2660430 Ontario Inc.

NOISE IMPACT STUDY

6710 HURONTARIO STREET

CITY OF MISSISSAUGA

May 2019

19310

Disclaimer

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May 5, 2019 **Reference Number:** 19310/250

Mr. Shakir Rehmatullah
2660430 Ontario Inc.
3621 Highway 7 East, Suite 503
Markham, ON
L3R 0G6

RE: Noise Impact Impact Study
Proposed Mixed-Use Development at 6710 Hurontario Street, City of Mississauga

Dear Mr. Rehmatullah:

LEA Consulting Ltd. is pleased to present the findings of this Noise Impact Study (NIS) for the proposed mixed-use development at 6710 Hurontario Street in the City of Mississauga.

The report concludes that provided that the noise mitigation measures recommended herein are implemented, the issue of excess noise due to vehicular traffic along Hurontario Street and Maritz Drive, future Hurontario-Main Light Rail Transit (HMLRT) traffic, and aircraft overflights to/from Lester B. Pearson Intersection Airport will not constrain the subject development from a noise standpoint.

Should you have any questions regarding this NIS, please do not hesitate to contact us.

Yours truly,

LEA CONSULTING LTD.

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TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

APPENDICES

1 INTRODUCTION

LEA Consulting Ltd. (LEA) was retained by 2660730 Ontario Inc. to prepare a Noise Impact Study (NIS) for the proposed mixed-use development located at 6710 Hurontario Street in the City of Mississauga. The subject site is located on the west side of Hurontario Street, approximately 90 metres to the south of Skyway Drive and Hurontario Street intersection. **Figure 1-1** illustrates the site location and **Figure 1-2** shows the existing site use.

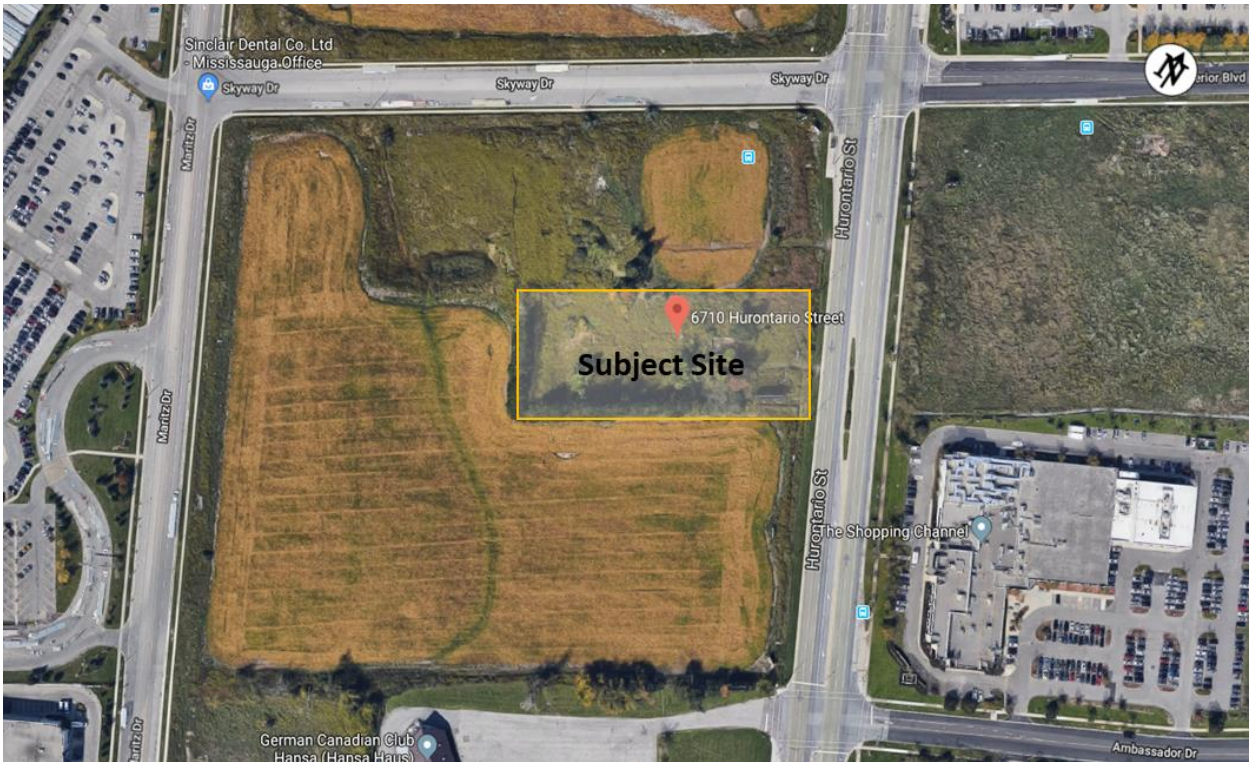

Figure 1-1: Site Location (Source: Google Maps)

The development proposal will consist of a 9- storey building consisting of office, hotel, and banquet hall uses, as well as some shared facilities.

Figure 1-3 shows the proposed site plan.

According to the Ministry of Environment, Conservation and Park (MECP) Environmental Noise Guideline NPC-300, a hotel is considered a noise sensitive land use.

Figure 1-2: Existing Site Use (Source: Google Maps)

The purpose of this noise study is to assess the future noise impacts on this property, resulting from vehicular traffic along Hurontario Street and Maritz Drive, the future Hurontario-Main Light Rail Transit (HMLRT) traffic, as well as aircraft overflights to/from Lester B. Pearson Intersection Airport, and if required, to determine any noise control measures necessary to attenuate excess noise impacting the proposed building's noise sensitive areas.

