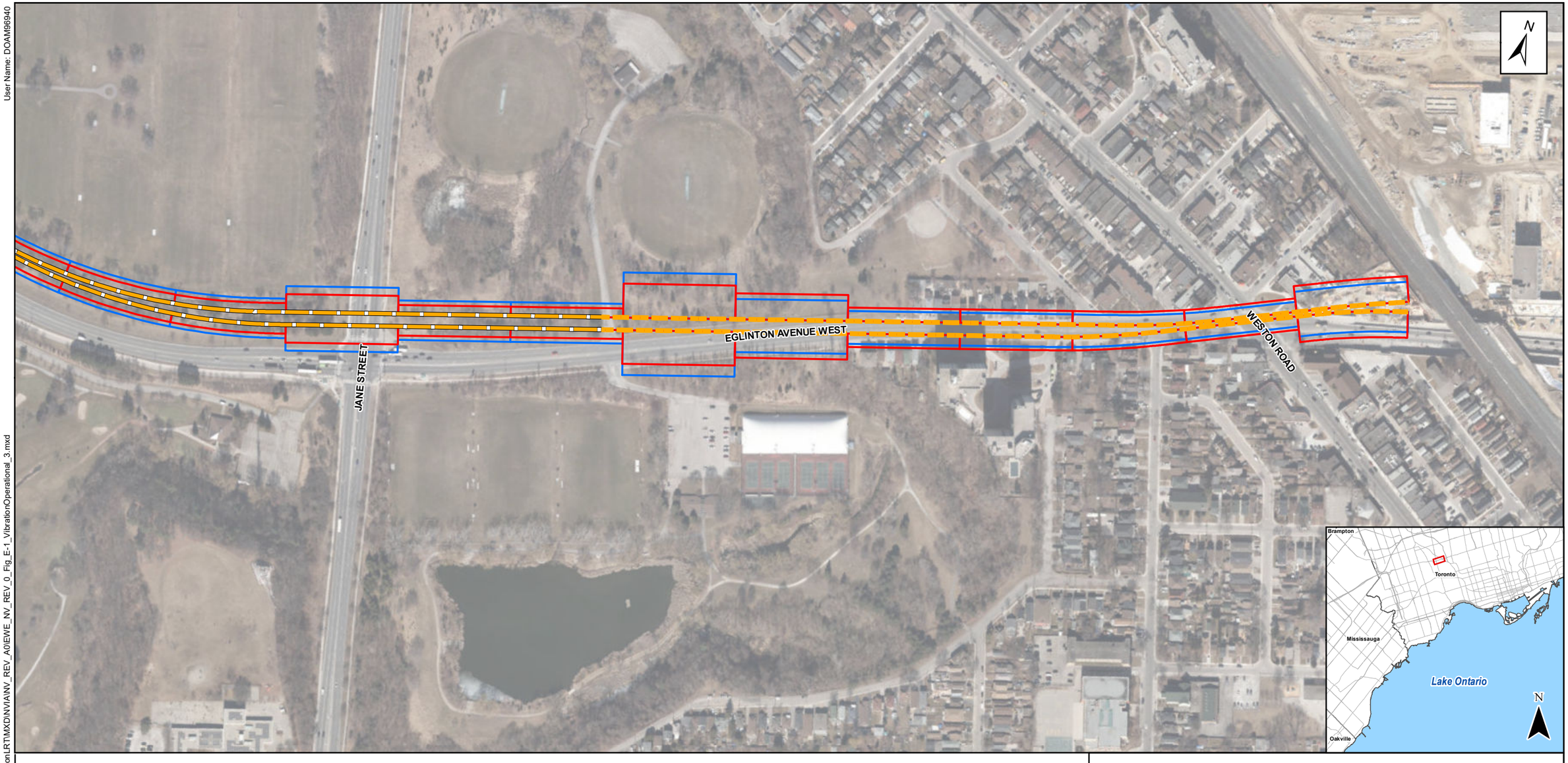
Equipment	Reference Distance (m)	PPV_{ref} (mm/s)	$L_{v,ref}$ (mm/s RMS)	$L_{v,ref}$ (VdB re: 1 µin/s)
Vibratory Roller	7.6	5.3	1.3	94
Shuttle Locomotive	2.0	29.5	7.4	109

The vibration annoyance limit of 0.14 mm/s RMS specified in Table 3-6 is equal to 75 VdB (re: 1 µin/s). The following equation from the FTA Manual [R-2] is applied to the vibratory roller and the shuttle locomotive to determine the ZOI radius, D.

$$L_{v,ZOI} = L_{v,ref} - 30\log\left(\frac{D}{D_{ref}}\right)$$

$$75\ VdB = 94\ VdB - 30\log\left(\frac{D}{7.6\ m}\right) \rightarrow D = 33\ m$$

$$75\ VdB = 109\ VdB - 30\log\left(\frac{D}{2.0\ m}\right) \rightarrow D = 27\ m$$



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Legend

Alignment

- Elevated
- Underground
- Noise Contours
- Vibration Contours

DATA SOURCES:

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2. ESRI - Basemap.

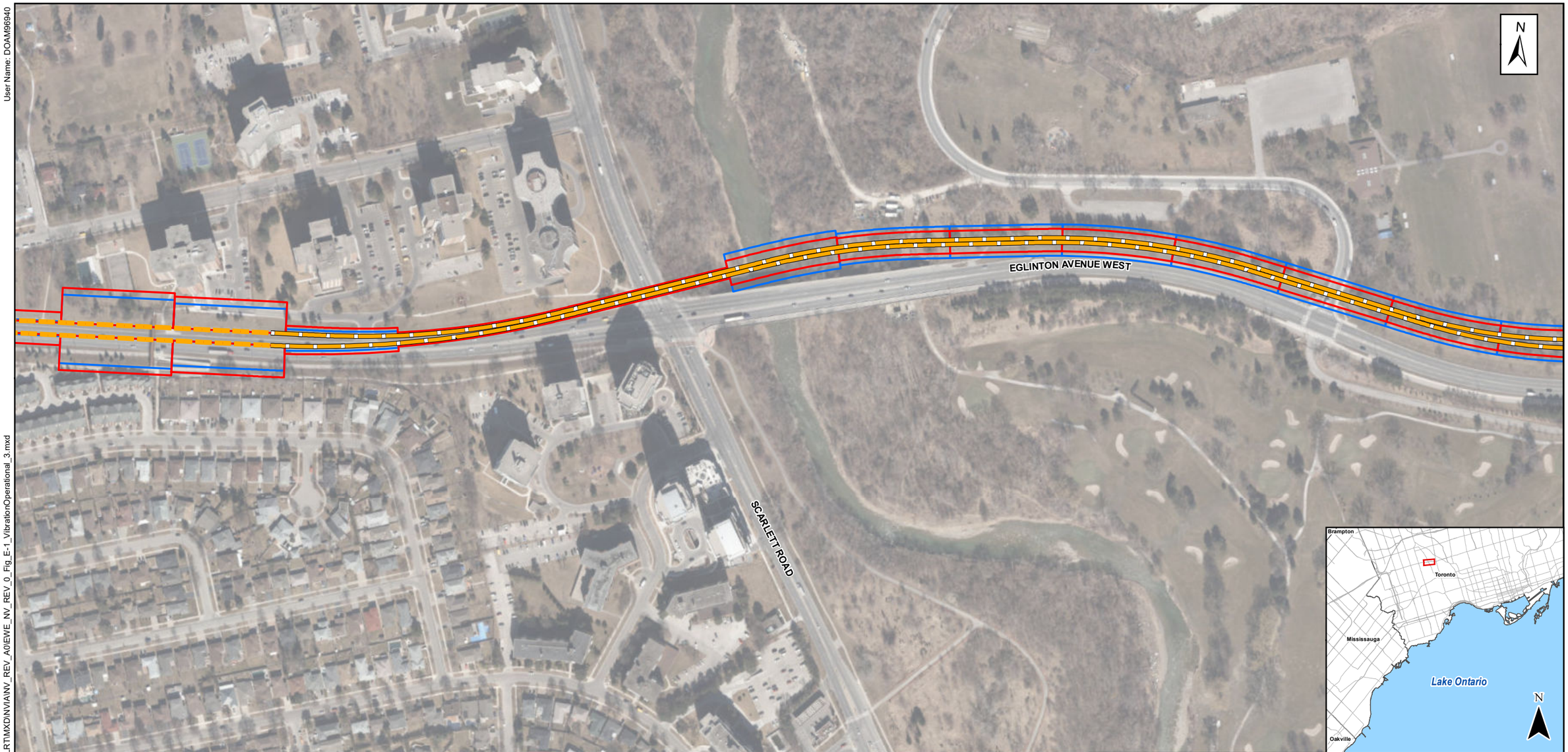
NOTES:

1. Vertical grade is approximate.
2. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Operational Vibrations**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 14, 2020**
Version: **0**	**Review:**	**Figure:** **E-1**	**Page:** **1 of 7**



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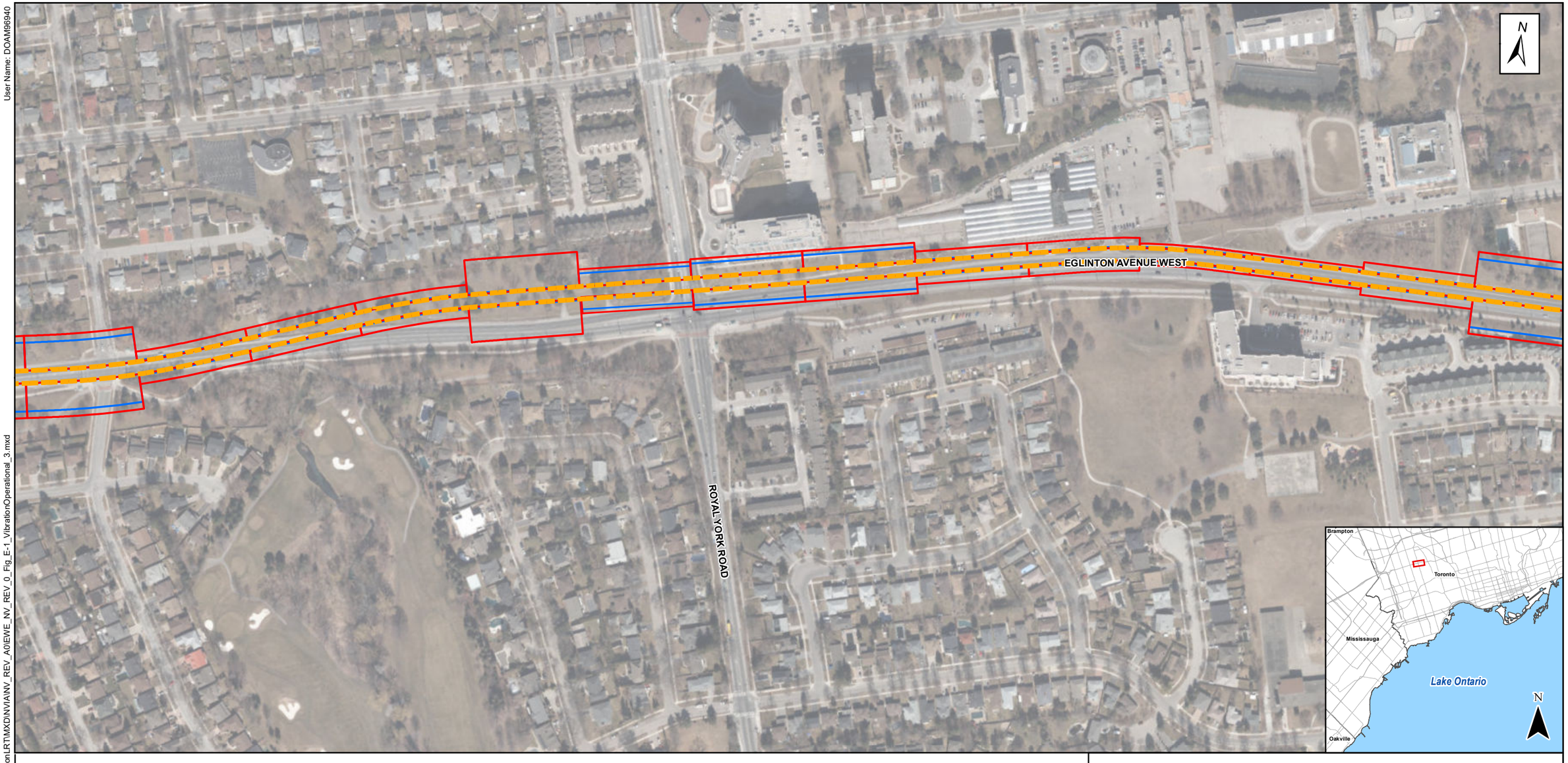

