

# FINAL REPORT



## 65 & 71 AGNES STREET

MISSISSAUGA, ONTARIO

### NOISE AND VIBRATION IMPACT STUDY

RWDI #2102814

May 5, 2022



#### SUBMITTED TO

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## VERSION HISTORY

Index	Date	Description	Prepared by	Reviewed by
1	April 13, 2022	Draft	KD	GER
2	May 5, 2022	Final	KD	GER



## EXECUTIVE SUMMARY

RWDI was retained to prepare a Noise and Vibration Impact Study for the proposed 65 & 71 Agnes Street development located in Mississauga, Ontario. The proposed development will consist of a 29-storey residential building. This assessment was completed to support the Zoning-By-Law Amendment and Official Plan Amendment as required by the City of Mississauga.

Installation of central air-conditioning so that all suites' windows can remain closed is recommended for the proposed development as a noise control measure.

Vibration from the future Hurontario LRT on the proposed development is not expected due to the setback being greater than the worst-case setback noted in the project's Environmental Project Report. Thus, no mitigation measures for vibration are required.

At this stage in design the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact on both the building itself and its surroundings is expected to be feasible to meet the applicable criteria. We recommend that the building design is evaluated prior during detailed design to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of the analysis including implementation of the recommendations included with this assessment, the proposed development is predicted to meet the applicable sound and vibration criteria.



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# 1 INTRODUCTION

RWDI was retained to prepare a Noise and Vibration Impact Study in support of the Zoning By-Law Amendment (ZBA) and Official Plan Amendment (OPA) for the proposed 65 & 71 Agnes Street development located in Mississauga, Ontario. The proposed development will consist of a 29-storey residential development. The context site plan is shown in **Figure 1** and the site layout is shown in **Figure 2**.

The site is exposed to noise from road traffic on Hurontario Street to the north east, Confederation Parkway to the south west, Dundas Street to the south east, and Hillcrest Avenue to the north west. Agnes Street and Cook Street were not included in the assessment as these two roads have low traffic volume and are not significant. There is no existing exposure to rail traffic at the site, with the closest rail located 500 m to the north west. The potential impacts from the future Hurontario LRT are included in the assessment.

A screening level assessment of nearby stationary sources was conducted, and it was deemed that there are no sources of concern for this development.

This assessment was completed to support the ZBA and OPA as required by the City of Mississauga. This assessment was based on design drawings dated March 29, 2022.

# 2 APPLICABLE CRITERIA

Applicable criteria for transportation noise sources (road and rail), stationary noise sources and rail vibration are adopted from the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline (MOE, 2013), with a summary of the applicable criteria included with **Appendix A**.

The proposed development site would be characterized as a "Class 1 Area", which is defined according to NPC-300 as an area with an acoustical environment typical of a major population centre, where the background sound level is dominated by the activities of people, usually road traffic, often referred to as "urban hum."

# 3 IMPACT OF THE ENVIRONMENT ON THE PROPOSED DEVELOPMENT

## 3.1 Transportation Source Assessment

### 3.1.1 Road Traffic Volume Data

The Annual Ultimate Daily Traffic (AUDT) volumes, traffic makeup, and day-night split were obtained from the City of Mississauga.

A summary of the traffic data used is included in **Table 1** below with more detailed information included in **Appendix D**.

**Table 1:** Road Traffic Volumes

Roadway	Future Traffic (AUDT)	% Day/Night	Speed Limit (km/hr)	% Trucks
Hurontario Street	31,700	90% /10%	50	4%
Dundas Street East	32,000	90% /10%	50	6%
Confederation Parkway	19,700	90% /10%	50	3%
Hillcrest Avenue	28,400	90% /10%	50	3%

### 3.1.2 LRT Traffic Volume Data

Traffic on the future Hurontario LRT was included in the assessment. The publicly available information (Mississauga, 2014) indicates that the LRT will be designed for up to 5-minute interval service during peak hours. It was conservatively assumed that during the daytime a total of 96 trains will run and at nighttime the 14 trains will run, averaging 10- to 15-minute service respectively, with the understanding the LRT does not operate from 1:30AM to 5:00AM.

Excerpts from the publicly available project documentation is included in **Appendix D**.

### 3.1.3 Representative Receptors

The selection of receptors affected by transportation noise sources was based on the drawings reviewed for this assessment. Using the “building evaluation” feature of Cadna/A, each façade of the residential buildings was assessed.

Outdoor Living Areas (OLAs) would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and which are readily accessible from the building. OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g. courtyards, roof-top terraces), and/or private backyards and terraces with a minimum depth of 4m provided they are the only outdoor living area for the occupant. Daytime sound levels were assessed at the rooftop amenity space on the 3-storey podium (OLA\_01) as indicated in **Figure 3**.

### 3.1.4 Analysis and Results

Sound levels due to the adjacent transportation (road and rail) sources were predicted using the RLS-90 standard (RLS,1990) and FTA method (FTA, 2018) as implemented in the Cadna/A software package.

To assess the impact of transportation noise on suites, the maximum sound level on each façade was determined with the results summarized in **Table 2**.

