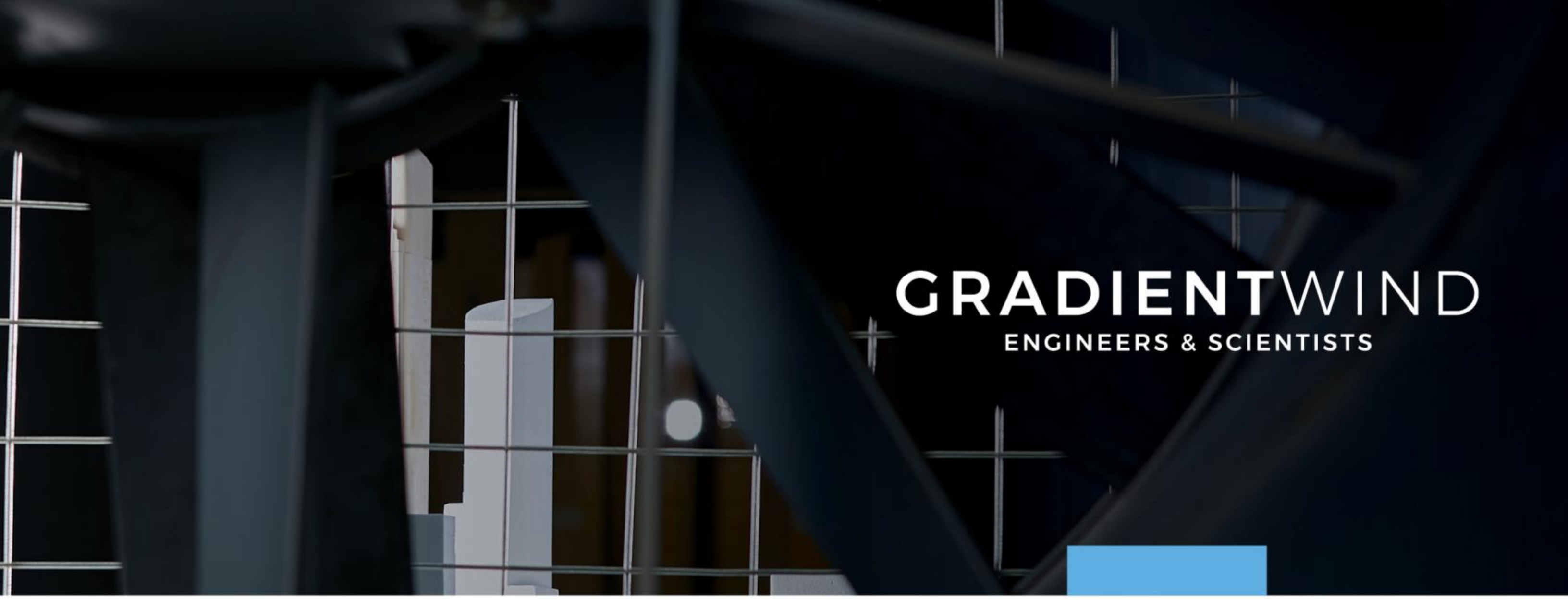
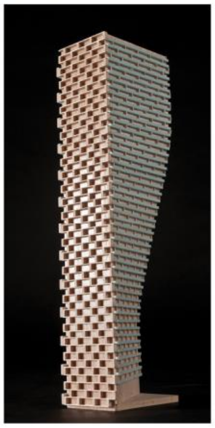
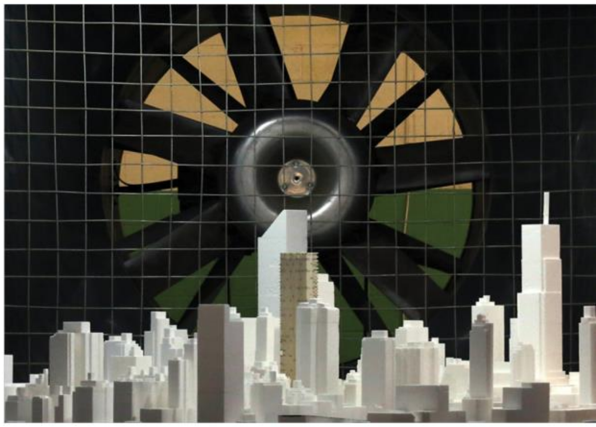