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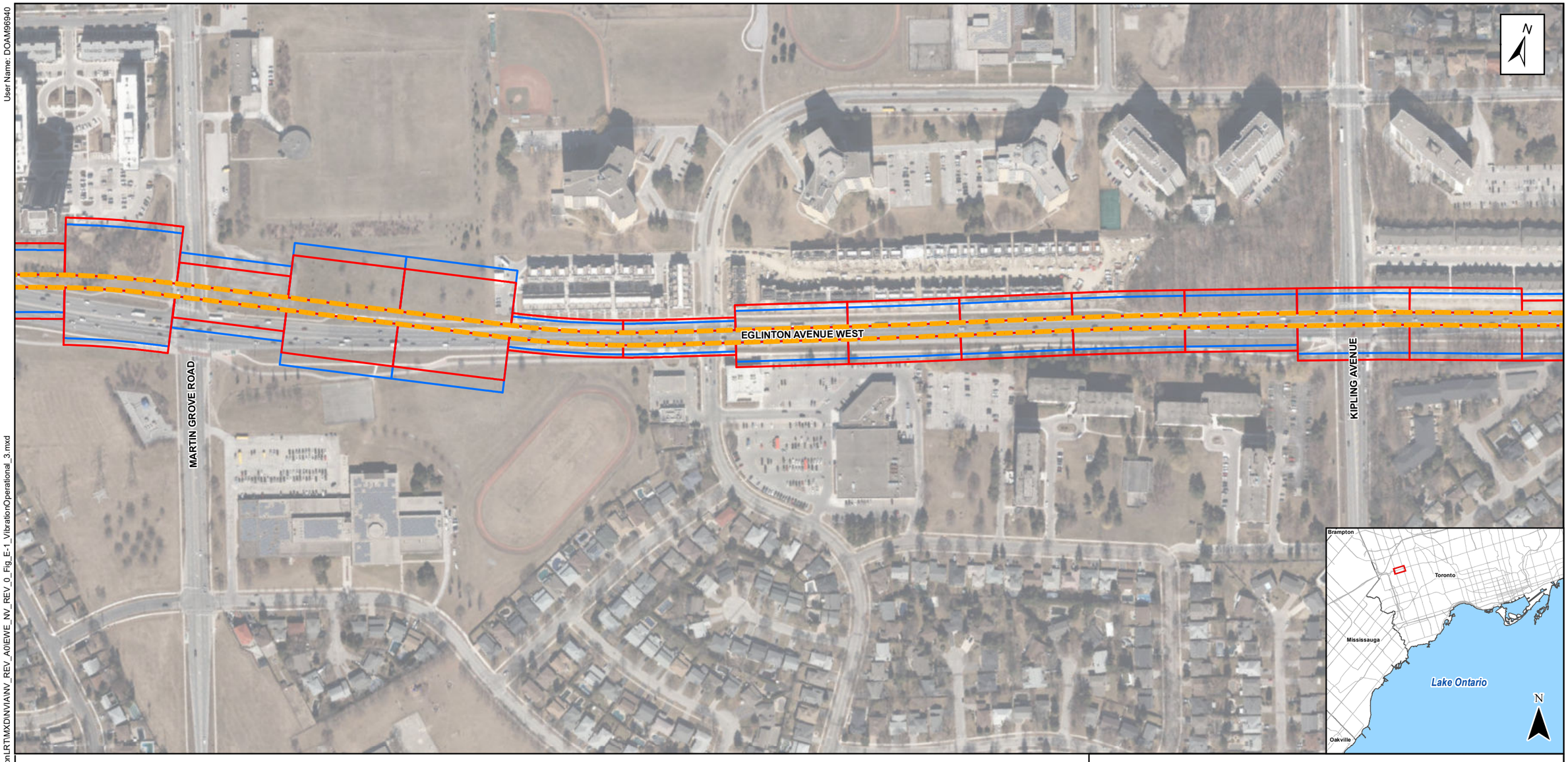

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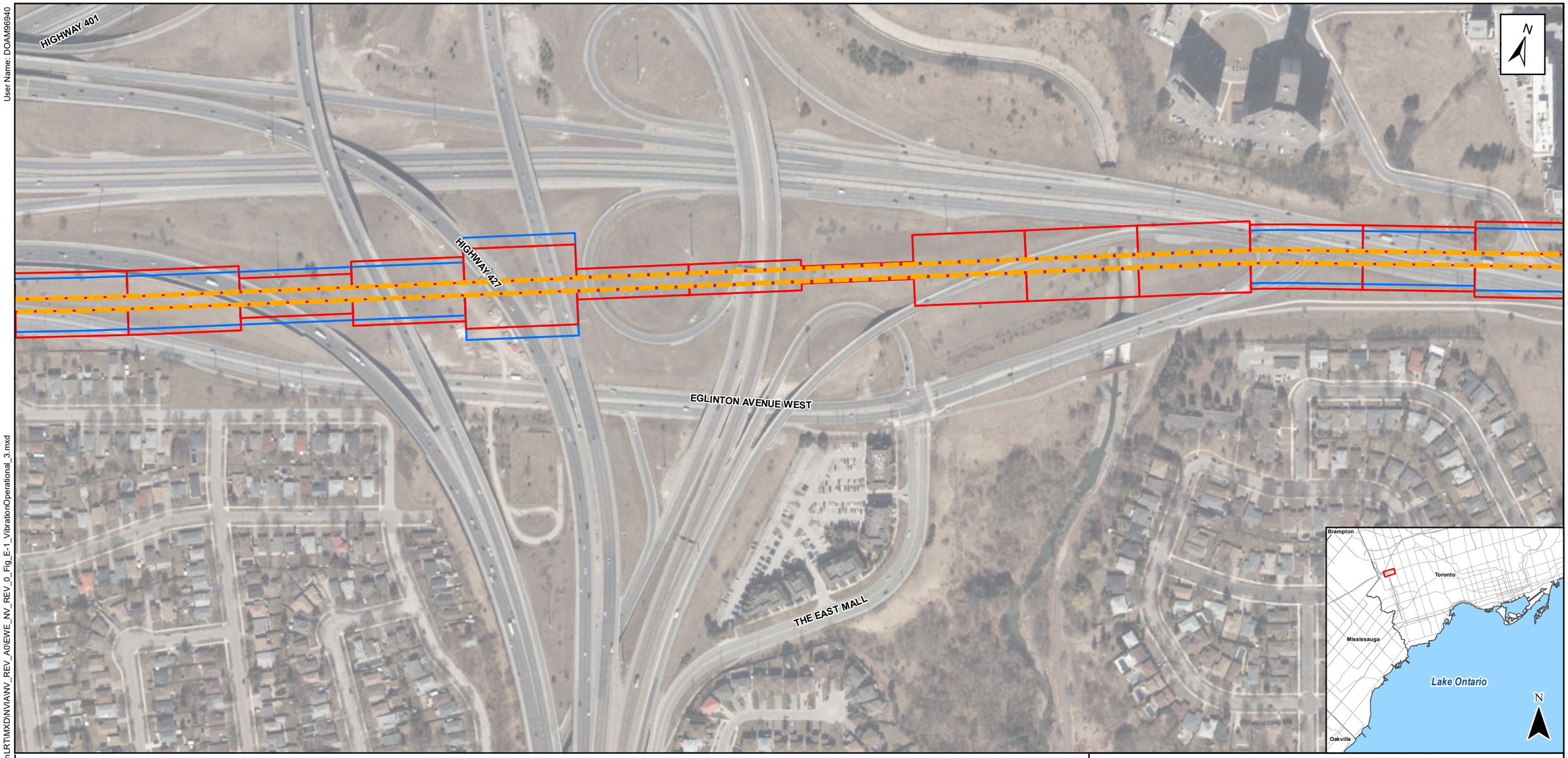

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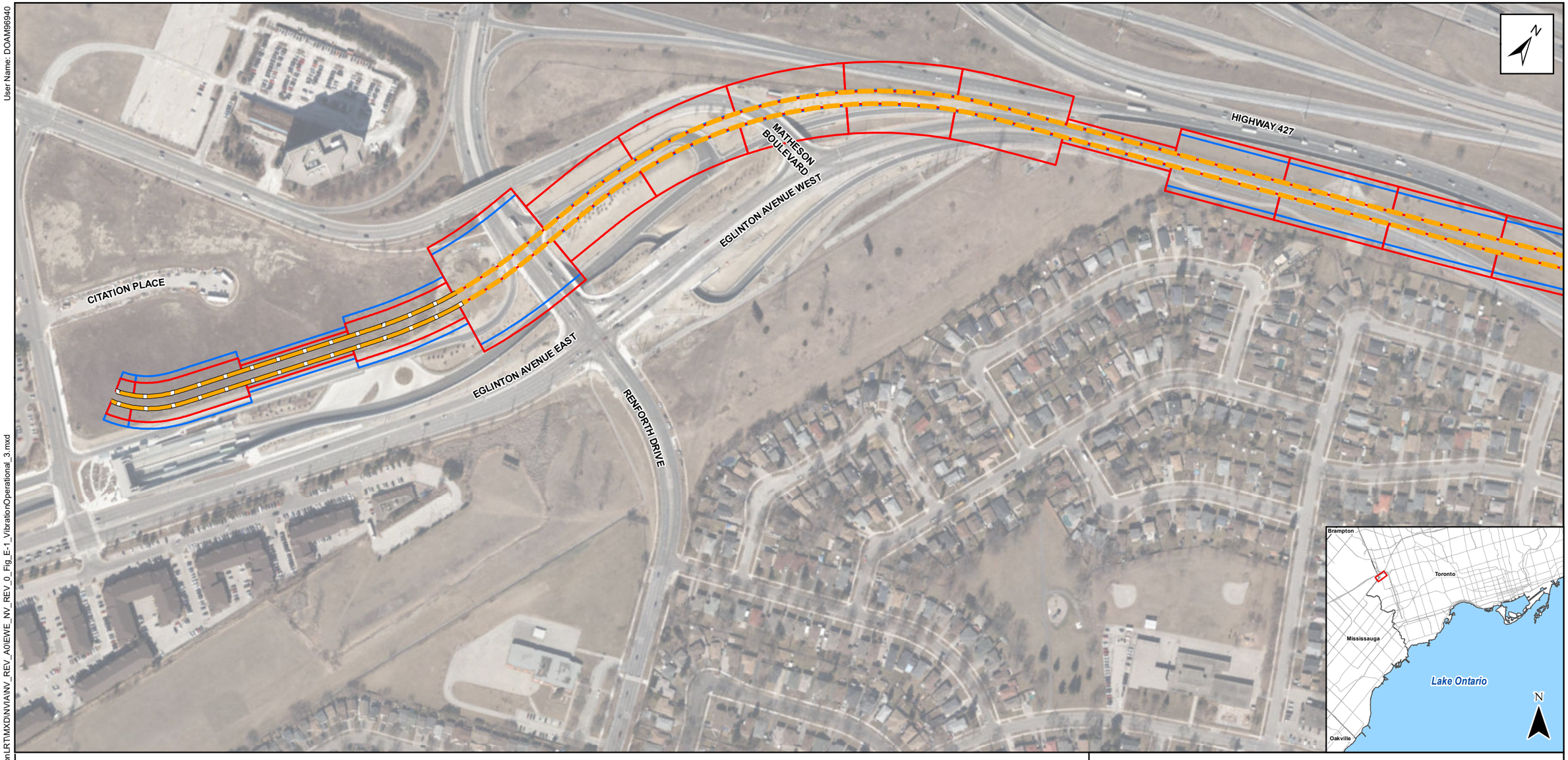

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		Track Modifications		Vibration Parameters						Vibration Contour	Ground-Borne Noise	Noise Contour
Chainage Segment	Segment Description	Track Conditions	Track Treatments	Ground Vibration Efficiency	Ground Noise Efficiency	Coupling	Land Use	Vibration Limit	Speed	With Mitigation	Noise Limit	With Mitigation
								[VdB]	[kph]	[m]	[dBA]	[m]
96+600	At-Grade	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Institutional	72	60	**18**	40	**12**
96+700	Portal Trench	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Institutional	72	60	**18**	40	**12**
96+800	Station Box	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Institutional	72	60	**9**	40	**5**
96+900	Portal Trench	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Institutional	72	60	**18**	40	**12**
97+000	Bored Tunnel	-	-	Efficient	Mid Frequency	-	Open Space - Residential	72	60	**40**	35	**47**
97+100	Rock-Based	-	-	-	High Frequency	-	Open Space - Residential	72	60	**1**	35	**26**
97+200	Rock-Based	-	-	-	High Frequency	-	Open Space - Residential	72	60	**1**	35	**26**
97+300	Rock-Based	-	-	-	High Frequency	-	Open Space - Residential	72	60	**1**	35	**26**
97+400	Rock-Based	-	-	-	High Frequency	-	Open Space - Residential	72	60	**1**	35	**26**
97+500	Rock-Based	-	-	-	High Frequency	-	Open Space - Residential	72	60	**1**	35	**26**
97+600	Rock-Based	-	-	-	High Frequency	1-2 Story Masonry	Residential	72	60	**1**	35	**5**
97+700	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**18**	35	**23**
97+800	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**18**	35	**23**
97+900	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**18**	35	**23**
98+000	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**18**	35	**23**
98+100	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Open Space	72	60	**18**	40	**12**
98+200	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Open Space - Residential	72	60	**18**	35	**23**
98+300	Bored Tunnel	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**40**	40	**30**
98+400	Rock-Based	-	-	-	High Frequency	-	Open Space	72	60	**1**	40	**8**
98+500	Rock-Based	-	-	-	High Frequency	-	Open Space	72	60	**1**	40	**8**
98+600	Rock-Based	-	-	-	High Frequency	3-4 Story Masonry	Open Space - Residential	72	60	**1**	35	**2**
98+700	Rock-Based	-	-	-	High Frequency	-	Open Space - Residential	72	60	**1**	35	**26**
98+800	Rock-Based	-	-	-	High Frequency	-	Residential	72	60	**1**	35	**26**
98+900	Rock-Based	-	-	-	High Frequency	-	Residential	72	60	**1**	35	**26**
99+000	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**18**	35	**23**
99+100	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**18**	35	**23**
99+200	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	70	**22**	35	**28**
99+300	Bored Tunnel	-	-	Efficient	Mid Frequency	-	Residential	72	70	**45**	35	**51**
99+400	Station Box	-	-	Efficient	Mid Frequency	-	Institutional	72	70	**28**	40	**19**
99+500	Station Box	Special Trackwork (Monoblock)	-	Efficient	Mid Frequency	-	Institutional	72	80	**49**	40	**38**
99+600	Bored Tunnel	-	-	Efficient	Mid Frequency	-	Institutional	72	80	**49**	40	**38**
99+700	Bored Tunnel	-	High resilience Fasteners	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	80	**8**	35	**11**
99+800	Bored Tunnel	-	High resilience Fasteners	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	80	**8**	35	**11**
99+900	Bored Tunnel	-	-	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	80	**17**	35	**22**
100+000	Bored Tunnel	-	-	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	80	**17**	35	**22**
100+100	Bored Tunnel	-	-	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	80	**17**	35	**22**
100+200	Bored Tunnel	-	-	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	80	**17**	35	**22**
100+300	Station Box	Special Trackwork (Monoblock)	-	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	80	**17**	35	**22**
100+400	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
100+500	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
100+600	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
100+700	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
100+800	Bored Tunnel	-	High resilience Fasteners	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**13**	35	**17**
100+900	Bored Tunnel	-	High resilience Fasteners	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**13**	35	**17**
101+000	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**

