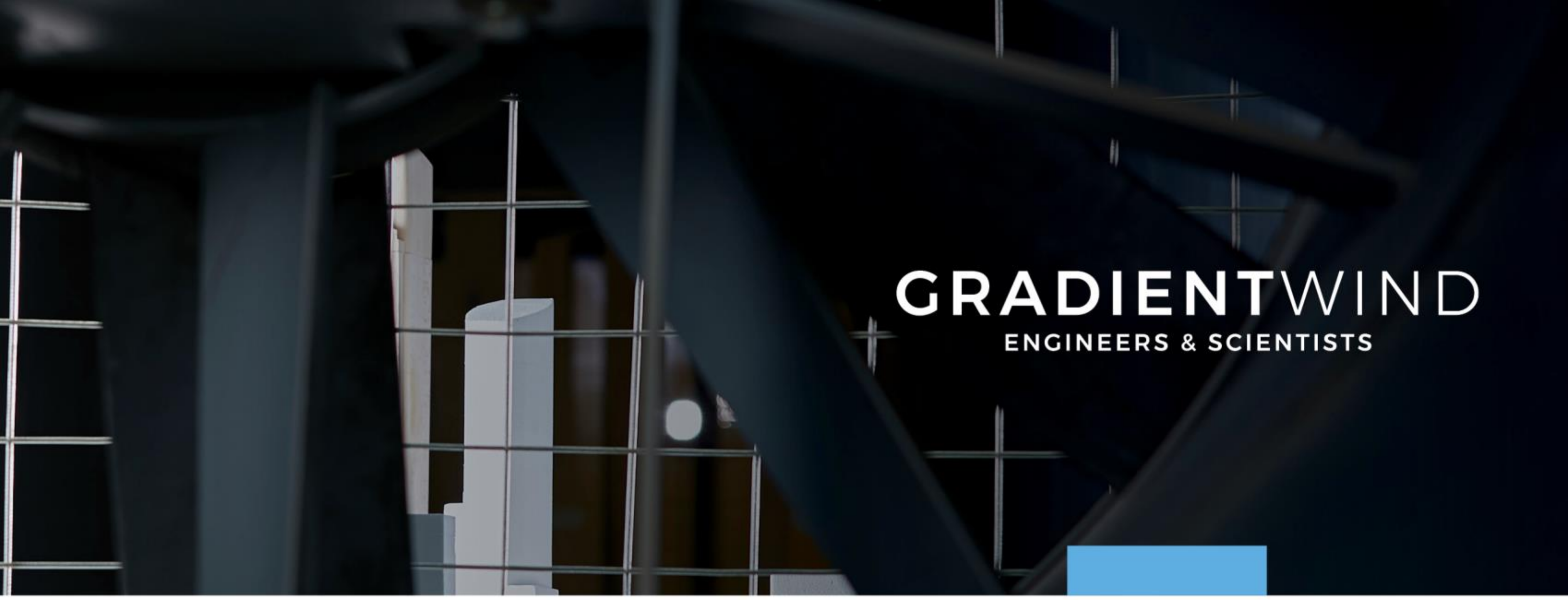
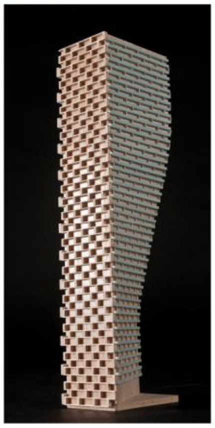
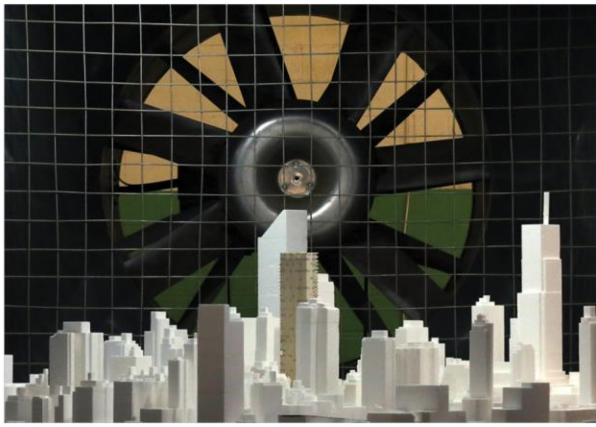