STATIONARY NOISE ASSESSMENT

60 Denzil Doyle Court
Kanata, Ontario

REPORT: 21-274 – Stationary Noise





December 8, 2022

PREPARED FOR

Huntington Properties
1306 Wellington Street West Suite 200
Ottawa, Ontario K1Y 3B2

PREPARED BY

Efser Kara, MSc, LEED GA, Acoustic Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a stationary noise assessment performed for a proposed development located at 60 Denzil Doyle Court in Kanata, Ottawa, Ontario. The proposed development comprises six (6) self-storage buildings (Building A, B, C, D, E, and F). The major sources of stationary noise are a rooftop unit (RTU) serving Building A and truck traffic in the development, both of which were assessed for their potential impact on nearby noise-sensitive buildings. Figure 1 illustrates a complete site plan with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) requirements; (ii) architectural drawings provided by Architecture 49, dated November 2022; (iii) sound power data of the rooftop unit (RTU) and specifications as provided by Goodkey, Weedmark & Associates Ltd., and sound power levels of the moving truck based on Gradient Wind's past experience with similar developments.

The results of the stationary noise analysis indicate that noise levels at Plane of Window (POW) will range between 35 dBA and 49 dBA during the daytime and evening period (07:00-23:00) and 28 dBA and 42 dBA during the nighttime period (23:00-07:00). The highest noise levels occur at the west Plane of Window (POW) receptor of 630 Eagleson Road which is directly across the truck route of the proposed development.

All noise levels are expected to fall below limits specified by the ENCG for a Class 1 area, therefore, no mitigation for stationary noise sources on the proposed building is required. The proposed building is expected to be compatible with existing noise-sensitive land uses.

GRADIENTWIND
ENGINEERS & SCIENTISTS

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Huntington Properties to undertake a stationary noise assessment for the proposed self-storage facility located at 60 Denzil Doyle Court in Kanata, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of noise levels received at neighbouring developments generated by on-site stationary noise sources.

The present scope of work involves assessing the noise impact of exterior noise levels generated by the rooftop unit (RTU) serving Building A and moving trucks. This assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) requirements; (ii) architectural drawings provided by Architecture 49, dated November 2022; (iii) sound power data of the rooftop unit (RTU) and specifications as provided by Goodkey, Weedmark & Associates Ltd., and sound power levels of the moving truck based on Gradient Wind's past experience with similar developments.

2. TERMS OF REFERENCE

This report describes a stationary noise assessment performed for a proposed self-storage development (Access Storage) located at 60 Denzil Doyle Court in Kanata, Ontario. The study site is located on an irregular parcel of land bound by Denzil Doyle Court to the northwest, Michael Cowpland Drive to the southeast, and Terence Matthews Crescent to the southwest.

The development comprises six (6) buildings, Building A to the south, Buildings E and F to the north, and Buildings B, C, and D (from east to west, respectively) lying parallel to each other at the centre of the site.

The major sources of stationary noise impacting surrounding buildings are a rooftop unit (RTU) atop Building A and moving truck traffic within the development. Figure 1 illustrates a complete site plan with the surrounding context. Figure 2 illustrates the locations of receptors as well as the stationary noise sources.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the expected noise levels on existing noise sensitive lands from proposed stationary sources, and (ii) where necessary provide appropriate mitigation strategies to ensure the noise levels at surrounding buildings remain compliant with the sound level limits defined by the ENCG.

4. METHODOLOGY

4.1 Background

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 particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise 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 better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

4.2 Stationary Noise

4.2.1 Criteria for Stationary Noise

For stationary sources, the L_{eq} is commonly calculated on an hourly interval, while for roadways, the L_{eq} is calculated based on a 16-hour daytime/8-hour nighttime split. Noise criteria taken from NPC-300 apply to outdoor points of reception (POR). A POR is defined under NPC-300 as "any location on a noise-sensitive land use where noise from a stationary source is received"[1]. This applies to the plane of window and outdoor amenity spaces serving the development. A POR can be located on existing or zoned-for-future-use premises of permanent or seasonal residences, hotels/motels, nursing/retirement homes, rental residences, hospitals, campgrounds, and noise-sensitive buildings such as schools, places of worship and daycare facilities.