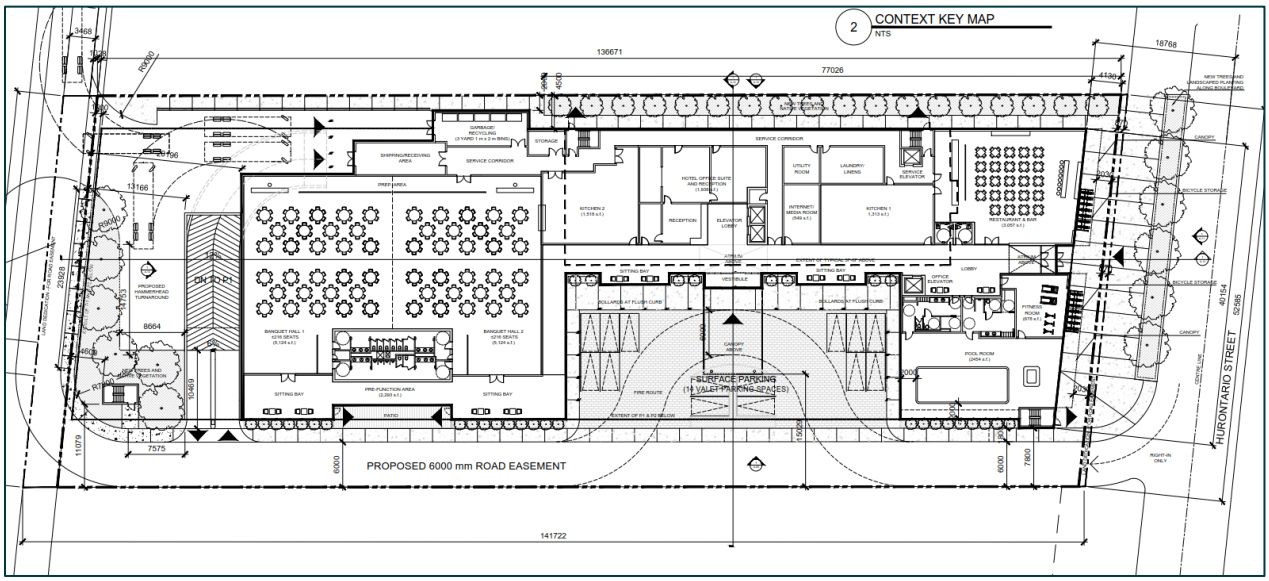

Figure 1-3: Proposed Site Plan

2 NOISE SOURCES

The section describes all the potential dominant noise sources which were identified for the current noise assessment.

2.1 TRANSPORTATION NOISE SOURCES

Vehicular traffic along Hurontario Street and Maritz Drive, as well as the aircraft overflights to/from Lester B. Pearson Intersection Airport were identified as the existing dominant source of transportation noise in the proximity of the subject site. Furthermore, the future HMLRT tracks, which will be located immediately to the east of the subject site on Hurontario Street, was also identified as a potential transportation noise source near the subject site.

2.2 STATIONARY NOISE SOURCES

The surrounding area is expected to feature high ambient sound levels, dominated by roadway noise and the "urban hum" that is typical of the urban environment. The Walmart Canada distribution centre is located approximately 260 metres to the east from the nearest noise sensitive area within the proposed development. At that distance, any noise impacts related to truck activity associated with the distribution centre are expected to be acoustically insignificant at the nearest sensitive use within the subject site. To confirm this, LEA undertook a site visit on Thursday, February 14, 2019. Based on our observations, truck activity from the distribution centre was inaudible at the subject site.

Based on this, no significant stationary noise sources were identified that could impact the subject site.

Furthermore, the proposed floor plans illustrate that all mechanical equipment related to the proposed development will be enclosed in the penthouse mechanical room, and consequently, the subject site is not expected to pose stationary noise impacts on itself or the surrounding noise sensitive uses.

Accordingly, a stationary noise assessment was excluded from the current assessment.

3 NOISE ASSESSMENT CRITERIA

This chapter summarizes the applicable noise criteria for land use planning in accordance with the Ontario Ministry of Environment, Conservation and Park (MECP) Publication NPC-300 "*Environmental Noise Guideline, Stationary and Transportation Sources - Approval and Planning*" dated 2013.

3.1 NOISE ASSESSMENT CRITERIA FOR ROAD AND RAIL NOISE

The noise assessment criteria are based on the MECP Publication NPC-300 Guidelines

3.1.1 Sound Level Limits

The sound level limits for road, rail and aircraft fly-by traffic noise are summarized in **Table 3.1**. The sound level limits are used for determining the need of noise abatement measures.

Type of Space	Time Period	Sound Level Limits		
		Road	Rail	Air
Living/Dining, Den Areas of residences	07:00 – 23:00	L_{eq} (16 hours): 45 dBA	L_{eq} (16 hours): 40 dBA	NEF/NEP 5
	23:00 – 07:00	L_{eq} (8 hours): 45 dBA	L_{eq} (8 hours): 40 dBA	
Sleeping quarters	07:00 – 23:00	L_{eq} (16 hours): 45 dBA	L_{eq} (16 hours): 40 dBA	NEF/NEP 0
	23:00 – 07:00	L_{eq} (8 hours): 40 dBA	L_{eq} (8 hours): 35 dBA	
Outdoor Living Area	07:00 – 23:00	L_{eq} (16 hours): 55 dBA (may consider noise control measures) L_{eq} (16 hours): 60 dBA (noise control measure are required)		NEF/NEP 30

Table 3.1: MECP Sound Level Limits

It is noted that although the sound level limit for the Outdoor Living Area (OLA) is 55 dBA, noise control measures may be applied. If measures are not provided, a noise warning clause is required in the sale/tenancy agreements to inform prospective residents of potential noise impacts. If sound levels at the OLA are greater than 60 dBA, noise control measures are required to be implemented along with an appropriate warning clause in the sale/tenancy agreements.