STATIONARY NOISE ASSESSMENT

150 Dun Skipper Drive
Ottawa, Ontario

REPORT: 24-238 – Stationary Noise





April 22, 2025

PREPARED FOR
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EXECUTIVE SUMMARY

This report describes a stationary noise assessment performed for the proposed development located at 150 Dun Skipper Drive in Ottawa, Ontario. The development comprises two residential buildings rising six storeys with 'L' shaped planforms and outdoor parking. To the immediate east of the subject site are proposed commercial buildings labeled A, B, C, and D. Stationary noise sources associated with these commercial buildings include rooftop air handling equipment, fans, condensers, refrigerated trailers (reefers), and a garbage compactor. Figure 1 illustrates a site plan with the surrounding context.

The focus of this study is the exterior noise levels generated by stationary noise source, associated with the adjacent commercial development, to the east. The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) architectural drawings prepared by prepared by PMA Architectes; (iv) mechanical equipment data provided by Atkins Realis; and (v) sound power data for the garbage compactor, refrigerated trailer (reefer), refrigeration condensers, and rooftop equipment on the commercial buildings B, C, and D are based on Gradient Wind's past experience with similar projects.

Our stationary noise assessment indicates that noise levels at nearby points of reception are expected to fall below the ENCG noise criteria. As such, the proposed development is expected to be compatible with the proposed commercial land uses.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Zayoun Group on behalf of Maverick Development Corporation to undertake a stationary noise assessment for the proposed residential development, located at 150 Dun Skipper Drive in Ottawa, Ontario. This report summarizes the methodology, results and recommendations related to a stationary noise assessment.

The present scope of work involves assessing the impact of stationary noise sources from the adjacent commercial developments onto the proposed residential development. The assessment was performed based on theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP) NPC-300[2] guidelines, architectural drawings prepared by PMA Architectes, mechanical equipment data provided by Atkins Realis, surrounding street layouts obtained from the City of Ottawa, and recent site imagery. The sound power data for the garbage compactor, refrigerated trailer (reefer), refrigeration condensers, and rooftop equipment on the commercial buildings B, C, and D are based on Gradient Wind's past experience with similar projects.

2. TERMS OF REFERENCE

The focus of this stationary noise assessment is the proposed residential development located at 150 Dun Skipper Drive in Ottawa, Ontario. The subject site is situated on a rectangular parcel of land bounded by Bank Street to the east, Cedar Creek Drive to the west, Dun Skipper Drive to the south, and open space to the north. The proposed residential development comprises two residential buildings rising six storeys with 'L' shaped planforms and outdoor parking.

To the immediate east of the subject site are proposed commercial buildings labeled A, B, C, and D. Stationary noise sources associated with these commercial buildings include rooftop air handling equipment, fans, condensers, refrigerated trailers (reefers), and a garbage compactor.

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[1] City of Ottawa Environmental Noise Control Guidelines, January 2016

[2] Ministry of the Environment, Conservation and Parks (MECP), Environmental Noise Guideline – Publication NPC-300, August 2013

The study site is surrounded by a low-rise residential subdivision to the west and a home improvement store and south. An empty lot is located to the north, with the proposed commercial buildings to the east of the subject site. Figure 1 illustrates a complete site plan with the surrounding context.

2.1 Assumptions

The sound power levels for the rooftop air handling units and fans on Commercial Building A are based on manufacturer data provided by Atkins Realis. Sound power data for the garbage compactor, refrigerated trailer (reefer), refrigeration condensers, and rooftop equipment on the commercial buildings B, C, and D are based on Gradient Wind's experience.

The following assumptions have been made in the analysis:

(i) The sound power levels of the rooftop air handling units and fans for the commercial building A are based on the data provided by Atkins Realis.