[1] NPC – 300, page 14

The proposed development is located in an already-developed area and close to an arterial road (Eagleson Road). As man-made noise sources are dominant, the area is classified as a Class 1 area. According to NPC-300, the recommended maximum noise level for an urban (Class 1) environment at a POR is either the lowest one-hour background noise level due to other sources, or the exclusionary limits outlined in Table 3, whichever is higher.

TABLE 1: EXCLUSIONARY LIMITS FOR CLASS 1 AREA

Time of Day	Class 1	
	Outdoor Points of Reception	Plane of Window
07:00 – 19:00	50	50
19:00 – 23:00	50	50
23:00 – 07:00	N/A	45

4.2.2 Assumptions

Mechanical information of the proposed building was based on a combination of information obtained from Goodkey, Weedmark & Associates Ltd. and Gradient Wind's experience with similar developments. The following assumptions have been made in the analysis:

(i) Sound power data for the 3-Ton rooftop unit (RTU) is based on the manufacturer's data provided by Goodkey, Weedmark & Associates Ltd.

(ii) The sound power data of the moving trucks are based on Gradient Wind's past experience with similar developments.

(iii) The rooftop unit (RTU) located on the roof of Building A was modelled as a point source, whereas the moving truck traffic was modelled as a moving source.

(iv) The RTU is assumed to operate continuously over a 1-hour period during the daytime/evening period and for 50% of the time during the nighttime period.

(v) During the daytime, 10 moving trucks were assumed to enter and exit the storage facility per hour. During the nighttime, this assumption was reduced to 2 per hour.

(vi) The screening effects of the buildings as well as reflections from the facades of the buildings have been considered in the analysis.

(vii) Default ground surfaces were taken to be absorptive while the hard ground surfaces such as pavement and concrete were modelled as reflective.

4.2.3 Determination of Noise Source Power Levels

Sound power data of the rooftop unit (RTU) was based on the information obtained from Goodkey, Weedmark & Associates Ltd. and sound power levels of the moving truck were based on Gradient Wind's past experience with similar developments. Table 4 summarizes the unmitigated sound power levels used for each source in the analysis. Figure 2 illustrates the location of these stationary noise sources.

TABLE 2: EQUIPMENT SOUND POWER LEVELS, UNMITIGATED (DBA)

Source ID	Description	Height Above Grade/Roof (m)	Frequency (Hz)								
			63	125	250	500	1000	2000	4000	8000	Lw(A)
S1	RTU (3 Tons)	1.5	59	70	70	73	73	70	66	62	**79**
S2	Moving Truck	2	65	72	76	85	90	89	83	74	**94**

4.2.4 Stationary Source Noise Predictions

The impact of the surrounding stationary noise sources on the development 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 is capable of representing three-dimensional surfaces and first reflections of sound waves over a suitable spectrum for human hearing. The methodology has been used on numerous assignments and has been accepted by the MECP as part of Environmental Compliance Approvals applications.

A total of 7 receptor locations were chosen on the surrounding noise-sensitive buildings and outdoor areas. Receptor locations are described in Table 4 and illustrated in Figure 2. Also, a grid was defined in the *Predictor-Lima* model which contained several hundred individual points at which, noise impacts were measured for the daytime and evening (07:00 – 23:00) and nighttime (23:00 – 07:00) periods, the results at the grid are displayed as a contour plot in Figures 3 & 4. The rooftop unit (RTU) located on the roof of Building A was modelled as a point source, whereas the moving truck traffic was modelled as a moving source.

Air temperature, pressure and relative humidity were set to 10°C, 101.3 kPA and 70%, respectively. Ground absorption over the study area was determined based on topographical features (such as water, concrete, grassland, etc.). A coefficient of 0 was used for hard surfaces, such as concrete and paved areas, and 1 for soft surfaces, such as grass and vegetative areas. Existing and proposed buildings were added to the model to account for screening and reflection effects from building façades. Modelling data can be provided upon request.