**Table 2:** Predicted Ground Transportation Source Sound Levels – Plane of Window

Building	Road		LRT		Road + Rail		Notes
	Day L <sub>EQ</sub> , 16hr	Night L <sub>EQ</sub> , 8hr	Day L <sub>EQ</sub> , 16hr	Night L <sub>EQ</sub> , 8hr	Day L <sub>EQ</sub> , 16hr	Night L <sub>EQ</sub> , 8hr	
<b>Tower</b>	60 dBA	53 dBA	45 dBA	39 dBA	60 dBA	53 dBA	1
<b>Podium</b>	57 dBA	50 dBA	43 dBA	38 dBA	57 dBA	50 dBA	1

**Notes:**

1. Applicable for low and medium density developments: Provision for future installation of air-conditioning, warning clause "Type C".  
Applicable for high density developments: Installation of air-conditioning to allow for windows and doors to remain closed, warning clause "Type D". Refer to **Appendix C** for guidance regarding air-conditioning as a noise mitigation measure.

To assess the impact of transportation noise on the qualifying OLAs for the development, predicted sound level results are summarized in **Table 3**.

**Table 3:** Transportation Sound Levels in Outdoor Living Areas (OLAs)

Receptor	Description	Daytime L <sub>EQ</sub> , 16hr	Notes
<b>OLA_01</b>	3-Storey Outdoor Amenity	49 dBA	1

**Notes:**

1. The predicted sound level meets the NPC-300 criterion for OLAs. Noise control measures are not required.

Due to the exposure to transportation sources along existing nearby roads and the future Hurontario LRT. The combined (road and rail) daytime average sound levels for the OLAs included in the assessment is 49 dBA. Since the OLA is below 55 dBA, noise control measures are not required.

## 3.2 Rail Vibration Assessment

Vibration analysis was completed for the design of the LRT and excerpts from the report are included in **Appendix D**. It states the worst case for vibration as "Any sensitive receptor located at least 25 m from the line of the nearest track wherever the LRT travels at 80 km/h will meet the guidelines limit of the 0.10 mm/s without any additional control measures". The setback to the proposed development is approximately 200 m. Therefore vibration from the LRT at the proposed development is not expected to be a concern.

## 3.3 Recommendations

Based on the noise and vibration impact assessment results, the following recommendations were determined for the project. Recommendations are provided for both transportation sources and stationary sources.



### 3.3.1 Transportation Sources

The following recommendations are provided to address transportation sources.

#### 3.3.1.1 *Ventilation Recommendations*

Due to the transportation sound levels at the plane of the façade, central air conditioning is recommended for the proposed development to allow for windows and doors to remain closed as a noise mitigation measure. Further, prospective purchasers or tenants should be informed by a warning clause “Type D”.

### 3.3.2 Warning Clauses

The following warning clauses are recommended for the proposed development:

1. NPC-300 Type D to address transportation sound levels at the plane of window

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. The wording of the recommended warning clauses is included with **Appendix B**.

## 4 IMPACT OF THE PROPOSED DEVELOPMENT ON ITS SURROUNDINGS AND ON ITSELF

On-site stationary sources for the development are expected to consist of HVAC related equipment in the roof-top mechanical penthouse as well as various exhaust fans. Further, consideration should be given to control airborne and structure-borne noise generated within the proposed development.

Within the development itself the main sources of noise that are likely to affect the uses of the building are the mechanical systems.

Provided that best practices for the acoustical design of the building are followed, noise from building services equipment associated with the development are expected to be feasible to meet the applicable sound level criteria due to the nature (residential) of the proposed development.

We recommend that the potential noise impact of the proposed development is reviewed during detailed design to ensure the applicable sound level criteria will be achieved.

## 5 CONCLUSIONS

RWDI was retained to prepare a Noise and Vibration Impact Study for the proposed residential development located in Mississauga, Ontario.

Installation of central air-conditioning so that all suites' windows can remain closed is recommended for the proposed development as a noise control measure.

Vibration from the future Hurontario LRT on the proposed development is not expected due to the setback being greater than the worst-case setback noted in the project's Environmental Project Report. Thus, no mitigation measures for vibration are required.

At this stage in design the impact of the development on itself and its surroundings could not be quantitatively assessed. However, the impact on both the building itself and its surroundings is predicted to meet the applicable criteria.

We recommend that the building design is evaluated prior to building permit to ensure that the acoustical design is adequately implemented in order to meet the applicable criteria.

Based on the results of the analysis including implementation of the recommendations included with this assessment, the proposed development is predicted to meet the applicable sound and vibration criteria.



## 6 REFERENCES

1. Ontario Ministry of the Environment (MOE), August 2013, Publication NPC-300, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning (MOE, 2013).
2. Richtlinien für den Lärmschutz an Strassen (RLS). BM für Verkehr, Bonn, 1990 (RLS, 1990).
3. Federal Transit Administration, U.S. Department of Transportation, Transit Noise and Vibration Impact Assessment, 2018 (FTA, 2018).
4. The Railway Association of Canada (RAC), Guidelines for New Development in Proximity to Railway Operations (RAC, 2013).
5. City of Mississauga, City of Brampton, and Metrolinx, Hurontario-Main LRT Project Preliminary Design TPAP Environmental Project Report (Mississauga, 2014).