(ii) Sound power data for the garbage compactor, refrigerated trailer (reefer), refrigeration condensers, and rooftop equipment on the commercial buildings B, C, and D are based on Gradient Wind's past experience with similar projects.

(iii) The rooftop air handling units, fans, and the condenser are assumed to operate continuously over a 1-hour period during the daytime periods and at 50% during the nighttime periods.

(iv) The garbage compactor is assumed to operate at 17% over a 1-hour period during the daytime periods and at 0% during the nighttime periods.

(v) The reefer is assumed to operate at 50% over a 1-hour period during the daytime periods and at 0% during the nighttime periods, as local by-laws prohibit overnight deliveries.

(vi) The ground region was modelled as reflective ground due to the presence of pavement (hard ground). The ground was also assumed to be flat.

(vii) Noise receptors were strategically placed at 10 locations around the study building (see Figure 2).

(viii) Parapet walls were included in the calculations for all proposed commercial buildings: a 1.1 m high parapet for Building A, and 1.05 m high parapets for Buildings B, C, and D. All parapet walls should be constructed with a minimum surface mass of 20 kg/m² and installed without any gaps.

3. OBJECTIVES

The main goals of this work are to (i) calculate the future noise levels on the proposed residential development produced by stationary sources of the proposed commercial buildings and (ii) ensure that exterior noise levels do not exceed the allowable limits specified by the ENCG, as outlined in Section 4 of this report.

4. METHODOLOGY

The impact of the external stationary noise sources on the nearby noise-sensitive areas was determined by computer modelling. Stationary noise source modelling is based on the software program *Predictor-Lima* developed from the International Standards Organization (ISO) standard 9613 Parts 1 and 2. This computer program simulates three-dimensional surfaces and first reflections of sound waves over a suitable spectrum for human hearing. This methodology has been used on numerous assignments and has been accepted by the MECP as part of Environmental Compliance Approvals applications. 10 receptor locations were selected for the study site, as illustrated in Figure 2.

4.1 Perception of Noise

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Its measurement is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which represents the noise perceived by the human ear. With this scale, a doubling of sound power at the source results in a 3 dBA increase in measured noise levels at the receiver and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

Stationary sources are defined in the ENCG as "all sources of sound and vibration, whether fixed or mobile, that exist or operate on a premises, property or facility, the combined sound and vibration levels of which are emitted beyond the property boundary of the premises, property or facility, unless the source(s) is (are) due to construction" [3].

4.2 Stationary Noise Criteria

The equivalent sound energy level, L_{eq}, provides a weighted measure of the time-varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time-varying noise level over a selected period of time. For stationary sources, the L_{eq} is commonly calculated on an hourly interval, while for roadways, the L_{eq} is calculated on the basis of a 16-hour daytime/8-hour nighttime split.

The surrounding area of the development would be defined as a Class 1 (urban) environment, as background noise levels are dominated by human activities such as roadway and transit sources. The exclusionary sound level limits for Class 1 areas are summarized in Table 1 below. In a Class 1 area, daytime (07:00-19:00) and evening (19:00 to 23:00) criteria are identical and for simplicity the results presented in this report combine these two periods for a daytime period of (07:00 to 23:00). The applicable sound level limit is the higher of either the values in Table 1 or background noise levels due to sources such as transportation. In the case of this development, background noise levels are dominated by roadway traffic along Bank Street. The one-hour equivalent background sound levels were determined based on the highest values calculated in the Traffic Noise Study prepared for this development. To determine the overall background sound levels, a 10 dBA adjustment was subtracted from the Traffic Noise Study's results sound levels.

[3] City of Ottawa Environmental Noise Control Guidelines, page 10

TABLE 1: EXCLUSIONARY LIMITS FOR CLASS 1 AREA

Time of Day	Point of Reception (POR)	
	Outdoor Points of Reception (OPOR)	Plane of Window (POW)
07:00 – 19:00	50	50
19:00 – 23:00	50	50
23:00 – 07:00	N/A	45

4.3 Determination of Noise Source Power Levels

Table 2 summarizes the sound power of each source used in the analysis. The stationary noise source locations can be seen in Figure 3.

