Impactful Engineering

PROVENCHER ROY

MIFO – Stationary noise assessment

Environmental Noise Study

Final Issue

BPA Ref.: 8021-043

May 16, 2025

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MIFO – Stationary noise assessment

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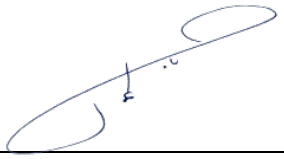
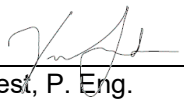
Prepared by:



Idriss Boumaiza, M. A. Sc.
Acoustics and Noise Control

Verified by:



Vincent Laforest, P. Eng.
Acoustics and Noise Control
OIQ membership no.: 5088054

Issues		
Revision	**Date**	**Issue Title**
00	2025-05-16	Final Issue

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1. Introduction

BPA was retained by Provencher Roy to undertake a stationary noise assessment for the proposed new MIFO (Mouvement d'Implication Francophone d'Orléans) facility development located at 6600 Carriere street in Ottawa (Ontario). The present scope of work involves assessing exterior noise levels generated by a chiller, condensing units and other HVAC systems. More precisely, the following elements were undertaken as part of this mandate:

- Noise prediction modelling, using an acoustic simulation software, considering the operation of all mechanical equipment, and used to evaluate the environmental noise impact.
- Assessment of the compliance of the noise levels with the acoustic thresholds defined by the city of Ottawa bylaw.

2. Terminology and definitions

The following section describes important principles and terminology used throughout this report.

- **Linear weighted decibels, dB**: raw data without a correction applied | Value measured by a sound level meter without any weighting applied.
- **A-weighted decibels, dB(A)**: a decibel value for which an A-weighted filter has been applied to simulate the hearing acuity (frequency threshold) of the human ear.
- **Ambient noise**: the ambient noise is measured as a baseline in a room or in the environment where an acoustical study is to be conducted, according to a given operating condition and an occupancy condition.
- **Equivalent sound level (Leq)**: defined as the continuous sound level, which has the same energy as a time-varying noise level over a selected period of time.
- **Background noise (LAF_{95})**: represents the A-weighted sound pressure level, which is present or exceeded during 95% of the measurement interval.

3. Noise criteria

Applicable noise criteria are taken from NPC-300 (Ontario's environmental noise guidelines) and ENCG (Ottawa's environmental noise control guidelines). NPC-300 describes maximum sound levels that apply to outdoor points of reception (POR), defined as "*any location on a noise sensitive land use where noise from a stationary source is received*".

Table 3-1 outlines the recommended maximum noise levels for a Class 2 area, defined as "*an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 areas, with sound levels characteristic of Class 1 during daytime and low evening and night background sound level defined by natural environment and infrequent human activity".* The study site is considered to be Class 2 as it is located within the "Suburban east area" as defined in Ottawa's Schedule A and B.

Table 3-1: Maximal sound pressure level

	Maximal sound pressure Levels* dB(A)		
	Day 7h-19h	Evening 19h-23h	Night 23h-7h
Outdoor point of reception	50	45	--
Plane of window	50	50	45

4. Acoustic modelling

4.1 MODELLING SCENARIO

Computer modelling was done using the DataKustic CadnaA sound prediction software, which follows ISO 9613 standards. The following calculation settings were used:

- Temperature: 20 °C.
- Air humidity (%): 70.
- Wind: 10 km/h.
- Ground attenuation factor for roadways and paved areas: 0.
- Buildings are reflecting.

To assess the impact of stationary noise on adjacent land uses, sound level was calculated at seven (7) noise-sensitive selected receptors. The locations of receptors are described in Table 4-1 below and shown on Figure 4-1. Receptors elevations are presented on drawing C1 of appendix 3.

Table 4-1: Receptor Locations

Receptor	Description
R1	Plane of window – Garneau catholic high school
R2	Backyard – 1561 Montcerf Ct
R3	Backyard – 1575 Champneuf Dr
R4	Playground – École élémentaire catholique
R5	Playground – École élémentaire catholique
R6	Backyard – 6594 Richer Dr
R7	Plane of window – 6607 Carrier Street

Figure 4-1: Noise receptors location

4.2 STATIONARY NOISE SOURCES

Stationary noise sources were modelled as point sources based on sound levels shown in Table 4-2. The acoustic model assumes that all noise sources are operating at full capacity at the same time. Mechanical equipment locations and technical data sheets are attached in appendix 2.

Table 4-2: Sound power levels

Source	Description	Frequency (Hz) dB								
		63	125	250	500	1000	2000	400	8000	Overall dB(A)
RF-CH-01	Outdoor chiller	75	76	79	83	87	85	79	74	
RF-CU-01	Outdoor Condensing unit	64	68	64	67	62	57	51	45	67
RF-CU-02	Outdoor Condensing unit	--	--	--	--	--	--	--	--	60

Source	Description	Frequency (Hz) dB								
		63	125	250	500	1000	2000	400	8000	Overall dB(A)
RF-CU-03	Outdoor Condensing unit	--	--	--	--	--	--	--	--	65
RF-CU-04	Outdoor Condensing unit	--	--	--	--	--	--	--	--	60
RF-CU-05	Outdoor Condensing unit	--	--	--	--	--	--	--	--	65
03-AHU-01 03-AHU-02	Intake*	77	83	89	74	73	75	73	68	83
03-AHU-01 03-AHU-02	Exhaust*	84	84	85	87	83	80	79	74	89
02-MUA-01 02-AHU-04 02-AHU-03	Intake*	58	63	77	59	48	60	64	54	71
02-MUA-01 02-AHU-04 02-AHU-03	Exhaust*	67	66	70	82	80	78	79	72	86

(*) this sound levels include attenuation from ductwork in accordance with ASHRAE standards.

4.3 RESULTS

The environmental noise simulation results are presented in drawings C1 and C2 (appendix 4). Sound contour maps at 1.5 metres above grade are illustrated in drawing C1. Drawing C2 illustrates location of noise-sensitive receptors and calculated stationary noise for all noise sources.

Table 4-3 provides a summary of the estimated sound levels at noise-sensitive receptors.

Table 4-3: Anticipated sound levels

Receptors	Description	Sound Level dB(A)	Criteria			NPC-300 criteria
			Day	Evening	Night	
R1	Plane of window – Garneau catholic high school	41	50	--**	--**	Ok
R2	Backyard – 1561 Montcerf Ct	38	50	45	--	Ok
R3	Backyard – 1575 Champneuf Dr	39	50	45	--	Ok
R4	Playground – École élémentaire catholique	45	50	--**	--	Ok

Receptors	Description	Sound Level dB(A)	Criteria			NPC-300 criteria
			Day	Evening	Night	
R5	Playground – École élémentaire catholique	49	50	--**	--	Ok
R6	Backyard – 6594 Richer Dr	<30	50	45	--	Ok
R7	Plane of window – 6607 Carrier Street	41	50	45	45	Ok

(**) Acoustic thresholds during the evening and night periods do not apply to this receptor considering the schools opening hours.

The sound modelling indicates that the predicted sound levels from all stationary noise sources range from 30 to 49 dB(A). As summarized in Table 4-3, stationary noise levels comply with the city of Ottawa noise bylaw (ENCG).

The sound levels for outdoor points of reception (R2, R3, R4, R5) range from 30 to 49 dB(A), thus complying with the maximum allowable limit of 50 dB(A). For plane of window receptors (R1, R7), expected noise levels are around 41 dB(A). These levels meet the nighttime permissible sound levels for the plane of windows noise sensitive receptors.

