2023-06-21

Ryan Crowle, ME, ASHRAE
Principal
IDEA Inc.
595 Byron Avenue, Ottawa, ON K1Z 8R1
Tel: 613-728-0008 ext. 517
rcrowle@integratedesign.ca

IDEA Inc. – 2663 Innes Road
Noise Impact Assessment

Dear Ryan,

This report assesses two items: (1) the environmental noise impact from the mechanical equipment located at the new apartment building to be located at 2663 Innes Road, to determine the effect of this equipment on noise levels at nearby noise sensitive buildings, and (2) the traffic noise impact on the exterior envelope of the building, to determine the effect of traffic noise on the indoor areas.

This report is based on:

- Site plan and architectural drawings with plans dated October 6, 2022
- Preliminary mechanical equipment selections and locations received December 2, 2022.

The noise impact from the mechanical and electrical equipment to the surrounding area must not exceed the City of Ottawa Noise Bylaw limit of 50 dBA during the day and the City of Ottawa Environmental Noise Control Guidelines (ENCG) and Ontario Ministry of Environment, Conservation and Parks limit of 45 dBA at night. The ENCG refers to the MOECP NPC-300 Guidelines. From the above information, we have constructed a 3D model to predict sound pressure levels at the locations of nearby noise-sensitive buildings resulting from noise from the mechanical equipment at the proposed new apartment building to be located at 2663 Innes Road. We have determined that there are no mitigation measures required with the current equipment selections.

The traffic noise must meet the requirements in the ENCG for maximum road and railway noise levels for indoor areas. For the traffic noise assessment, the noise impact from Innes Road to the south of the new building was calculated. Using the Ministry of Environment's STAMSON modeling software, we have calculated the noise impact from traffic noise. An additional building component assessment was not required, as the noise levels at the plane of window did not meet the threshold to trigger an assessment using the AIF method. It has been determined that no changes are required to the exterior wall or window assemblies proposed in the architectural drawings due to noise from traffic on nearby roads.

Contents

1.0 Introduction & Site Description

State of the Art Acoustik Inc. has been commissioned by IDEA Inc. to complete a noise study for the development of a new apartment building to be located at 2663 Innes Road in Ottawa, Ontario. The building consists of a four-storey building with a make-up air unit and dry cooler as expected rooftop equipment. There is no parking garage, and no other significant mechanical equipment is anticipated. It is located within a mainly residential area, with a retirement residence, school and tennis club directly adjacent to the property and a retail area across Innes Road. We have analyzed the noise from the new equipment at the closest points of reception to determine the worst-case scenario of noise impact from the new building to the surroundings and traffic noise from Innes Road in order to determine the noise impact onto the new building itself.

1.1 Scaled Area Location Plan

Figure 1.1 shows the site plan for the new development and Figure 1.2 shows a satelite view of the site and surrounding area. Figure 1.3 provides site plan context within the surrounding area. Adjacent noise sensitive buildings include mainly residential buildings, schools and retail area.

Figure 1.1 – Site plan of 2663 Innes Road.

Figure 1.2 – Surrounding area around 2663 Innes Rd. from Google Maps imagery.

Figure 1.3 – Surrounding area around 2663 Innes Rd. from site plan context drawing provded by IDEA Inc.

2.0 Environmental Noise Assessment

In this section we provide our environmental noise assessment from the new building to the surrounding area. We detail the noise limits, noise sources, points of reception used in our modeling, modeling and calculation procedures, and predicted noise levels.

2.1 City of Ottawa Noise Bylaw & Enviornmental Noise Control Guidelines

The City of Ottawa Noise Bylaw and Environmental Noise Control Guidelines (ENCG) have the same limit for daytime permissible Sound Pressure Level (SPL) at a noise sensitive location in a Class 1 area of 50 dBA. The Bylaw is to be used in conjunction with the City of Ottawa Environmental Noise Control Guidelines (ENCG), which are based on the Ministry of Environment, Conservation and Parks (MOECP) NPC-300 Noise Control Guidelines. The City of Ottawa ENCG requires a 45 dBA SPL at night or ambient noise, whichever is higher. Therefore, when analyzing equipment for environmental noise studies, all non-emergency equipment in operation during the day must meet the Bylaw and ENCG limit of 50 dBA during the day and the ENCG limit of 45 dBA at night.

It should also be mentioned that the MOECP allows emergency equipment such as generators to be analyzed separately from all other equipment and allows for a limit of 55 dBA during non-emergency use such as testing. However, the City of Ottawa Bylaw does not make this distinction and therefore, the daytime limit of 50 dBA must still be met at each noise sensitive point of reception in the nearby area. However as there is no emergency equipment that is a part of this development, no analysis of emergency equipment is required.

The points of reception (POR) are chosen at the nearest noise-sensitive buildings, including the nearby school to the north, tennis club to the east, retirement residence to the west and nearest residences across Innes Road at the Emily Murphy Non-Profit Housing. These PORs will allow us to calculate the most significant noise impacts and mitigate it accordingly. These are discussed in further detail below.

2.2 Significant Noise Sources

Preliminary selections for mechanical equipment have been made and IDEA Inc. has provided preliminary locations and sound data for the expected equipment. The noise sources which are being considered for this assessment of the mechanical noise to nearby residences are summarized in Table 2.1 below.

Noise Source	Quantity	Location
Dry Cooler	1	Rooftop
Makeup Air Unit	1	Rooftop

Table 2.1 – Quantity and location of noise sources considered.

Table 2.1 shows that the noise sources are located on the rooftop of the building. In order to analyze the worst-case noise impact on the surrounding area, our analysis will include all sources in operation during the day and at night.

We have used sound data from equipment provided by IDEA Inc. for the MUA and dry cooler in order to determine the noise impact at surrounding noise sensitive points of reception.