TABLE 2: EQUIPMENT SOUND POWER LEVELS (DBA)

Source ID	Description	Height Above Grade (m)	Frequency (Hz)								
			63	125	250	500	1000	2000	4000	8000	Total
Building A											
S1	EF-1	6.6	-	-	-	-	77.1	-	-	-	**77.1**
S2	EF-2	6.6	43.6	61.1	64.4	63.8	62.0	63.4	59.8	53.9	**70.6**
S3	EF-3	6.6	37.6	49.1	51.4	51.8	53.0	52.4	50.8	47.9	**59.7**
S4	EF-4	6.6	51.6	62.1	66.4	63.8	63.0	63.4	60.8	55.9	**71.6**
S5	EF-5	6.6	42.6	54.1	55.4	58.8	60.0	59.4	56.8	52.9	**65.9**
S6	EF-6	6.6	57.6	67.1	70.4	70.8	69.0	71.4	69.8	66.9	**78.1**
S7	EF-7	6.6	57.6	67.1	70.4	70.8	69.0	71.4	69.8	66.9	**78.1**
S8	RTU-1	7.1	66.6	62.1	64.4	68.8	68.0	65.4	62.8	61.9	**74.7**
S9	RTU-2	7.1	-	-	-	-	82.0	-	-	-	**82.0**
S10	RTU-3	7.1	-	-	-	-	89.0	-	-	-	**89.0**
S11	RTU-4	7.1	-	-	-	-	80.0	-	-	-	**80.0**
S12	RTU-5	7.1	-	-	-	-	79.0	-	-	-	**79.0**

TABLE 3 CONTINUED: EQUIPMENT SOUND POWER LEVELS (DBA)

Source ID	Description	Height Above Grade (m)	Frequency (Hz)								
			63	125	250	500	1000	2000	4000	8000	Total
S13	AC-1A	6.6	-	-	-	-	54.0	-	-	-	**54.0**
S14	MUA-1	7.1	-	-	-	-	67.8	-	-	-	**67.8**
S15	CU-1	6.6	-	-	-	-	87.0	-	-	-	**87.0**
S16	CU-2	6.6	-	-	-	-	87.0	-	-	-	**87.0**
S17	Compactor	0.5	-	-	-	-	95.0	-	-	-	**95.0**
S18	Reefer	2.7	-	-	-	-	96.0	-	-	-	**96.0**
Building B											
S19	HVAC-10	5.9	-	-	-	-	82.0	-	-	-	**82.0**
S20	HVAC-11	5.9	-	-	-	-	82.0	-	-	-	**82.0**
Building C											
S21, S22, S23, S24, S25, S26, S27, S28, & S29	HVAC-1, HVAC-2, HVAC-3, HVAC-4, HVAC-5, HVAC-6, HVAC-7, HVAC-8, & HVAC-9	5.9	-	-	-	-	83.0	-	-	-	**83.0**
Building D											
S30	RTU-D	5.9	-	-	-	-	80.0	-	-	-	**80.0**

4.4 Stationary Source Noise Predictions

A total of 10 receptor locations were chosen on the surrounding noise-sensitive buildings to measure the noise impact at the outdoor point of reception (OPOR) and plane of window (POW) receptors during the daytime/evening period (07:00 – 23:00), as well as during the nighttime period (23:00 – 07:00). All mechanical units were represented as point sources in the Predictor model. Table 4 below contains Predictor-Lima calculation settings. These are typical settings that have been based on ISO 9613 standards and guidance from the MECP. Receptor locations are described in Table 5 and illustrated in Figure 2.

Ground absorption over the study area was determined based on topographical features (such as water, concrete, grassland, etc.). An absorption value of 0 is representative of hard ground, while a value of 1 represents grass and similar soft surface conditions. Existing and proposed buildings were added to the model to account for screening and reflection effects from building façades. A Predictor-Lima sample output is available upon request.