5. Conclusion

BPA was retained by Provencher Roy to undertake a stationary noise assessment for the proposed new MIFO (Mouvement d'Implication Francophone d'Orléans) facility development located at 6600 Carriere street in Ottawa (Ontario). The results of the current study indicate that predicted noise levels at nearby points are expected to fall below the city bylaw noise criteria. These results consider the operation of the mechanical equipment. As such, the proposed equipment is expected to satisfy Ottawa's noise bylaw.

APPENDIX 1
Noise bylaw - Ottawa

PLANNING AND GROWTH MANAGEMENT
URBANISME ET GESTION DE LA CROISSANCE

ENVIRONMENTAL NOISE CONTROL GUIDELINES: Introduction and Glossary

January 2016

3.0 Stationary Sources of Noise

This section applies to new development in proximity to existing stationary sources of noise and to development of new stationary noise sources in proximity to noise sensitive land uses. Stationary sources of noise, either fixed or mobile, represent the combined sound and vibration levels emitted beyond the property boundary. Stationary source noise can be generated by individual or multiple sources (facilities). Examples of individual noise sources include generators, fans and commercial air conditioners. Examples of facilities include manufacturing facilities, car dealerships and vehicle maintenance facilities, snow disposal sites, car washes and transit stations. Some sources of noise are excluded from the definition of a stationary noise source by the province these include: construction activities, gas stations, music concerts and festivals, and individual retail stores where goods are not frequently delivered.

The impact of stationary noise on the community is largely dependent on its location in the city. Within the Provincial guidelines there are four separate community class areas which are defined by their ambient sound level (see Table 3.0 below).

Table 3.0: Area Classes for Definition of Stationary Noise Ambient Sound Level

Class 1	Means 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." Within the City Class 1 areas generally include all of the urban area as well as lands in proximity to Employment Lands and the 416/417 corridor.
Class 2	Means an area with an acoustical environment that has qualities representative of both Class 1 and Class 3 areas. These are the suburban areas of the City outside of the busy core where the urban hum is evident but within the urban boundary. Class 2 areas also include core areas of large and medium sized villages such as Manotick, Greely, Richmond, Carp and Metcalfe. Class 2 areas have the following characteristics: i. sound levels characteristic of Class 1 during daytime (07:00 to 19:00 or to 23:00 hours); and ii. low evening and night background sound level defined by natural environment and infrequent human activity starting as early as 19:00 hours (19:00 or 23:00 to 07:00 hours).
Class 3	Means a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as: i. a small community or village; ii. agricultural area; iii. a rural recreational area such as a cottage or a resort area; or iv. a wilderness area. • • Within the City, Class 3 areas are found in the rural area, Greenbelt and within small residential oriented villages such as Kinburn, Ashton, Sarsfield and Constance Bay.

Class 4	Means an area or specific site that would otherwise be defined as Class 1 or 2 and which: i. is an area intended for development with new noise sensitive land use(s) that are not yet built; ii. is in proximity to existing, lawfully established stationary source(s); and iii. has formal confirmation (designation) from the City of the Class 4 area classification through Council approval. This classification may not be applied retroactively. Existing noise sensitive land use(s) cannot be classified as Class 4 areas until these land uses are replaced, redeveloped or rebuilt. Class 4 is only applied on a property by property basis and, if the noise source is removed (i.e. the Provincial ECA is removed or lapses), the classification will become consistent with that of the adjacent lands (either Class 1 or 2). Finally, lands adjacent to undeveloped industrially zoned properties or areas defined as employment lands in the Official Plan may not be classified Class 4. Class 4 is considered to be an extraordinary circumstance that, while proposed by an applicant, can only be classified through a City or Ontario Municipal Board approval of a Planning Act application and accompanying noise study. A list and schedule for each Class 4 area that have been approved by the City is found in Appendix E.

3.1 When a Study is Required for Stationary Noise

The goal of an assessment of stationary noise is to provide for land use compatibility. To this end these guidelines follow the Provincial "D" Series of guidelines. The D guidelines were produced by the Ministry of Environment in the 1990's to address land use compatibility between industry and sensitive land uses. A key component of the D series guidelines is the Area of Influence where a study is required. A key difference between the D series and these guidelines is for applications submitted to the Province under the Aggregate Resources Act. In this circumstance the assessment is widened to match the criteria in the Official Plan which is 500 metres for a quarry and 300 metres for a pit.

The City will apply the provincial stationary noise guidelines in any of three application situations:

1. when a new noise-sensitive receptor is proposed in proximity to existing stationary sources of noise or;
2. a new noise-generating facility/sources is proposed in proximity to existing noise-sensitive receptors or lands designated for future development of noise sensitive receptors .
3. An existing stationary noise source is expanded or intensified.

Proposed new noise-sensitive development must evaluate noise impact and submit a noise feasibility and/or detailed noise study if it is within:

- 100 metres of lands designated for employment under the Official Plan or zoned for industrial use;

- 100 metres of an existing stationary noise source;
- 300 metres of a pit licensed under the Aggregate Resources Act or;
- 500 metres of a quarry licensed under the Aggregate Resources Act.

Noise impacts from proposed equipment and facilities that are expanded or intensified are considered by the Province during approval processes under the Environmental Protection Act. Whether or not an updated or new approval is required from the Province, the City may request that a noise study or Acoustical Audit be prepared and that a certification of final construction be submitted.

3.2 Applicable Guidelines for Stationary Noise

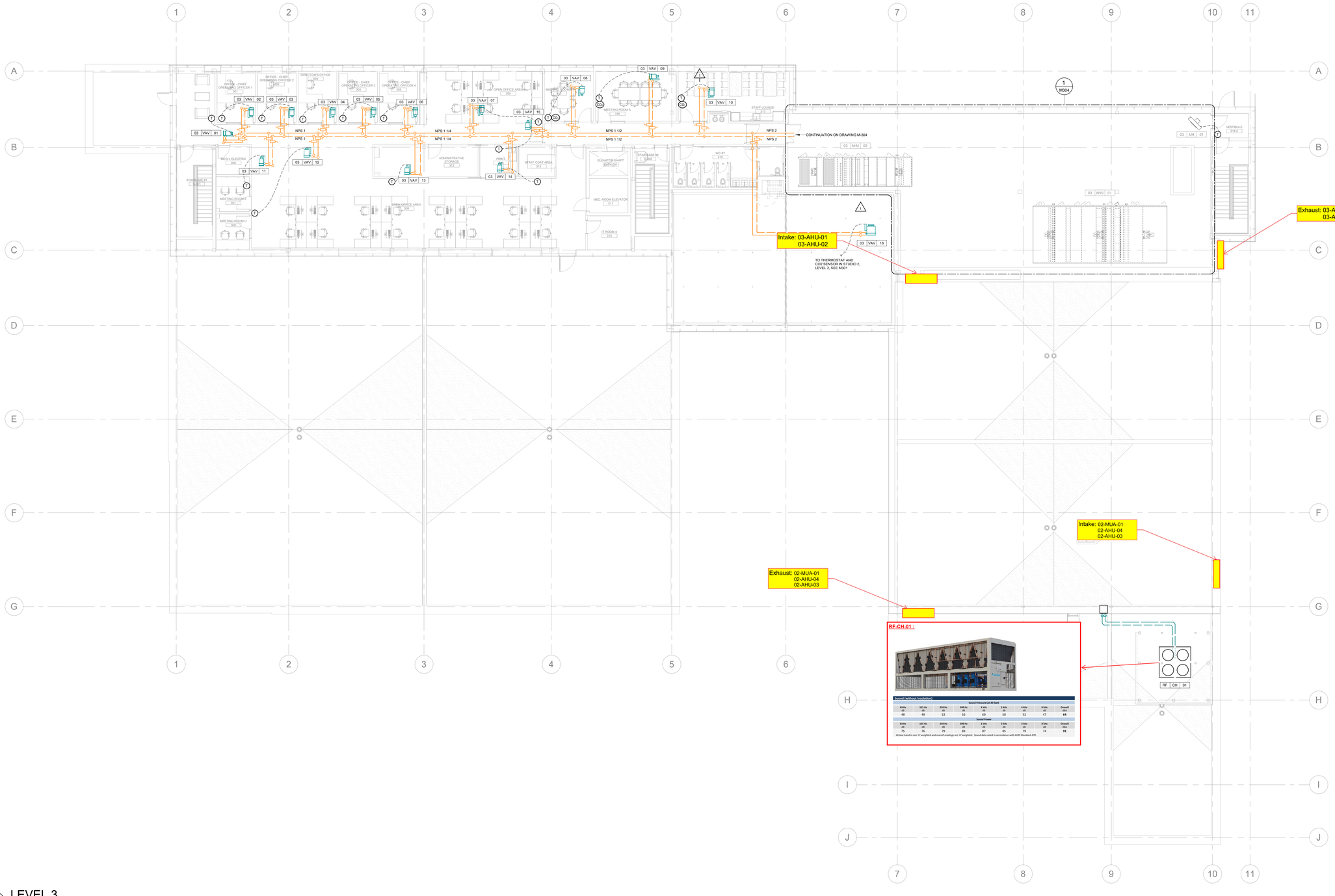
In late 2013 the Province issued updated environmental noise guidelines for stationary and transportation sources – Publication NPC-300. Unless otherwise noted, the City requires development to be consistent with the NPC-300 guidelines. For convenience, the NPC-300 guidelines for Stationary Noise are reproduced in Table 3.2 below.