Significant Sources	Manufacturer	Model	Quantity	Sound Levels Used (dBA)
Dry Cooler	Ref Plus	FVV High Speed	1	68 dBA @ 10 ft
MUA Inlet	Daiken	DPS010A	1	84.4
MUA Radiated	Daiken	DPS010A	1	89.4

Table 2.2 – Summary of equipment and sound levels in this analysis

	Octave Band Sound Power Levels (dB)								
Noise Source	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**	**dBA**
Dry Cooler (per fan)	68 dBA @ 10 feet								--
MUA Inlet	73	72	80	75	77	76	71	66	84.4
MUA Radiated	85	85	81	78	76	71	64	57	89.4

Table 2.3 – Octave band sound power levels of noise sources

2.3 Equipment Site Plan

Figure 2.1 below shows the plans identifying the proposed locations of the sound generating equipment on the roof. Care should be taken when choosing actual locations of large equipment, such as the MUA or dry cooler, to avoid locating equipment directly above bedrooms. Note that the dry cooler configuration is 2x4 fans and not 1x5 as shown and has been modeled as such.

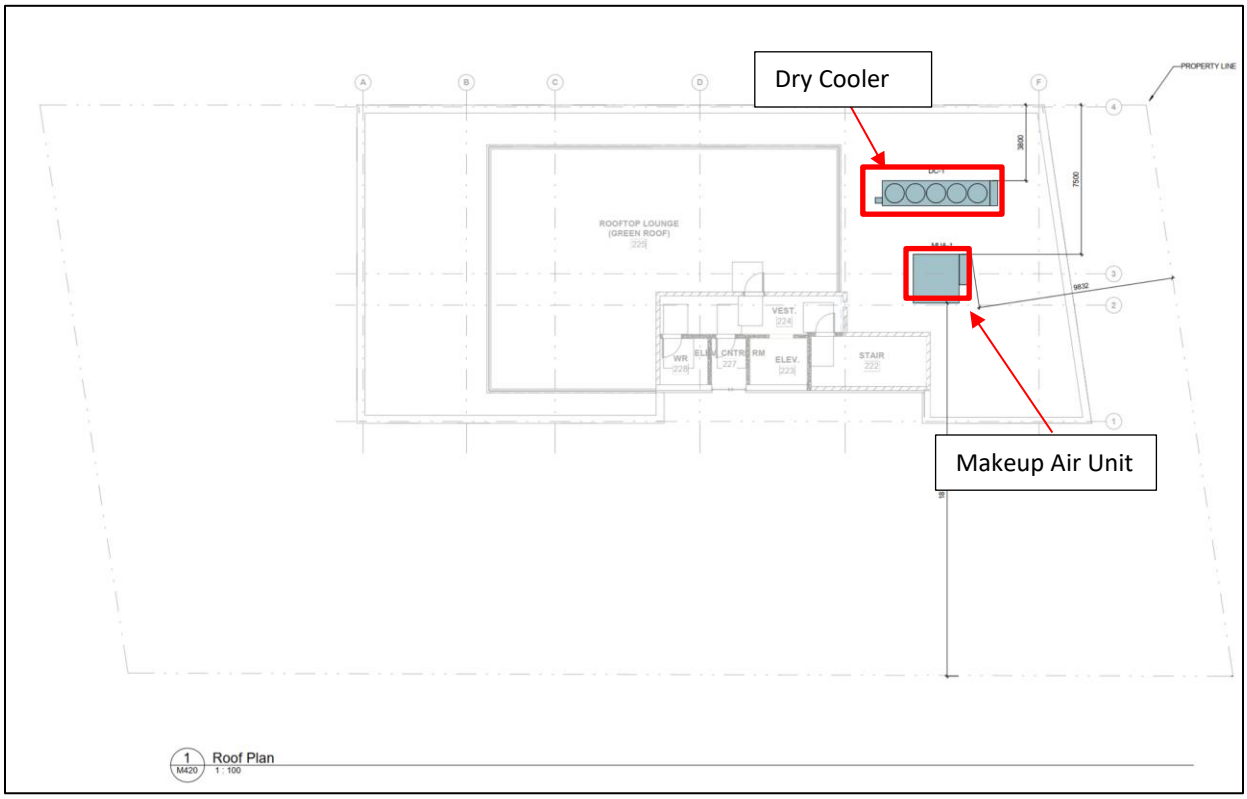


Figure 2.1 – Rooftop mechanical plan showing proposed locations of rooftop equipment.

2.4 Points of Reception

Points of reception (PORs) have been selected to evaluate the noise levels at locations of nearby noise sensitive buildings. Figure 2.2 shows the locations and heights of the four PORs used. As the new development is slightly higher than many of the surrounding properties, some of the noise is partially shielded by the roof of the building itself. The adjacent retirement residence and residential homes across Innes Road, however, are 2-3 storeys and noise from the rooftop equipment has an impact on these noise-sensitive buildings. POR1 is located at a height of 5m from the ground along the south-east façade of the Good Shepherd School located at 101 Bearbrook Road. POR2 is located along the east façade of the Aspira Bearbrook Retirement Living located at 2645 Lyndale Innes Road at a height of 10m. POR3 is located at a height of 10m along the north façade of Unit 84 at 2676 Innes Road. POR4 is located on the south-west façade of the Blackburn Tennis Club building at 2669 Innes Road at a height of 4.0m. While this is not a noise-sensitive building, it is still critical to meet noise limits at this property so that other more noise-sensitive buildings, such as the Lifecentre church next door, will also be met. Note that the rooftop amenity area is not defined as a required amenity space and therefore was not analyzed as a point of reception.