TABLE 4: CALCULATION SETTINGS

Parameter	Setting
Meteorological correction method	Single value for C0
Value C0	5.0
Ground attenuation factor for roadways and paved areas	0
Temperature (K)	283.15
Pressure (kPa)	101.33
Air humidity (%)	70

TABLE 5: RECEPTOR LOCATIONS

Receptor Number	Receptor Type	Receptor Location	Height Above Grade (m)
Building 1			
R1	POW	Level 6 – Southeast Façade	16.5
R2	POW	Level 6 – Northeast Façade	16.5
R3	POW	Level 6 – North Façade	16.5
R4	POW	Level 6 – West Façade	16.5
R5	POW	Level 6 – South Façade	16.5
Building 2			
R6	POW	Level 6 – South Façade	16.5
R7	OPOR	Level 6 – Southeast Façade	16.5
R8	OPOR	Level 6 – Northeast Façade	16.5
R9	OPOR	Level 6 – North Façade	16.5
R10	OPOR	Level 6 – West Façade	16.5

5. RESULTS

The results of the calculations without any mitigation measures can be seen in Table 6.

TABLE 6: HVAC NOISE LEVELS

Receptor Number	Receptor Type	Height Above Grade (m)	Noise Level (dBA)		Sound Level Limits		Meets ENCG Class 1 Criteria	
			Day*	Night	Day*	Night	Day*	Night
Building 1								
R1	POW	16.5	51	47	54*	47*	Yes	Yes
R2	POW	16.5	48	45	52*	45	Yes	Yes
R3	POW	16.5	45	42	50	45	Yes	Yes
R4	POW	16.5	25	19	50	45	Yes	Yes
R5	POW	16.5	36	33	50	45	Yes	Yes
Building 2								
R6	POW	16.5	42	39	50	45	Yes	Yes
R7	POW	16.5	49	45	51*	45	Yes	Yes
R8	POW	16.5	54	46	54*	46*	Yes	Yes
R9	POW	16.5	32	28	50	45	Yes	Yes
R10	POW	16.5	29	20	50	45	Yes	Yes

* Background noise level
** Day values include both day and evening results.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current study indicate that noise levels at the points of reception are expected to fall below the ENCG noise criteria provided that the assumptions outlined in Section 2.1 are followed and the sound power levels of the stationary noise sources don't exceed the levels shown in Table 2. As such, the proposed development is expected to be compatible with the proposed commercial land uses.