Table 3.2a: Guidelines for Stationary Noise – Steady and Varying Sound

Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA)

Time of Day	Class 1 Area		Class 2 Area		Class 3 Area		Class 4 Area	
	Outdoor Point of Reception	Plane of Window	Outdoor Point of Reception	Plane of Window	Outdoor Point of Reception	Plane of Window	Outdoor Point of Reception	Plane of Window
07:00 – 19:00	50	50	50	50	45	45	55	60
19:00 – 23:00	50	50	45	50	40	40	55	60
23:00 – 07:00	-	45	-	45	-	40	-	55

APPENDIX 2
Technical data sheets and drawing



1 LEVEL 3
M303
1 : 100

COLOUR LEGEND HEATING-COOLING
HOT WATER HEATING
CHILLED WATER
MEDIUM TEMPERATURE WATER
HOT PROPYLENE GLYCOL
GEOTHERMAL PROPYLENE GLYCOL
REHEAT PROPYLENE GLYCOL

GENERAL NOTES

A. THIS DRAWING SHOWS THE GENERAL ARRANGEMENT OF PIPING AND EQUIPMENT. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING DISTANCES AND OBSTRUCTIONS ON SITE AND COORDINATING WITH STRUCTURE AND ARCHITECTURE. CONTRACTOR MUST CONFIRM THE DIMENSION OF THE PIPING BEFORE ORDERING ANY MATERIAL.

B. REFER TO THE M-130 SERIES HYDRAULIC DIAGRAMS, DETAILS AND TABLES FOR ALL ACCESSORIES TO BE INSTALLED ON THE HEATING/COOLING PIPING AND FOR FLOW RATES TO BE BALANCED. IN THE EVENT OF ANY DISCREPANCY BETWEEN THE PIPING DIMENSIONS SHOWN IN THE DIAGRAMS AND THOSE SHOWN IN THE DRAWINGS, THE DIMENSIONS SHOWN IN THE DIAGRAMS SHALL PREVAIL.

2 C. UNLESS OTHERWISE SPECIFIED, HEATING PIPES SUPPLYING TERMINAL ELEMENTS MUST BE AT LEAST NPS 3/4.

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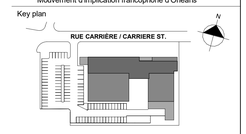
Project
Nouvel édifice du MIFO / New MIFO facility

MIFO
MOUVEMENT D'IMPLICATION FRANCOPHONE D'ORLÉANS

6600 rue Carrière
Orléans, Ontario K1C 1J4

Mouvement d'implication francophone d'Orléans

Key plan



Notes
- Before the work is carried out, the contractor must check the dimensions and conditions of the site and immediately notify the architect of any situations that do not comply with the plans and specifications.
- Never take measurements to scale on the drawings.
- This drawing can be used for construction only and only if it has been: "Issued for construction"

Rev	Description	Date
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2	ADDENDUM MEC-003	2025-02-07
1	ADDENDUM MEC-002	2025-01-29
0	ISSUED FOR TENDER	2025-01-17

Seal

Architecture
PROVENCHER_ROY
PROVENCHER ROY ASSOCIÉS ARCHITECTES INC.
47 Rue Clarence, Suite 400
OTTAWA, ONTARIO, CANADA K1N 9K1
T 613 686.6339
T 613 680.6339
PROVENCHERROY.CA

Consultants
Structural
LEROUX + CYR
LEROUX + CYR
130 boul. Henri-Bourassa Est
MONTRÉAL, QUÉBEC, CANADA, H3L 1B7
T 438.381.7773

Mechanical - Electrical - Plumbing
bouthillette parizeau
Bouthillette Parizeau
8580 av. de l'Esplanade Bureau 200,
MONTRÉAL, QUÉBEC, CANADA,H2P 2R8
T 514 383.3747

Civil
Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS
Jp2g Consultants Inc.
1150 Morrison Drive, Suite 410
Ottawa, Ontario, K2H 8S9
T 613 828.7800 C 613 220.6454

Landscape
Vlan
Vlan paysages
24, Avenue Mont-Royal O, Bureau 901
Montréal, Québec, Canada, H2T 2S2
T 514 572.9107

Theatre consultants
TRIZART ALLIANCE
Trizart alliance
5524 rue Saint-Patrick, Bureau 505
Montréal, Québec, Canada, H4E 1A8
T 514 843.7473

Drawing
MECHANICAL
HEATING & COOLING
LEVEL 3

M303_3

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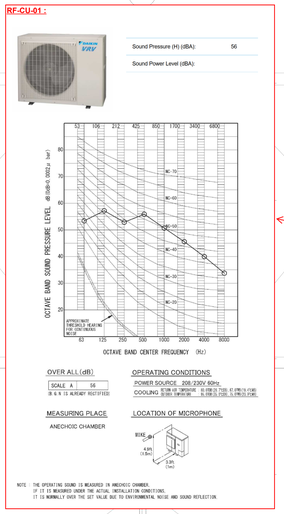
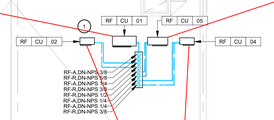
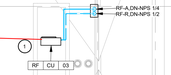
Date	Approved by
2025-04-10	M. WALLACE
Project number	Drawing number / Revision
8021-043	M303 / 3







1 ROOF
M505
1 : 100

COLOUR LEGEND VENTILATION
FRESH AIR
SUPPLY
RETURN
GENERAL EXHAUST
SOILED EXHAUST
HOOD EXHAUST
REFRIGERANT

DRAWING NOTES

1 COORDINATE ROOF WORKS WITH ARCHITECTURE.

GENERAL NOTES

A. THIS DRAWING SHOWS THE GENERAL ARRANGEMENT OF PIPING AND EQUIPMENT. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING DISTANCES AND OBSTRUCTIONS ON SITE AND COORDINATING WITH STRUCTURE AND ARCHITECTURE. CONTRACTOR MUST CONFIRM THE DIMENSION OF THE PIPING BEFORE ORDERING ANY MATERIAL.