TABLE 3: CALCULATION SETTINGS

Parameter	Setting
Meteorological correction method	Single value for C0
Value C0	2.0
Ground attenuation factor for roadways and paved areas	0
Temperature (K)	283.15
Pressure (kPa)	101.33
Air humidity (%)	70

TABLE 4: RECEPTOR LOCATIONS

Receptor No / Type	Receptor Location	Height Above Grade (m)
R1 / POW	630 Eagleson Road - West	1.5
		4.5
R2 / POW	630 Eagleson Road - South	1.5
		4.5
R3 / POW	80 Michael Cowpland Drive - North	1.5
		4.5
R4 / POW	80 Terence Matthews Crescent - South	1.5
		4.5
R5 / POW	80 Terence Matthews Crescent - East	1.5
		4.5
R6 / POW	65 Denzil Doyle Crescent - South	1.5
		4.5
R7 / OPOR	80 Terence Matthews Crescent - Play Area East	1.5

5. STATIONARY NOISE RESULTS

5.1 Stationary Noise Levels

Table 5 shows the noise level results at the neighbouring noise-sensitive buildings.

TABLE 5: STATIONARY NOISE LEVELS (dBA)

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	Stationary Noise Level (dBA)		Meets MECP Class 1 Criteria	
			Day*	Night	Day*	Night
1	1.5	630 Eagleson Rd - West	48	41	YES	YES
	4.5		49	42		
2	1.5	630 Eagleson Rd - South	40	33	YES	YES
	4.5		41	34		
3	1.5	80 Michael Cowpland Dr - North	41	35	YES	YES
	4.5		42	35		
4	1.5	80 Terence Matthews Ct - South	35	28	YES	YES
	4.5		37	30		
5	1.5	80 Terence Matthews Ct - East	42	35	YES	YES
	4.5		43	36		
6	1.5	65 Denzil Doyle Ct - South	37	31	YES	YES
	4.5		39	32		
7	1.5	80 Terence Matthews Ct - Play Area East	45	N/A**	YES	N/A**

* Day values also represent the evening values.
** OPOR noise levels during the nighttime are not considered as per ENCG

The results of the stationary noise analysis indicate that noise levels at Plane of Window (POW) will range between 35 dBA and 49 dBA during the daytime and evening period (07:00-23:00) and 28 dBA and 42 dBA during the nighttime period (23:00-07:00). The highest noise levels occur at the west Plane of Window (POW) receptor of 630 Eagleson Road which is directly across the truck route of the proposed development. Noise levels at all receptors, including Receptor 7 (OPOR), are below the MECP criteria for Class 1 areas.

6. CONCLUSIONS

The results of the stationary noise analysis indicate that noise levels at Plane of Window (POW) will range between 35 dBA and 49 dBA during the daytime and evening period (07:00-23:00) and 28 dBA and 42 dBA during the nighttime period (23:00-07:00). The highest noise levels occur at the west Plane of Window (POW) receptor of 630 Eagleson Road which is directly across the truck route of the proposed development.

All noise levels are expected to fall below limits specified by the ENCG for a Class 1 area, therefore, no mitigation for stationary noise sources on the proposed building is required. The proposed building is expected to be compatible with existing noise-sensitive land uses.

This concludes our stationary noise 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,