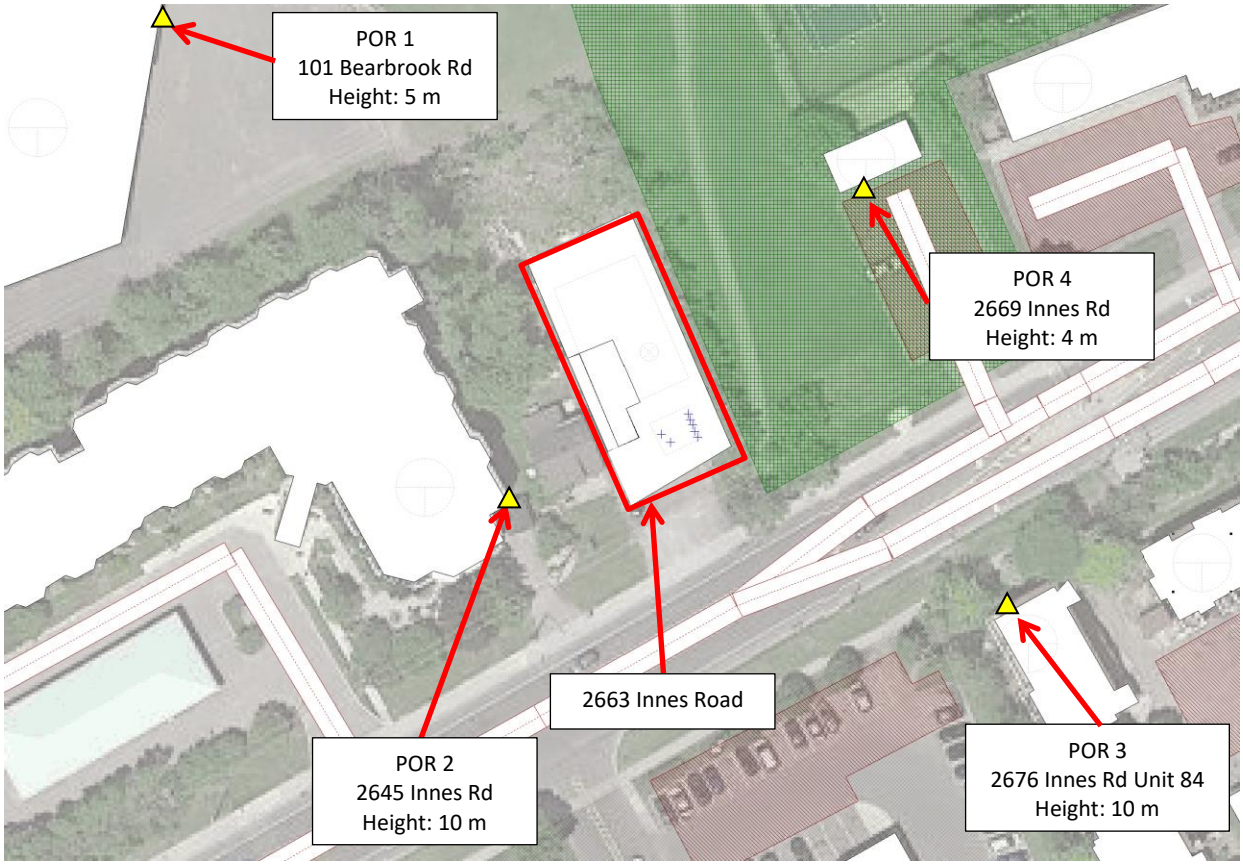


Figure 2.2 – Cadna map showing locations and heights of points of reception for stationary noise assessment of equipment at 2663 Innes Road**.**

2.5 Methodology Used in Environmental Noise Impact Calculation

The following sections describe the methodology and software used to model the sound pressure levels at the points of reception due to the noise sources while considering parameters such as source levels, distance, topography, barriers, and building geometry.

2.5.1 Procedure Used to Assess Noise Impact at Each Point of Reception

This environmental noise analysis was done using an environmental noise modeling software called CadnaA which references ISO 9613. CadnaA predicts environmental noise through calculations based on a 3D model which uses geometrical, landscape, and topographical data, combined with details of the proposed construction and the noise source power levels.

We created a 3D rendering of the neighbourhood around the building and placed the noise sources in the model at the appropriate locations and then and applied the sound power levels as identified above. The colours on the ground and building represent the sound pressure level in that area. Sound

power levels per octave band were entered into CadnaA at the source's location and the resulting sound pressure levels were calculated at the points of reception.

2.5.2 Other Parameters/Assumptions Used in Calculations

The following table describes the parameters used in the CadnaA model:

Parameter	Value/Condition
Ground Absorption	Default value of 0
Building Reflections	On
Temperature (°C)	10
Relative Humidity (%)	70

Table 2.2 – Parameters used in CadnaA modeling

2.6 Environmental Noise Levels

This section summarizes the CadnaA noise mapping results. Section 2.6.1 below illustrates the steady state sound pressure levels generated by all the noise sources with the currently selected equipment described above for daytime and nighttime operations, including full operation of the MUA and dry cooler. As a worst case scenario, our analysis has been completed with all equipment in operation, as there is no emergency equipment associated with the building. Therefore, with all equipment on at all times, the most stringent noise limit must be met, which is 45 dBA for nighttime scenarios. Note that even though all equipment may not be in operation at the same time for the majority of the time (for example, the dry cooler operating at a partial load at night) the worst-case scenario is still necessary for analysis as per NPC-300 requirements.

2.6.1 Results with Current Selections for Daytime and Nighttime Operations

Figure 2.3 shows the noise grid prediction at 10 m height and the sound pressure levels predicted at all PORs (POR1, POR2, POR3 and POR4) with all equipment in operation which shows the noise map at height equal to the most affected PORs. Figure 2.3 shows that the sound pressure levels at each POR are below the 45 dBA City of Ottawa nighttime limit. Values shown on the buildings in Figure 2.3 below show the highest sound pressure level along the façade of the building. The location of the highest value along the façade is where the PORs have been chosen.

