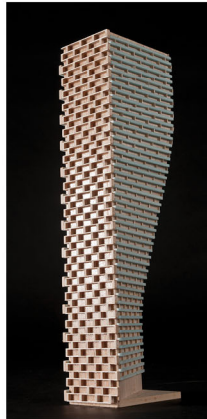


**STATIONARY NOISE
ASSESSMENT**

7628 Flewellyn Road
Stittsville, Ontario

REPORT: 21-119-Stationary Noise R1



September 3, 2024

PREPARED FOR

Cash for Trash Canada
7628 Flewellyn Road
Stittsville, ON K2S 1B6

PREPARED BY

Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a stationary noise assessment in support of Zoning By-Law Amendment (ZBA) and Site Plan Control (SPA) applications for the proposed recycling facility located at 7628 Flewellyn Road in Stittsville, Ontario. The property comprises a 50.0-acre approximately rectangular parcel of land, bordering Flewellyn Road from the south, and is currently occupied by an existing salvage yard on the north portion of the site. The recycling facility is to be relocated to the south portion of the site, in a 27.0-acre rectangular portion of the property land. Figure 1 illustrates the site plan and surrounding context.

The assessment was performed based on (i) theoretical noise calculation methods conforming to the City of Ottawa’s Environmental Noise Control Guidelines (ENCG); (ii) Ministry of the Environment, Conservation and Parks (MECP) NPC-300 guidelines; (iii) site plan drawing dated February 2023; (iv) a site visit conducted by Gradient Wind on November 1, 2021; (v) Gradient Wind’s experience with similar developments, and; (vi) recent satellite imagery.

The results of the current study indicate that stationary noise levels received at nearby noise sensitive dwellings, generated by the relocated waste processing and recycling operations, are expected to comply with ENCG sound level limits for a Class 2 area at all points of reception. The proposed relocation shifts sources of stationary noise farther away from points of reception, resulting in a reduction of noise received at the adjacent residential dwellings as compared to current conditions. The proposed development is expected to be compatible with the surrounding noise-sensitive dwellings, according to the assumptions outlined in Section 2.1.



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1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Fotenn Planning + Design on behalf of Cash for Trash Canada to undertake a stationary noise assessment in support of Zoning By-Law Amendment (ZBA) and Site Plan Control (SPA) applications for the proposed recycling facility located at 7628 Flewellyn Road in Stittsville, Ontario. This report summarizes the methodology, results and recommendations related to a stationary noise assessment.

The present scope of work involves assessing exterior noise levels generated by sources of anticipated stationary noise (relocated waste processing and recycling operations) introduced by the development on surrounding noise-sensitive residential properties adjacent to the subject property. The main sources of noise include three (3) cranes, one (1) bailer, one (1) loader, one (1) skid steer, truck movements and the operation of power tools. The assessment was performed based on theoretical noise calculation methods conforming to the City of Ottawa's Environmental Noise Control Guidelines¹ (ENCG), Ministry of the Environment, Conservation and Parks (MECP) NPC-300² guidelines, site plan drawing dated February 2023, a site visit conducted by Gradient Wind on November 1, 2021, Gradient Wind's experience with similar developments, and recent satellite imagery.

2. TERMS OF REFERENCE

The focus of this stationary noise assessment is the property located at 7628 Flewellyn Road in Stittsville, Ontario. For the purposes of this study, Flewellyn Road is referred to as project north. The property comprises a 50.0-acre approximately rectangular parcel of land, bordering Flewellyn Road from the south, and is currently occupied by an existing salvage yard on the north portion of the site.

The recycling facility is to be relocated to the south portion of the site, in a 27.0-acre rectangular portion of the property land. A 7.0-meter driveway is located north of the rezoning area, providing access to the relocated facilities from Flewellyn Road (north), while trees are retained to the east of the site. The site plan contains a warehouse and office, mechanic shop, vehicle processing building and a large outdoor metal storage area at the south end of the property. The surroundings of the proposed development are primarily open fields and wooded areas, with existing residential uses to the north and east, as well as an

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



existing quarry and future residential land parcel to the west. Figure 1 illustrates the site plan and surrounding context, and Figure 2 illustrates the location of points of reception (POR) included in this study.