		Track Modifications		Vibration Parameters						Vibration Contour	Ground-Borne Noise	Noise Contour
Chainage Segment	Segment Description	Track Conditions	Track Treatments	Ground Vibration Efficiency	Ground Noise Efficiency	Coupling	Land Use	Vibration Limit	Speed	With Mitigation	Noise Limit	With Mitigation
								[VdB]	[kph]	[m]	[dBA]	[m]
101+100	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
101+200	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
101+300	Station Box	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**13**	35	**17**
101+400	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
101+500	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
101+600	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
101+700	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
101+800	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
101+900	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
102+000	Rock-Based	-	-	-	High Frequency	1-2 Story Masonry	Residential	72	80	**1**	35	**9**
102+100	Rock-Based	-	-	-	High Frequency	1-2 Story Masonry	Residential	72	80	**1**	35	**9**
102+200	Rock-Based	-	-	-	High Frequency	1-2 Story Masonry	Residential	72	80	**1**	35	**9**
102+300	Station Box	-	-	-	High Frequency	1-2 Story Masonry	Residential	72	80	**1**	35	**31**
102+400	Station Box	Special Trackwork (Monoblock)	High resilience Fasteners	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**13**	35	**17**
102+500	Bored Tunnel	-	-	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	80	**17**	35	**22**
102+600	Bored Tunnel	-	-	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	80	**17**	35	**22**
102+700	Rock-Based	-	-	-	High Frequency	1-2 Story Masonry	Residential	72	80	**1**	35	**9**
102+800	Rock-Based	-	-	-	High Frequency	1-2 Story Masonry	Residential	72	80	**1**	35	**9**
102+900	Rock-Based	-	-	-	High Frequency	3-4 Story Masonry	Residential	72	80	**1**	35	**4**
103+000	Rock-Based	-	-	-	High Frequency	3-4 Story Masonry	Residential	72	80	**1**	35	**4**
103+100	Rock-Based	-	-	-	High Frequency	1-2 Story Masonry	Residential	72	80	**1**	35	**9**
103+200	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	80	**25**	35	**31**
103+300	Portal Trench	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	70	**22**	35	**28**
103+400	Elevated	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	70	**4**	35	**7**
103+500	Elevated	-	-	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	70	**1**	35	**3**
103+600	Elevated	-	-	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	70	**1**	35	**3**
103+700	Elevated	-	-	Efficient	Mid Frequency	3-4 Story Masonry	Residential	72	70	**1**	35	**3**
103+800	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	70	**15**	40	**9**
103+900	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**12**	40	**8**
104+000	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**12**	40	**8**
104+100	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**12**	40	**8**
104+200	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**12**	40	**8**
104+300	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**12**	40	**8**
104+400	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**12**	40	**8**
104+500	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**12**	40	**8**
104+600	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**12**	40	**8**
104+700	Station Box	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**23**	40	**16**
104+800	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**12**	40	**8**
104+900	Elevated	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**12**	40	**8**
105+000	Portal Trench	-	-	Efficient	Mid Frequency	-	Open Space	72	60	**40**	40	**30**
105+100	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**18**	35	**23**
105+200	Bored Tunnel	-	High resilience Fasteners	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**9**	35	**12**
105+300	Bored Tunnel	-	High resilience Fasteners	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**9**	35	**12**
105+400	Bored Tunnel	-	High resilience Fasteners	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**9**	35	**12**

		Track Modifications		Vibration Parameters						Vibration Contour	Ground-Borne Noise	Noise Contour
Chainage Segment	Segment Description	Track Conditions	Track Treatments	Ground Vibration Efficiency	Ground Noise Efficiency	Coupling	Land Use	Vibration Limit	Speed	With Mitigation	Noise Limit	With Mitigation
								[VdB]	[kph]	[m]	[dBA]	[m]
105+500	Bored Tunnel	-	High resilience Fasteners	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**9**	35	**12**
105+600	Bored Tunnel	-	-	Efficient	Mid Frequency	1-2 Story Masonry	Residential	72	60	**18**	35	**23**

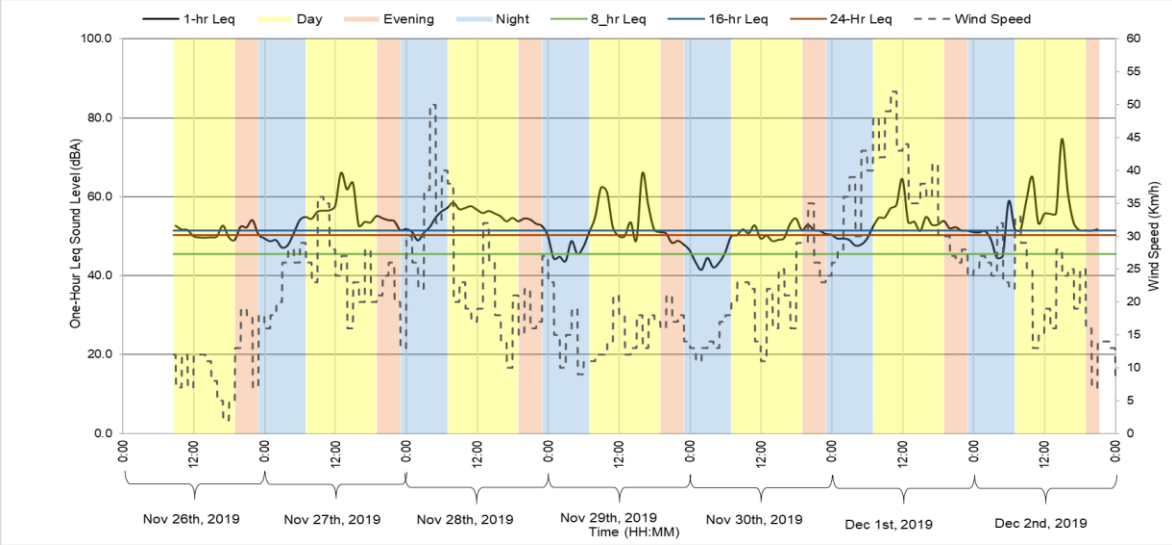
Appendix F

Noise Monitor Reports

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_15
Nearest Address	71 Bigham Crescent
GPS Coordinates	43.662006, -79.587830

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	48
16 Hr Day Leq (07:00-23:00)	51
24 Hr Day Leq (00:00-24:00)	50
Night Time Minimum (23:00-07:00)	41
8 Hr Night Leq (23:00-07:00)	45

Location Photo

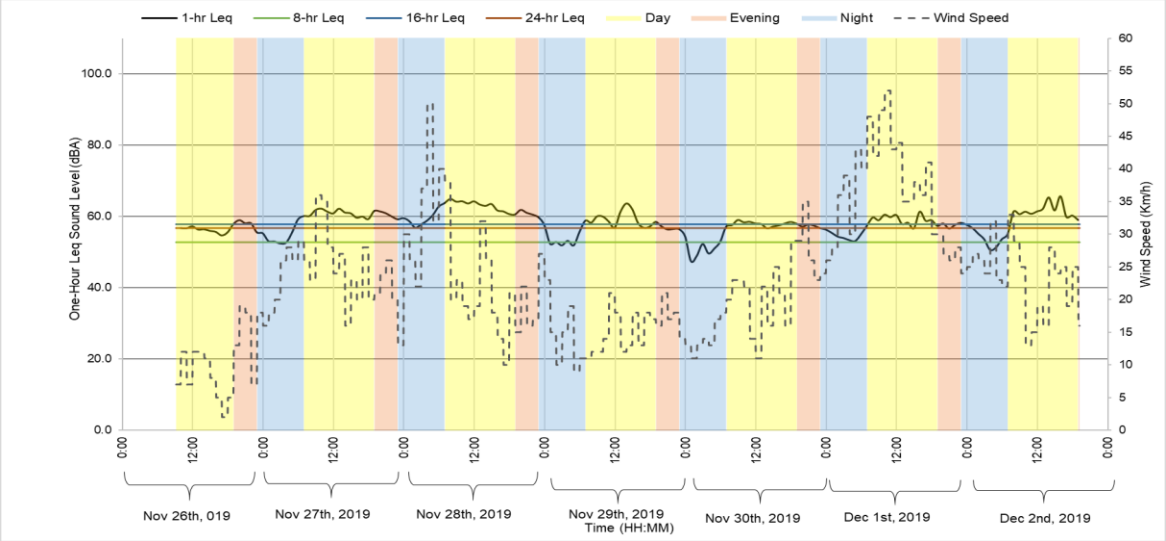
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_14
Nearest Address	9 Courtwright Road
GPS Coordinates	43.668437, -79.579159

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	55
16 Hr Day Leq (07:00-23:00)	58
24 Hr Day Leq (00:00-24:00)	57
Night Time Minimum (23:00-07:00)	45
8 Hr Night Leq (23:00-07:00)	53

Location Photo

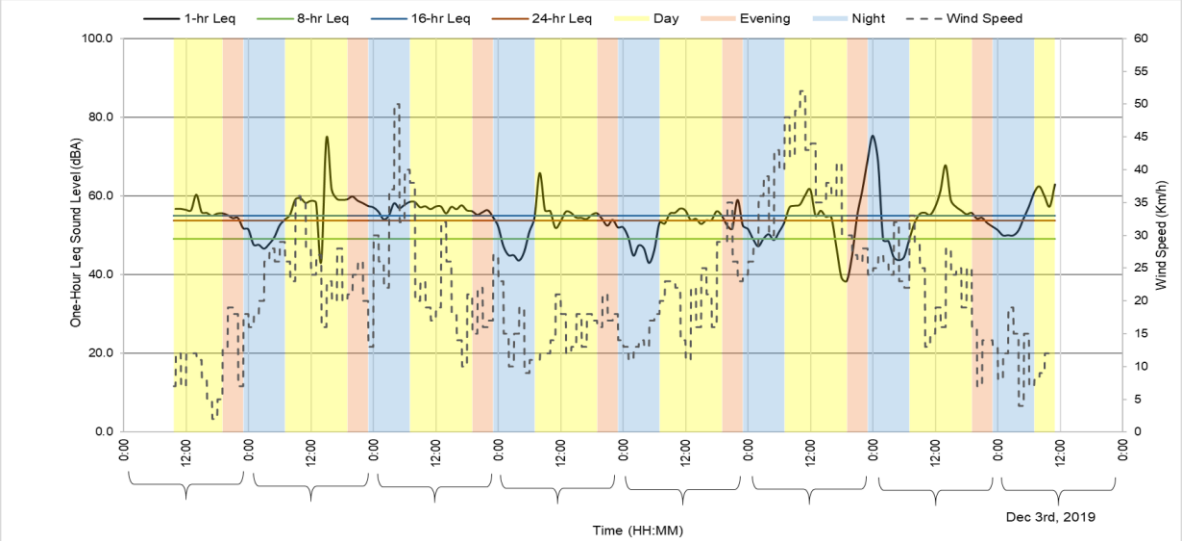
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_13
Nearest Address	134 Widdicombe Hill Boulevard
GPS Coordinates	43.675550, -79.558860

1 Hr. Leq Plot



Criteria	**Value (dBA)**
Day Time Minimum (07:00-23:00)	38
16 Hr Day Leq (07:00-23:00)	55
24 Hr Day Leq (00:00-24:00)	54
Night Time Minimum (23:00-07:00)	43
8 Hr Night Leq (23:00-07:00)	49

Location Photo

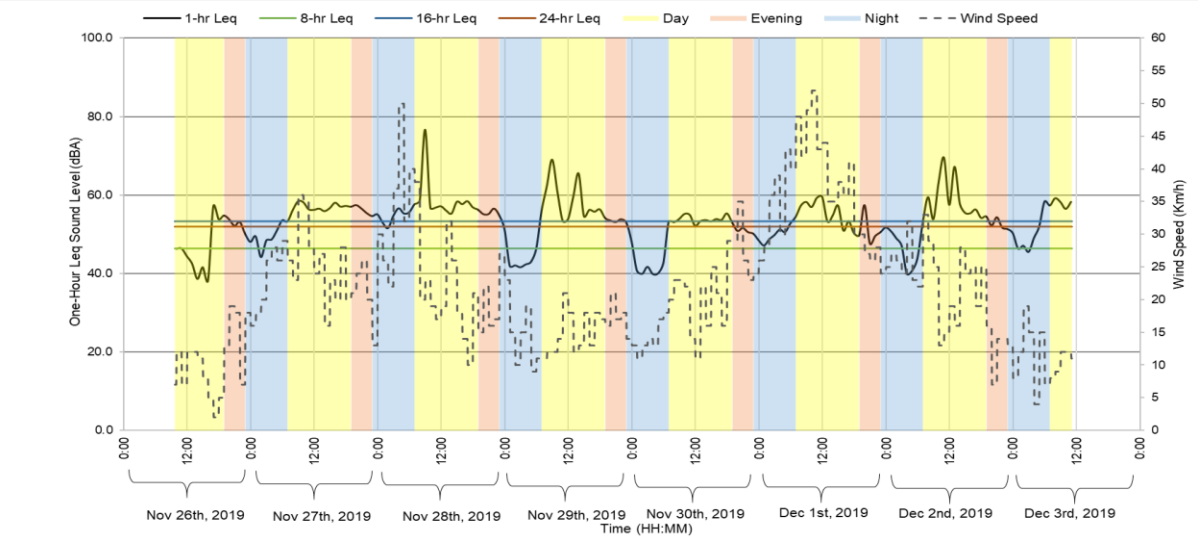
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_12
Nearest Address	18 Dewsbury Crescent
GPS Coordinates	43.672875, -79.558145