This concludes our assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

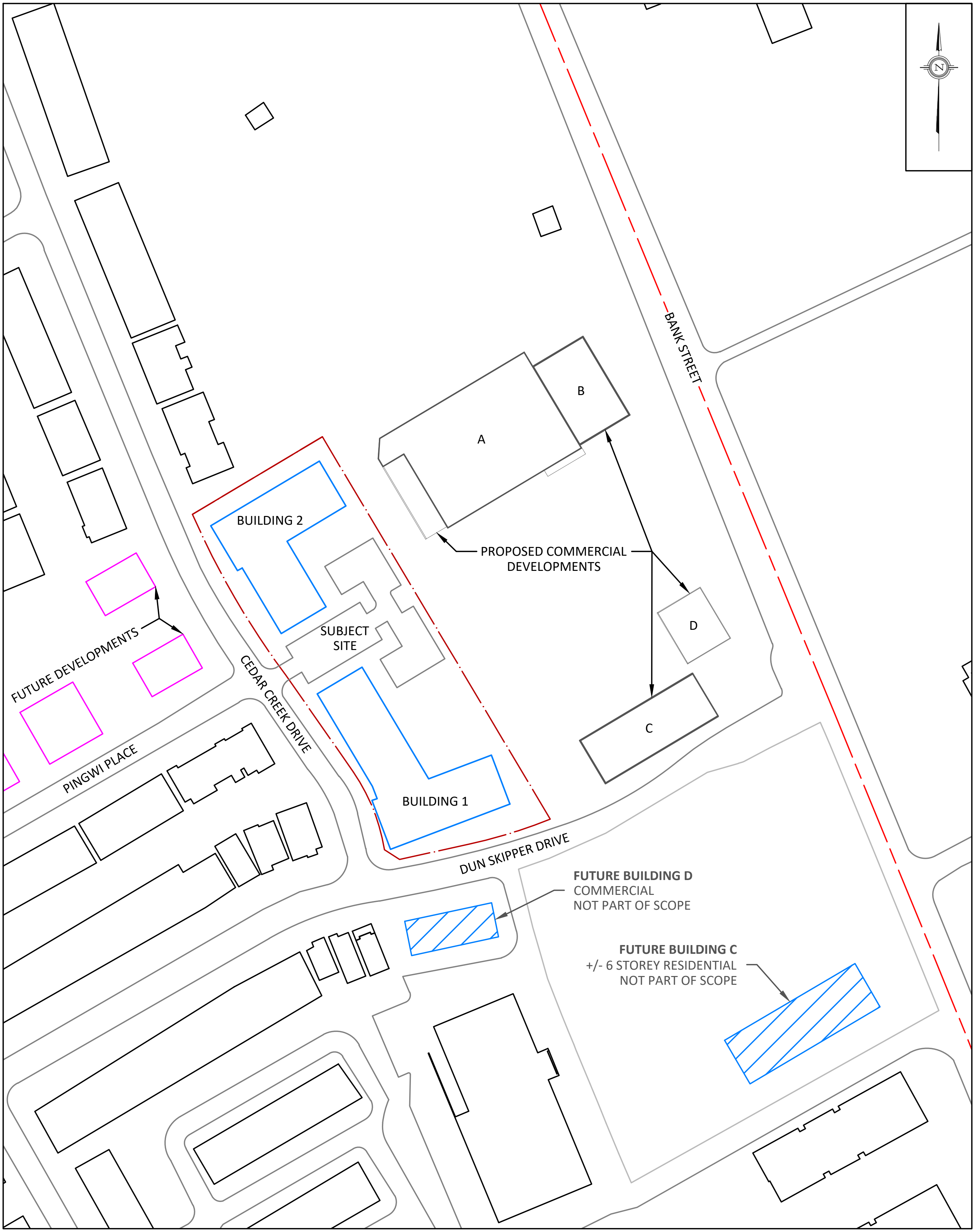
Sincerely,

Gradient Wind Engineering Inc.

Benjamin Page, AdvDip
Jr. Environmental Scientist

Joshua Foster, P.Eng.
Principal

Gradient Wind File #24-238 – Stationary Noise



GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT: 150 DUN SKIPPER DRIVE, OTTAWA TRANSPORTATION NOISE ASSESSMENT		DESCRIPTION: FIGURE 1: PROPOSED SITE PLAN AND SURROUNDING CONTEXT
	SCALE: 1:2000 (APPROX.)	DRAWING NO.: 24-238-1	
	DATE: APRIL 22, 2025	DRAWN BY: B.P.	