Under the definition of a noise sensitive land use, office and industrial uses are not listed, therefore the impacts of the surroundings on the site, do not need to be considered. Furthermore NPC-300 states, “a land use that would normally be considered noise sensitive, such as a dwelling, but is located within the property boundaries of the stationary source is not considered a noise sensitive land use.”

2.1 Assumptions

The sound power levels used in this assessment were based on actual site measurements taken by Gradient Wind on November 1, 2021, and previous experience with similar developments. The following assumptions have been made in the analysis:

- (i) Operations at the facility occur only during the daytime period (08:00 - 19:00).
- (ii) Sources of stationary noise include three (3) cranes, one (1) bailer, one (1) loader, one (1) skid steer, truck movements and the operation of power tools.
- (iii) Sources of impulsive stationary noise (i.e., bangs) are produced by some of the operations such as throwing/splitting/crushing of recycled materials.
- (iv) In a 1-hour period during daytime hours (08:00 - 19:00), fifteen (15) light-, five (5) medium-, and two (2) heavy-truck movements occur.
- (v) Background noise is excluded from consideration as Flewellyn Road is classified as a rural collector road with minimal roadway traffic during off-peak hours. The area is considered a Class 2 Area.
- (vi) The ground region was modelled as absorptive for unpaved surfaces (soft ground).

3. OBJECTIVES

The main goals of this work are to (i) calculate the future noise levels on the surrounding noise-sensitive dwellings produced by stationary noise sources 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 residential areas was determined through 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. Fourteen (14) 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 NPC-300 as “a source of sound or combination of sources of sound that are included and normally operated within the property lines of a facility and includes the premises of a person as one stationary source, unless the dominant source of sound on those premises is construction”³.

4.2 Criteria for Stationary Noise

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,

³ NPC – 300, page 16

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.

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”⁴. A POR can be located on an 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 and places of worship. The recommended maximum noise levels for a Class 2 environment at a POR are outlined in Table 1 below. The residential areas relevant to this study are defined as Class 2 because they border on Flewellyn road, which is a rural collector roadway. Furthermore, an operational quarry borders the site directly to the west. These conditions indicate that the sound field is dominated by the activities of people (road traffic and industrial noise) during the daytime period. The sound levels limits used in this assessment are the exclusionary limits for Class 2 area, as listed in Table 1.

TABLE 1: EXCLUSIONARY LIMITS FOR CLASS 2 AREA

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

4.3 Determination of Stationary Noise Source Power Levels

Sound power levels for this assessment were based on site measurements taken by Gradient Wind on November 1, 2021, and previous experience with similar developments. Table 2 (below) identifies all equipment considered in this assessment and their corresponding sound power levels.

TABLE 2: EQUIPMENT SOUND POWER LEVELS (dBA)

Source	Description	Height Above Grade (m)	Frequency (Hz)							
			63	125	250	500	1000	2000	4000	8000

⁴ NPC – 300, page 14



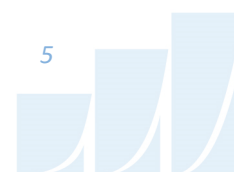
S1-S3	Crane	3.0	87	97	97	100	112	101	97	87	113
S4	Bailer	2.0	87	97	87	100	108	97	97	87	110
S5	Loader	2.0	73	83	87	96	96	94	89	78	101
S6	Skid Steer	1.5	-	-	-	-	96	-	-	-	96
S7	Light-Truck	1.25	-	-	-	-	96	-	-	-	90
S8	Medium-Truck	2.0	-	-	-	-	100	-	-	-	100
S9 - S10	Heavy-Truck	2.0	73	83	87	96	101	94	89	78	103
S11	Power Tools	1.5	-	-	-	-	96	-	-	-	96

4.4 Stationary Source Noise Predictions

The impact of stationary noise sources on nearby residential areas was determined by computer modelling using the software program Predictor-Lima, which has an algorithm for outdoor noise propagation based on ISO standard 9613 Parts 1 and 2. The methodology has been used on numerous assignments and has been accepted by the Ministry of the Environment, Conservation and Parks (MECP) as part of Environmental Compliance Approval applications.