Table 3.2 summarizes the ventilation requirements for road and rail noise sources.

Plane of Window Sound Level (L_{eq})	Ventilation Requirement	Warning Clause Requirement
Daytime (07:00 to 23:00)		
≤55 dBA	None	None
55 ≤65 dBA	Forced air heating with provisions for the installation of central air conditioning	Recommended
> 65 dBA	Central air conditioning	Required
Nighttime (23:00 to 07:00)		
≤50	None	None
50 ≤60	Forced air heating with provisions for the installation of central air conditioning.	Recommended
> 60	Central air conditioning	Required

Table 3.2: MECP Ventilation Requirements

4 TRANSPORTATION NOISE ASSESSMENT

4.1 METHODOLOGY

The transportation noise assessment is based on the method of prediction outlined in the Ontario Ministry of Environment, Conservation and Park (MECP) document "*ORNAMENT*" dated October 1989. Noise levels due to vehicular traffic on Hurontario Street and Maritz Drive, and HMLRT traffic on Hurontario Street were calculated using the MECP "STAMSON" noise modelling software, version 5.04.

4.2 DATA COLLECTION

Hurontario Street is a north-south arterial road that operates with six-lane cross-section (three lanes per direction) in the proximity of the subject site. It is under the jurisdiction of City of Mississauga. The roadway operates with a speed limit of 80 km/h within the study area.

Figure 4-1: Hurontario Street in Proximity of Site (Source: Google Map)

As Huronatrio Street is more than 4 lanes wide, the northbound and southbound directions were assessed as separate segments, consistent with ORNAMENT methodology. **Figure 4-1** shows the segment of Hurontario Street in the proximity of the subject site. Our assessment accounts for the new Hurontario Street geometry (i.e. lane shits) resulting from the implementation of the future HMLRT

Maritz Drive is a major north-south collector road with two northbound and two southbound lanes, and a two way left turn lane in the middle. The roadway is under the jurisdiction of City of Mississauga. The speed limit is 50 km/h based on information provided by the City of Mississauga. **Figure 4-2** shows the segment of Maritz Drive in the proximity of the subject site.

Figure 4-2: Maritz Drive in Proximity of Site (Source: Google Map)

The ultimate Average Annual Daily Traffic (AADT) data, medium/heavy truck percentages, day/night split for Hurontario Street and Maritz Drive were obtained from the City of Mississauga.

Table 4.1 summarizes the traffic data used for the noise assessment. For further details regarding the development of the traffic data, please refer to **Appendix A**.

Traffic Data	Future AADT	Day/Night Ratio	Percentage of Medium Trucks	Percentage of Heavy Trucks	Posted Speed Limit
Hurontario Street	51,200	90/10	3.8%	3.2%	80 km/h
Maritz Drive	11,800	90/10	3.8%	3.2%	50 km/h

Table 4.1: Traffic Data Inputs Summary for Stamson Model

Light-rail vehicle volume data was obtained from Appendix B6 of the of the Hurontario LRT Environmental Project Report (June 2014). As per the Appendix B12 (Preliminary System Operations Plan) of the Environmental Project Report, light-rail vehicles are expected to travel at up to 80 km/h in vicinity of the subject site.

4.3 POINTS OF RECEPTION

As noted, the development proposal consists of a 9-storey building consisting of office, hotel, and banquet hall uses, as well as some shared facilities. Based on the floor plans, there are no outdoor noise sensitive area for the propose development. As noted, there are no daytime sound level limites for the hotel spaces in the MECP noise guidelines NPC-300. For the purposes of the current asessment, the nighttime limit was applied to the daytime period.

The details related to the receptor locations, setbacks, and receptor heights which were used in the noise assessment are summarized **Table 4.2**. The locations of the receptors are illustrated in **Figure 4-3**.

Receptor	Analysis Period	Type of Space	Location of Receptor	Receptor Elevation (m)
R1	Daytime (07:00 to 23:00)	Sleeping Quarters	Northerly Façade	30 m (1)
	Nighttime (23:00 to 07:00)			
R2	Daytime (07:00 to 23:00)	Sleeping Quarters	Easterly Façade	30 m (1)
	Nighttime (23:00 to 07:00)			
R3	Daytime (07:00 to 23:00)	Sleeping Quarters	Southerly Façade	30 m (1)
	Nighttime (23:00 to 07:00)			
R4	Daytime (07:00 to 23:00)	Sleeping Quarters	Westerly Façade	30 m (1)
	Nighttime (23:00 to 07:00)			

Table 4.2: Receptor Locations, Setbacks, and Heights

(1) *Based on the height of the 9th floor elevation (28.5 m) plus receptor height of 1.5 metres.*