B. ALL SLAB PENETRATIONS AND DUCT POSITIONS TO BE COORDINATED WITH ARCHITECTURE AND STRUCTURE.

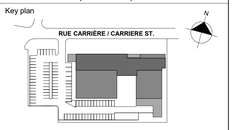
Project
Nouvel édifice du MIFO / New MIFO facility

MIFO
MOUVEMENT D'IMPLICATION FRANCOPHONE D'ORLÉANS

6600 rue Carrière
Orléans, Ontario K1C 1J4

Mouvement d'implication francophone d'Orléans

Key plan



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Rev	Description	Date
1	ISSUED FOR CONSTRUCTION - SI #001	2025-04-10
0	ISSUED FOR TENDER	2025-01-17

Seal

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PROVENCHER_ROY
PROVENCHER ROY ASSOCIÉS ARCHITECTES INC.
47 Rue Clarence, Suite 400
OTTAWA, ONTARIO, CANADA K1N 9K1
T 613 696.6539
T 613 680.6539
PROVENCHERROY.CA

Consultants
Structural
LEROUX + CYR
LEROUX + CYR
130 boul. Henri-Bourassa Est
MONTRÉAL, QUÉBEC, CANADA, H3L 1B7
T 438.381.7773

Mechanical - Electrical - Plumbing
bouthillette parizeau
Bouthillette Parizeau
8580 av. de l'Esplanade Bureau 200,
MONTRÉAL, QUÉBEC, CANADA,H2P 2R8
T 514 383.3747

Civil
Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS
Jp2g Consultants Inc.
1150 Morrison Drive, Suite 410
Ottawa, Ontario, K2H 8S9
T 613 828.7800 C 613 220.6454

Landscape
Vlan
Vlan paysages
24, Avenue Mont-Royal O, Bureau 901
Montréal, Québec, Canada, H2T 2S2
T 514 572.9107

Theatre consultants
TRIZART ALLIANCE
Trizart alliance
5524 rue Saint-Patrick, Bureau 505
Montréal, Québec, Canada, H4E 1A8
T 514 843.7473

Drawing
MECHANICAL
VENTILATION
ROOF

M505_1

Scale	Drawn by
1 : 100	J-P. DESHARNAIS
Date	Approved by
2025-04-10	M. WALLACE
Project number	Drawing number / Revision
8021-043	M505 / 1

2025-04-08 14:24:58

RF-CH-01

TRAILBLAZER® Packaged Air-Cooled Scroll Chiller

Job Information	*Technical Data Sheet*
Job Name	22108363 - MIFO - New Building
Date	12/16/2024
Submitted By	Wael Khalaf
Software Version	16.21
Unit Tag	RF-CH-01 50%PG

Image may not represent ordered unit

Unit Overview

Model Number	Capacity ton	Voltage	Unit Starter Type	ASHRAE 90.1	LEED Enhanced Refrigerant Management Credit
AGZ004F	56.44	575 V / 60 Hz / 3 Ph	Across the Line	'07, '10, '13, '16 & '19	Pass

Unit

Unit Type	Platform	Unit Revision
Air-Cooled Scroll Compressor Chiller	Standard Efficiency Packaged	00

Display	Tubing
Door Mounted Display	EEXV, Repl FD, Liq/Disch Shutoff, HS Relief, No Suction Shutoff, HGBP

Fan Type	Refrigerant Type	Refrigerant Weight
AC Fan Motors / Fantrol (32°F Min.) - AF	R32	40 lb (per unit)

Compressor	Approval
PLNNLLNN	ETL/cETL, AHRI & ASHRAE 90.1

Evaporator

Evaporator Model:	PPA240H122
Fluid Volume:	4.3 gal
Connection Hand:	Universal, 1-Pass, Grooved, Standard Head
Connection Size:	2.5 in
Insulation:	Single Layer Insulation to Suction at each Compressor

Entering Fluid Temperature	Leaving Fluid Temperature	Fluid Type	Glycol Concentration	Fluid Flow	Fluid Flow (with glycol) Min / Max	Pressure Drop	Pressure Drop (with glycol) Min / Max	Fouling Factor
50.00 °F	38.00 °F	Propylene Glycol	50.0 %	128.9 gpm	85.0 / 340.0 gpm	12.6 ft H_2O	0.000 / 76.3 ft H_2O	0.000100 °F.ft².h/Btu

Note: Evaporator Pressure Drop does not include a strainer. Minimum flow is based on a Constant Flow Pumping System Type.

Condenser

Coil Fins:	MicroChannel
Guards:	Condenser Coil Wire Grilles & Base Frame Wire Grilles

Design Ambient Air Temperature	Altitude	Fan Diameter	Minimum Design Ambient Temperature
95.0 °F	0.000 ft	31.5 in	32.0 °F

Unit Performance

Design

Capacity	Input Power	Efficiency (EER)	IPLV.IP (EER)*
56.44 ton	72.50 kW	9.343 Btu/W.h	15.72 Btu/W.h

Performance Points rated at AHRI Ambient Relief - with Glycol

		Unit			Evaporator				Condenser	
Point #	% Load	Capacity ton	Input Power kW	Efficiency (EER) Btu/W.h	Fluid Flow gpm	Pressure Drop ft H_2O	Entering Fluid °F	Leaving Fluid °F	Ambient Air °F	Altitude ft
1	100.0	56.44	72.50	9.343	128.9	12.6	50.00	38.00	95.0	0.000
2	90.0	50.80	58.68	10.39	128.9	12.6	48.80	38.00	89.0	0.000
3	80.0	45.15	46.39	11.68	128.9	12.6	47.60	38.00	83.0	0.000
4	70.0	39.51	35.82	13.24	128.9	12.6	46.40	38.00	77.0	0.000
5	60.0	33.87	27.64	14.70	128.9	12.6	45.20	38.00	71.0	0.000
6	50.0	28.22	21.99	15.40	128.9	12.6	44.00	38.00	65.0	0.000
7	40.0	22.58	17.98	15.07	128.9	12.6	42.80	38.00	59.0	0.000
8	30.0	16.93	12.26	16.57	128.9	12.6	41.60	38.00	55.0	0.000
9	20.0	This load point is below the chiller minimum load.								
10	10.0	This load point is below the chiller minimum load.								

Performance Points rated at AHRI Standard Conditions - with Water

Point #	% Load	Capacity ton	Input Power kW	Efficiency (EER) Btu/W.h
1	100	65.06	75.94	10.28
2	75	48.80	42.30	13.84
3	50	32.53	23.03	16.95
4	25	16.27	10.78	18.10

** IPLV reflects AHRI standard rating conditions with water and does not change with user defined conditions*

Sound (without insulation)

Sound Pressure (*at 30 feet*)

63 Hz dB	125 Hz dB	250 Hz dB	500 Hz dB	1 kHz dB	2 kHz dB	4 kHz dB	8 kHz dB	Overall dBA
48	49	52	56	60	58	52	47	**64**

Sound Power

63 Hz dB	125 Hz dB	250 Hz dB	500 Hz dB	1 kHz dB	2 kHz dB	4 kHz dB	8 kHz dB	Overall dBA
75	76	79	83	87	85	79	74	**91**

Octave band is non 'A' weighted and overall readings are 'A' weighted. Sound data rated in accordance with AHRI Standard-370.