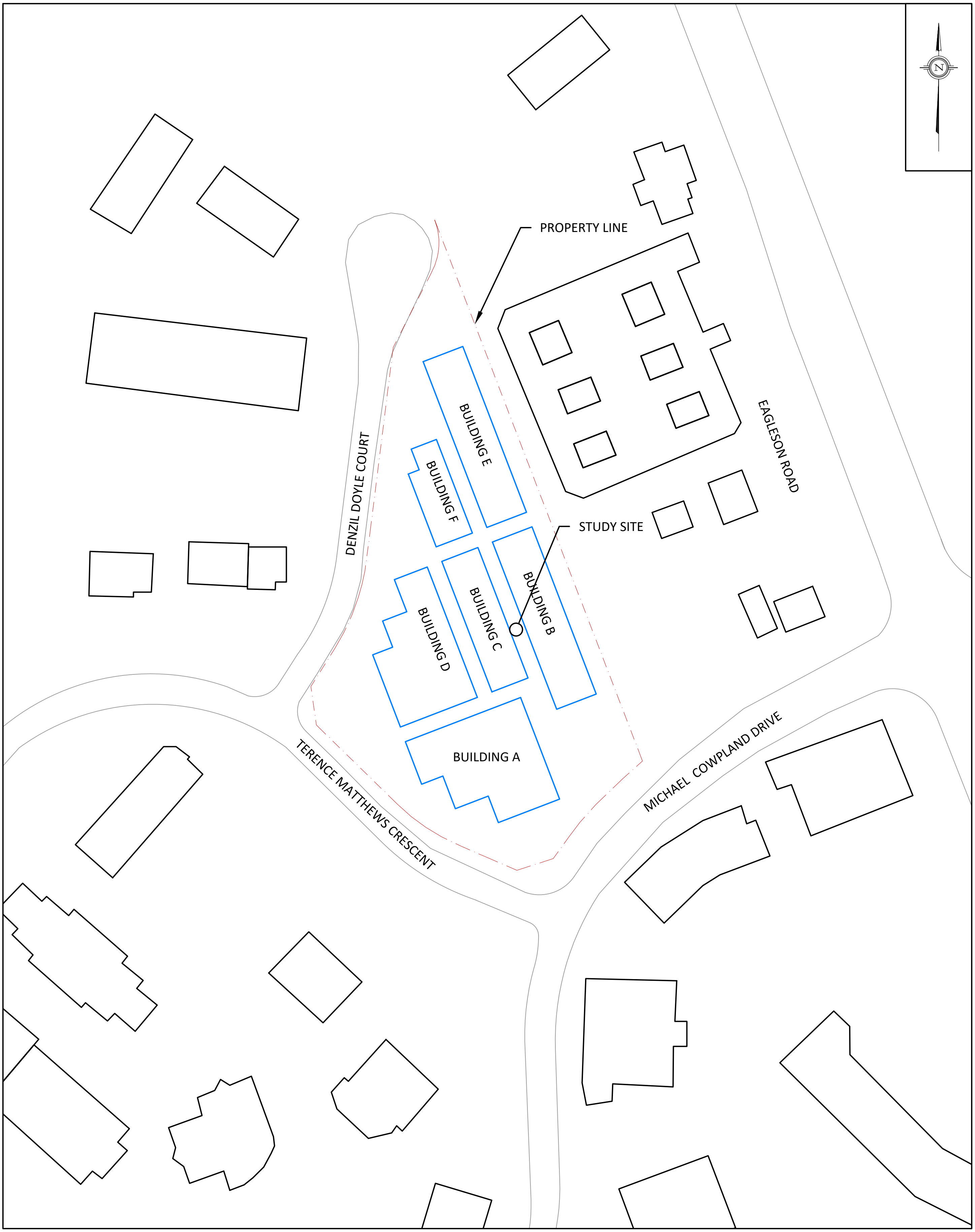
Gradient Wind Engineering Inc.