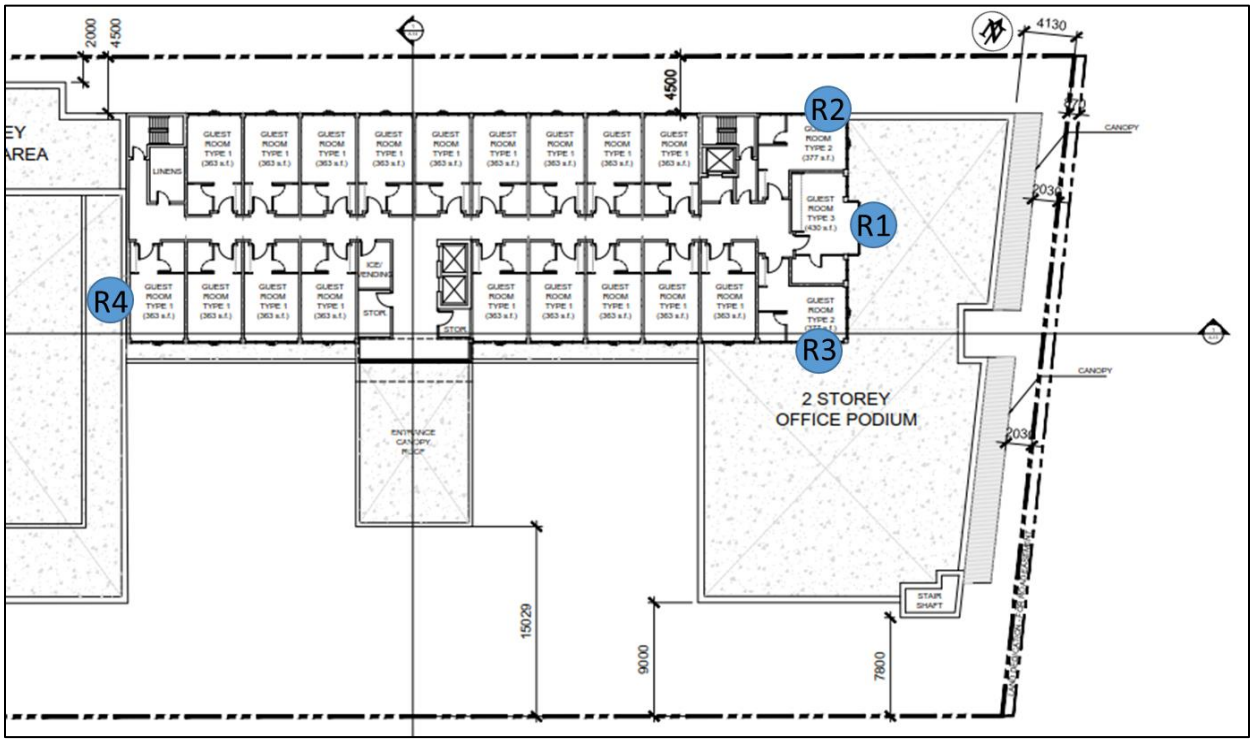

Figure 4-3: Noise Receptor Locations

4.4 UNATTENUATED FUTURE SOUND LEVELS

The future predicted unattenuated sound levels due to vehicular road traffic and HMLRT traffic on Hurontario Street and Maritz Drive are summarized in **Table 4.3** and detailed Stamson analysis printouts are attached in **Appendix B**.

Receptor	Sound Level Vehicular Traffic		Sound Level HMLRT Traffic		Overall Sound Level	
	Daytime (L_{eq} 16 hours)	Nightime (L_{eq} 8 hours)	Daytime (L_{eq} 16 hours)	Nightime (L_{eq} 8 hours)	Daytime (L_{eq} 16 hours)	Nightime (L_{eq} 8 hours)
R1	70 dBA	63 dBA	56 dBA	51 dBA	70 dBA	63 dBA
R2	73 dBA	66 dBA	60 dBA	55 dBA	73 dBA	67 dBA
R3	70 dBA	63 dBA	57 dBA	52 dBA	70 dBA	64 dBA
R4	54 dBA	47 dBA	n/a	n/a	54 dBA	47 dBA

Table 4.3: Unattenuated Sound Levels

4.5 OUTDOOR NOISE CONTROL MEASURES

No outdoor noise control measures are required for the proposed development since there is no outdoor sensitive area for the proposed development.

4.6 INDOOR NOISE CONTROL MEASURES

4.6.1 Ventilation Requirements

Based on the unattenuated sound levels shown in Table 4.3 and the ventilation requirements shown in Table 3.2, **a central air conditioning is required for all hotel rooms along the northerly, easterly and southerly façades** of the proposed building. However, similar to other hotel/commercial buildings, the proposed development will likely provide central heat and air conditioning system to serve the all the hotel rooms, as well as the office and banquet hall. Thus, it is expected that this requirement will be met. In addition, as per NPC-300 MECP requires the inclusion of a Type D noise warning clause in the sale/tenancy agreements, as applicable, to inform prospective users of potential noise impacts. Wording for the Type D warning clause is provided below:

Type D Warning Clause: "This 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, Conservation and Parks."

4.6.2 Building Components

The required Acoustical Insulation Factor (AIF) was calculated based on the indoor sound level limits shown in Table 3-1 and the predicted outdoor façade sound levels shown in Table 4-3, and the number of room components in the indoor space. Furthermore, the aircraft flyovers were accounted in the AIF calculation, as the proposed development falls in the Noise Exposure Forecast (NEF)/Noise Exposure Projection (NEP) contour 34. It is noted that aircraft noise is the major contributor towards the required AIF.

The required Sound Transmission Class (STC) ratings for both windows, walls and floor-ceiling assemblies were then calculated based on the calculated AIF, and assumed window-to-floor and wall-to-floor area ratios to determine the building component requirements for the proposed building.

The STC requirements for all walls and windows are summarized in **Table 4.4**. Details related to the STC calculations are attached in **Appendix C**.

Receptor	Type of Space	Window STC Required(1)	Wall STC Required(1)	Floor-Ceiling STC Required(1)
R1	Northerly Façade Sleeping Quarters	STC 44	STC 47 *(OBC 2017)*	STC 47 *(OBC 2017)*
R2	Easterly Façade Sleeping Quarters	STC 45	STC 47 *(OBC 2017)*	STC 47 *(OBC 2017)*
R3	Southerly Façade Sleeping Quarters	STC 44	STC 47 *(OBC 2017)*	STC 47 *(OBC 2017)*
R4	Westerly Façade Sleeping Quarters	STC 43	STC 46 *(OBC 2017)*	STC 47 *(OBC 2017)*

Table 4.4: Building Component Requirements

(1) Based on the conservative window-to-floor ratios of 60% for Type 1 and Type 2 rooms and 80% for Type 3 room, as well as a wall-to-floor ratio of 100%.