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	38
16 Hr Day Leq (07:00-23:00)	53
24 Hr Day Leq (00:00-24:00)	52
Night Time Minimum (23:00-07:00)	39
8 Hr Night Leq (23:00-07:00)	46

Location Photo

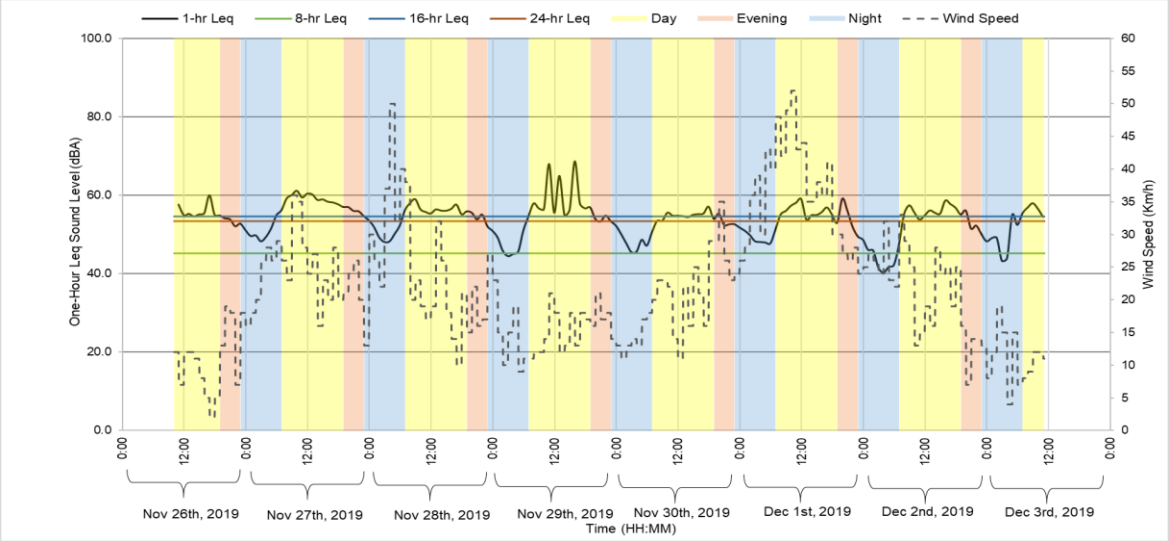
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_11
Nearest Address	43 Dryden Way
GPS Coordinates	43.678065, -79.549228

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	53
16 Hr Day Leq (07:00-23:00)	55
24 Hr Day Leq (00:00-24:00)	53
Night Time Minimum (23:00-07:00)	40
8 Hr Night Leq (23:00-07:00)	45

Location Photo

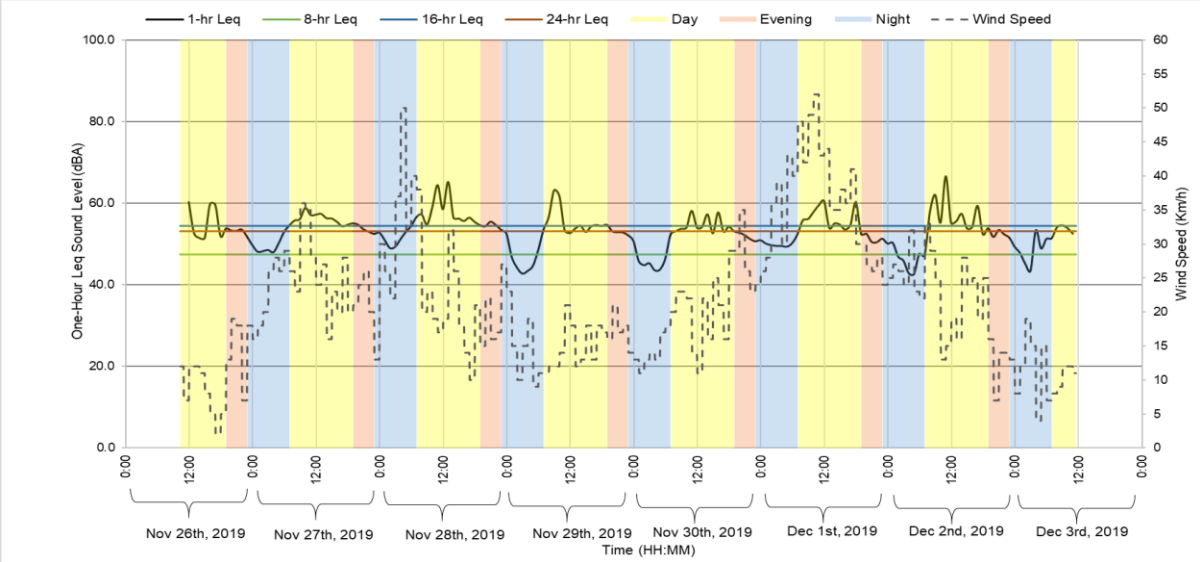
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_10
Nearest Address	46 Oldham Road
GPS Coordinates	43.677989, -79.543393

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	51
16 Hr Day Leq (07:00-23:00)	54
24 Hr Day Leq (00:00-24:00)	53
Night Time Minimum (23:00-07:00)	42
8 Hr Night Leq (23:00-07:00)	47

Location Photo

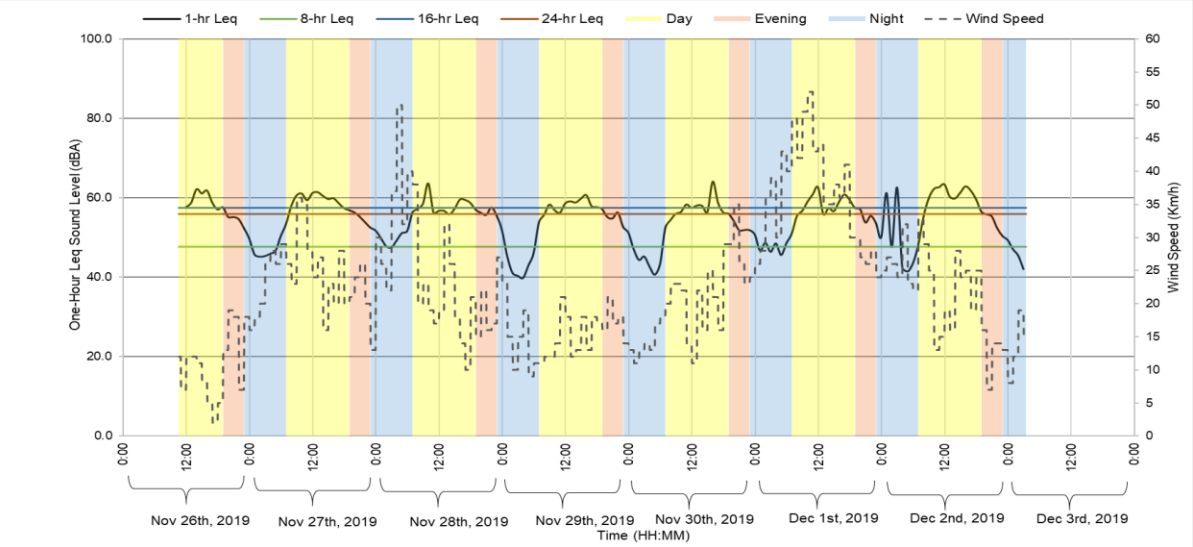
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_09
Nearest Address	58 Waterford Drive
GPS Coordinates	43.680690, -79.541664

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	54
16 Hr Day Leq (07:00-23:00)	57
24 Hr Day Leq (00:00-24:00)	56
Night Time Minimum (23:00-07:00)	40
8 Hr Night Leq (23:00-07:00)	48

Location Photo

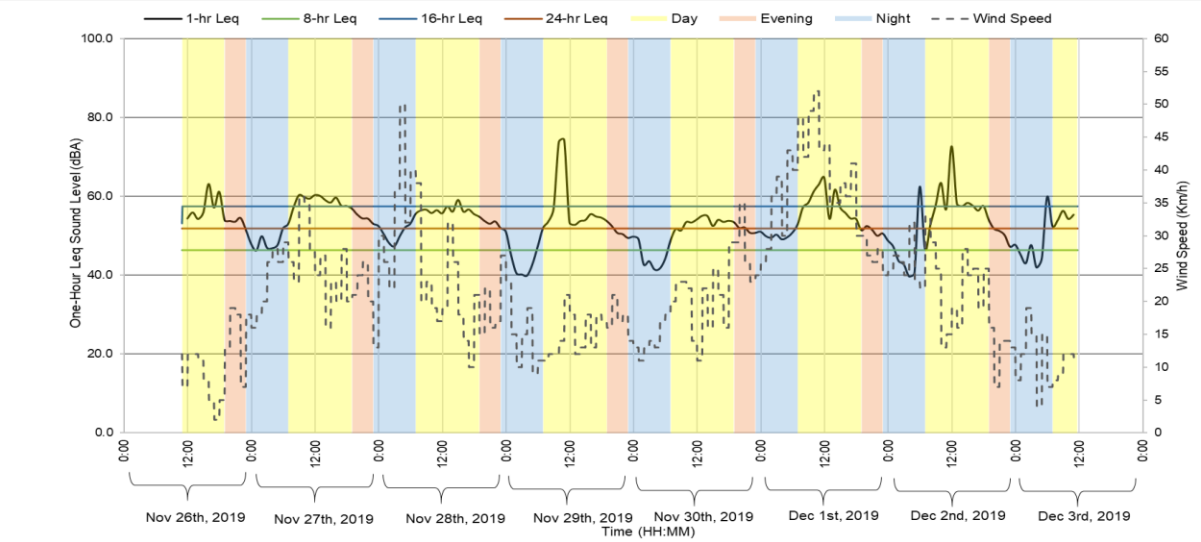
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_08
Nearest Address	102 Poplar Heights Drive
GPS Coordinates	43.679555, -79.536539

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	51
16 Hr Day Leq (07:00-23:00)	53
24 Hr Day Leq (00:00-24:00)	52
Night Time Minimum (23:00-07:00)	40
8 Hr Night Leq (23:00-07:00)	46

Location Photo

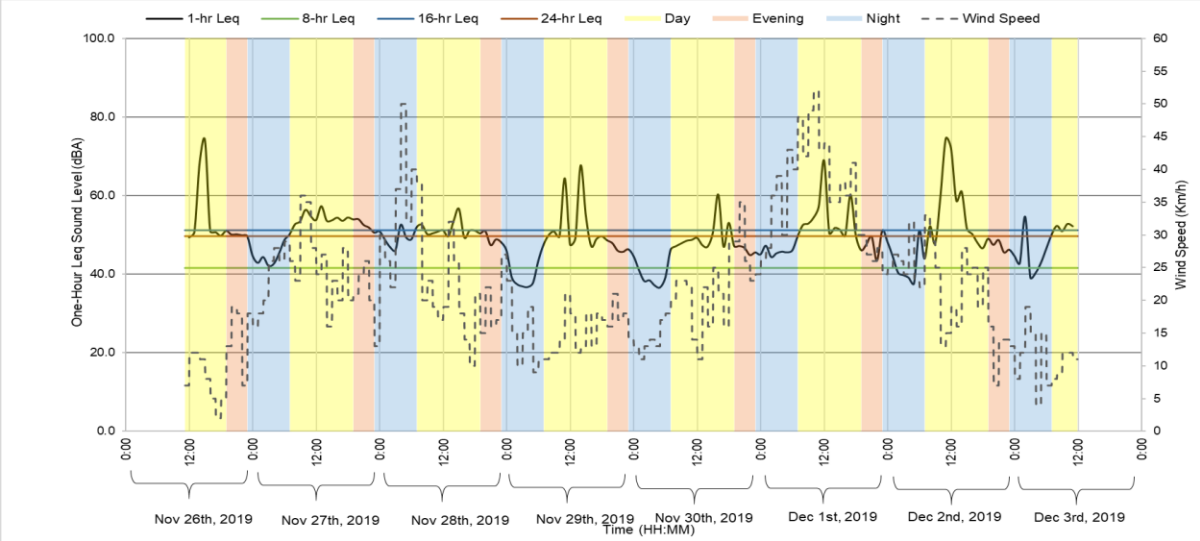
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_07
Nearest Address	25 Crestridge Heights Road
GPS Coordinates	43.683142, -79.528744

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	45
16 Hr Day Leq (07:00-23:00)	51
24 Hr Day Leq (00:00-24:00)	50
Night Time Minimum (23:00-07:00)	36
8 Hr Night Leq (23:00-07:00)	42

Location Photo

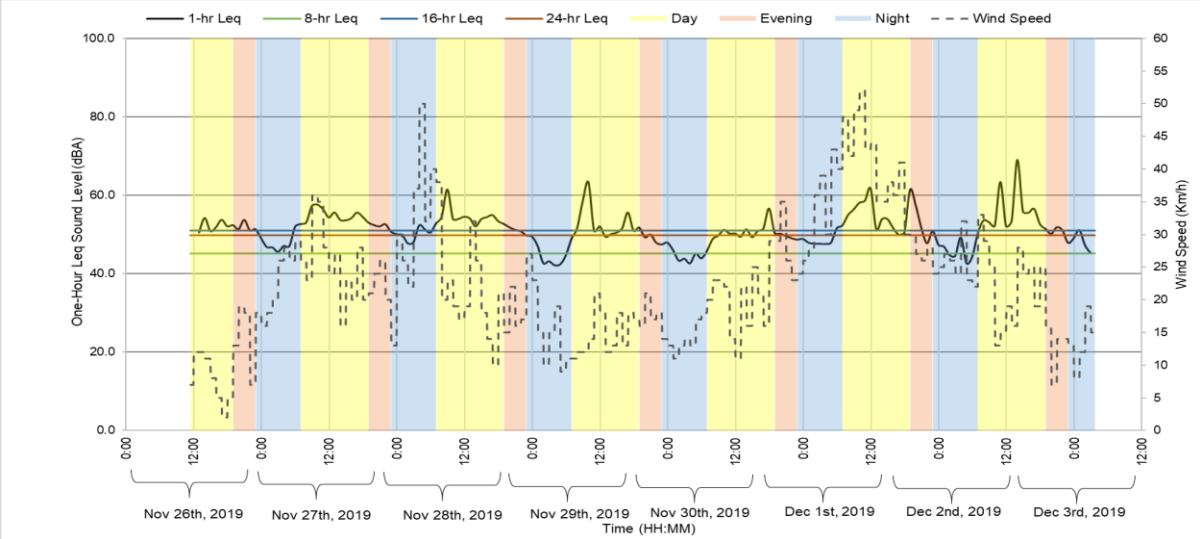
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_06
Nearest Address	26 Swordbill Drive
GPS Coordinates	43.682038, -79.523193