Physical

Unit

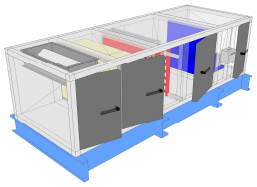
Length*	Height	Width*	Shipping Weight*	Operating Weight*
85 in	99 in	88 in	3881 lb	3919 lb

* *Shipping and operating weights are based on 'worst case' unit configuration variations but do not include the weights of any Options or Accessories. Contact Chiller Applications for additional information.*

Vision® Air Handling Unit

02-MUA-01

Job Information	Technical Data Sheet
Job Name	22108363 - MIFO - New Building
Date	October 03 2022
Submitted By	WK
Software Version	12.92
Unit Tag	MUA - Cuisine



Unit Overview

Model Number	Supply					
	Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in
CAH004GHGC	1260	1.00	2.64	30*	40*	110

**Not including base rails, coil connectors, drain connectors and control boxes.*

Unit

Model Number:	CAH004GHGC		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	24 gauge G90 Galvanized Steel (unpainted)		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Inline horizontal	**Drive (Handling) Location:**	Right
Base:	8" formed channel	**Wall Thickness:**	2 in
Altitude:	0 ft	**Parts Warranty:**	Standard One Year

Mixing Box

Component: 1 | Length: 20 in | Shipping Section: 1

Portion	Damper					Blade Action	Rated CFM	Air Pressure Drop	Quantity
	Size (length x width)		Location	Type	Actuation				
	Overall	Opening							
Outside Air	16 in x 36 in	12 in x 26 in	Top	UltraSeal Low Leak	NA	Parallel	1260 cfm	0.03 insWg	1
Return Air	No opening	No opening		None		None	1260 cfm		0

Door

Location	Width	Opening
Drive side	16 in	Outward

Supply Fan

Component: 5 | Length: 28 in | Shipping Section: 1

Fan Performance

Air Volume	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power	Speed		Outlet Velocity
	External	Total	Cabinet				Operating	Maximum	
1260 cfm	1.00 inWc	2.64 inWc	0.00 inWc	1.27	0.9 kW	0.94 BHP	2945 rpm	4000 rpm	0 ft/min

Fan Data

Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Material Type	Number of Blades	Discharge	Motor Location
Centrifugal - Plenum	Airfoil / 2	1	12.38 in	Aluminum	9	Axial	Behind Fan

Motor Data

Power	Electrical Supply	Speed	Efficiency	Enclosure	Frame Size	Supplier	Number of Poles	Lock Rotor Current	Full Load Current
1.5 HP	575/60/3 V/Hz/Phase	3500 rpm	Premium	ODP	143 T frame	Generic	2	16.00 A	1.64 A

Fan Options

Shaft Grounding Kit:	Provided	Isolator Type:	Rubber in shear

VFD/Starter/Disconnect Data

Selection Type:	External J-Box	Vendor:	Factory Standard
Voltage:	575 V	Height x Width x Depth:	6.00 in x 6.00 in x 4.00 in
Mounting:	Door Side	Enclosure:	NEMA 1

Door

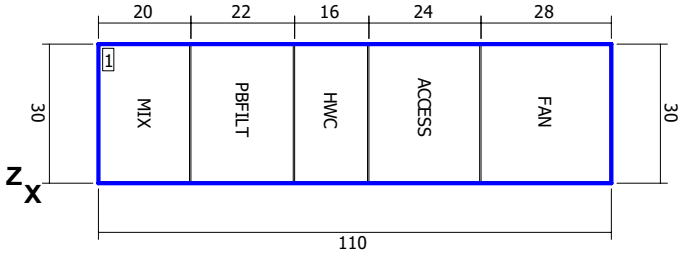
Location	Width	Opening
Drive side	12 in	Outward

Unit Sound Power (dB)

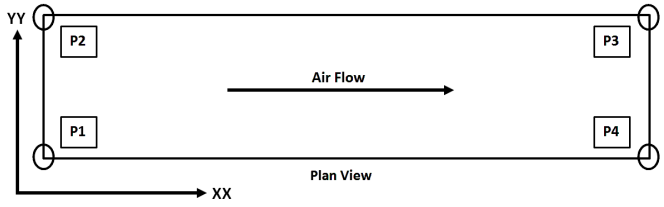
Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	64	58	52	60	51	45	46	51
Unit Discharge:	72	68	68	74	73	73	70	64
Unit Return:	64	58	56	67	54	47	46	51

Shipping Section Details

Section	Length in	Weight lb	Corner Weights (lb)				Center of Gravity (in)		
			P1	P2	P3	P4	XX	YY	ZZ
1	110	955	232	221	245	257	58	20	18
Entire Unit	**110**	**955**	**232**	**221**	**245**	**257**	**58**	**20**	**18**



Elevation View



NOTE: Special components aren't included in the corner weights and center of gravity data.

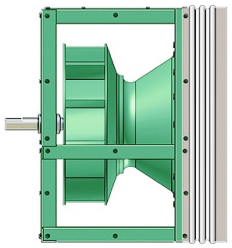
03-AHU-01

22108363-MIFO
AHU-1
HTS Package

Fan Performance

AHU-GEN ALT
EF

FAN	
MODEL	20TCEPFN
FAN CLASS	1
WHEEL DIAMETER	20 in
WIDTH	SWSI
WHEEL WIDTH %	81
FAN BLADE QUANTITY	9
QUANTITY OF FANS	1



OPERATING POINT	OP. PT1			
AIRFLOW	4965	ft^3/min		
TOTAL STATIC PRESSUE	2.50	in wg		
EXTERNAL STATIC PRESSURE	1.10	in wg		
ELEVATION	0	ft		
TEMPERATURE USED FOR DENSITY	70	°F		
AIR DENSITY	0.075	lb/ft^3		
AIR MASS FLOW RATE	372	lb/hr		
FAN SPEED	1750	rev/min		
MAXIMUM SPEED FOR FAN CLASS	2101	rev/min		
TIP SPEED	9163	ft/min		
MOTOR SPEED AT OPERATING POINT	1750	rev/min		
VFD HZ AT DESIGN SPEED	60	hz		
FAN POWER CONSUMPTION AT OP POINT	3.0	hp		
MOTOR POWER CAPABILITY AT OP POINT	5.0	hp		
FAN TORQUE AT OPERATING POINT	9	lbl-ft		
MOTOR TORQUE CAPABILITY AT OP POINT	15	lbl-ft		
FAN STATIC EFFICIENCY	66.0	%		
FAN TOTAL EFFICIENCY	66.0	%		
FAN PEAK TOTAL EFFICIENCY	73.3	%		
FAN EFFICIENCY GRADE RATING	80.0	%		
TOTAL EFF/PEAK TOTAL EFF	90.0	%		
BLADE PASSAGE FREQUENCY	262	hz		
TEMPERATURE RISE ACROSS FAN	1.6	°F		

MOTOR DATA		
MOTOR RATED HP	5	hp
MOTOR FULL LOAD CURRENT	5	A
MOTOR EFFICIENCY	89.5	%
MOTOR SHAFT GROUNDING	YES	
MOTOR FRAME SIZE	184T	
ENCLOSURE TYPE	ODP	
SYNCHRONOUS MOTOR SPEED AT 60HZ	1750	rev/min
VOLTAGE/PHASE/HZ	575/3/60	