Note that a change in mechanical equipment serving this building can increase or decrease the sound pressure levels at the surrounding noise sensitive buildings. Therefore, the final chosen dry cooler should have a maximum sound pressure level of 68 dBA at 10 feet, such as the one used in this study, as any higher will result in exceeding the 45 dBA limit. The current MUA sound power levels should also not be exceeded. If either piece of equipment is changed in future design stages and noise generated is increased from the levels identified in Section 2.2, an acoustic barrier will be required. Based on the currently chosen equipment, no mitigation is required.

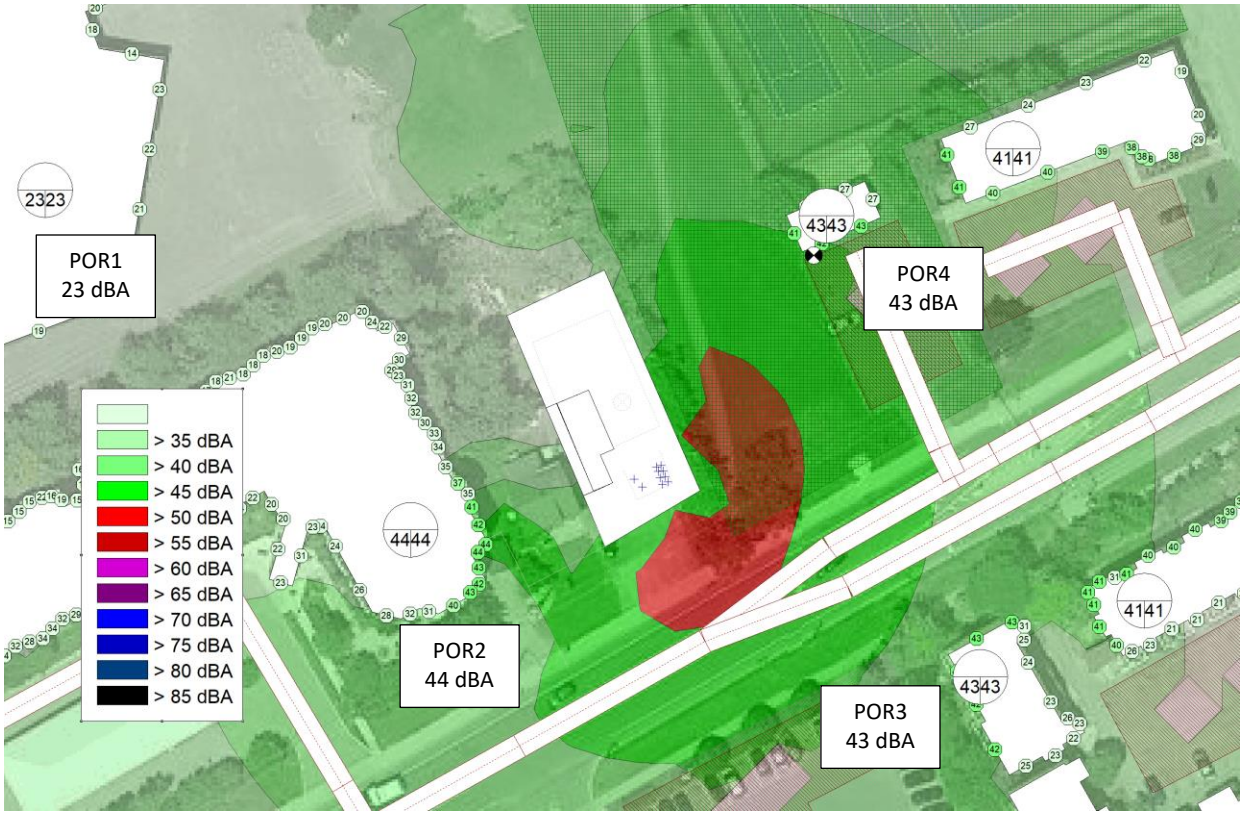


Figure 2.3 – Noise map at 10 m height with current equipment selections for daytime and nighttime operations. Predicted noise levels shown for PORs at heights defined in Figure 2.2.

3.0 Traffic Noise Study

The following section describes our analysis of the road noise impact on the proposed new building at 2663 Innes Road.

3.1 City of Ottawa Environmental Noise Guidelines for Traffic Noise (Road & Rail)

This assessment uses the City of Ottawa – Environmental Noise Control Guidelines (ENCG), dated January 2016, to assess and mitigate noise from roads, transit ways, railways and aircraft. The maximum road and rail noise levels for indoor and outdoor living areas are taken from Table 2.2a, 2.2b and 2.2c of the ENCG and summarized in Table 3.1 and Table 3.2 below.

Time	**Indoor Leq Levels (dBA) Class 1, 2 & 3 Areas**
	Road Traffic Noise Level Limit (dBA)
07:00 – 23:00	**50** for general offices, reception areas, retail stores, etc.
07:00 – 23:00	**45** for living/dining areas of residences and sleeping quarters
23:00 – 07:00	**40** for sleeping quarters

Table 3.1 – Criteria for Indoor Area Road Noise Levels

	Outdoor Leq Levels (dBA) Class 1, 2 & 3 Areas
	Road/Rail Traffic Noise Level Limit (dBA)
07:00 – 23:00	**55** for Outdoor Living Areas

Table 3.2 – Criteria for Outdoor Living Area Road/Rail Noise Levels

The ENCG states that noise control studies are to be prepared when the indoor area is within the following setback distances from the road, highway and railway noise sources:

- 100m from an arterial road or a major collector, light rail corridor or bus rapid transitway
- 250m from an existing or proposed highway
- 300m from a proposed or existing rail corridor or secondary main railway line
- 500m from a 400-series provincial highway or principle main railway line

The only roadway within the limits defined above is Innes Road, which is approximately 19m (center line) from the closest façade of the new proposed building. This is the only noise source considered for this analysis as there are no nearby rail or aircraft noise sources.