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	48
16 Hr Day Leq (07:00-23:00)	51
24 Hr Day Leq (00:00-24:00)	50
Night Time Minimum (23:00-07:00)	42
8 Hr Night Leq (23:00-07:00)	45

Location Photo

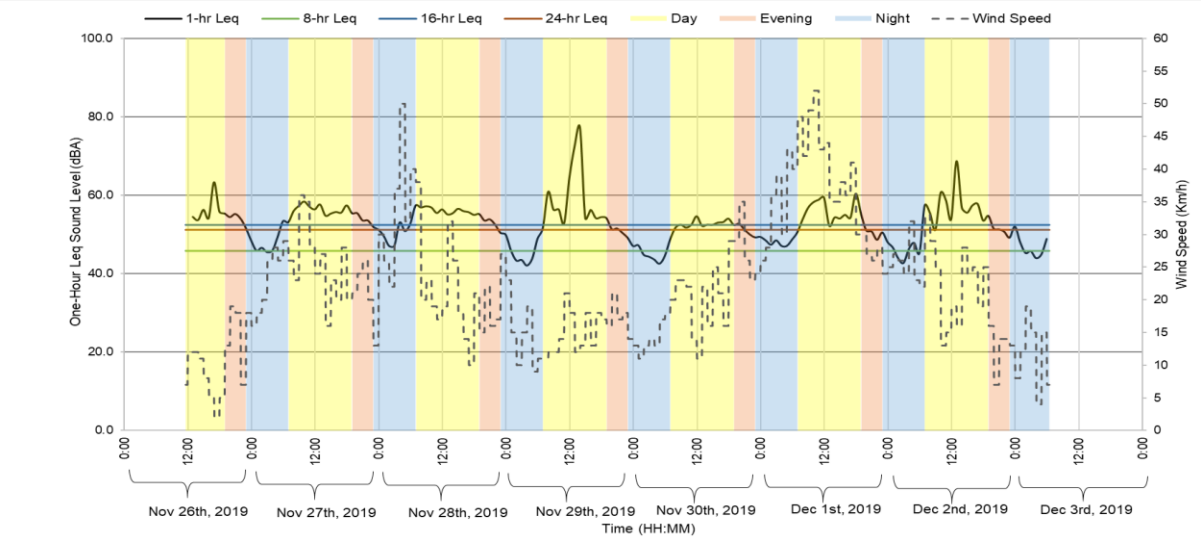
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_05
Nearest Address	62 Lemonwood Drive
GPS Coordinates	43.682138, -79.518622

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	51
16 Hr Day Leq (07:00-23:00)	52
24 Hr Day Leq (00:00-24:00)	51
Night Time Minimum (23:00-07:00)	42
8 Hr Night Leq (23:00-07:00)	46

Location Photo

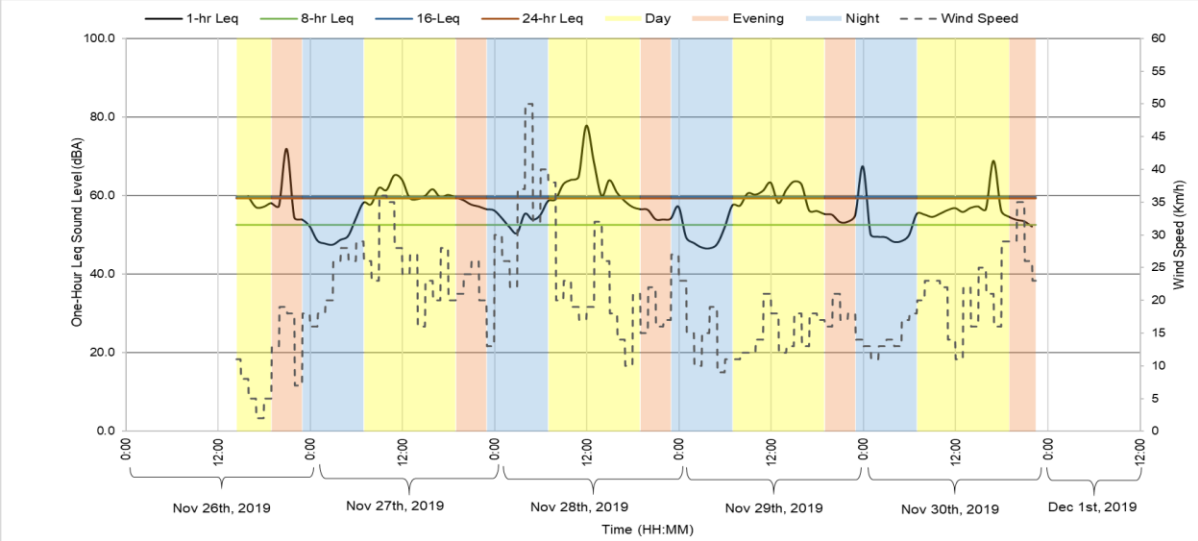
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 11/30/2019
Type of Measurement	Noise
Location Tag	NM_04
Nearest Address	39 Richview Road
GPS Coordinates	43.684332, -79.515125

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	54
16 Hr Day Leq (07:00-23:00)	60
24 Hr Day Leq (00:00-24:00)	59
Night Time Minimum (23:00-07:00)	46
8 Hr Night Leq (23:00-07:00)	53

Location Photo

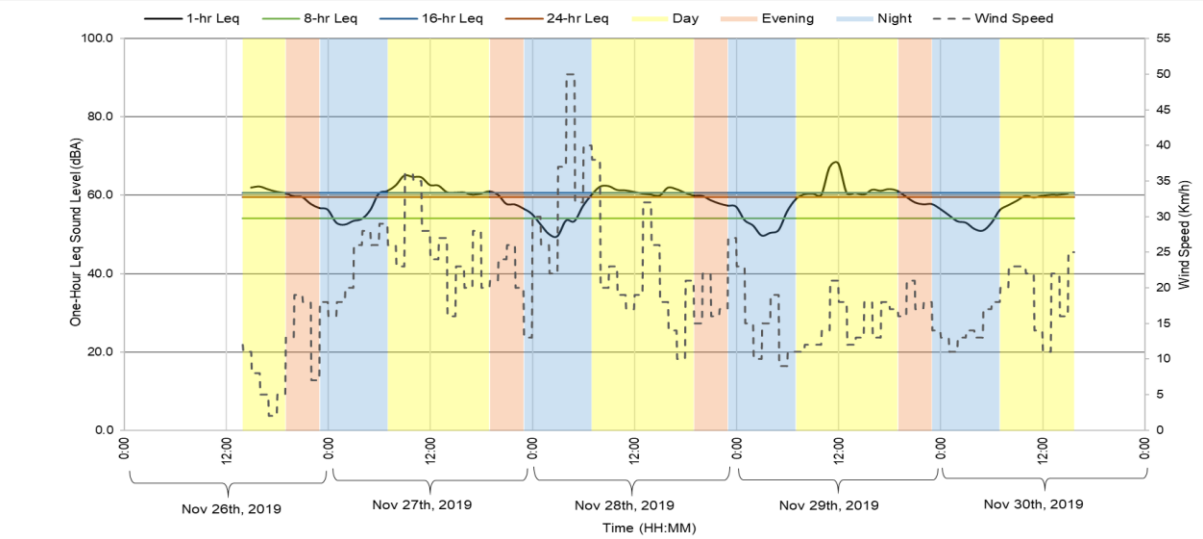
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 11/30/2019
Type of Measurement	Noise
Location Tag	NM_03
Nearest Address	SE Scarlett Heights Park
GPS Coordinates	43.682747, -79.511815

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	57
16 Hr Day Leq (07:00-23:00)	61
24 Hr Day Leq (00:00-24:00)	59
Night Time Minimum (23:00-07:00)	49
8 Hr Night Leq (23:00-07:00)	54

Location Photo

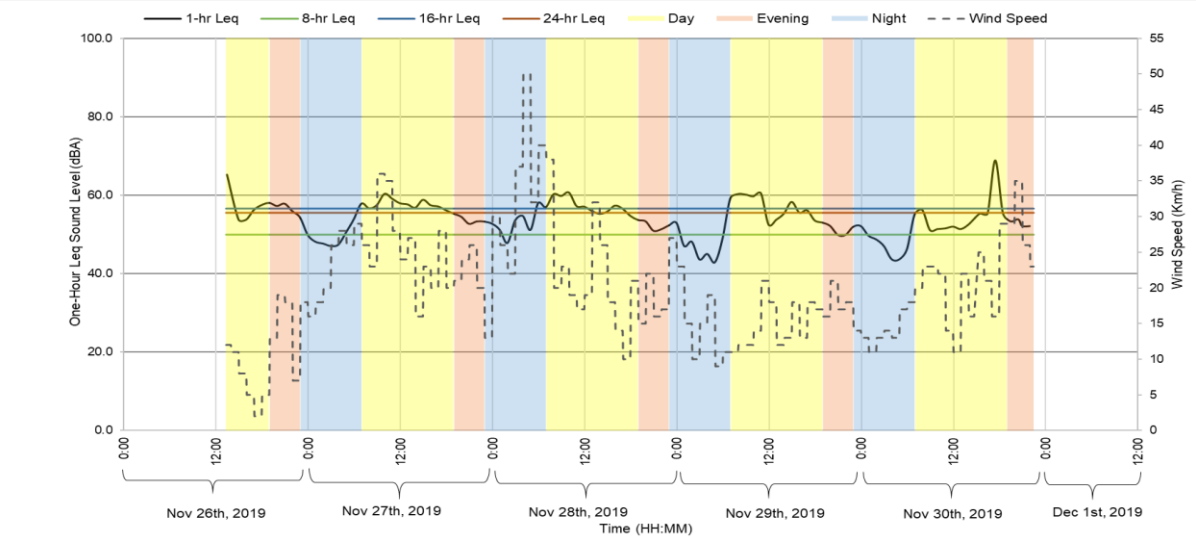
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/01/2019
Type of Measurement	Noise
Location Tag	NM_02
Nearest Address	120 Emmett Avenue
GPS Coordinates	43.687123, -79.508858

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	51
16 Hr Day Leq (07:00-23:00)	57
24 Hr Day Leq (00:00-24:00)	56
Night Time Minimum (23:00-07:00)	43
8 Hr Night Leq (23:00-07:00)	50

Location Photo

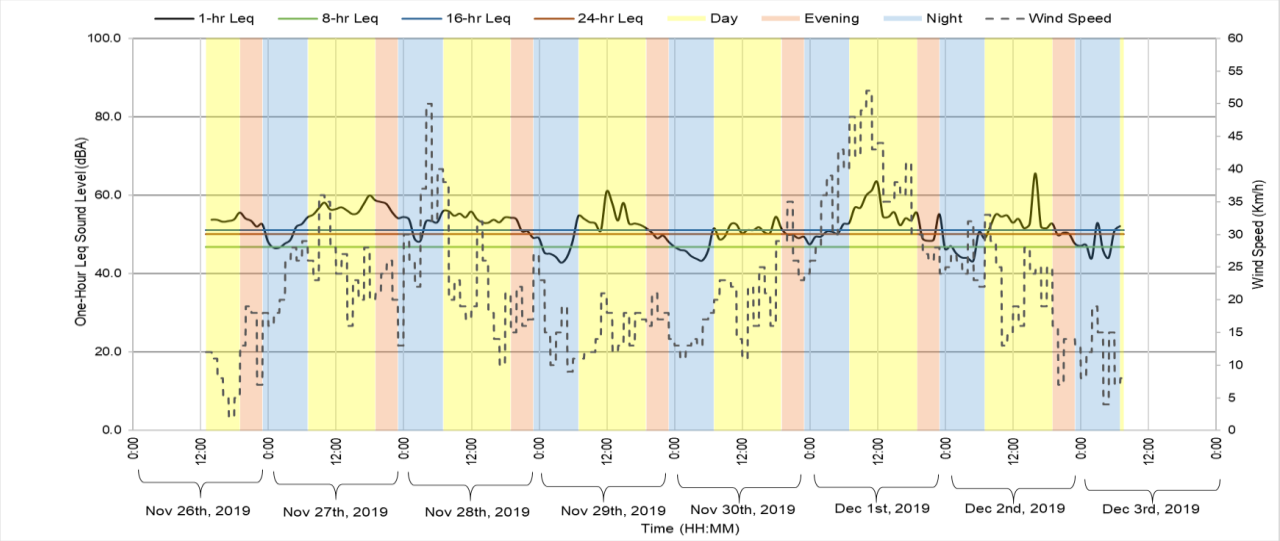
Description

Baseline measurement

Eglinton West Extension Noise and Vibration Location Deliverables

Recording Period	11/26/2019 to 12/03/2019
Type of Measurement	Noise
Location Tag	NM_01
Nearest Address	30 Somerville Avenue
GPS Coordinates	43.687516, -79.494881

1 Hr. Leq Plot



Criteria	Value (dBA)
Day Time Minimum (07:00-23:00)	49
16 Hr Day Leq (07:00-23:00)	51
24 Hr Day Leq (00:00-24:00)	50
Night Time Minimum (23:00-07:00)	42
8 Hr Night Leq (23:00-07:00)	47