A total of fourteen (14) receptor locations were chosen at nearby noise-sensitive dwellings to measure the noise impact at points of reception (POR) during the daytime period (07:00 - 19:00). POR locations include plane of window (POW) and outdoor points of reception (OPOR) of the adjacent residential properties. Sensor locations are described in Table 3 and illustrated in Figure 2. Sources were modeled as point sources and moving sources, while buildings were defined as 3D objects. As previously mentioned, the model represents a “worse-case scenario” where all the equipment is in operation. 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. 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. Predictor-Lima modelling data is available upon request.

To predict the effect of relocating the waste processing and recycling operations towards the south of the site, the following methodology was applied. First, a model was constructed to correlate with the measurement locations and results from the site visit conducted by Gradient Wind on November 1, 2021.



The initial model was simulated existing noise conditions at the waste processing and recycling facility. Once the model accurately represented the site measurements, all sources were shifted to the south with reference to the site plan (McRobie Architects, August 2021). This second iteration of the model positioned all noise producing equipment approximately 300 meters to the south with respect to the initial model. Simulations were then completed to predict the noise impacts of relocated equipment at all relevant points of reception.

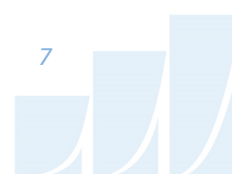


TABLE 3: RECEPTOR LOCATIONS

Receptor Number	Receptor Location	Height Above Grade (m)
1	OPOR - Future Residential (Northwest)	1.5
2	POW - 7623 Flewellyn Road	1.5
3a	POW - 7609 Flewellyn Road	1.5
3b	OPOR - 7609 Flewellyn Road	1.5
4	POW - 7603 Flewellyn Road	1.5
5a	POW - 7598 Flewellyn Road	1.5
5b	OPOR - 7598 Flewellyn Road	1.5
6a	POW - 7592 Flewellyn Road	1.5
6b	OPOR - 7592 Flewellyn Road	1.5
7a	POW - 7586 Flewellyn Road	1.5
7b	OPOR - 7586 Flewellyn Road	1.5
8a	POW - 7576 Flewellyn Road	1.5
8b	OPOR - 7576 Flewellyn Road	1.5
9	POW - 7524 Flewellyn Road	1.5

TABLE 4: CALCULATION SETTINGS

Parameter	Setting
Meteorological correction method	Single value for CO
Value CO	2.0
Ground attenuation factor for lawn areas	1
Ground attenuation factor for roadways and paved areas	0
Temperature (K)	283.15
Pressure (kPa)	101.33
Air humidity (%)	70



5. RESULTS AND DISCUSSION

5.1 Stationary Noise Results

Noise levels received at the surrounding noise-sensitive dwellings, produced by relocated waste processing and recycling operations are presented in Table 5. Noise levels are based on assumptions in Section 2.1. Noise contours at 1.5 metres above grade for all stationary noise sources are illustrated in Figure 3. As Table 5 summarizes, stationary noise levels meet Class 2 criteria at all receptors.

TABLE 5: NOISE LEVELS FROM STATIONARY SOURCES

Receptor Number	Receptor Location	Noise Level (dBA)	Daytime Sound Level Limits	Meets Class 2 Criteria
1	OPOR - Future Residential (Northwest)	49	50	YES
2	POW - 7623 Flewellyn Road	45	50	YES
3a	POW - 7609 Flewellyn Road	47	50	YES
3b	OPOR - 7609 Flewellyn Road	44	50	YES
4	POW - 7603 Flewellyn Road	45	50	YES
5a	POW - 7598 Flewellyn Road	48	50	YES
5b	OPOR - 7598 Flewellyn Road	49	50	YES
6a	POW - 7592 Flewellyn Road	49	50	YES
6b	OPOR - 7592 Flewellyn Road	50	50	YES
7a	POW - 7586 Flewellyn Road	48	50	YES
7b	OPOR - 7586 Flewellyn Road	49	50	YES
8a	POW - 7576 Flewellyn Road	49	50	YES
8b	OPOR - 7576 Flewellyn Road	49	50	YES
9	POW - 7524 Flewellyn Road	47	50	YES



6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current study indicate that stationary noise levels received at nearby noise sensitive dwellings, generated by the relocated waste processing and recycling operations, are expected to comply with ENCG sound level limits for a Class 2 area at all points of reception. The proposed relocation shifts sources of stationary noise farther away from points of reception, resulting in a reduction of noise received at the adjacent residential buildings as compared to current conditions. The proposed development is expected to be compatible with the surrounding noise-sensitive dwellings, according to the assumptions outlined in Section 2.1.