## 7 STATEMENT OF LIMITATIONS

This report entitled 65 & 71 Agnes Street dated April 15, 2022, was prepared by Rowan Williams Davies & Irwin Inc. ("RWDI") for Intentional Capital ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein 65 & 71 Agnes Street ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

# FIGURES





Context Site Plan

65 & 71 Agnes Street, Mississauga, ON.

Drawn by: KD	Figure: Fig 1
Project #: 2102814	
Date: 2022-04-11	







## Site Layout

65 & 71 Agnes Street, Mississauga, ON.

Drawn by: KD

Figure: Fig 2

Project #:

2102814

Date:

2022-04-12








Legend

Proposed Development

OLA Receptor

Outdoor Living Areas (OLAs)	Drawn by: KD	Figure: Fig 3	
	Project #: 2102814		
	Date: 2022-04-12		
65 & 71 Agnes Street, Mississauga, ON.			



A large decorative graphic on the left side of the page, featuring a blue triangle at the top left and a large, light gray curved shape that dominates the lower half of the page.

# APPENDIX A



## APPENDIX A: CRITERIA

### A.1 Transportation Sources

Guidance from the Ontario Ministry of the Environment, Conservation and Parks (MECP) NPC-300 Environmental Noise Guideline was used to assess environmental noise generated by transportation-related sources. There are three aspects to consider, which include the following:

- i. Transportation source sound levels in indoor living areas (living rooms and sleeping quarters), which determines building façade elements (windows, exterior walls, doors) sound insulation design recommendations.
- ii. Transportation source sound levels at the plane of the window, which determines air-conditioning and ventilation system recommendations and associated warning clauses which inform the future occupants that windows and doors must be closed in order to meet the indoor sound level criteria.
- iii. Transportation source sound levels in Outdoor Living Areas (OLAs), which determines OLA noise mitigation and related warning clause recommendations.

#### A.1.1 Road and Rail

##### A.1.1.1 Indoor Sound Level Criteria

For assessing sound originating from transportation sources, NPC-300 defines sound level criteria as summarized in Table 1 for indoor areas of sensitive uses. The specified values are maximum sound levels and apply to the indicated indoor spaces with the windows and doors closed.

**Table 1: Indoor Sound Level Criteria for Road and Rail Sources**

Type of Space	Source	Sound Level Criteria (Indoors)	
		Daytime Leq,16-hr 07:00h – 23:00h	Nighttime Leq,8-hr 23:00h – 07:00h
<b>Living Quarters</b> Examples: Living, dining and den areas of residences, hospitals, nursing homes, schools and daycare centres	<b>Road</b>	45 dBA	
	<b>Rail</b>	40 dBA	
<b>Sleeping Quarters</b>	<b>Road</b>	45 dBA	40 dBA
	<b>Rail</b>	40 dBA	35 dBA

NPC-300 also provides guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The guideline sound level criteria presented in Table 2 are provided to inform good-practice design objectives.

**Table 2: Supplementary Indoor Sound Level Criteria for Road and Rail Sources**

Type of Space	Source	Sound Level Criteria (Indoors)	
		Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h
General offices, reception areas, retail stores, etc.	Road	50 dBA	-
	Rail	45 dBA	-
Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	Road	45 dBA	-
	Rail	40 dBA	-
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	Road	-	40 dBA
	Rail	-	35 dBA
Sleeping quarters of hotels/motels	Road	-	45 dBA
	Rail	-	40 dBA

### A.1.1.2 Outdoor Living Areas (OLAs)

Outdoor Living Areas (OLAs) would include outdoor areas intended and designed for the quiet enjoyment of the outdoor environment and which are readily accessible from the building.

OLAs may include any common outdoor amenity spaces associated with a multi-unit residential development (e.g. courtyards, roof-top terraces), and/or private backyards and terraces with a minimum depth of 4m provided they are the only outdoor living area for the occupant. The sound level criteria for outdoor living areas is summarized in Table 3.

**Table 3: Sound Level Criteria – Outdoor Living Area**

Assessment Location	Sound Level Criteria (Outdoors)	
	Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h
Outdoor Living Area (OLA) (Combined Road and Rail)	55 dBA	-

### A.1.1.3 Outdoor and Plane of Window Sound Levels

In addition to the sound level criteria, noise control measures and requirements for ventilation and warning clauses requirements are recommended for residential land-uses based on predicted transportation source sound levels incident in the plane of window at bedrooms and living/dining rooms, and/or at outdoor living areas. These recommendations are summarized in Table 4 below.