Location Photo

Description

Baseline measurement

Appendix G

Construction Damage ZOI Maps

Legend

- Construction Site
- Vibration Zone of Influence - 8m
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton West Crosstown Extension**		
Figure Title:	**Vibration Impact Assessment** **Construction Sites Vibration - Damage ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** G-1	**Page:** 1 of 7

User Name: DOAM96940

Document Path: T:\Maps\GIS_Data\Metrolinx\EglintonLRT\MXD\NV\AINV_REV_A0\EWE_REV_A2_Fig_G-1_VibrationBuildingDamage.mxd

Legend

- Construction Site
- Vibration Zone of Influence - 8m
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton West Crosstown Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration - Damage ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** G-1	**Page:** 2 of 7

User Name: DOAM96940

Document Path: T:\Maps\GIS_Data\Metrolinx\Eglinton\LRT\MXD\NV\A\NV_REV_A0\EWE_REV_A2_Fig_G-1_VibrationBuildingDamage.mxd

Legend

- Construction Site
- Vibration Zone of Influence - 8m
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton West Crosstown Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration - Damage ZOI**		
Prepared By:	4TRANSIT / PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** G-1	**Page:** 3 of 7

Legend

- Construction Site
- Vibration Zone of Influence - 8m
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton West Crosstown Extension**
Figure Title:	**Vibration Impact Assessment** **Construction Sites Vibration - Damage ZOI**
Prepared By:	4TRANSIT PARSONS HATCH WSP
Date:	**May 11, 2020**
Version: 0	**Review:**
Figure:	**G-1**
Page:	**4 of 7**

User Name: DOAM96940

Document Path: T:\Maps\GIS_Data\Metrolinx\EglintonLRT\MXD\NV\ANV_REV_A0\EWE_REV_A2_Fig_G-1_VibrationBuildingDamage.mxd

Legend

- Construction Site
- Vibration Zone of Influence - 8m
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton West Crosstown Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration - Damage ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** G-1	**Page:** 5 of 7

Legend

- Construction Site
- Vibration Zone of Influence - 8m
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton West Crosstown Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration - Damage ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** G-1	**Page:** 6 of 7

User Name: DOAM96940

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User Name: DOAM96940

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Legend

- Construction Site
- Vibration Zone of Influence - 8m
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton West Crosstown Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration - Damage ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** G-1	**Page:** 7 of 7

Appendix H

Construction Annoyance ZOI Maps

User Name: DOAM96940

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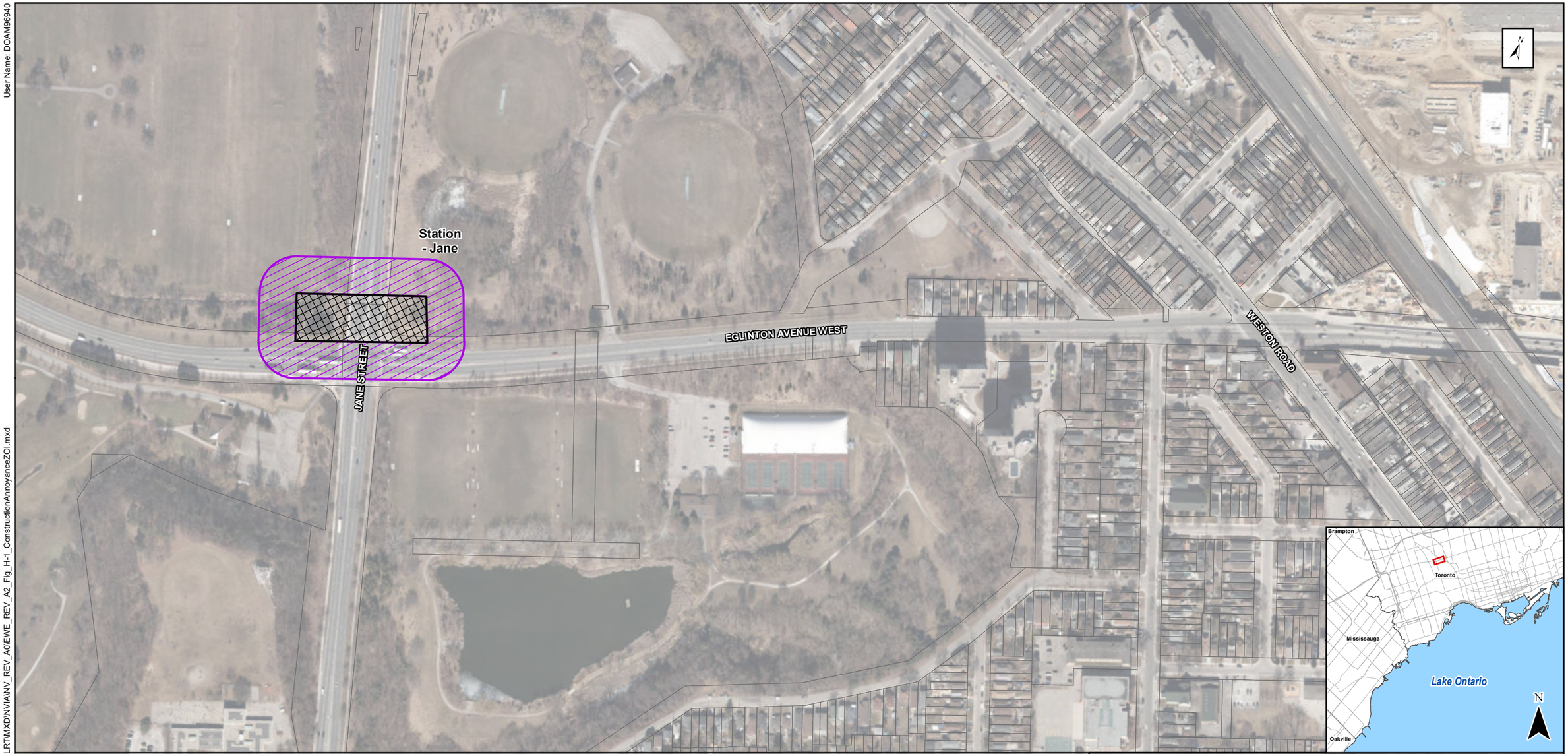


Legend

- Construction Sites
- Vibration Annoyance Buffer - 33m
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

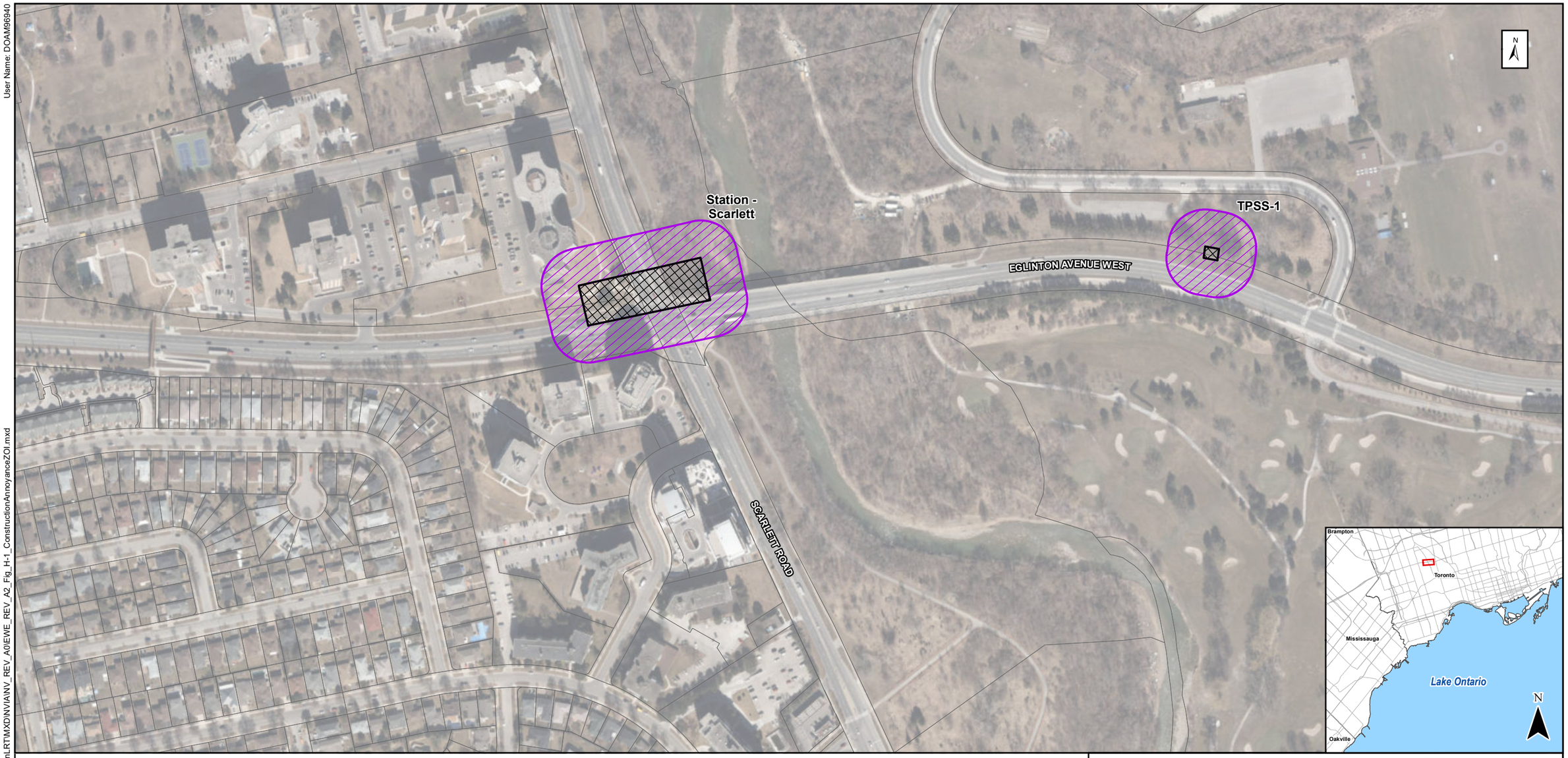
NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration – Annoyance ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** H-1	**Page:** 1 of 7



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Legend

- Construction Sites
- Vibration Annoyance Buffer - 33m
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration – Annoyance ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** H-1	**Page:** 2 of 7

User Name: DOAM96940

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Legend

- Construction Sites
- Vibration Annoyance Buffer - 33m
- Property Boundary

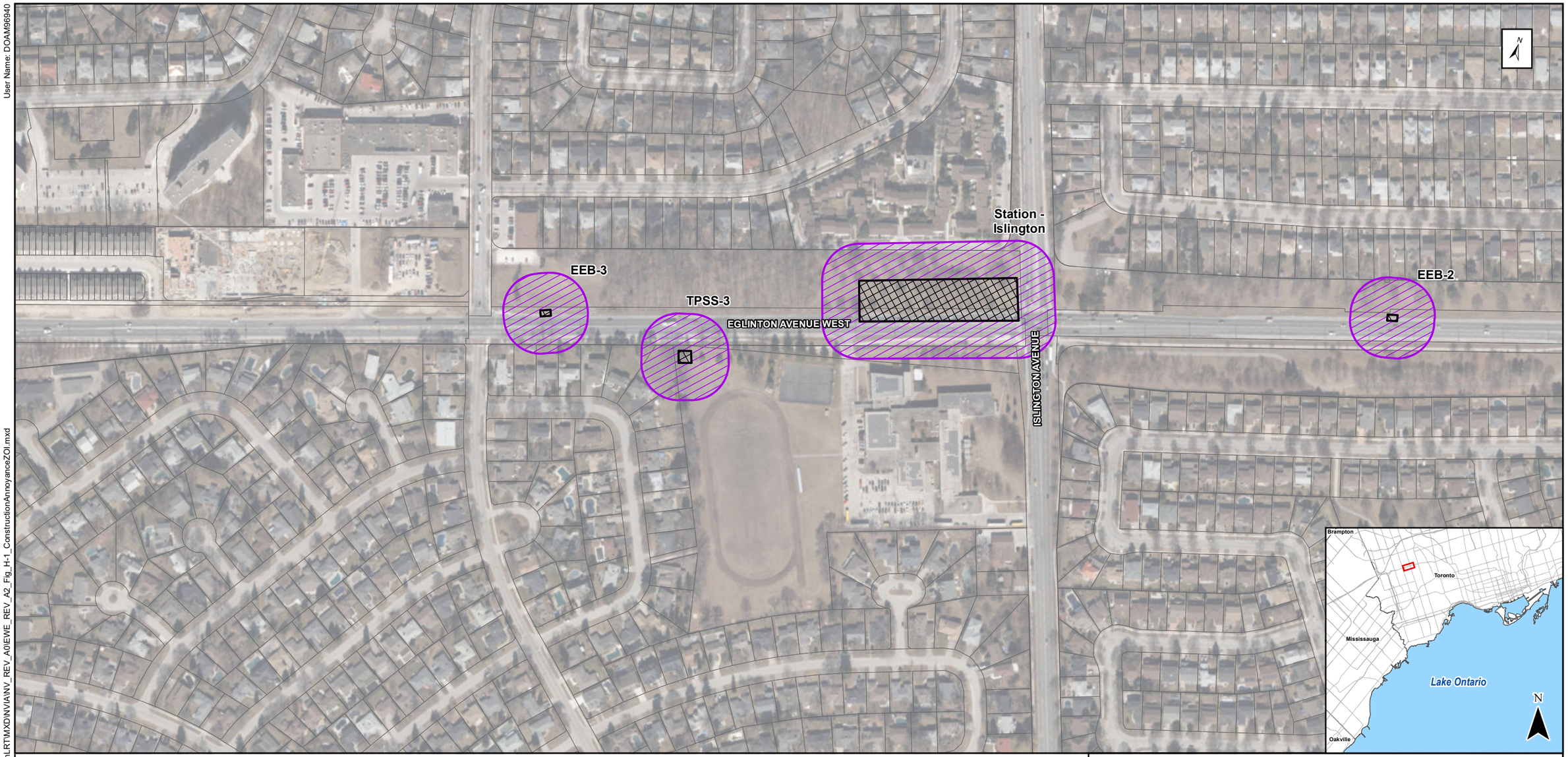
DATA SOURCES:
1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:
1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration – Annoyance ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** H-1	**Page:** 3 of 7