LICENSED PROFESSIONAL ENGINEER
J. R. FOSTER
100155655
Dec 8, 2022
PROVINCE OF ONTARIO

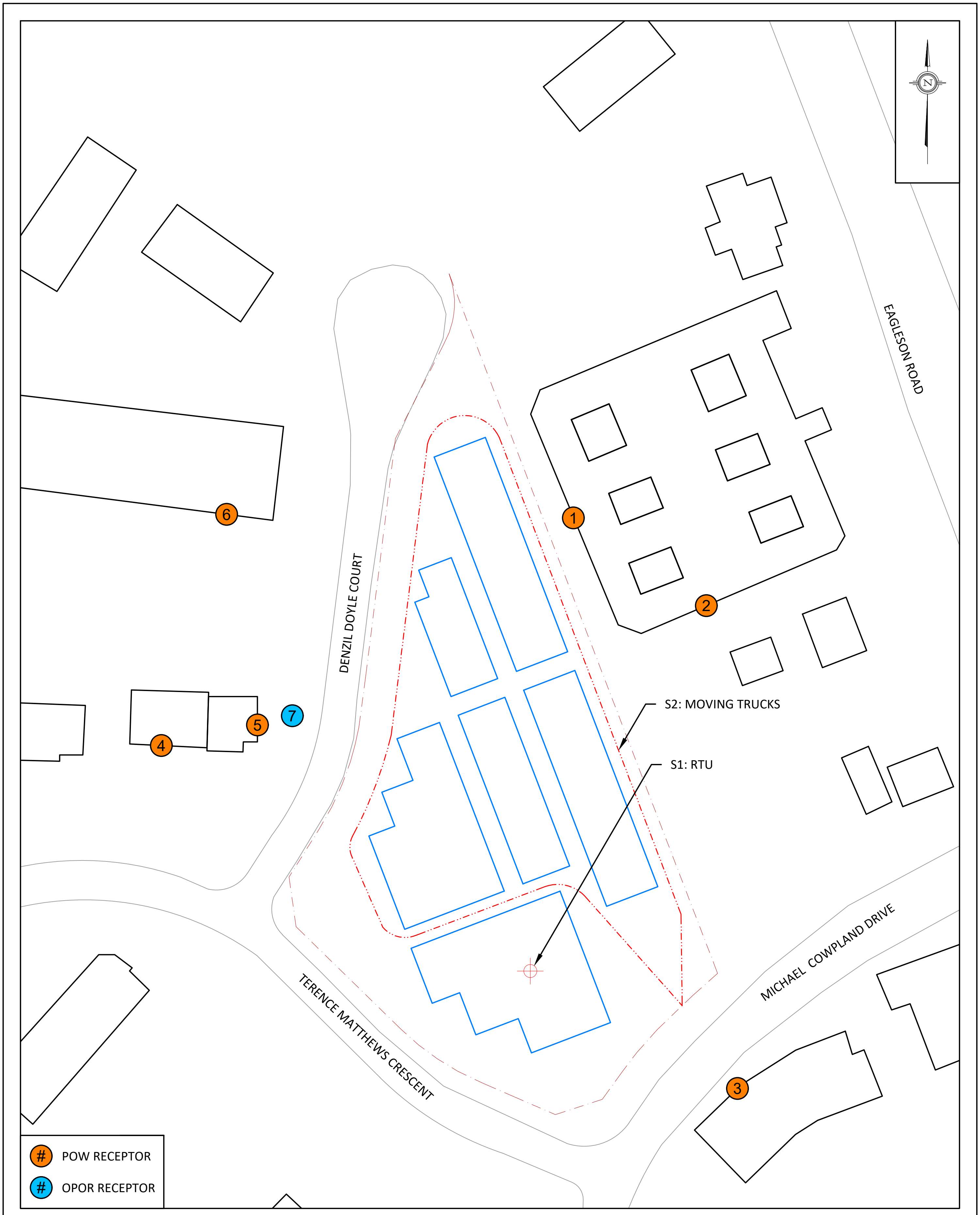
Efser Kara, MSc, LEED GA
Acoustic Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #21-274 – Stationary Noise



GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD , OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT: 60 DENZIL DOYLE COURT, KANATA STATIONARY NOISE ASSESSMENT		DESCRIPTION: FIGURE 1: SITE PLAN AND SURROUNDING CONTEXT
	SCALE: 1:2000 (APPROX.)	DRAWING NO.: GWE21-274-1	
	DATE: NOVEMBER 30, 2022	DRAWN BY: E.K.	



GRADIENTWIND
ENGINEERS & SCIENTISTS

127 WALGREEN ROAD , OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT: 60 DENZIL DOYLE COURT, KANATA STATIONARY NOISE ASSESSMENT		DESCRIPTION: FIGURE 2: STATIONARY NOISE SOURCE AND RECEIVER LOCATIONS
SCALE: 1:1500 (APPROX.)	DRAWING NO.: GWE21-274-2	
DATE: NOVEMBER 30, 2022	DRAWN BY: E.K.	