3.2 Traffic Noise Sources

For this study, the only surface transportation noise sources considered was traffic from Innes Road, for which the road center line is located approximately 19m from the nearest façade of the new building. The new proposed buildings are farther than 100m from any other collector or arterial road.

Table 3.3 below summarizes the roadway's parameters obtained from Table B1 on p. 75 of The City of Ottawa Environmental Noise Control Guidelines 2016, "Appendix B: Table of Traffic and Road Parameters To Be Used For Sound Level Predictions" for the respective roadway class.

Roadway	Implied Roadway Class	Annual Average Daily Traffic (AADT) Veh/Day	Posted Speed	Day/Night Split (%)	Medium Trucks (%)	Heavy Trucks (%)
Innes Rd	2 Lane Urban Collector	8,000	50 km/h	92/8	7	5

Table 3.3 – Summary of Major Roadway Noise Sources.

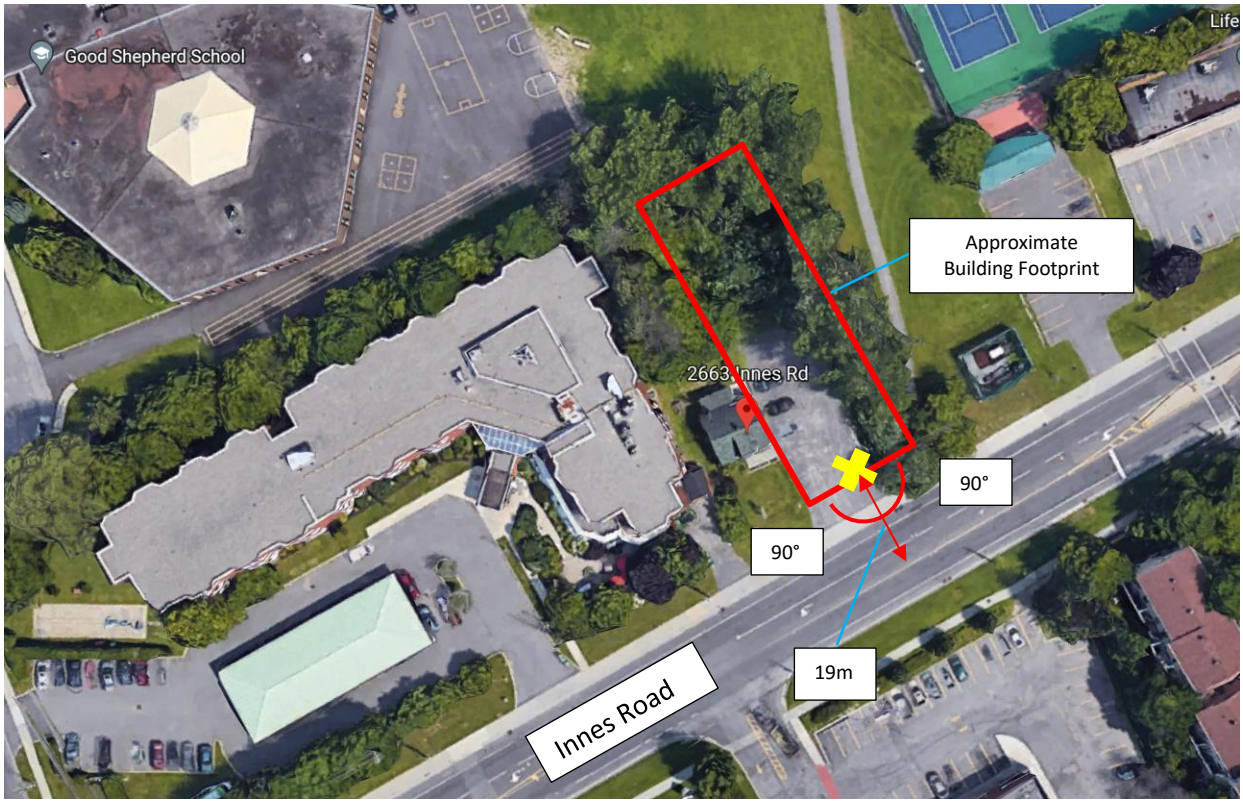


Figure 3.1 – Surrounding are of 2263 Innes Road showing locations and distances of relevant noise sources.

3.3 Points of Reception

To determine the worst-case noise impact on the façade of the building, we have chosen points of reception based on proximity to relevant noise sources, i.e., Innes Road. Innes Road runs in parallel with the front façade of the building, therefore we have chosen three points of reception: one on the first floor at the south-west corner of the building at the exterior of Office #1 as shown in Drawing SD6.02 (POR A), the 4th floor south-west corner at the exterior of the 1-bedroom unit as shown on Drawing SD6.04 (POR B) and at the rooftop lounge area (POR C) as shown on Drawing SD6.04. POR A is located at a height of 1.5m (ground floor), POR B is located at a height of 10.5m (4th floor) and are both located at 19m from the centerline of Innes Road. POR C is located in the middle of the Rooftop Lounge Area on the roof, which is approximately 38m from the centerline of Innes Road and a height of 13.5m. These PORs are shown in plan view in Figure 3.2, Figure 3.3, and Figure 3.4 below. Elevations were not available as a part of the current schematic pre-site application drawing package. Table 3.4 below summarizes the POR heights, distances to relevant noise sources, and angles to the sources.