**Table 4: Ventilation, Building Component, and Warning Clauses Recommendations for Road/Rail Sources**

Assessment Location	Transportation Sound Level (Outdoors)		Recommendations
	Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h	
Plane of Window (Road)	> 65 dBA	> 60 dBA	<p>Installation of air conditioning to allow windows to remained closed.</p> <p>The sound insulation performance of building components must be specified and designed to meet the indoor sound level criteria.</p> <p>Warning clause “Type D” is recommended.</p>
	> 55 dBA	> 50 dBA	<p>Applicable for low and medium density development: Forced-air ventilation system to allow for the future installation of air-conditioning. Warning clause “Type C” is recommended.</p> <p>Applicable for high density development: Air conditioning to allow windows to remained closed. Warning clause “Type D” is recommended.</p>

Assessment Location	Transportation Sound Level (Outdoors)		Recommendations
	Daytime $L_{eq,16-hr}$ 07:00h – 23:00h	Nighttime $L_{eq,8-hr}$ 23:00h – 07:00h	
Plane of Window (Rail <sup>1,2</sup> )	> 60 dBA	> 55 dBA	The acoustical performance of building façade components should be specified such that the indoor sound level limits are predicted to be achieved.  Warning clause “Type D” is recommended.
	> 60 dBA ( $L_{eq,24hr}$ ) and < 100m from tracks		Exterior walls consisting of a brick veneer or masonry equivalent for the first row of dwellings.  Warning clause “Type D” is recommended.
Outdoor Living Area (Combined Road and Rail <sup>3</sup> )	≤ 60 dBA > 55 dBA	-	If sound levels are predicted to exceed 55 dBA, but are less than 60 dBA, noise controls may be applied to reduce the sound level to 55 dBA.  If noise control measures are not provided, a warning clause “Type A” is recommended.
	> 60 dBA	-	Noise controls (barriers) should be implemented to meet the 55 dBA criterion.  If mitigation is not feasible to meet the 55 dBA criterion for technical, economic or administrative reasons, an exceedance of 5 dB may be acceptable (to a maximum sound level of 60 dBA). In this case a warning clause “Type B” would be recommended.

**Notes:**

1. Whistle noise is included (if applicable) in the determination of the sound level at the plane of window.
2. Some railway companies (e.g. CN, CP) may require that the exterior walls include a brick veneer or masonry equivalent for the façade facing the railway line, regardless of the sound level.
3. Whistle noise is not included in the determination of the sound level at the OLA.

#### **A.1.1.4 Rail Layover Sites**

NPC-300 provides a sound level limit for rail layover sites to be the higher of the background sound level or 55 dBA  $L_{eq,1-hr}$ , for any one-hour period.

#### **A.1.1.5 Rail Vibration Criteria**

An assessment of rail vibration is generally recommended for developments within 75m of a rail corridor or rail yard, and adjacent to or within a setback of 15m of a transit (subway or light-rail) rail line.

The generally accepted vibration criterion for sensitive land-uses is the threshold of perception for human exposure to vibration, being a vibration velocity level of 0.14 mm/s RMS in any one-third octave band centre frequency in the range of 4 Hz to 200 Hz.

This vibration criterion is based on a one-second exponential time-averaged maximum hold root-mean-square (RMS) vibration velocity level and is consistent with the Railway Associations of Canada (RAC, 2013) guideline, the U.S. Federal Transit Authority (FTA, 2018) criterion for residential land-uses, the Toronto Transit Commission (TTC) guidelines for the assessment of potential vibration impact of future expansion (MOEE/TTC, 1993).

## A.2 Stationary Sources

### A.2.1 NPC-300 Sound Level Criteria – Stationary Sources

Guidance from the MECP NPC-300 Environmental Noise Guideline is used to assess environmental noise generated by stationary sources, for example industrial and commercial facilities.

Noise from stationary sources is treated differently from transportation sources and requires sound levels be assessed for the predictable worst-case one-hour average sound level ( $L_{eq}$ ) for each period of the day. For assessing sound originating from stationary sources, NPC-300 defines sound level criteria for two types of Points of Reception (PORs): outdoor and plane of window.

The assessment criteria for all PORs is the higher of either the exclusion limit per NPC-300 or the minimum background sound level that occurs or is likely to occur at a POR. The applicable exclusion limit is determined based on the level of urbanization or “Class” of the area. The NPC-300 exclusion limits for continuously operating stationary sources are summarized in Table 9.

**Table 9: NPC-300 Exclusion Limits – Continuous and Quasi-Steady Impulsive Stationary Sources ( $L_{Aeq-1hr}$ )**

Time Period	Class 1 Area		Class 2 Area		Class 3 Area		Class 4 Area	
	Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window
<b>Daytime 0700-1900h</b>	50 dBA	50 dBA	50 dBA	50 dBA	45 dBA	45 dBA	55 dBA	60 dBA
<b>Evening 1900-2300h</b>	50 dBA	50 dBA	45 dBA	50 dBA	40 dBA	40 dBA	55 dBA	60 dBA
<b>Nighttime 2300-0700h</b>	--	45 dBA	--	45 dBA	--	40 dBA	--	55 dBA

**Notes:**

1. The applicable sound level criterion is the background sound level or the exclusion limit, whichever is higher.
2. Class 1, 2 and 3 sound level criteria apply to a window that is assumed to be open.
3. Class 4 area criteria apply to a window that is assumed closed. Class 4 area requires formal designation by the land-use planning authority.
4. Sound level criteria for emergency backup equipment (e.g. generators) operating in non-emergency situations such as testing or maintenance are 5 dB greater than the applicable sound level criteria for stationary sources.