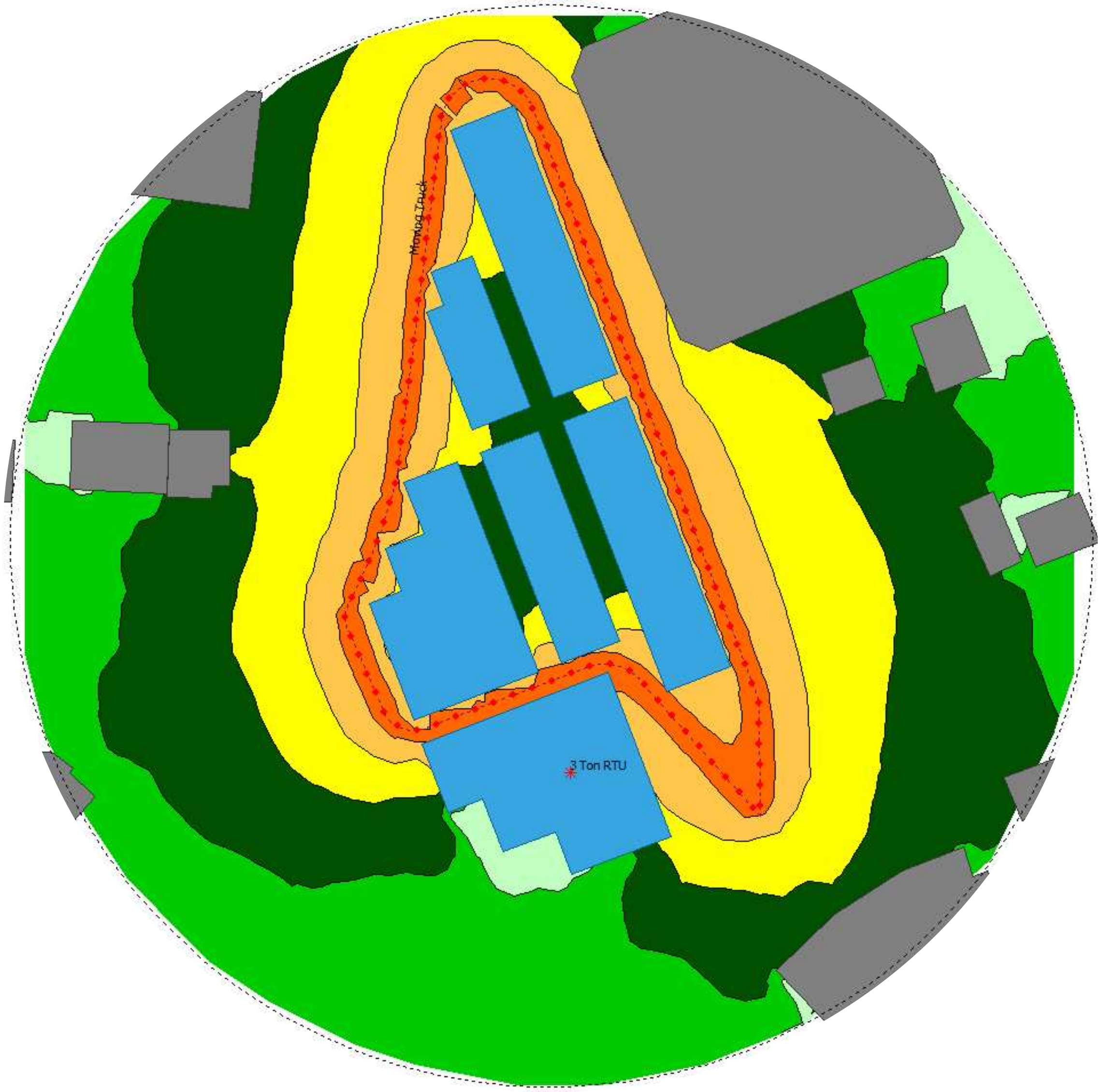


FIGURE 3: DAYTIME STATIONARY NOISE CONTOURS (4.5 M)