Note that POR A and POR C are only applicable during daytime and evening hours (7:00am to 11:00pm) as they are office space and the rooftop lounge. Note that we have assumed that a partial barrier will separate the rooftop lounge area from the remainder of the rooftop area where mechanical equipment is located.

Receiver	Height (m)	Noise Source		
		Confederation Line		
		Distance from Source (m)	Angle to source from left	Angle to source from right
POR A	1.5	19	90	90
POR B	10.5	19	90	90
POR C	13.5	38	90	90

Table 3.4 – Summary of POR height, distance from noise sources, and angles to noise sources.

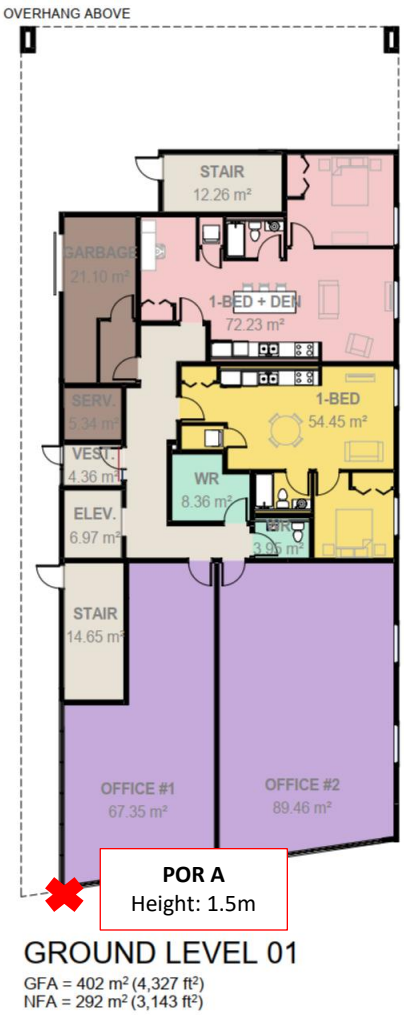


Figure 3.2 – Floor plan section of 1st floor showing the plane of window (POW) point of reception, POR A location.

Figure 3.3 – Floor plan section of 4th floor showing the plane of window (POW) point of reception, POR B location.

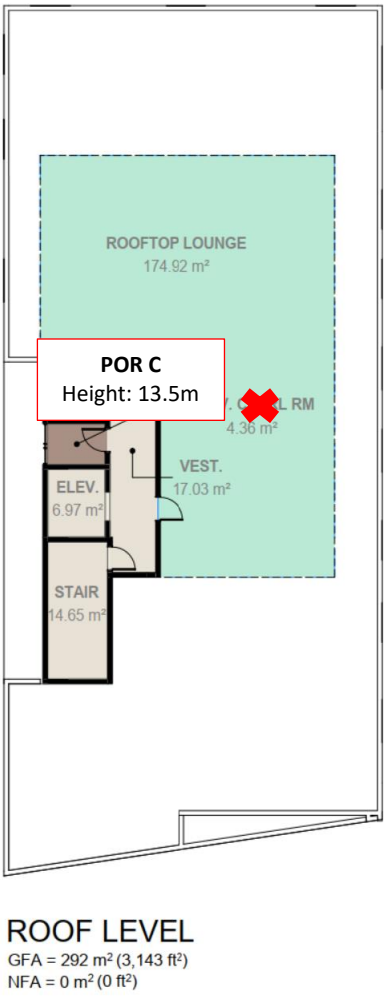


Figure 3.4 – Floor plan section of rooftop level showing the outdoor living area point of reception location (POR C).

3.4 Methodology Used in Traffic Noise Impact Calculation

In order to calculate the rail noise impact at the proposed development, we utilized the Ministry of Environment's STAMSON modeling software version 5.04. This program allows us to input variables of a road such as traffic volume, speed, day and night traffic splits, and topography to determine the noise impact at a point of reception.

According to the City of Ottawa, when noise levels could exceed 65 dBA at the Plane of Window (POW) of a noise sensitive building, the exterior cladding system of the building envelope must be acoustically designed to ensure the indoor noise criteria is achieved. The City of Ottawa recognizes the Acoustic Insulation Factor (AIF[1]) method as an appropriate analysis technique.

3.4.1 STAMSON Analysis Parameters

The parameters used in STAMSON to assess the noise impact at POR A, POR B and POR C are indicated in Table 3.5, 3.6 and 3.7 below, respectively. These are used in conjunction with the parameters for road traffic volume given in Table 3.2.

Parameter	Values Used
Railway	Innes Road
Time Period	16h/8h
Topography	Flat/gentle slope; no barrier
Rows of Houses	0
Density of First Row	N/A
Intermediate Surface	Reflective
Receiver Height (m)	1.5m
Source Receiver Distance (m)	19m
Road Source Angles	Θ1= -90°, Θ2=90°

Table 3.5 – Parameters used in the STAMSON model for POR A.

Parameter	Values Used
Railway	Innes Road
Time Period	16h/8h
Topography	Flat/gentle slope; no barrier
Rows of Houses	0
Density of First Row	N/A
Intermediate Surface	Reflective
Receiver Height (m)	10.5m
Source Receiver Distance (m)	19m
Road Source Angles	Θ1= -90°, Θ2=90°

Table 3.6 – Parameters used in the STAMSON model for POR B.

Parameter	Values Used
Railway	Innes Road
Time Period	16h/8h
Topography	Elevated; no barrier
Rows of Houses	0
Density of First Row	N/A
Intermediate Surface	Reflective
Receiver Height (m)	13.5m
Source Receiver Distance (m)	19m
Road Source Angles	Θ1= -90°, Θ2=90°
Elevation Change	13.5m
Barrier Angles	Θ1= -90°, Θ2=90°
Barrier to Receiver Distance	5m
Barrier Height	1.5m
Source Elevation	0m
Receiver Ground Elevation	0m
Barrier Base Elevation	12m

Table 3.7 – Parameters used in the STAMSON model for POR C.