OPERATING POINT	SOUND POWER LEVELS (dB re 10^{-12} Watts)								
	OCTAVE BAND	1	2	3	4	5	6	7	8
OP. PT1	INLET	79	86	94	85	80	78	72	65
	OUTLET	84	88	93	88	86	82	76	68
	INLET								
	OUTLET								
	INLET								
	OUTLET								
	INLET								
	OUTLET								

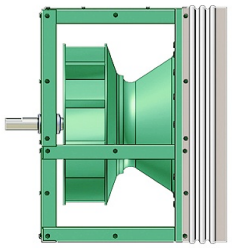
PROJECT: MIFO

DRAWN BY	MH	JOB NO.	65285	DWG NO	65285DT34	HAAKON INDUSTRIES
DATE	2022-10-12	UNITS	IMPERIAL	REVISION		

Fan Performance

AHU-GEN ALT
RF

FAN	
MODEL	20TCEPFN
FAN CLASS	1
WHEEL DIAMETER	20 in
WIDTH	SWSI
WHEEL WIDTH %	100
FAN BLADE QUANTITY	9
QUANTITY OF FANS	3



OPERATING POINT	OP. PT1			
TOTAL AIRFLOW	20670	ft^3/min		
NUMBER OF FANS OPERATING	3			
AIRFLOW PER FAN	6890	ft^3/min		
TOTAL STATIC PRESSUE	2.50	in wg		
EXTERNAL STATIC PRESSURE	1.10	in wg		
ELEVATION	0	ft		
TEMPERATURE USED FOR DENSITY	70	°F		
AIR DENSITY	0.075	lb/ft^3		
AIR MASS FLOW RATE	517	lb/hr		
FAN SPEED	1863	rev/min		
MAXIMUM SPEED FOR FAN CLASS	2101	rev/min		
TIP SPEED	9755	ft/min		
MOTOR SPEED AT OPERATING POINT	1863	rev/min		
VFD HZ AT DESIGN SPEED	63	hz		
FAN POWER CONSUMPTION AT OP POINT	4.3	hp		
MOTOR POWER CAPABILITY AT OP POINT	5.0	hp		
FAN TORQUE AT OPERATING POINT	12	lbl-ft		
MOTOR TORQUE CAPABILITY AT OP POINT	14	lbl-ft		
FAN STATIC EFFICIENCY	63.1	%		
FAN TOTAL EFFICIENCY	63.1	%		
FAN PEAK TOTAL EFFICIENCY	73.3	%		
FAN EFFICIENCY GRADE RATING	80.0	%		
TOTAL EFF/PEAK TOTAL EFF	86.1	%		
BLADE PASSAGE FREQUENCY	279	hz		
TEMPERATURE RISE ACROSS FAN	1.6	°F		

MOTOR DATA		
MOTOR RATED HP	5	hp
MOTOR FULL LOAD CURRENT	5	A
MOTOR EFFICIENCY	89.5	%
MOTOR SHAFT GROUNDING	YES	
MOTOR FRAME SIZE	184T	
ENCLOSURE TYPE	ODP	
SYNCHRONOUS MOTOR SPEED AT 60HZ	1750	rev/min
VOLTAGE/PHASE/HZ	575/3/60	

OPERATING POINT	SOUND POWER LEVELS (dB re 10^{-12} Watts)								
	OCTAVE BAND	1	2	3	4	5	6	7	8
OP. PT1	INLET	81	86	95	88	81	79	74	67
	OUTLET	84	87	94	91	88	84	78	70
	INLET								
	OUTLET								
	INLET								
	OUTLET								
	INLET								
	OUTLET								

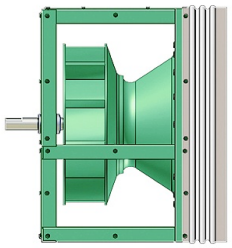
PROJECT: MIFO

DRAWN BY	MH	JOB NO.	65285	DWG NO	65285DT38	HAAKON INDUSTRIES
DATE	2022-10-12	UNITS	IMPERIAL	REVISION		

Fan Performance

AHU-GEN ALT
SF

FAN	
MODEL	24TCEPFN
FAN CLASS	2
WHEEL DIAMETER	24 in
WIDTH	SWSI
WHEEL WIDTH %	100
FAN BLADE QUANTITY	9
QUANTITY OF FANS	2



OPERATING POINT	OP. PT1			
TOTAL AIRFLOW	22075	ft^3/min		
NUMBER OF FANS OPERATING	2			
AIRFLOW PER FAN	11038	ft^3/min		
TOTAL STATIC PRESSUE	5.50	in wg		
EXTERNAL STATIC PRESSURE	1.80	in wg		
ELEVATION	0	ft		
TEMPERATURE USED FOR DENSITY	70	°F		
AIR DENSITY	0.075	lb/ft^3		
AIR MASS FLOW RATE	828	lb/hr		
FAN SPEED	1900	rev/min		
MAXIMUM SPEED FOR FAN CLASS	2183	rev/min		
TIP SPEED	11938	ft/min		
MOTOR SPEED AT OPERATING POINT	1900	rev/min		
VFD HZ AT DESIGN SPEED	65	hz		
FAN POWER CONSUMPTION AT OP POINT	12.8	hp		
MOTOR POWER CAPABILITY AT OP POINT	15.0	hp		
FAN TORQUE AT OPERATING POINT	35	lbl-ft		
MOTOR TORQUE CAPABILITY AT OP POINT	42	lbl-ft		
FAN STATIC EFFICIENCY	74.4	%		
FAN TOTAL EFFICIENCY	74.4	%		
FAN PEAK TOTAL EFFICIENCY	79.1	%		
FAN EFFICIENCY GRADE RATING	85.0	%		
TOTAL EFF/PEAK TOTAL EFF	94.1	%		
BLADE PASSAGE FREQUENCY	285	hz		
TEMPERATURE RISE ACROSS FAN	2.9	°F		

MOTOR DATA		
MOTOR RATED HP	15	hp
MOTOR FULL LOAD CURRENT	14.1	A
MOTOR EFFICIENCY	93	%
MOTOR SHAFT GROUNDING	YES	
MOTOR FRAME SIZE	254T	
ENCLOSURE TYPE	ODP	
SYNCHRONOUS MOTOR SPEED AT 60HZ	1750	rev/min
VOLTAGE/PHASE/HZ	575/3/60	

OPERATING POINT	SOUND POWER LEVELS (dB re 10^{-12} Watts)								
	OCTAVE BAND	1	2	3	4	5	6	7	8
OP. PT1	INLET	83	88	100	88	81	81	79	74
	OUTLET	91	92	95	94	89	86	83	79
	INLET								
	OUTLET								
	INLET								
	OUTLET								
	INLET								
	OUTLET								

PROJECT: MIFO

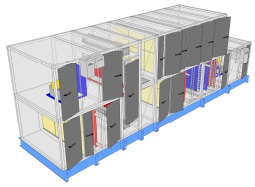
DRAWN BY	MH	JOB NO.	65285	DWG NO	65285DT42	HAAKON INDUSTRIES
DATE	2022-10-12	UNITS	IMPERIAL	REVISION		

03-AHU-02

Vision® Air Handling Unit

DAIKIN

Job Information	Technical Data Sheet
Job Name	22108363 - MIFO - New Building
Date	October 25 2022
Submitted By	WK
Software Version	12.92
Unit Tag	AHU-02 Gym



Unit Overview

Model Number	Supply						Return/Exhaust					
	Air Volume cfm	Static Pressure		External Dimensions			Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in		External inWc	Total inWc	Height in	Width in	Length in
CAH018GDGM	6605	1.50	5.45	50*	74*	318	3925	1.35	2.42	50*	74*	248