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.

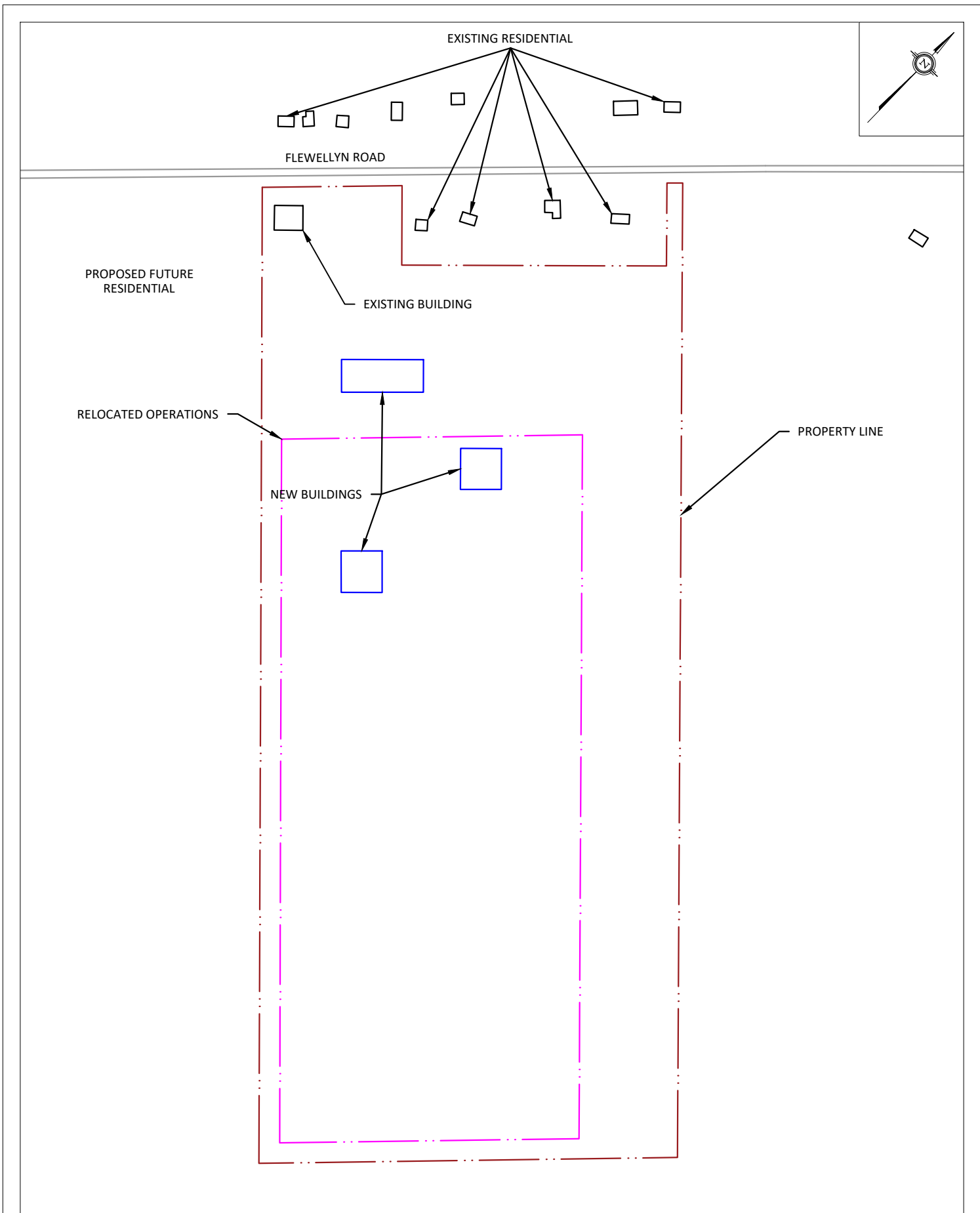
Sincerely,

Gradient Wind Engineering Inc.