3.5 Predicted Surface Transportation Noise Levels

Table 3.8 below shows the predicted sound pressure levels at the points of reception from the results of the STAMSON noise software calculation (Appendix A).

Noise Source	POR A (dBA)	POR B (dBA)		POR C (dBA)
	Day	Day	Night	Day
Innes Road	62.6	63.4	55.7	52.1

Table 3.8 – Predicted traffic noise at the PORs, broken down per source.

As sound levels at the plane of window at both PORs are both below the 65 dBA threshold in order to trigger a detailed AIF analysis of the building components. Therefore, provided that OBC requirements are met for all exterior components are met, no additional acoustic mitigation measures or changes to the exterior building components are required.

3.6 Warning Clauses

The City of Ottawa requires a Warning Clause whenever noise could meet or exceed 55 dBA 16 hour L_{eq} at the Outdoor Living Area or Plane of Window of any living or sleeping area prior to any noise mitigation. As levels are above 55 dBA at the POW at POR A and POR B, warning clauses are required.

Table 3.9 provides the types of warning clauses which have been taken directly from the MOECP NPC-300 Section C8.1 which also states:

"*A warning clause is not considered a form of noise mitigation. It is not acceptable therefore to use warning clauses in place of physical noise control measures to identify an excess over the MOE or City noise limits*."

TYPE	Warning Clause Text
Type A	Purchasers/tenants are advised that sound levels due to increasing road/rail/Light Rail/transit way traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.
Type B	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/rail/Light Rail/transitway traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the City and the Ministry of the Environment.
Type C	This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air condition 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 City and the Ministry of Environment.
Type D	This dwelling 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 City and the Ministry of Environment.

Table 3.9 - Warning Clause Types (from MOECP NPC-300 Section C8.1)

A Type D Warning Clause is to be applied to all units in the new 2663 Innes Road development.

4.0 Conclusion

We have completed a noise impact study for the proposed four storey apartment building at 2663 Innes Road in Ottawa. This analysis included an environmental noise impact review and a traffic noise review onto the development.

For the environmental noise impact, we used proposed equipment provided by IDEA Inc. and predicted the sound pressure levels at nearby sensitive points of reception. To meet the City of Ottawa and ENCG Noise Limits, no mitigation measures are required, however if equipment is changed to equipment with higher noise levels in future design stages, an acoustic barrier will be required.

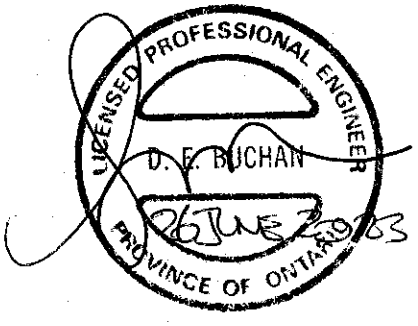
The traffic noise impact from Innes Road was reviewed and found to be less than 65 dBA at the 1st and 4th floor plane of window points of reception of the development, therefore a detailed building components analysis was not required. Sound levels from traffic were found to be less than 55 dBA at the rooftop lounge. Because levels exceeded 55 dBA at POR A and POR B, warning clauses as defined in Section 3.6 are required.

Should you have any comments or questions regarding this report, please do not hesitate to communicate with us.

Sincerely,

Patrick Richard, M.Sc.E.
Acoustic Consultant

Approved By:



Donald Buchan, P.Eng
Principal
Buchan Lawton Parent Ltd.

APPENDIX

STAMSON Calculations
Mechanical Equipment Cut Sheets

STAMSON 5.0 NORMAL REPORT Date: 14-12-2022 23:05:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2663inn1.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 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): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 19.00 / 19.00 m
Receiver height : 1.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: INNES (day)

Source height = 1.50 m

ROAD (0.00 + 62.59 + 0.00) = 62.59 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.66 65.75 0.00 -1.70 -1.46 0.00 0.00 0.00 62.59

Segment Leq : 62.59 dBA

Total Leq All Segments: 62.59 dBA

Results segment # 1: INNES (night)

Source height = 1.50 m

ROAD (0.00 + 55.50 + 0.00) = 55.50 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.48 58.16 0.00 -1.52 -1.14 0.00 0.00 0.00 55.50

Segment Leq : 55.50 dBA

Total Leq All Segments: 55.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.59
(NIGHT): 55.50

STAMSON 5.0 NORMAL REPORT Date: 14-12-2022 23:05:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2663inn2.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 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): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 19.00 / 19.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: INNES (day)

Source height = 1.50 m

ROAD (0.00 + 63.09 + 0.00) = 63.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.48	65.75	0.00	-1.52	-1.14	0.00	0.00	0.00	63.09

Segment Leq : 63.09 dBA

Total Leq All Segments: 63.09 dBA

Results segment # 1: INNES (night)

Source height = 1.50 m

ROAD (0.00 + 55.50 + 0.00) = 55.50 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.48	58.16	0.00	-1.52	-1.14	0.00	0.00	0.00	55.50

Segment Leq : 55.50 dBA

Total Leq All Segments: 55.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.09
(NIGHT): 55.50

STAMSON 5.0 NORMAL REPORT Date: 14-12-2022 23:06:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2663inn3.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 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): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 10.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 38.00 / 19.00 m
Receiver height : 13.50 / 7.50 m
Topography : 4 (Elevated; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 1.50 m
Elevation : 13.50 m
Barrier receiver distance : 5.00 / 10.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 12.00 m
Reference angle : 0.00

Results segment # 1: INNES (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.50 ! 13.50 ! -0.08 ! 11.92