As noted in Table 4.4, the following window STC values are required to mitigate road traffic sound levels to the MECP indoor sound level criteria:

- Windows with STC 45 or greater are required for all hotel unit windows facing the east;
- Windows with STC 44 or greater are required for all hotel unit windows facing the north and south;

- Windows with STC 43 or greater are required for all hotel unit windows facing the west;
- Exterior walls with STC 47 or greater are required for all hotel unit exterior walls facing the north, east and south;
- Exterior walls with STC 46 or greater are required for all hotel unit exterior walls facing the west; and
- Ceiling-roof assemblies with STC 47 or greater are required for all hotel units located on the highest level of the building.

It is noted that the window STC values were calculated on the basis of the window-to-floor ratios of 60 percent for Type 1 and Type 2 rooms and 80 percent for Type 3 room, due to the floor-to-ceiling windows proposed for the development, as shown in **Figure 4-4**. Smaller windows relative to the unit size can significantly decrease the above-noted window STC requirements. The window and wall STC requirement should be confirmed during the site plan stage when more detail drawings are available.

Figure 4-4: Large floor-to-ceiling windows

5 VERIFICATION OF NOISE CONTROL MEASURES

According to the NPC-300 noise guidelines, the implementation of all required noise control measures should be verified by qualified Acoustical Consultant. All relevant builder's plans should be certified by an Acoustic Consultant as being in conformance with the recommendations of the approved Noise Impact Study. Further, prior to the final inspection and release for occupancy, the recommended noise control measures within the subject site should be inspected by an Acoustic Consultant. The intent is to ensure that the recommendations and builder's plans are compliant with the approved Noise Impact Study.

6 CONCLUSIONS AND RECOMMENDATIONS

With the following noise control measures implemented, the noise impacts due to vehicular road traffic on Hurontario Street and Maritz Drive, HMLRT traffic and Pearson International Aircraft flyovers can be mitigated to meet the applicable MECP sound level criteria.

- **A central air conditioning is required** for all hotel rooms along the northerly, easterly and southerly façades of the proposed building. However, similar to other hotel/commercial buildings, the proposed development will likely provide central heat and air conditioning system to serve the all the hotel rooms, as well as the office and banquet hall. Thus, it is expected that this requirement will be met.;
- A **Type D noise warning clause** is required in the sale/tenancy agreements, as applicable, to inform prospective users of potential noise impacts. For further details see Section 4.6.1;
- Windows with **STC 45 or greater** are required for **all hotel unit windows facing the east**;

- Windows with **STC 44 or greater** are required for **all hotel unit windows facing the north and south**;
- Windows with **STC 43 or greater** are required for **all hotel unit windows facing the west**;
- Exterior walls with **STC 47 or greater** are required for **all hotel unit exterior walls facing the north, east and south**;
- Exterior walls with **STC 46 or greater** are required for **all hotel unit exterior walls facing the west**; and
- Ceiling-roof assemblies with **STC 47 or greater** are required for **all hotel units located on the highest level of the building**.
- Once detailed floor plans become available, the window glazing requirements should be verified based on actualy window-to-floor area ratios, with the possibility of reducing the window glazing requirements.

APPENDIX A

Traffic Data

NOISE REPORT FOR PROPOSED DEVELOPMENT

Date:	08-Feb-19

REQUESTED BY:

Name:	Danny Tat
Company:	LEA Consulting Ltd

PREPARED BY:

Name	Bertuen Mickle
Tel#:	(905) 615-3200

MISSISSAUGA

Location: -Hurontario Street (between Skyway Drive and Ambassador Drive)
-Maritz Drive (between Skyway Drive and Courtneypark Drive W)

ID# 402

ON SITE TRAFFIC DATA

Specific	*Street Names*				
	Hurontarion Street	Maritz Drive			
AADT:	51,200	11,800			
# of Lanes:	6 lanes	4 lanes			
% Trucks:	7%	7%			
Medium/Heavy Trucks Ratio:	55/45	55/45			
Day/Night Split:	90/10	90/10			
Posted Speed Limit:	80km/h	50kn/h			
Gradient Of Road:	<2%	<2%			
Ultimate R.O.W:	46m	30m			

Comments:

Ultimate Traffic Data only.

-There's a proposed LRT line along Hurontorio.Please contact Farhad Shala @(905)-616-2300 ext. 3377 of farhad.shala@mississauga.ca

APPENDIX B

Stamson Analysis

STAMSON 5.0 NORMAL REPORT Date: 06-05-2019 17:08:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te Time Period: Day/Night 16/8 hours
Description: Receptor R3 - South Facade

Road data, segment # 1: HurOnt NB (day/night)

Car traffic volume : 21427/2381 veh/TimePeriod *
Medium truck volume : 876/97 veh/TimePeriod *
Heavy truck volume : 737/82 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25600
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.80
Heavy Truck % of Total Volume : 3.20
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: HurOnt NB (day/night)

Angle1 Angle2 : -6.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 52.30 / 52.30 m
Receiver height : 30.00 / 30.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: HurOnt SB (day/night)

Car traffic volume : 21427/2381 veh/TimePeriod *
Medium truck volume : 876/97 veh/TimePeriod *
Heavy truck volume : 737/82 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25600

```
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.80
    Heavy Truck  % of Total Volume     :   3.20
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: HurOnt SB (day/night)
-------------------------------------------
Angle1   Angle2           :  -6.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  27.30 / 27.30  m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```