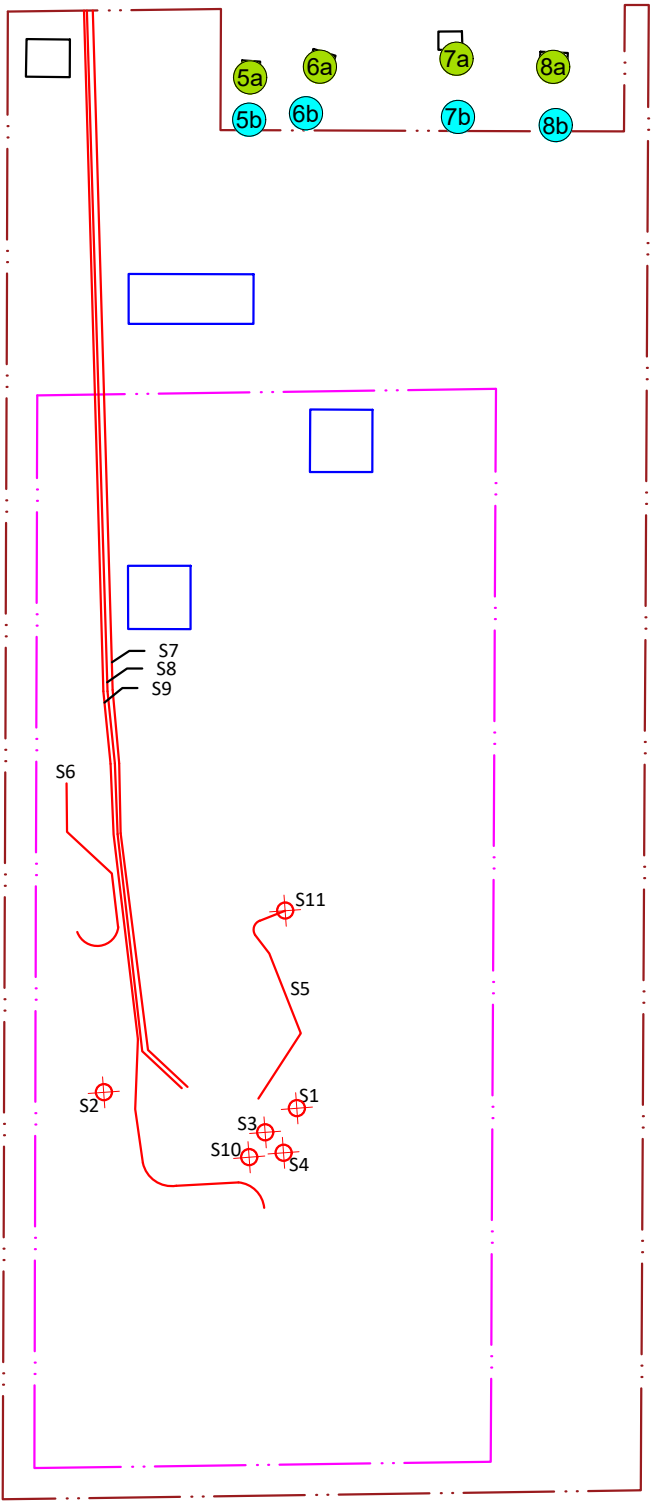
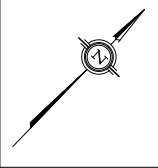


Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #21-119-Stationary Noise R1



GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT 7628 FLEWELLYN ROAD, STITTVILLE STATIONARY NOISE ASSESSMENT	DESCRIPTION FIGURE 1: SITE PLAN AND SURROUNDING CONTEXT
	SCALE 1:3600 (APPROX.)	DRAWING NO. GW21-119-1
	DATE APRIL 21, 2023	DRAWN BY M.L.