**Not including base rails, coil connectors, drain connectors and control boxes.*

Unit

Model Number:	CAH018GDGM		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	24 gauge G90 Galvanized Steel (unpainted)		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Stacked with opposed air flows	**Drive (Handling) Location:**	Right
Base:	10" formed channel	**Wall Thickness:**	2 in
Altitude:	0 ft	**Parts Warranty:**	Standard One Year

Exhaust Air Stream

Plenum Section	Component: 1	Length: 30 in	Shipping Section: 7

Air Pressure Drop

0.00 inWc

Custom Openings

Custom Opening	Location	Width	Height	Rainhood w/Screen
1	Top	70 in	26 in	None
2	End	70 in	26 in	None

Door

Location	Width	Opening
Drive side	26 in	Outward

Access Section	Component: 2	Length: 24 in	Shipping Section: 7

Air Pressure Drop

0.00 inWc

Door

Location	Width	Opening
Drive side	20 in	Outward

Supply Fan	Component: 14	Length: 52 in	Shipping Section: 10

Fan Performance

Air Volume	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power	Speed		Outlet Velocity
	External	Total	Cabinet				Operating	Maximum	
6605 cfm	1.50 inWc	5.45 inWc	0.01 inWc	1.19	7.5 kW	8.41 BHP	2719 rpm	3650 rpm	0 ft/min

Fan Data

Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Material Type	Number of Blades	Discharge	Motor Location
Centrifugal - Plenum	Airfoil / 2	1	18.25 in	Aluminum	9	-	Behind Fan

Motor Data

Power	Electrical Supply	Speed	Efficiency	Enclosure	Frame Size	Supplier	Number of Poles	Lock Rotor Current	Full Load Current
15.0 HP	575/60/3 V/Hz/Phase	3500 rpm	Premium	ODP	215 T frame	Generic	2	112.89 A	13.60 A

Fan Options

Shaft Grounding Kit:	Provided	Isolator Type:	Spring

VFD/Starter/Disconnect Data

Selection Type:	VFD	Vendor:	Danfoss (FC102)
Auxiliary Control:	Disconnect	Voltage:	575 V
Disconnect Type:	Non-Fused	Height x Width x Depth:	19.52 in x 12.03 in x 11.39 in
Mounting:	Door Side	Enclosure:	NEMA 1
VFD Quantity:	1		

Custom Openings

Custom Opening	Location	Width	Height	Rainhood w/Screen
1	Top	70 in	28 in	None

Door

Location	Width	Opening
Drive side	20 in	Outward

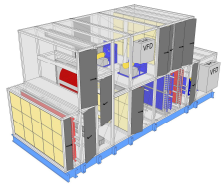
Unit Sound Power (dB)

Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	75	70	69	73	67	57	46	51
Unit Discharge:	85	79	83	90	89	83	82	75
Unit Return:	75	70	72	83	69	70	69	62

02-AHU-03

Vision® Air Handling Unit

Job Information	Technical Data Sheet
Job Name	22108363 - MIFO - New Building
Date	October 25 2022
Submitted By	WK
Software Version	12.92
Unit Tag	AHU-03 Salle de Spectacle



Unit Overview

Model Number	Supply						Return/Exhaust					
	Air Volume cfm	Static Pressure		External Dimensions			Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in		External inWc	Total inWc	Height in	Width in	Length in
CAH039GDGM	13440	0.90	4.47	68*	108*	302	13440	0.85	2.15	68*	108*	204

**Not including base rails, coil connectors, drain connectors and control boxes.*

Unit

Model Number:	CAH039GDGM		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	24 gauge G90 Galvanized Steel (unpainted)		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Stacked with opposed air flows	**Drive (Handling) Location:**	Right
Base:	10" formed channel	**Wall Thickness:**	2 in
Altitude:	0 ft	**Parts Warranty:**	Standard One Year

Exhaust Air Stream

Plenum Section	Component: 1	Length: 24 in	Shipping Section: 9

Opening Location	Opening Size	Air Pressure Drop
Top	20.00" x 104.00"	0.05 inWc

Door

Location	Width	Opening
Drive side	20 in	Outward

Access Section	Component: 2	Length: 20 in	Shipping Section: 9

Air Pressure Drop

0.00 inWc

Door

Location	Width	Opening
Drive side	16 in	Outward

Supply Fan	Component: 12	Length: 50 in	Shipping Section: 13

Fan Performance

Air Volume*	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power*	Speed		Redundancy(N-1)	Fan Circuit	
	External	Total	Cabinet				Operating	Maximum		MOP	MCA
6720 cfm	0.90 inWc	4.47 inWc	0.04 inWc	1.16	13.2 kW	7.29 BHP	2619 rpm	3650 rpm	62.2 %	25.0 A	18.0 A

Fan Data

Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Material Type	Number of Blades	Discharge	Motor Location
Centrifugal - Plenum	Airfoil / 2	2	18.25 in	Aluminum	9	Top, single opening	Behind Fan

Motor Data

Power	Electrical Supply	Speed	Efficiency	Enclosure	Frame Size	Supplier	Number of Poles	Lock Rotor Current*	Full Load Current*
7.5 HP	575/60/3 V/Hz/Phase	1750 rpm	Premium	ODP	213 T frame	Generic	4	56.45 A	8.01 A

Fan Options

Shaft Grounding Kit:	Provided	Isolator Type:	Spring

VFD/Starter/Disconnect Data

Selection Type:	VFD	Vendor:	Danfoss (FC102)
Auxiliary Control:	Disconnect	Voltage:	575 V
Disconnect Type:	Non-Fused	Height x Width x Depth:	40.83 in x 31.50 in x 16.00 in
Mounting:	Door Side	Enclosure:	NEMA 1
VFD Quantity:	1		

Door

Location	Width	Opening
Non-drive side	26 in	Outward

Notes

** after a unit label denotes the data for an individual fan.*

Unit Sound Power (dB)

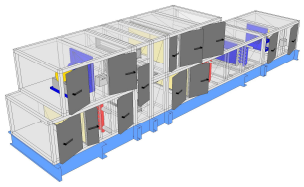
Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	80	73	76	76	72	61	52	51
Unit Discharge:	87	81	85	92	92	86	86	79
Unit Return:	80	74	86	77	74	74	75	65

02-AHU-04

Vision® Air Handling Unit

DAIKIN

Job Information	Technical Data Sheet
Job Name	22108363 - MIFO - New Building
Date	October 25 2022
Submitted By	WK
Software Version	12.92
Unit Tag	AHU-04 Salle des Artistes



Unit Overview

Model Number	Supply						Return/Exhaust					
	Air Volume cfm	Static Pressure		External Dimensions			Air Volume cfm	Static Pressure		External Dimensions		
		External inWc	Total inWc	Height in	Width in	Length in		External inWc	Total inWc	Height in	Width in	Length in
CAH006GDGC	1880	1.05	4.28	30*	52*	292	800	1.10	2.28	30*	52*	152

**Not including base rails, coil connectors, drain connectors and control boxes.*

Unit

Model Number:	CAH006GDGC		
Approval:	ETL Listed / ETL Listed to Canadian Safety Standards (ETL Label / ETLc Label)		
Outer Panel:	24 gauge G90 Galvanized Steel (unpainted)		
Liner:	24 gauge Galvanized Steel (unless noted per section)		
Insulation:	R-13 Injected Foam		
Unit Configuration:	Stacked with opposed air flows	**Drive (Handling) Location:**	Right
Base:	10" formed channel	**Wall Thickness:**	2 in
Altitude:	0 ft	**Parts Warranty:**	Standard One Year