ROAD (0.00 + 52.12 + 0.00) = 52.12 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 -4.04 0.00 0.00 0.00 -9.59 52.12

Segment Leq : 52.12 dBA

Total Leq All Segments: 52.12 dBA

Results segment # 1: INNES (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.50 ! 7.50 ! -7.66 ! 4.34

ROAD (0.00 + 38.80 + 0.00) = 38.80 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.00 58.16 0.00 -1.03 0.00 0.00 0.00 -18.33 38.80

Segment Leq : 38.80 dBA

Total Leq All Segments: 38.80 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.12
(NIGHT): 38.80

Condensing Section

Compressor

Type	Quantity	Refrigerant Charge lb	Total Power	Capacity Control	Compressor Isolation
Inverter Scroll + Fixed Scroll	2	20.0	8.23 kW	Mod Control with Inverter Compressor	Rubber in Shear

Compressor Amps:	
Compressor 1	3.6 A
Compressor 2	6.3 A

Compressor Options:	Suction and Discharge Isolation Valves

Condenser Coil

Type	Fins per Inch	Fin Material
Aluminum Microchannel	23	Aluminum

Condenser Fan Motors

Number of Motors*	Full Load Current (Total)
2	1.4 A

Internal Pressure Drop Calculation

External Static Pressure:	1.00 inH_2O
Filter:	0.05 inH_2O
Outside Air:	0.11 inH_2O
DX Coil:	0.17 inH_2O
Gas Heat:	0.08 inH_2O
Total Static Pressure:	1.42 inH_2O

Sound

	Sound Power (db)							
Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Inlet	73	72	80	75	77	76	71	66
Discharge	73	75	83	80	83	82	79	74
Radiated*	85	85	81	78	76	71	64	57

Options

Electrical

Field Connection:	Non-Fused Disconnect Switch
Power Options:	Phase Failure Monitor

Controls

Communication Card:	BACnet/IP card, Factory installed

Factory Installed Sensors

- Leaving Coil/Entering Fan Temperature Sensor
- Duct High Limit Switch
- BACnet/IP Card
- Discharge Air Temperature sensor – Wired in unit, mounted in supply duct
- Outside Air Temperature Sensor
- Dirty Filter On/Off Switch
- Supply Fan Air Proving Via Modbus

REFPLUS

2016

SRA-2013-R1

Niveau Sonore / Sound Rating

Condenseurs & Refroidisseurs de fluide / Condensers & Fluid coolers

Niveau de pression sonore en DBA @ 10 Ft du coté de l'unité
Sound Pressure Rating in DBA at 10 Ft from side of the unit

Modèle / Model		Arrangement																			
Condenseur - Condenser	Refroidisseur - Fluid Cooler	1X1	1X2	1X3	1X4	1X5	1X6	1X7	1X8	1X9	1X10	2X1	2X2	2X3	2X4	2X5	2X6	2X7	2X8	2X9	2X10
CCD / CCR	FCD	56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CMD* / CMR	FMD	62	65	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	65	68	70	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CQD*	FQD*	55	58	59	60	61	62	N/A	N/A	N/A	N/A	58	60	62	64	65	66	N/A	N/A	N/A	N/A
CLD* / CLR / CLW	FLD	62	65	66	67	68	69	70	71	N/A	N/A	65	67	69	71	72	73	74	75	N/A	N/A
CHD*	FHD*	65	68	69	70	71	72	N/A	N/A	N/A	N/A	68	70	72	74	75	76	N/A	N/A	N/A	N/A
CID*	FID*	72	75	76	77	78	79	N/A	N/A	N/A	N/A	75	77	79	81	82	83	N/A	N/A	N/A	N/A
CNR / CNW	FND	72	75	76	77	78	79	80	81	N/A	N/A	75	77	79	81	82	83	84	85	N/A	N/A
CBR / CBW low speed	FBD low speed	53	56	58	59	60	61	61	62	N/A	N/A	56	59	61	62	63	64	65	66	N/A	N/A
CBR / CBW high speed	FBD high speed	63	66	68	69	70	71	71	72	N/A	N/A	66	69	71	72	73	74	75	76	N/A	N/A
CVD* / CVR / CVW low speed	FVD low speed	51	54	55	56	57	58	59	60	N/A	N/A	54	56	58	60	61	62	63	64	N/A	N/A
CVD* / CVR / CVW high speed	FVD high speed	59	62	63	64	65	66	67	68	N/A	N/A	62	64	66	68	69	70	71	72	N/A	N/A
CLX	FLV	62	65	66	67	68	69	70	71	71	72	65	67	69	71	72	73	74	75	76	77
CNX	FNV	72	75	76	77	78	79	80	81	82	83	75	77	79	81	82	83	84	85	86	87
CBX low speed	FBV low speed	53	56	58	59	60	61	61	62	62	63	56	59	61	62	63	64	65	66	67	68
CBX high speed	FBV high speed	63	66	68	69	70	71	71	72	73	74	66	69	71	72	73	74	75	76	77	78
CVX low speed	FVV low speed	51	54	55	56	57	58	59	60	60	61	54	56	58	60	61	62	63	64	65	66
CVX high speed	FVV high speed	59	62	63	64	65	66	67	68	69	70	62	64	66	68	69	70	71	72	73	74

*** Ancien Modèle / old model**
X - En attente de confirmation / to be confirmed

Les niveaux sonores sont évalués selon des lectures officielles sur un CQD, CLD et CVR.
applicables seulement sur une unité à décharge d'air verticale.
Les niveaux sonores peuvent variés selon le bruit de fond ambiant et l'arrangement des ventilateurs.

Sound ratings are evaluated from official tests done on model CQD, CLD & CVR.
Sound ratings are for vertical air flow unit.
Actual sound ratings may vary depending of background noise and mounting arrangement.

original13/03/2009