- NOISE SOURCE
- OPOR RECEPTOR
- POW RECEPTOR

PROJECT	7628 FLEWELLYN ROAD, STITTSVILLE STATIONARY NOISE ASSESSMENT	
SCALE	1:3600 (APPROX.)	DRAWING NO. GW21-119-2
DATE	APRIL 21, 2023	DRAWN BY M.L.

DESCRIPTION
 FIGURE 2:
 STATIONARY NOISE SOURCES AND
 POINTS OF RECEPTION

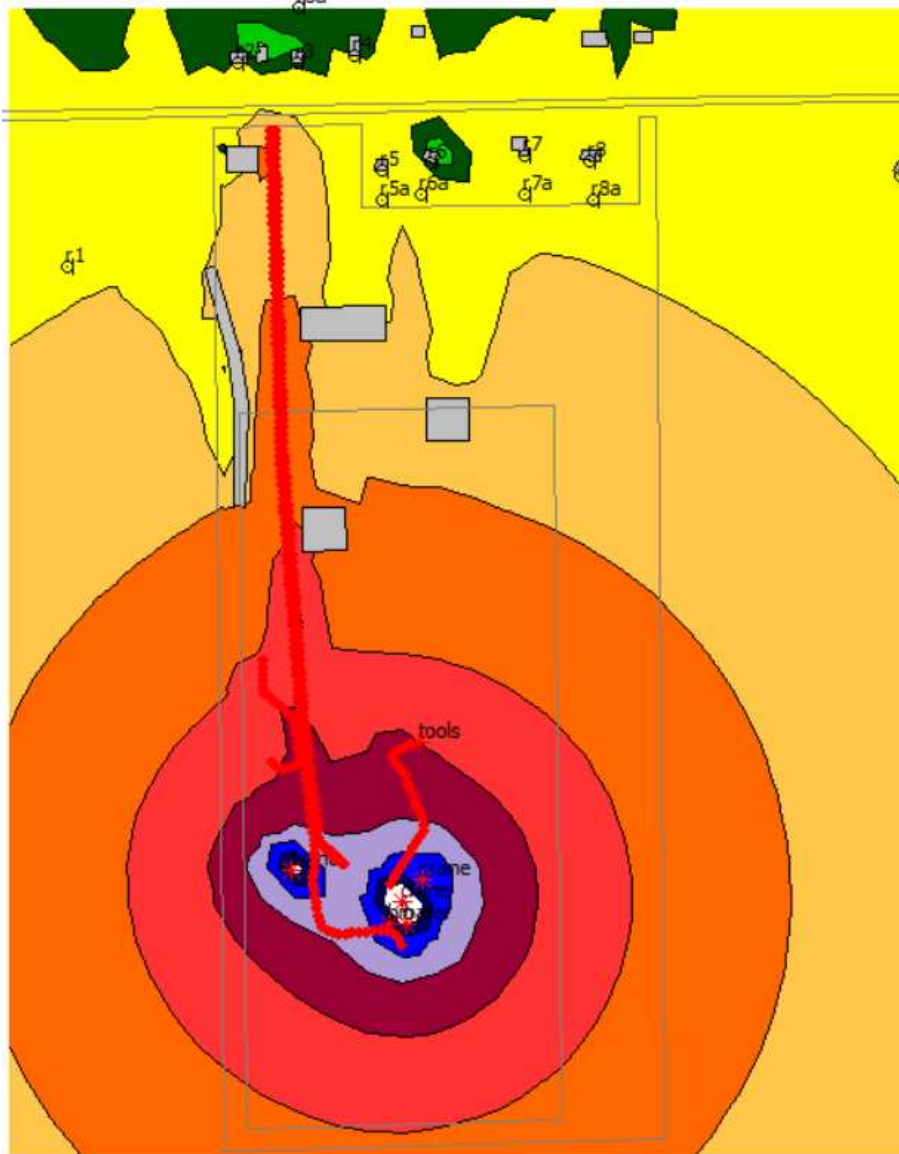


FIGURE 3: DAYTIME STATIONARY NOISE CONTOURS (1.5 METERS ABOVE GRADE)