For impulsive sound, other than quasi-steady impulsive sound, from a stationary source, the sound level criteria at a POR is expressed in terms of the Logarithmic Mean Impulse Sound Level ( $L_{LM}$ ), and is summarized in Table 10.

**Table 10:** NPC-300 Exclusion Limits – Impulsive Stationary Sources (L<sub>LM</sub>)

Time Period	Number of Impulses in Period of One-Hour	Class 1 and 2 Areas		Class 3 Areas		Class 4 Areas	
		Outdoor	Plane of Window	Outdoor	Plane of Window	Outdoor	Plane of Window
Daytime (0700-2300h)	9 or more	50 dBAI	50 dBAI	45 dBAI	45 dBAI	55 dBAI	60 dBAI
Nighttime (2300-0700h)		-	45 dBAI	-	40 dBAI	-	55 dBAI
Daytime (0700-2300h)	7 to 8	55 dBAI	55 dBAI	50 dBAI	50 dBAI	60dBAI	65 dBAI
Nighttime (2300-0700h)		-	50 dBAI	-	45 dBAI	-	60 dBAI
Daytime (0700-2300h)	5 to 6	60 dBAI	60 dBAI	55 dBAI	55 dBAI	65 dBAI	70 dBAI
Nighttime (2300-0700h)		-	55 dBAI	-	50 dBAI	-	65 dBAI
Daytime (0700-2300h)	4	65 dBAI	65 dBAI	60 dBAI	60 dBAI	70 dBAI	75 dBAI
Nighttime (2300-0700h)		-	60 dBAI	-	55 dBAI	-	70 dBAI
Daytime (0700-2300h)	3	70 dBAI	70 dBAI	65 dBAI	65 dBAI	75 dBAI	80 dBAI
Nighttime (2300-0700h)		-	65 dBAI	-	60 dBAI	-	75 dBAI
Daytime (0700-2300h)	2	75 dBAI	75 dBAI	70 dBAI	70 dBAI	80 dBAI	85 dBAI
Nighttime (2300-0700h)		-	70 dBAI	-	65 dBAI	-	80 dBAI
Daytime (0700-2300h)	1	80 dBAI	80 dBAI	75 dBAI	75 dBAI	85 dBAI	90 dBAI
Nighttime (2300-0700h)		-	75 dBAI	-	70 dBAI	-	85 dBAI

**Notes:**

1. The applicable sound level criterion is the background sound level or the exclusion limit, whichever is higher.

The background features a large, light gray circular shape on the right side, partially overlapping a blue triangular shape on the left. The text 'APPENDIX B' is centered within the gray circle.

## APPENDIX B



## APPENDIX B: WARNING CLAUSES

Warning clauses are recommended to be included on all development agreements, offers of purchase and agreements of purchase and sale or lease. Warning clauses may be used individually or in combination.

The following warning clauses are recommended based on the applicable guidelines; however, wording may be modified/customized during consultation with the planning authority to best suit the proposed development:

### B.1 Transportation Sources

**NPC-300 Type A:** Recommended to address surface transportation sound levels in OLAs if sound level is in the range of >55 dBA but  $\leq$  60 dBA, and noise controls have not been provided.

*"Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air traffic) may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."*

**NPC-300 Type B:** Recommended to address surface transportation sound levels in OLAs if the sound level is in the range of >55 dBA but  $\leq$  60 dBA, and noise controls have been provided. Recommended to address outdoor aircraft sound levels  $\geq$  NEF 30.

*"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (rail traffic) (air traffic) may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."*

**NPC-300 Type C:** Applicable for low and medium density developments only, recommended to address transportation sound levels at the plane of window.

*"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

**NPC-300 Type D:** Recommended to address transportation sound levels at the plane of window.

*"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

**Proximity to Railway Line:** Metrolinx/CN/CP/VIA Warning Clause for developments that are within 300 metres of the right-of-way

*"Warning: [Canadian National Railway Company] [Metrolinx / GO] [Canadian Pacific Railway Company] [VIA Rail Canada Inc.] or its assigns or successors in interest has or have a right-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the rail facilities on such right-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR/Metrolinx/GO/CPR/VIA will not responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid right-of-way."*

## B.2 Stationary Sources

**NPC-300 Type E:** Recommended to address proximity to commercial/industrial land-use

*"Purchasers/tenants are advised that due to the proximity of the adjacent industrial/commercial land-uses, noise from the industrial/commercial land-uses may at times be audible."*

**NPC-300 Type F:** Recommended to for Class 4 Area Notification

*"Purchasers/tenants are advised that sound levels due to the adjacent industry (facility) (utility) are required to comply with sound level limits that are protective of indoor areas and are based on the assumption that windows and exterior doors are closed. This dwelling unit has been supplied with a ventilation/air conditioning system which will allow windows and exterior doors to remain closed."*

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# APPENDIX C

## APPENDIX C: NOISE MITIGATION GUIDANCE

### C.1 Acoustic/Noise Barrier

Generally, noise controls to attenuate transportation sound levels at Outdoor Living Areas (OLAs) would consist of the implementation of acoustic/noise barriers with materials that would meet the guidance included in NPC-300, for example:

- A wall, berm, wall/berm combination or similar structure, used as a noise control measure, and high enough to break the line-of-sight between the source and the receptor.
- The minimum surface density (face weight) is 20 kg/m<sup>2</sup>
  - Many materials could satisfy the surface density requirement, e.g. wood, glass, concrete, Plexiglas, Acrylite.
  - The required thickness can be determined by dividing the 20 kg/m<sup>2</sup> face weight by the material density (kg/m<sup>3</sup>). Typically, this would imply:
    - 50 mm (2") thickness of wood
    - 13 mm (0.5") thickness of lighter plastic (like Plexiglas or PVC)
    - 6 mm (0.25") thickness of heavier material (like aluminum, glass, concrete)
- The barrier should be structurally sound, appropriately designed to withstand wind and snow load, and constructed without cracks or surface gaps. Joints between panels may need to be overlapped to ensure surfaces are free of gaps, particularly for wood construction.
- Any gaps under the barrier that are necessary for drainage purposes should be minimized and localized, so that the acoustical performance of the barrier is maintained.
- If a sound absorptive face is to be included in the barrier design, the minimum noise reduction coefficient is recommended to be NRC 0.7.

### C.2 Building Ventilation and Air Conditioning

The use of air conditioning itself is not a noise control measure; however, it allows for windows and doors to remain closed, thereby reducing the indoor sound levels.

NPC-300 provides the following guidance with respect to implementation of building ventilation and air conditioning:

- a. the noise produced by the proposed ventilation system in the space served does not exceed 40 dBA. In practice, this condition usually implies that window air conditioning units are not acceptable;
- b. the ventilation system complies with all national, provincial and municipal standards and codes;
- c. the ventilation system is designed by a heating and ventilation professional; and
- d. the ventilation system enables the windows and exterior doors to remain closed.

Air conditioning systems also need to comply with Publication NPC-216, and/or any local municipal noise by-law that has provisions relating to air conditioning equipment.

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# APPENDIX D

### LRT System Elements

#### LRT Operations

The objective of the operational design criteria was to set out specifications that will help ensure reliable service, even during downgraded operating conditions. The operations will also vary to cater to the expected demand throughout the hours of operation. On a daily basis, revenue service is expected to commence at 5:00 a.m. from both terminal stops and end at 1:30 a.m. on weekdays and Saturdays, and operate between 7:00 a.m. and midnight on Sundays. The headway will be adjusted throughout operational service in order to comply with scheduling demands, with a minimum headway of 5 minutes during peak periods and decreasing in off-peak periods. The current operations plan will result in an average operating speed of 27 km/h and a one-way journey time of 47 minutes between the two end stops. This is achieved through partial segregation from other vehicular traffic and providing priority to LRT vehicles at signalized intersections (through the implementation of Intelligent Transportation System components), and the system will operate on an LRT vehicle priority green signal basis. In order to achieve this, the traffic signal system will be optimized, including the installation of an integrated system of location sensors, with specialized traffic controllers that use logical algorithms to define optimum cycle times for an LRT priority system throughout the corridor.

#### Light Rail Vehicle

The light rail vehicles will be multi-section articulated low-floor vehicles, with a maximum width of 2.65 m (excluding rear-view cameras) and a length of about 30 m (although longer units around 40 m long are also possible). Initially, the vehicles will typically be operated in two-unit consists (60 m long). The system has been designed to operate with three-unit consists up to a length of 90 m in the long term. Peak carrying capacity will be in the order of 200 passengers/vehicle, or 600 passengers per 3-vehicle consist.



#### Maintenance and Storage Facility



It is proposed that the HMLRT Maintenance and Storage Facility (MSF) be situated on the provincially-owned lands within the Parkway Belt West bounded by Highway 407 to the north, Hurontario Street to the west, the Hydro One Networks Inc. transmission line and utility corridor to the south and Kennedy Road to the east. It will be connected to Hurontario Street via a dedicated spur line that diverges from the Hurontario Street corridor and runs east on Topflight Drive and north on Edwards Boulevard. The 7 ha MSF will accommodate up to 56 LRVs initially, and 74 over the long term. The HMLRT Control Centre will also be located on the MSF site. The MSF layout is shown in Appendix A.1 of this EPR.

#### Power Supply and Distribution

The system will be designed to provide the necessary power, as well as the voltage range, to ensure proper operation of the trains. The traction power system, consisting of traction power substations (TPSS) and the Overhead Contact System (OCS), will provide 750Vdc to power the trains. Due to concerns related to heritage attributes within the Main Street South Heritage Area and Downtown Brampton, (i.e., between the north crossing of Etobicoke Creek and the Brampton GO stop), an alternative power supply system (the option comprising battery packs or super/ultracapacitors installed on board the LRVs, with no Overhead Contact System) is being carried forward for further investigation of costs and benefits as part of the Detail Design phase. Its implementation is contingent upon final acceptability of financial and technical implications.