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Legend

- Construction Sites
- Vibration Annoyance Buffer - 33m
- Property Boundary

DATA SOURCES:
1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:
1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration – Annoyance ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** H-1	**Page:** 4 of 7

User Name: DOAM96940

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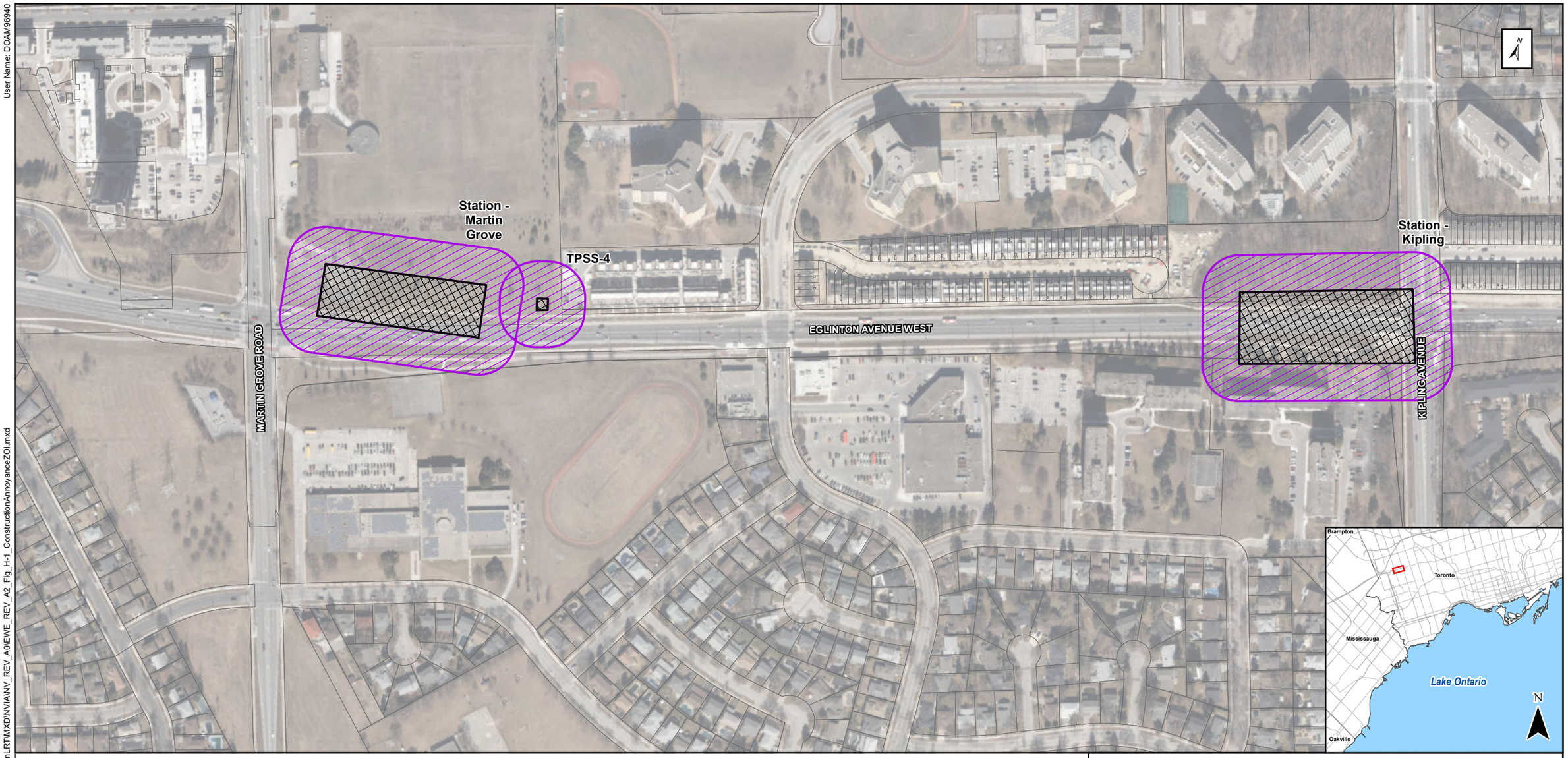

Legend

- Construction Sites
- Vibration Annoyance Buffer - 33m
- Property Boundary

DATA SOURCES:

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2. ESRI - Basemap.

NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

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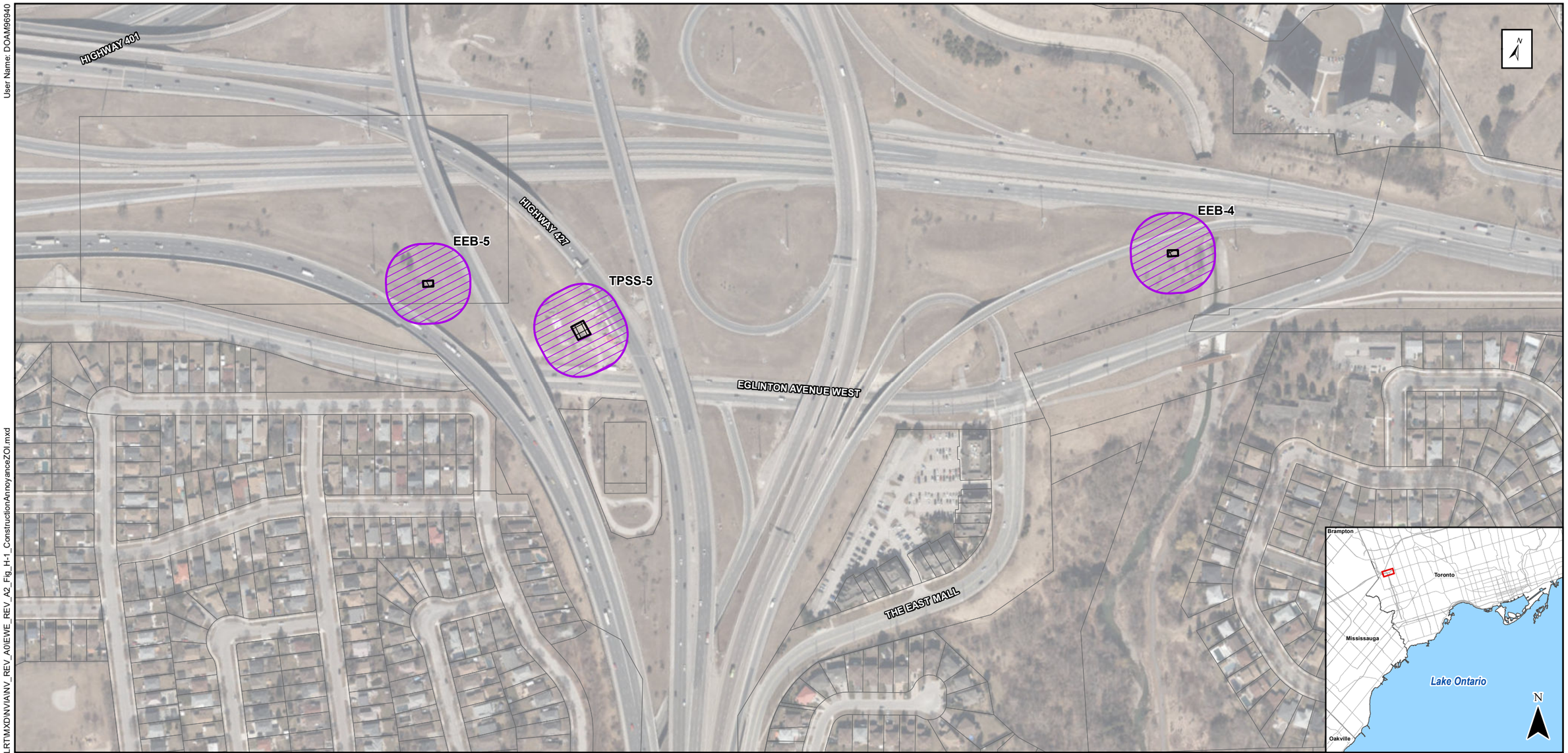
Project:	**Eglinton Crosstown West Extension**
Figure Title:	**Vibration Impact Assessment** **Construction Sites Vibration – Annoyance ZOI**
Prepared By:	4TRANSIT PARSONS HATCH WSP
Date:	**May 11, 2020**
Version: 0	**Review:**
Figure:	**H-1**
Page:	**5 of 7**



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- Construction Sites
- Vibration Annoyance Buffer - 33m
- Property Boundary

DATA SOURCES:
1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:
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Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration – Annoyance ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** H-1	**Page:** 6 of 7

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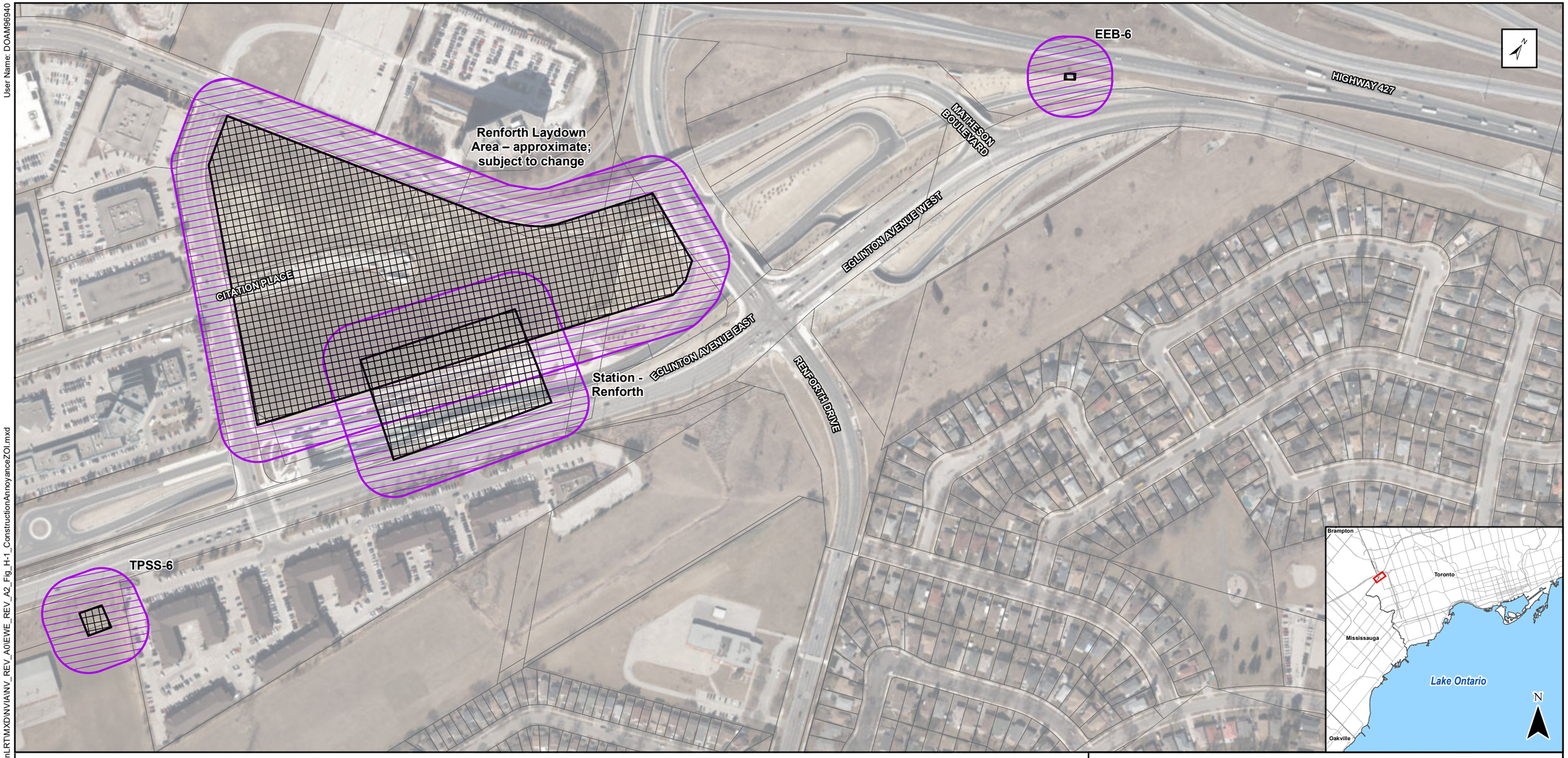

Legend

- Construction Sites
- Vibration Annoyance Buffer - 33m
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Construction Sites Vibration – Annoyance ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**May 11, 2020**
Version: 0	**Review:**	**Figure:** H-1	**Page:** 7 of 7

User Name: DOAM96940

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Legend

Alignment

- Above ground
- Underground
- Vibration Annoyance Buffer (See Note 1)
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