Exhaust Air Stream

Plenum Section	Component: 1	Length: 26 in	Shipping Section: 6

Air Pressure Drop

0.00 inWc

Custom Openings

Custom Opening	Location	Width	Height	Rainhood w/Screen
1	End	40 in	8 in	None
2	End	40 in	8 in	None

Door

Location	Width	Opening
Drive side	22 in	Outward

Access Section	Component: 2	Length: 24 in	Shipping Section: 6

Air Pressure Drop

0.00 inWc

Door

Location	Width	Opening
Drive side	20 in	Outward

Supply Fan

Component: 13 | Length: 38 in | Shipping Section: 8

Fan Performance

Air Volume	Static Pressure			Fan Energy Index(FEI)	Total Input Power	Fan Shaft Power	Speed		Outlet Velocity
	External	Total	Cabinet				Operating	Maximum	
1880 cfm	1.05 inWc	4.28 inWc	0.04 inWc	1.16	2.0 kW	2.18 BHP	3430 rpm	4000 rpm	0 ft/min

Fan Data

Fan Type	Blade Type / Class	Quantity of Fans	Wheel Diameter	Material Type	Number of Blades	Discharge	Motor Location
Centrifugal - Plenum	Airfoil / 2	1	12.38 in	Aluminum	12	-	Behind Fan

Motor Data

Power	Electrical Supply	Speed	Efficiency	Enclosure	Frame Size	Supplier	Number of Poles	Lock Rotor Current	Full Load Current
3.0 HP	575/60/3 V/Hz/Phase	3500 rpm	Premium	ODP	145 T frame	Generic	2	25.60 A	3.00 A

Fan Options

Shaft Grounding Kit:	Provided	**Isolator Type:**	Spring

VFD/Starter/Disconnect Data

Selection Type:	External J-Box	**Vendor:**	Factory Standard
Voltage:	575 V	**Height x Width x Depth:**	6.00 in x 6.00 in x 4.00 in
Mounting:	Door Side	**Enclosure:**	NEMA 1

Custom Openings

Custom Opening	Location	Width	Height	Rainhood w/Screen
1	Bottom	22 in	20 in	None

Door

Location	Width	Opening
Drive side	22 in	Outward

Unit Sound Power (dB)

Type	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Radiated:	74	65	56	64	59	53	46	51
Unit Discharge:	80	75	74	81	81	81	80	71
Unit Return:	74	65	57	66	59	57	57	52

APPENDIX 3
CadnaA – Drawing

BPA

PROJET

MIFO - Stationary noise assessment

CLIENT

Provencher Roy

Receptors

Name	Height (m)
R1	1.5
R2	1.5
R3	1.5
R4	1.5
R5	1.5
R6	1.5
R7	1.5

LÉGENDE

- Point Source
- Building
- Receiver
- Calculation Area

Drawing Title

Environmental Noise

Localisation Drawing Noise Receptors

PROJET No.

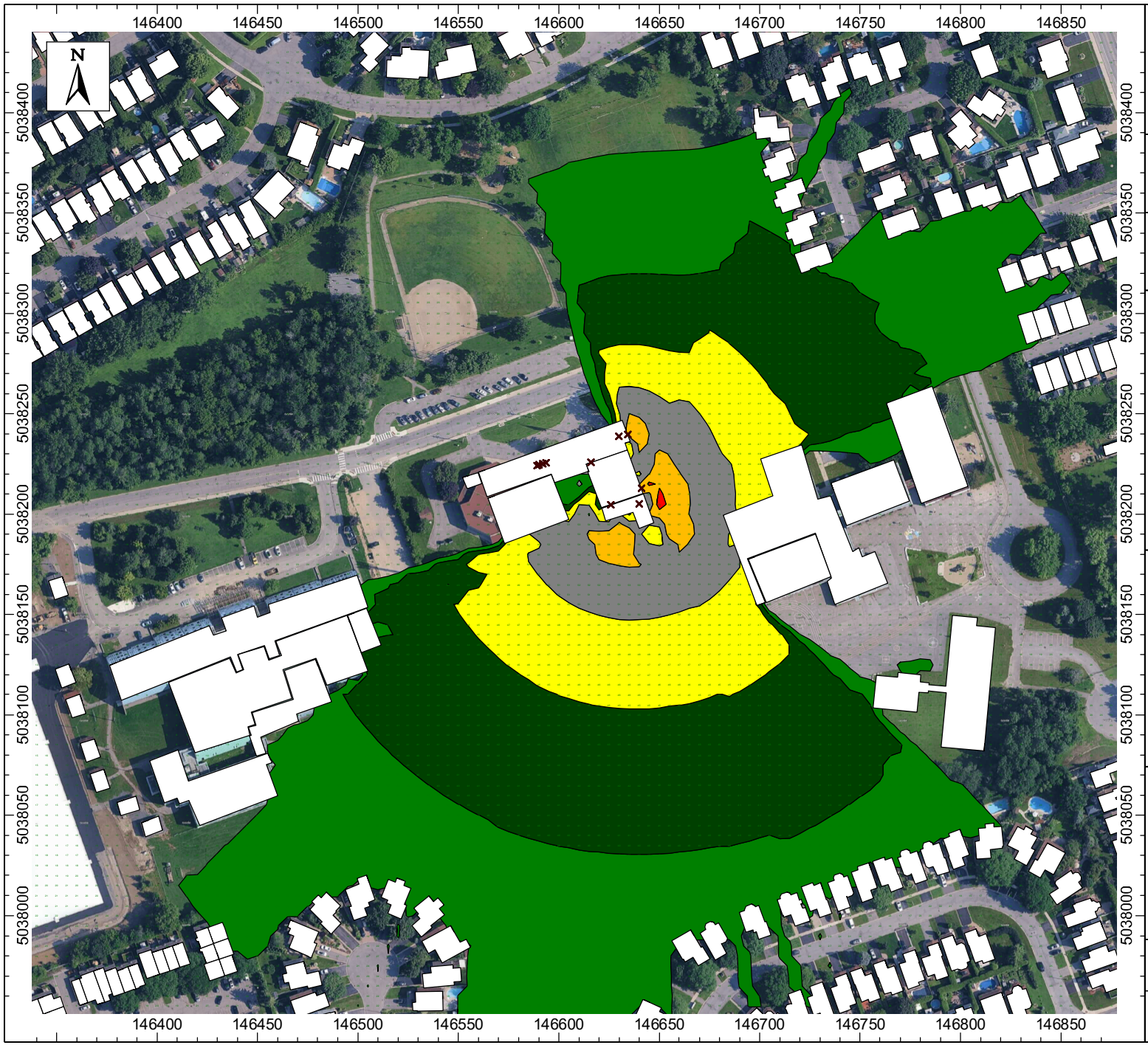
8021-043

DATE

15/05/2025

Drawing No.

C1



BPA

PROJET

MIFO - Stationary noise assessment

CLIENT

Provencher Roy

Sound levels

- >= 35.0 dBA
- >= 40.0 dBA
- >= 45.0 dBA
- >= 50.0 dBA
- >= 55.0 dBA
- >= 60.0 dBA
- >= 65.0 dBA
- >= 70.0 dBA
- >= 75.0 dBA
- >= 80.0 dBA

LÉGENDE

- Point Source
- Building
- Receiver
- Calculation Area

Drawing Title

Environmental Noise

Noise Mapping
Condensing unit - Est side
Area of equal sound level at 1.5m of ground
5.0m mesh grid

PROJET No
8021-043

DATE
15/05/2025

Drawing No
C2

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