```
Road data, segment # 3: Maritz Dr (day/night)
---------------------------------------------
Car traffic volume  :  9877/1097  veh/TimePeriod  *
Medium truck volume :   404/45    veh/TimePeriod  *
Heavy truck volume  :   340/38    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  11800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.80
    Heavy Truck  % of Total Volume     :   3.20
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Maritz Dr (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   -6.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 291.00 / 291.00 m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```



```
Results segment # 1: HurOnt NB (day)
```

Source height = 1.34 m

ROAD (0.00 + 65.16 + 0.00) = 65.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-6	90	0.00	73.31	0.00	-5.42	-2.73	0.00	0.00	0.00	65.16

Segment Leq : 65.16 dBA

↟

Results segment # 2: HurOnt SB (day)

Source height = 1.34 m

ROAD (0.00 + 67.98 + 0.00) = 67.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-6	90	0.00	73.31	0.00	-2.60	-2.73	0.00	0.00	0.00	67.98

Segment Leq : 67.98 dBA

↟

Results segment # 3: Maritz Dr (day)

Source height = 1.34 m

ROAD (0.00 + 49.56 + 0.00) = 49.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-6	0.00	65.75	0.00	-12.88	-3.31	0.00	0.00	0.00	49.56

Segment Leq : 49.56 dBA

Total Leq All Segments: 69.85 dBA

↟

Results segment # 1: HurOnt NB (night)

Source height = 1.34 m

ROAD (0.00 + 58.63 + 0.00) = 58.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-6	90	0.00	66.78	0.00	-5.42	-2.73	0.00	0.00	0.00	58.63

Segment Leq : 58.63 dBA

Results segment # 2: HurOnt SB (night)

Source height = 1.34 m

ROAD (0.00 + 61.45 + 0.00) = 61.45 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-6	90	0.00	66.78	0.00	-2.60	-2.73	0.00	0.00	0.00	61.45

Segment Leq : 61.45 dBA

Results segment # 3: Maritz Dr (night)

Source height = 1.34 m

ROAD (0.00 + 43.05 + 0.00) = 43.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-6	0.00	59.24	0.00	-12.88	-3.31	0.00	0.00	0.00	43.05

Segment Leq : 43.05 dBA

Total Leq All Segments: 63.32 dBA

RT/Custom data, segment # 1: HMLRT (day/night)

Traffic volume : 560/88 veh/TimePeriod
Speed : 80 km/h

Data for Segment # 1: HMLRT (day/night)

Angle1 Angle2 : -6.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0

```
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  37.10 / 37.10  m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

↟

Results segment # 1: HMLRT (day)

```
---------------------------------
```

Source height = 0.50 m

RT/Custom (0.00 + 57.42 + 0.00) = 57.42 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-6	90	0.00	64.09	-3.93	-2.73	0.00	0.00	0.00	57.42

Segment Leq : 57.42 dBA

Total Leq All Segments: 57.42 dBA

↟

Results segment # 1: HMLRT (night)

```
---------------------------------
```

Source height = 0.50 m

RT/Custom (0.00 + 52.40 + 0.00) = 52.40 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-6	90	0.00	59.06	-3.93	-2.73	0.00	0.00	0.00	52.40

Segment Leq : 52.40 dBA

Total Leq All Segments: 52.40 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 70.09
(NIGHT): 63.65

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 06-05-2019 17:09:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4a.te Time Period: Day/Night 16/8 hours
Description: Receptor R4 - West Facade

Road data, segment # 1: Maritz (day/night)

Car traffic volume	9877/1097	veh/TimePeriod *
Medium truck volume	404/45	veh/TimePeriod *
Heavy truck volume	340/38	veh/TimePeriod *
Posted speed limit	50 km/h	
Road gradient	0 %	
Road pavement	1 (Typical asphalt or concrete)	

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT)	11800
Percentage of Annual Growth	0.00
Number of Years of Growth	0.00
Medium Truck % of Total Volume	3.80
Heavy Truck % of Total Volume	3.20
Day (16 hrs) % of Total Volume	90.00

Data for Segment # 1: Maritz (day/night)

Angle1 Angle2	-90.00 deg	90.00 deg
Wood depth	0	(No woods.)
No of house rows	0 / 0	
Surface	2	(Reflective ground surface)
Receiver source distance	237.00 / 237.00 m	
Receiver height	30.00 / 30.00 m	
Topography	1	(Flat/gentle slope; no barrier)
Reference angle	0.00	

Results segment # 1: Maritz (day)

Source height = 1.34 m

ROAD (0.00 + 53.77 + 0.00) = 53.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	65.75	0.00	-11.99	0.00	0.00	0.00	0.00	53.77

Segment Leq : 53.77 dBA

Total Leq All Segments: 53.77 dBA

↟
Results segment # 1: Maritz (night)

Source height = 1.34 m

ROAD (0.00 + 47.25 + 0.00) = 47.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	59.24	0.00	-11.99	0.00	0.00	0.00	0.00	47.25

Segment Leq : 47.25 dBA

Total Leq All Segments: 47.25 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 53.77
(NIGHT): 47.25

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 06-05-2019 17:07:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1.te Time Period: Day/Night 16/8 hours
Description: Receptor R1 - North Facade

Road data, segment # 1: HurOnt NB (day/night)

Car traffic volume : 21427/2381 veh/TimePeriod *
Medium truck volume : 876/97 veh/TimePeriod *
Heavy truck volume : 737/82 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25600
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.80
Heavy Truck % of Total Volume : 3.20
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: HurOnt NB (day/night)

Angle1 Angle2 : -90.00 deg 6.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 53.90 / 53.90 m
Receiver height : 30.00 / 30.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: HurOnt SB (day/night)

Car traffic volume : 21427/2381 veh/TimePeriod *
Medium truck volume : 876/97 veh/TimePeriod *
Heavy truck volume : 737/82 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25600