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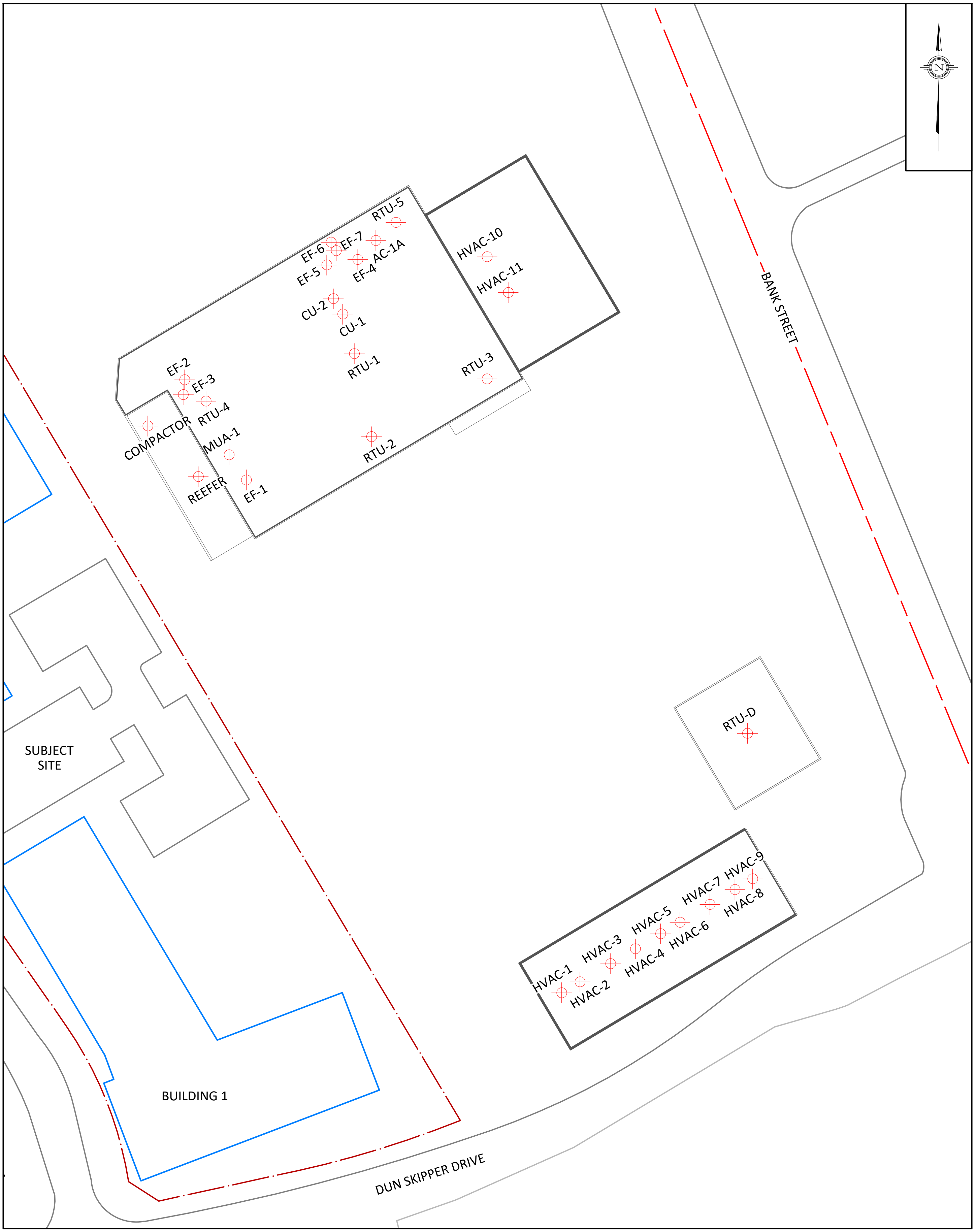
PROJECT: 150 DUN SKIPPER DRIVE, OTTAWA TRANSPORTATION NOISE ASSESSMENT		DESCRIPTION: FIGURE 2: RECEPTOR LOCATIONS
SCALE: 1:1000 (APPROX.)	DRAWING NO.: 24-238-2	
DATE: APRIL 22, 2025	DRAWN BY: B.P.	



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	SCALE 1:1000(APPROX.)	DRAWING NO. 24-238-3	
	DATE APRIL 22, 2025	DRAWN BY B.P.	

FIGURE 4: DAYTIME NOISE CONTOURS (4.5 M ABOVE GRADE)

80 – 85 dB
75 – 80 dB
70 – 75 dB
65 – 70 dB
60 – 65 dB
55 – 60 dB
50 – 55 dB
45 – 50 dB
40 – 45 dB
35 – 40 dB
0 – 35 dB

FIGURE 5: NIGHTTIME NOISE CONTOURS
(4.5 M ABOVE GRADE)

80 – 85 dB
75 – 80 dB
70 – 75 dB
65 – 70 dB
60 – 65 dB
55 – 60 dB
50 – 55 dB
45 – 50 dB
40 – 45 dB
35 – 40 dB
0 – 35 dB