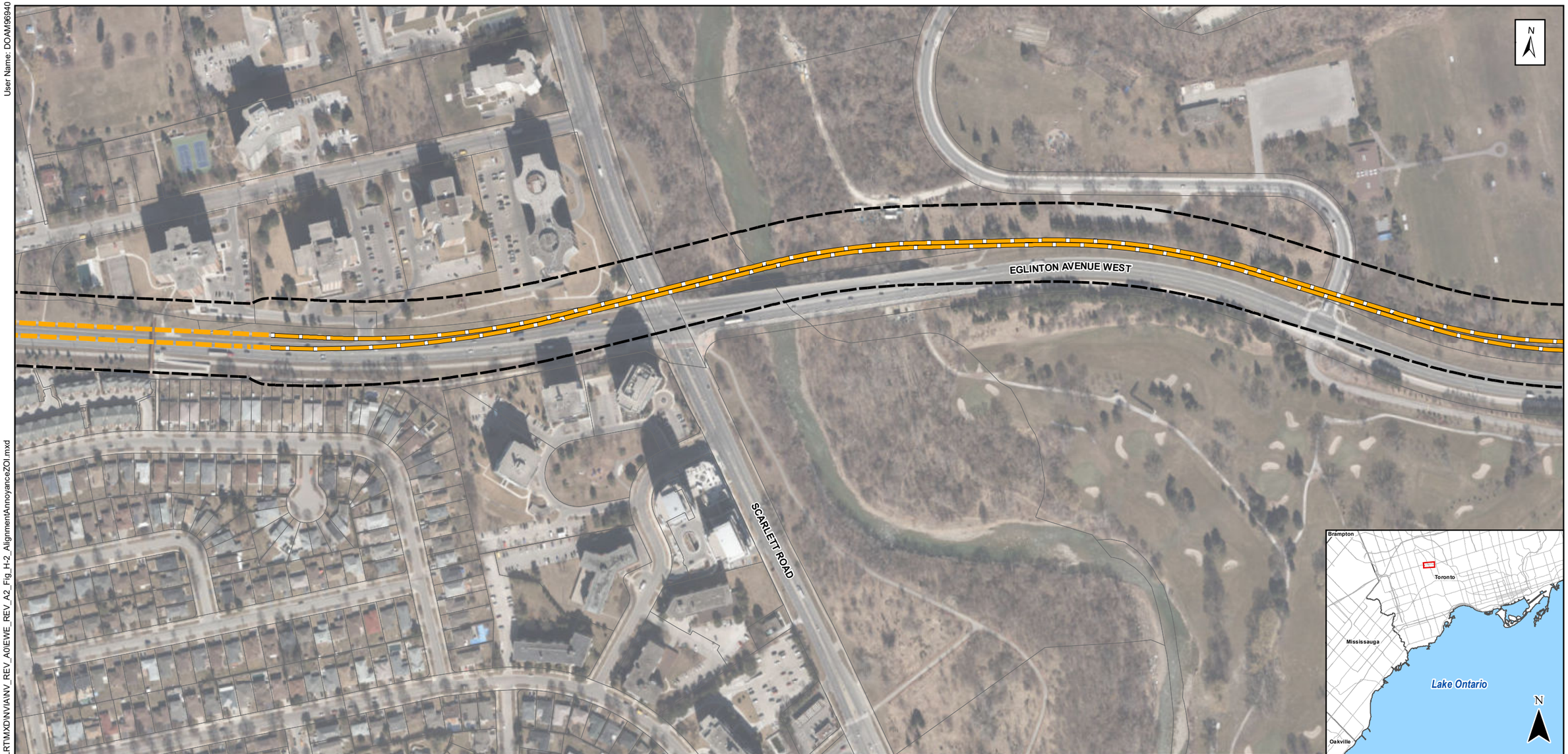
NOTES:

1. Study Area Buffer: 33 m above ground portion; 27 m underground portion.
2. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton Crosstown West Extension**
Figure Title:	**Vibration Impact Assessment Alignment Construction - Annoyance ZOI**
Prepared By:	4TRANSIT / PARSONS HATCH WSP
Date:	**April 13, 2020**
Version: 1-1	**Review:**
Figure: H-2	**Page:** 1 of 7



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Legend

Alignment

- Above ground
- Underground
- Vibration Annoyance Buffer (See Note 1)
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Study Area Buffer: 33 m above ground portion; 27 m underground portion.
2. Datum: NAD83 CSRS; Projection: MTM 10.

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1:3,500

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Alignment Construction - Annoyance ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 1-1	**Review:**	**Figure:** H-2	**Page:** 2 of 7

Legend

Alignment

- Above ground
- Underground
- Vibration Annoyance Buffer (See Note 1)
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Study Area Buffer: 33 m above ground portion; 27 m underground portion.
2. Datum: NAD83 CSRS; Projection: MTM 10.

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Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Alignment Construction - Annoyance ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 1-1	**Review:**	**Figure:** H-2	**Page:** 3 of 7

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Legend

Alignment

- Above ground
- Underground
- Vibration Annoyance Buffer (See Note 1)
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Study Area Buffer: 33 m above ground portion; 27 m underground portion.
2. Datum: NAD83 CSRS; Projection: MTM 10.

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Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Alignment Construction - Annoyance ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 1-1	**Review:**	**Figure:** H-2	**Page:** 4 of 7

Legend

Alignment

- Above ground
- Underground
- Vibration Annoyance Buffer (See Note 1)
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Study Area Buffer: 33 m above ground portion; 27 m underground portion.
2. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton Crosstown West Extension**
Figure Title:	**Vibration Impact Assessment Alignment Construction - Annoyance ZOI**
Prepared By:	4TRANSIT PARSONS HATCH WSP
Date:	**April 13, 2020**
Version: 1-1	**Review:**
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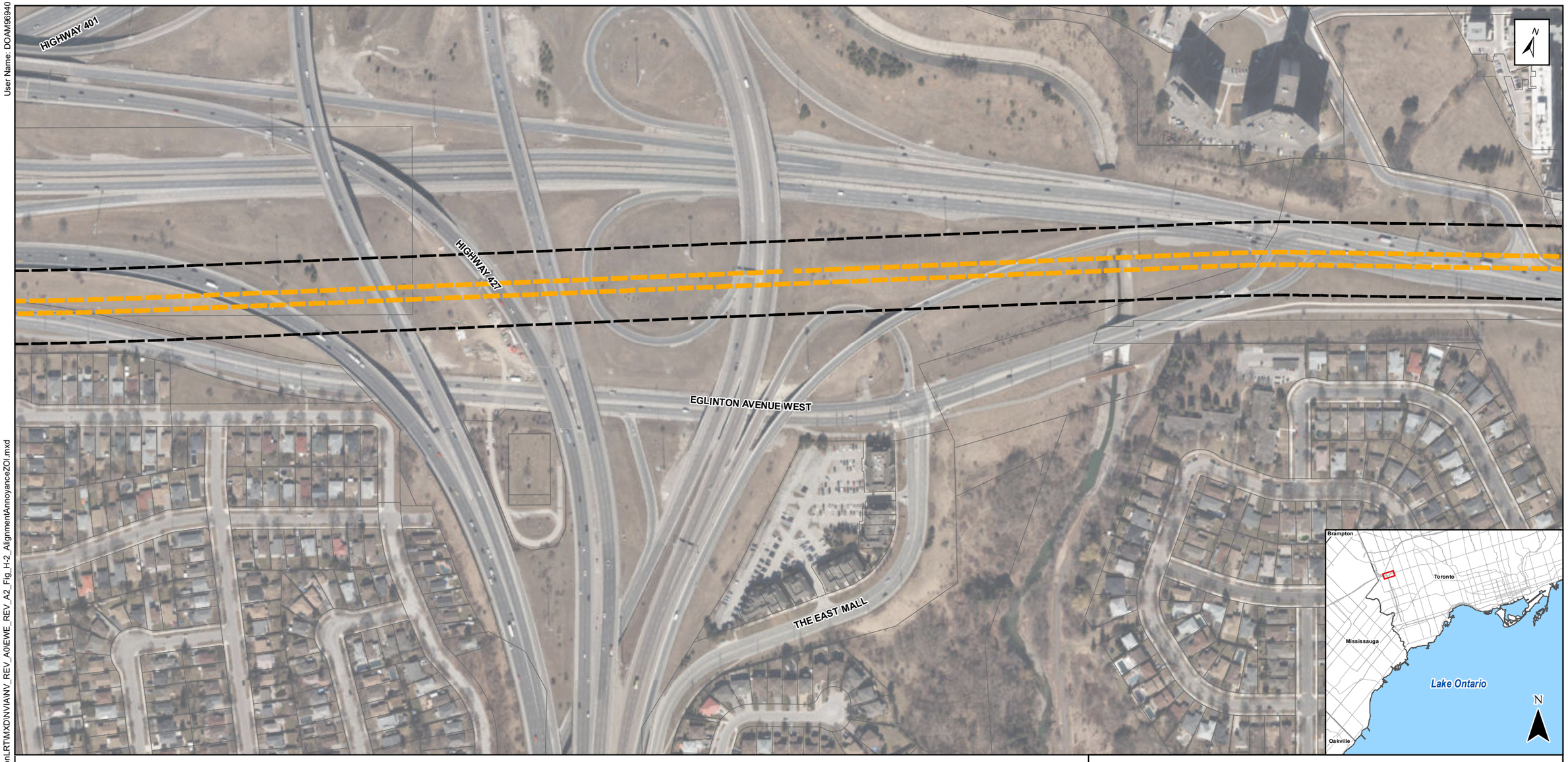
Page:	**5 of 7**



Legend

Alignment

- Above ground
- Underground
- Vibration Annoyance Buffer (See Note 1)
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Study Area Buffer: 33 m above ground portion; 27 m underground portion.
2. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

1:3,500

Project:	**Eglinton Crosstown West Extension**		
Figure Title:	**Vibration Impact Assessment Alignment Construction - Annoyance ZOI**		
Prepared By:	4TRANSIT PARSONS HATCH WSP	**Date:**	**April 13, 2020**
Version: 1-1	**Review:**	**Figure:** H-2	**Page:** 6 of 7

User Name: DOAM96940

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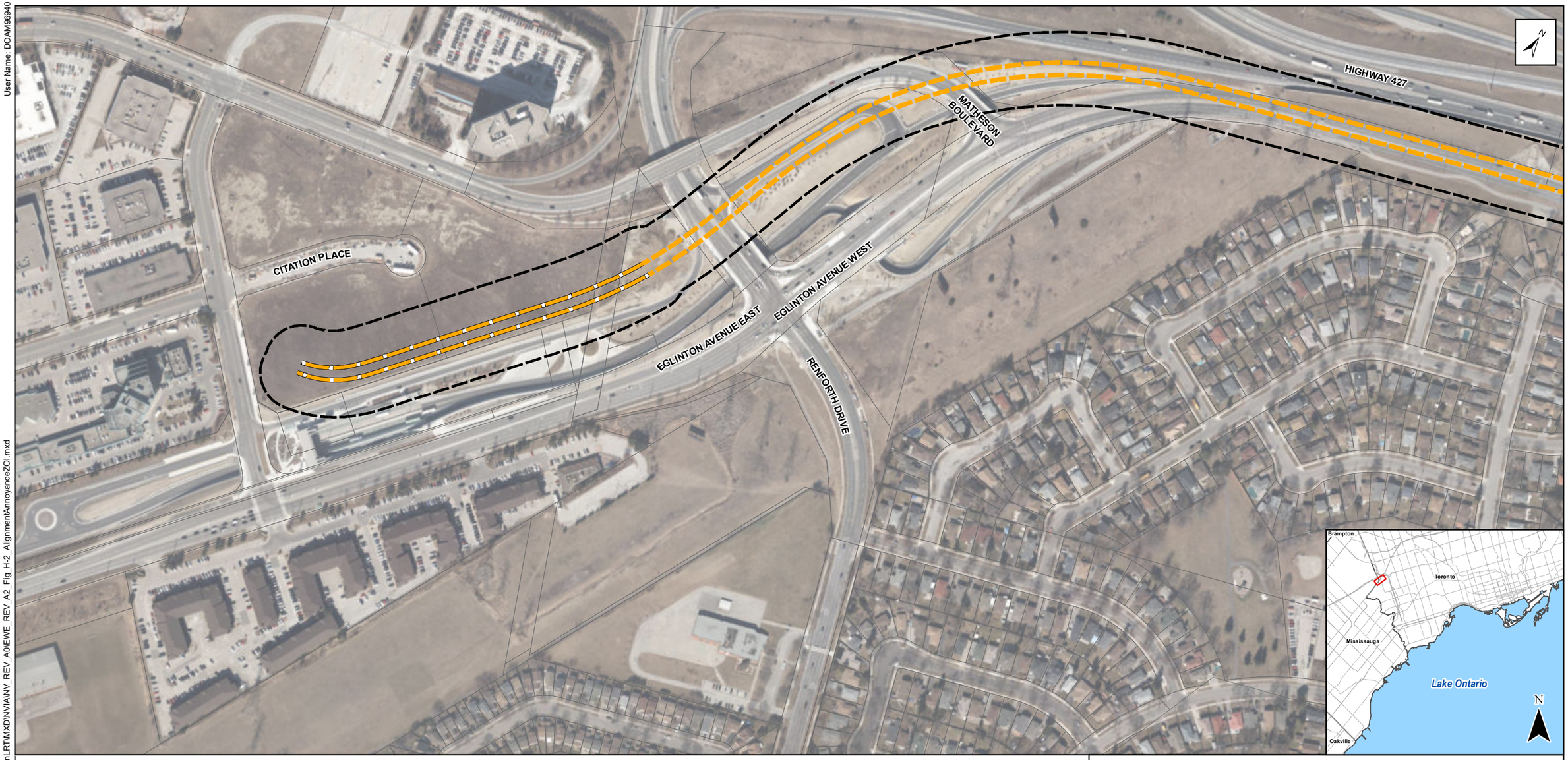

Legend

Alignment

- Above ground
- Underground
- Vibration Annoyance Buffer (See Note 1)
- Property Boundary

DATA SOURCES:

1. Ontario Open Data Catalogue - Roads and Railways.
2. ESRI - Basemap.

NOTES:

1. Study Area Buffer: 33 m above ground portion; 27 m underground portion.
2. Datum: NAD83 CSRS; Projection: MTM 10.

0 50 100 200 Meters

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Project:	**Eglinton Crosstown West Extension**
Figure Title:	**Vibration Impact Assessment Alignment Construction - Annoyance ZOI**
Prepared By:	4TRANSIT PARSONS HATCH WSP
Date:	**April 13, 2020**
Version: 1-1	**Review:**
Figure:	**H-2**
Page:	**7 of 7**