```
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.80
    Heavy Truck  % of Total Volume     :   3.20
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: HurOnt SB (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   6.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  28.90 / 28.90  m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```



```
Road data, segment # 3: Maritz Dr (day/night)
---------------------------------------------
Car traffic volume  :  9877/1097  veh/TimePeriod  *
Medium truck volume :   404/45    veh/TimePeriod  *
Heavy truck volume  :   340/38    veh/TimePeriod  *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  11800
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.80
    Heavy Truck  % of Total Volume     :   3.20
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 3: Maritz Dr (day/night)
-------------------------------------------
Angle1   Angle2           :   6.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 289.00 / 289.00 m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```



```
Results segment # 1: HurOnt NB (day)
```

Source height = 1.34 m

ROAD (0.00 + 65.03 + 0.00) = 65.03 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	6	0.00	73.31	0.00	-5.55	-2.73	0.00	0.00	0.00	65.03

Segment Leq : 65.03 dBA

↟

Results segment # 2: HurOnt SB (day)

Source height = 1.34 m

ROAD (0.00 + 67.73 + 0.00) = 67.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	6	0.00	73.31	0.00	-2.85	-2.73	0.00	0.00	0.00	67.73

Segment Leq : 67.73 dBA

↟

Results segment # 3: Maritz Dr (day)

Source height = 1.34 m

ROAD (0.00 + 49.59 + 0.00) = 49.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
6	90	0.00	65.75	0.00	-12.85	-3.31	0.00	0.00	0.00	49.59

Segment Leq : 49.59 dBA

Total Leq All Segments: 69.64 dBA

↟

Results segment # 1: HurOnt NB (night)

Source height = 1.34 m

ROAD (0.00 + 58.49 + 0.00) = 58.49 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	6	0.00	66.78	0.00	-5.55	-2.73	0.00	0.00	0.00	58.49

Segment Leq : 58.49 dBA

Results segment # 2: HurOnt SB (night)

Source height = 1.34 m

ROAD (0.00 + 61.20 + 0.00) = 61.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	6	0.00	66.78	0.00	-2.85	-2.73	0.00	0.00	0.00	61.20

Segment Leq : 61.20 dBA

Results segment # 3: Maritz Dr (night)

Source height = 1.34 m

ROAD (0.00 + 43.08 + 0.00) = 43.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
6	90	0.00	59.24	0.00	-12.85	-3.31	0.00	0.00	0.00	43.08

Segment Leq : 43.08 dBA

Total Leq All Segments: 63.11 dBA

RT/Custom data, segment # 1: HMLRT (day/night)

Traffic volume : 560/88 veh/TimePeriod
Speed : 80 km/h

Data for Segment # 1: HMLRT (day/night)

Angle1 Angle2 : -90.00 deg -6.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0

```
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  41.40 / 41.40  m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

Results segment # 1: HMLRT (day)

Source height = 0.50 m

RT/Custom (0.00 + 56.37 + 0.00) = 56.37 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-6	0.00	64.09	-4.41	-3.31	0.00	0.00	0.00	56.37

Segment Leq : 56.37 dBA

Total Leq All Segments: 56.37 dBA

Results segment # 1: HMLRT (night)

Source height = 0.50 m

RT/Custom (0.00 + 51.34 + 0.00) = 51.34 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-6	0.00	59.06	-4.41	-3.31	0.00	0.00	0.00	51.34

Segment Leq : 51.34 dBA

Total Leq All Segments: 51.34 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.84
(NIGHT): 63.39

STAMSON 5.0 NORMAL REPORT Date: 06-05-2019 17:08:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te Time Period: Day/Night 16/8 hours
Description: Receptor R2 - East Facade

Road data, segment # 1: HurOnt NB (day/night)

Car traffic volume : 21427/2381 veh/TimePeriod *
Medium truck volume : 876/97 veh/TimePeriod *
Heavy truck volume : 737/82 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25600
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.80
Heavy Truck % of Total Volume : 3.20
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: HurOnt NB (day/night)

Angle1 Angle2 : -90.00 deg 84.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 49.60 / 49.60 m
Receiver height : 30.00 / 30.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: HurOnt SB (day/night)

Car traffic volume : 21427/2381 veh/TimePeriod *
Medium truck volume : 876/97 veh/TimePeriod *
Heavy truck volume : 737/82 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25600

```
    Percentage of Annual Growth        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   3.80
    Heavy Truck  % of Total Volume     :   3.20
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: HurOnt SB (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   84.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  24.60 / 24.60  m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```



```
Results segment # 1: HurOnt NB (day)
-----------------------------------

Source height = 1.34 m

ROAD (0.00 + 67.97 + 0.00) = 67.97 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     84   0.00  73.31   0.00  -5.19  -0.15   0.00   0.00   0.00  67.97
-------------------------------------------------------------------------------

Segment Leq : 67.97 dBA
```



```
Results segment # 2: HurOnt SB (day)
-----------------------------------

Source height = 1.34 m

ROAD (0.00 + 71.02 + 0.00) = 71.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     84   0.00  73.31   0.00  -2.15  -0.15   0.00   0.00   0.00  71.02
-------------------------------------------------------------------------------