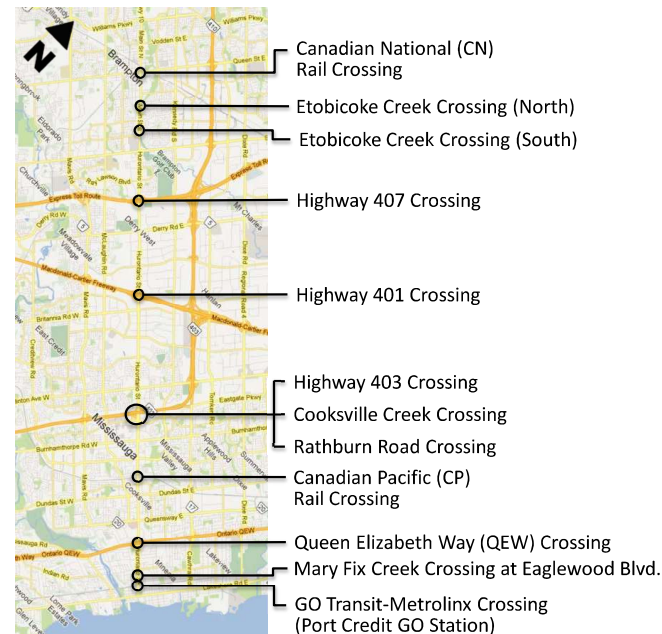


The system will be designed to allow for a single TPSS failure without any degradation of service. A preliminary estimate indicates that 15 TPSS would be needed for the mainline and one TPSS will be provided for the Maintenance and Storage Facility to meet the Service Level to 2031. The preliminary TPSS locations are shown in Appendix A.1 of this EPR.

### Structures

A number of existing structures are affected by the proposed HMLRT design scheme. In addition, some new structures are proposed. The engineering investigations included an assessment of the condition of all existing structures in the LRT corridor, identified the new structures required, and offered recommendations for the structural work to be completed as part of the project. The structure locations are shown in Figure ES-3.

**Figure ES-3: Key Plan for New and Upgraded Structures**



The proposed structural work, as shown on the Preliminary Design plates in Appendix A.1, include:

- New bridges at:
  - GO Transit-Metrolinx Crossing (Port Credit GO Station) - immediately west of the existing bridge (box structure through the existing rail embankment);
  - Mary Fix Creek - Eaglewood Boulevard will be extended to Oriole Avenue (west of Hurontario Street) via a new bridge over the Mary Fix Creek channel;
  - Queen Elizabeth Way (QEW) - construction of a new bridge to carry the QEW over the realigned northbound lanes carrying general purpose traffic; and

Roadway	Intersection	2031 AM Peak Hour Traffic Volumes		Increase (dB)
		No Project	With Project	
Confederation Pkwy.	Hillcrest	1,623	1,735	0.3
Confederation Pkwy.	Dundas	1,259	1,232	-0.1
Confederation Pkwy.	King	583	812	1.4
<b>Confederation Pkwy.</b>	<b>Paisley</b>	<b>274</b>	<b>562</b>	<b>3.1</b>
<b>Confederation Pkwy.</b>	<b>Queensway</b>	<b>61</b>	<b>336</b>	<b>7.4</b>
Kennedy	Queen	1,331	1,375	0.1
Kennedy	Clarence	1,070	1,049	-0.1
Kennedy	Glidden	916	954	0.2
Kennedy	Steeles	706	680	-0.2
Kennedy	First Gulf Blvd.	943	1,068	0.5
Kennedy	Derry	808	934	0.6
Kennedy	Courtneypark	978	1,067	0.4
Kennedy	Matheson	676	721	0.3
Kennedy	Bristol	656	743	0.5
Central Pkwy.	Eglinton	1,038	1,140	0.4
Central Pkwy.	Rathburn	804	824	0.1
Central Pkwy.	Burnhamthorpe	675	645	-0.2
Central Pkwy.	Bloor	1,031	1,045	0.1
Central Pkwy.	Cliff	742	824	0.5
Central Pkwy.	Mississauga Valley South	685	815	0.8

As can be seen in the above table, the sound-level increases along parallel routes are quite minimal. Increases of less than 3 dB in the average sound levels are considered insignificant. The exceptions are shown in bold in Table 4-7, along a portion of Confederation Parkway. Here, the absolute sound levels increase between 3 and 7 dB. While this is a significant change, it should be taken in context with the absolute sound levels.

With peak-hour volumes of 336 vehicles per hour at Queensway, the sound levels at receptors along Confederation Parkway would be approximately 56 dB Leq during the daytime and 50 dBA Leq during the night-time. In comparing this to the MOEE/TTC draft protocol's baseline limit of 55 dBA during the daytime and 50 dBA during the night-time, the impacts are actually 1 dB and 0 dB, respectively.

Hence, overall, the diversion of traffic to parallel routes is minor and the acoustic effects are insignificant. Noise control measures are not warranted for any associated increases in traffic noise along the major parallel routes.

The potential vehicle wheel squeal has also been reviewed wherever the LRT corridor makes sharp turns. Generally, such turns occur at major intersections where the ambient sound levels are already quite high. Provided that the light rail vehicles are equipped with a wheel damping system, the increase in sound levels at the intersections is approximately 2-3 dB in the worst-case. Hence, further noise control measures to control wheel squeal are not required.