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

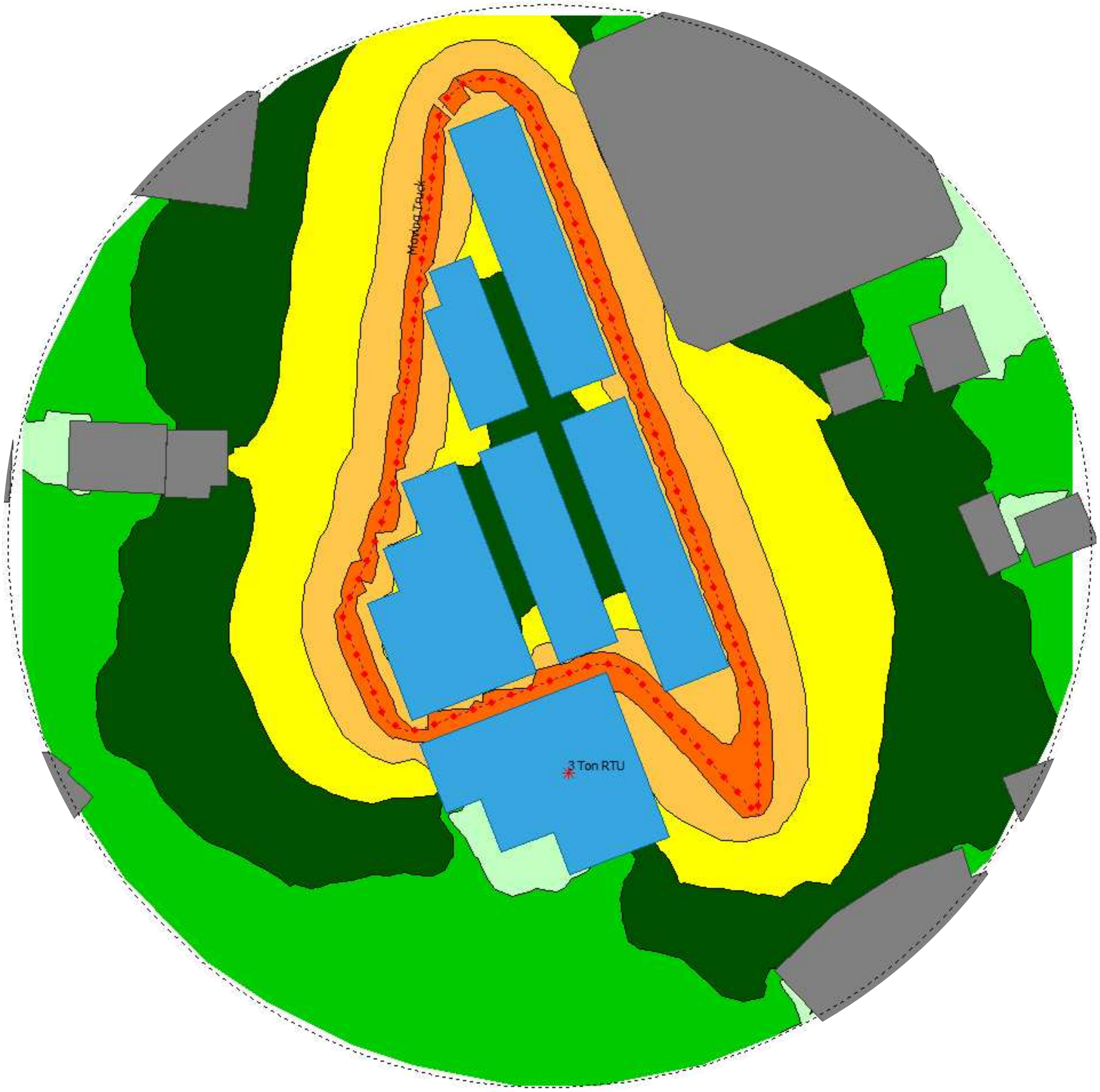


FIGURE 4: NIGHTTIME STATIONARY NOISE CONTOURS (4.5 M)

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