Segment Leq : 71.02 dBA

Total Leq All Segments: 72.77 dBA
```



```
Results segment # 1: HurOnt NB (night)
```

Source height = 1.34 m

ROAD (0.00 + 61.44 + 0.00) = 61.44 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	84	0.00	66.78	0.00	-5.19	-0.15	0.00	0.00	0.00	61.44

Segment Leq : 61.44 dBA

↟

Results segment # 2: HurOnt SB (night)

Source height = 1.34 m

ROAD (0.00 + 64.48 + 0.00) = 64.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	84	0.00	66.78	0.00	-2.15	-0.15	0.00	0.00	0.00	64.48

Segment Leq : 64.48 dBA

Total Leq All Segments: 66.23 dBA

↟

RT/Custom data, segment # 1: HMLRT (day/night)

Traffic volume : 560/88 veh/TimePeriod
Speed : 80 km/h

Data for Segment # 1: HMLRT (day/night)

Angle1 Angle2 : -90.00 deg 84.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 37.10 / 37.10 m
Receiver height : 30.00 / 30.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↟

Results segment # 1: HMLRT (day)

Source height = 0.50 m

RT/Custom (0.00 + 60.01 + 0.00) = 60.01 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	84	0.00	64.09	-3.93	-0.15	0.00	0.00	0.00	60.01

Segment Leq : 60.01 dBA

Total Leq All Segments: 60.01 dBA

Results segment # 1: HMLRT (night)

Source height = 0.50 m

RT/Custom (0.00 + 54.98 + 0.00) = 54.98 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	84	0.00	59.06	-3.93	-0.15	0.00	0.00	0.00	54.98

Segment Leq : 54.98 dBA

Total Leq All Segments: 54.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.99
(NIGHT): 66.55

APPENDIX C

STC Calculations

(LRT)

Representative Receptor	Description	Period	Overall Leq	Road Leq	Rail Leq (LRT)	Aircraft (NEF)	Number of Room Components, C	AIF Required				Window/Floor Area Ratio	Wall/Floor Area Ratio	Window STC	Wall STC	Ventilation Requirements	
								Road	Rail	Air	Overall						
R1	Northerly Façade - Living/Dining	Daytime	69.84	69.64	56.37	34.00	3	31	23	39	40	60%	100%	44	47	AC	AC
	Northerly Façade - Living/Dining	Nighttime	63.39	63.11	51.34	34.00	3	25	18	39	39	60%	100%	43	46	FA	
	Northerly Façade - Bedrooms	Daytime	69.84	69.64	56.37	34.00	3	31	23	39	40	60%	100%	44	47	AC	
	Northerly Façade - Bedrooms	Nighttime	63.39	63.11	51.34	34.00	3	30	18	39	40	60%	100%	44	47	FA	
R2	Easterly Façade - Living/Dining	Daytime	72.99	72.77	60.01	34.00	2	33	25	39	40	80%	100%	45	47	AC	AC
	Easterly Façade - Living/Dining	Nighttime	66.54	66.23	54.98	34.00	2	31	20	39	40	80%	100%	45	47	AC	
	Easterly Façade - Bedrooms	Daytime	72.99	72.77	60.01	34.00	2	33	25	39	40	80%	100%	45	47	AC	
	Easterly Façade - Bedrooms	Nighttime	66.54	66.23	54.98	34.00	2	31	20	39	40	80%	100%	45	47	AC	
R3	Southerly Façade - Living/Dining	Daytime	70.09	69.85	57.42	34.00	3	32	24	39	40	60%	100%	44	47	AC	AC
	Southerly Façade - Living/Dining	Nighttime	63.66	63.32	52.40	34.00	3	25	19	39	39	60%	100%	43	46	FA	
	Southerly Façade - Bedrooms	Daytime	70.09	69.85	57.42	34.00	3	32	24	39	40	60%	100%	44	47	AC	
	Southerly Façade - Bedrooms	Nighttime	63.66	63.32	52.40	34.00	3	30	19	39	40	60%	100%	44	47	FA	
R4	Westerly Façade - Living/Dining	Daytime	53.77	53.77	0.00	34.00	3	16	0	39	39	60%	100%	43	46	None	None
	Westerly Façade - Living/Dining	Nighttime	47.25	47.25	0.00	34.00	3	14	0	39	39	60%	100%	43	46	None	
	Westerly Façade - Bedrooms	Daytime	53.77	53.77	0.00	34.00	3	16	0	39	39	60%	100%	43	46	None	
	Westerly Façade - Bedrooms	Nighttime	47.25	47.25	0.00	34.00	3	14	0	39	39	60%	100%	43	46	None	

AIF = Leq (outside) - Leq (inside) + 10logC + 2
where C = Number of room components

Window (or door) area expressed as percentage of room floor area	Acoustic Insulation Factor (AIF)
80	STC-5
63	STC-4
50	STC-3
40	STC-2
32	STC-1
25	STC
20	STC+1
16	STC+2
12.5	STC+3
10	STC+4
8	STC+5
6.3	STC+6
5	STC+7
4	STC+8

Note: For area percentages not listed in the table, use the nearest listed value.

Examples: For a window whose area = 20% of th room floor area and STC = 32, the AIF is 32 + 1 = 33.

For a window whose area = 60% of th room floor area and STC = 29, the AIF is 29 - 4 = 25.

Exterior wall area expressed as percentage of room floor area	Acoustic Insulation Factor (AIF)
200	STC-10
160	STC-9
125	STC-8
100	STC-7
80	STC-6
63	STC-5
50	STC-4
40	STC-3
32	STC-2
25	STC-1
20	STC
16	STC+1
12.5	STC+2
10	STC+3
8	

Note: For area percentages not listed in the table, use the nearest listed value.

Examples: For a wall whose area = 120% of the room floor area and STC = 48, the AIF is 48 - 8 = 40.

Source: Canadian Mortgage and Housing Corporation and Research Council of Canada