#### Maintenance and Storage Facility

A preliminary review of the MSF indicates that the noise from the facility will not be significant at the nearest sensitive receptors. The results of the modelling indicate that the sound level from the MSF will be approximately 55 dBA 1-hr Leq at the nearest sensitive receptor during the most sensitive hour. As the ambient sound level has been calculated to be 58 dBA at this location, an adverse impact is not expected.

The greatest contributors to the overall sound from the MSF are the noise from dust collector fans and the noise from wheel squeal. Also, there is some potential for noise from the paint booth fans, depending on the size of the fan selected.

Overall, given the distance between the MSF and the nearest sensitive receptor, and given the high ambient noise from Highway 407, a noise impact from the MSF is not expected.

#### Traction Power Substations

A preliminary review of the noise from the traction power substations (TPSS) has been completed. Based on measurements of similar transformers, it is assumed that each TPSS will produce a sound level of approximately 63 dBA at a distance of 3 m. The modelling indicates that, in most cases, the sound levels from the TPSS are well below the ambient sound levels at the nearest sensitive receptors and are also well below the MOE's minimum exclusion level of 45 dBA. Hence, noise control measures are not warranted for most of the TPSS. TPSS18, located near the Brampton GO Station, needs to be moved so that it is a minimum of 23 m from the nearest sensitive receptor to avoid the potential noise impacts. Alternatively, it should be ensured that the actual TPSS sound level output is less than or equal to 58 dBA at a distance of 3 m and that the sound level is not tonal.

Both the TPSS and the MSF will require ECAs from the MOE. A more detailed review of the noise affects of these facilities will be completed at that time.

#### Vibration

Based on the current design, the LRT will run as close as 5 to 10 m from the façades of some buildings. More typically, the LRT will run more than 20 m from the nearest building.

Any sensitive receptors located at least:

- 10 m from the centreline of the nearest track wherever the LRT travels at 40 km/h
- 15 m from the centreline of the nearest track wherever the LRT travels at 50 km/h
- 20 m from the centreline of the nearest track wherever the LRT travels at 60 km/h
- 25 m from the centreline of the nearest track wherever the LRT travels at 80 km/h

will meet the guideline limit of 0.10 mm/s without any additional vibration control measures. An additional 5 dB reduction (44% reduction) will be required for areas with residential receptors located closer than the minimum setbacks described above, in order to reduce the vibration levels to 0.10mm/s rms. For concrete embedded track, however, vibration control to limit vibration-induced noise is more critical and will supersede the requirements for ground-borne vibration mitigation.

The results of the assessment also suggest that some sensitive receptors (critical residential rooms) along the HMLRT corridor, including those within 50 m of special trackwork (crossovers, switches and pocket tracks) may experience levels of vibration-induced noise that require mitigation. Vibration levels immediately adjacent to special track structures can be up to 3 times (10 dB) greater than vibration levels on tangent track (assuming the speed remains the same).



Date: 07-Feb-22

## NOISE REPORT FOR PROPOSED DEVELOPMENT

### REQUESTED BY:

Name: Amy Patenaude

Company: RWDI

### Location:

Hurontario Street - Dundas Street to Queensway  
Dundas Street East - Hurontario Street to Grenville Drive / Cliff Road  
Camilla Road - Dundas Street East to King Street East

### PREPARED BY:

Nam Steven Guan

Tel#: 905-615-3200 ext. 5933



ID 535

## ON SITE TRAFFIC DATA

Specific	Street Names				
	Hurontario St	Dundas St E	Camilla Rd		
AADT:	31,700	33,200	8,600		
# of Lanes:	4 Lanes*	4 Lanes	2 Lanes		
% Trucks:	4%	6%	3%		
Medium/Heavy Trucks Ratio:	55/45	55/45	55/45		
Day/Night Split:	90/10	90/10	90/10		
Posted Speed Limit:	50 km/h	50 km/h	40 km/h		
Gradient Of Road:	<2%	<2%	<2%		
Ultimate R.O.W:	35 m	42 m	26 m		

### Comments:

Ultimate street data only (2041).

\*Note: the future lane configuration of Hurontario Street at this location will consist of 4 through lanes with 2 LRT lines along the center of the roadway.



Date: 24-Mar-22

## NOISE REPORT FOR PROPOSED DEVELOPMENT

### REQUESTED BY:

Name: Amy Patenaude

Company: RWDI

### Location:

Confederation Parkway - Hillcrest Avenue to Dundas Street West  
Hillcrest Avenue - Confederation Parkway to Hurontario Street

### PREPARED BY:

Nam Steven Guan

Tel#: 905-615-3200 ext. 5933



ID 538

## ON SITE TRAFFIC DATA

Specific	Street Names				
	Confederation Pkwy	Hillcrest Ave			
AADT:	19,700	28,400			
# of Lanes:	4 Lanes	4 Lanes			
% Trucks:	3%	3%			
Medium/Heavy Trucks Ratio:	55/45	55/45			
Day/Night Split:	90/10	90/10			
Posted Speed Limit:	50 km/h	50 km/h			
Gradient Of Road:	<2%	<2%			
Ultimate R.O.W:	30 m	26 m			

### Comments:

Ultimate Traffic Data Only